Greater Mekong Subregion
Environment Operations Center

Strategic Environmental Assessment of the North South Economic Corridor Strategy and Action Plan

Annex 1: Completed Templates

November 2008

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Environment
Template 12: Air and water pollution
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Introduction:

With high-speed economy development during 10th (2001-2005) and 11th (2006-2010) Five Year Plan period, environmental pollution control is a key factor to sustainable development. In order to control air and water pollution effectively, a set of quality and pollutants emission control laws, regulations, industrial and technological polices, environmental standard system and institutions system were established and improved in the past 30 years, and air and water pollutants discharged were controlled.

During 10th Five Year Plan period, water quality of 6 main river systems in Yunnan including Lancang River (Mekong River) and Honghe river in the NSEC mostly could meet its environmental standard or not get worse. Air quality in 7 main control cities including Kunming, Yuxi and Jinghong city in the NSEC all meet air quality standards. Main control indicators of air and water pollution are still SO_2, soot, industrial dust, COD and NH_3-N during 10th and 11th five years period. At the end of 2005, total volume of pollutants discharged including COD, NH_3-N, and soot were controlled effectively except SO_2 and industrial dust. Pollutants discharged per GDP decreased gradually. In the 11th Five Years Plan for Environmental protection, volume of SO_2, COD and NH_3-N discharged are selected into the indicators system of the Plan as the most important indicators of environmental pollution control according to the economy and industrial development trends.

Indicator:
Total volume of SO_2 discharged
Official target:

Table1: Target of Total volume of SO_2 discharged in the NSEC in 2010 (thousand ton)

prefecture	Target
Kunming	≤89
Yuxi	Data is unavailable
Pu'er	13.1
Honghe	decreased 20% (or more)of total volume in 2005
Xishuangbanna	1.24
Yunnan	≤50.1

(Source: Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC).

Trends: Compared with 2000, volume of SO_2 discharged increased 35.2% in 2005 due to increasing coal consumption in the raw and processed materials and thermal power industry. The rate of standardized emission of SO_2 is 46.8%. Total volume of SO_2 discharged in the 3 prefectures including Kunming and Honghe prefecture in the NSEC accounts for 81% of total volume of SO_2 discharged in Yunnan. SO_2 especially industrial SO_2 which accounts for 82% of total volume of SO_2 discharged is still the main air pollutant in Yunnan. In the 11th Five Year Plan period, relevant research shows that if calculated with current increasing rate of economy, energy demands, and pollution control level, total volume of SO_2 discharged in 2010 will increase nearly 1 multiple than the volume in 2005.

Now, more integrated measures of SO_2 pollution control are introduced in the 11th Five Year Plan period. In the NSEC, compared with 2005, total volume of SO_2 discharged increased to 345 thousand ton (up 5.6%), accounting for 62.6% of total volume in Yunnan. Honghe, Kunming and Yuxi are 3 prefectures with the most volume of industrial SO_2 discharged in Yunnan province, even in Kuming and Honghe prefecture, the volume is over 100 thousand ton. In 2006, the rate of standardized emission of SO_2 is from 40% (Xishuangbanna) to 85.6 %(Kunming).

Drivers of trends:

disadvantageous driver:

During 10^{th} and 11^{th} Five Years Plan period, main sources of industrial air pollutants are thermal power plants, chemical material and products industry, non-metal mineral products industry, ferrous and nonferrous smelting industry, which account for 93.7% of total volume in Yunnan. With high-speed economy development which average increasing rate of GDP per year exceed 8.5% during the 11^{th} fiver year period, high energy consumption industry is been sustaining development, such as metallurgy, electric power , nonferrous smelting industry, chemical industry and architectural material industry. In 2010, the coal demand will increase to 100 million ton and power capacity of thermal power plants will reach 13.8 million kilowatt. Volume of pollutants from above-mentioned industry will increase in the 11^{th} five-year period obviously. (annex 1)

advantageous driver:

Integrated effective measures of SO_2 pollution control are implemented in the 10^{th} and 11^{th} Five Year Plan period; including soot and dust decontaminate facility in all the thermal power plants and industrial boiler, new desulfurization technology utilization in the thermal power plants, clean energy utilization.

Indicator: Urban air quality

1) Number of days which API less than or equal 1

2) number of cities which air quality in 80% of days per year excelled grade 2 (national air quality standard, annex 2)

API≤1 means air quality excelled grade 2 (national air quality standard), air quality is good, harmless to people's health.

Target:

Table2 targets in the NSEC in 2010 (thousand ton)

Prefecture	Target
Kunming	API in 85% of days per year less than or equal 1
Yuxi	over 330 days which air quality in 80% of days per year excelled grade 2
Pu'er	More than 80% counties in Pu'er prefecture which air quality in 80% of days per year excelled grade 2
Honghe	over 330 days per year in 3 cities (Mengzi, Kaiyuan, and Gejiu) which air quality excelled grade 2
Xishuangbanna	over 347 days which air quality in 80% of days per year excelled grade 2
Yunnan	More than 80% cities in Yunan which air quality in 80% of days per year excelled grade 2

(Source: Yunnan 11^{th} Five Year Plan of Environmental protection, prefecture 11^{th} Five Year Plan of Environmental protection in the NSEC).

Trends:

Now, air quality in all capital cities and 3 main polluted cities are monitored by the local settled monitoring system involving 4 automatic monitoring cities in the NSEC (Kunming, Yuxi, Jinhong and Gejiu). In the 10^{th} Five Year Plan period, urban air quality in 38.9% of monitoring cities were stable, 27.8% of cities got better and 33.3% of cities were aggravating. In the NSEC, air quality in more than 90% of days per year in the 4 automatic monitoring cities could meet the demands of grade 2 in 2005. Except Kaiyuan and Hekou in Honghe Prefecture which air quality reached the limit of grade 3, air quality in all monitoring cities in the NSEC could meet the demands of grade 2. From 2000 to 2005, air pollution in Kunming, Gejiu and Hekou city were aggravating, Yuxi, Pu'er and Kaiyan were stable. In 2006, Kaiyuan was involved in the automatic monitoring system in the NSEC, air quality in the main monitoring cities in the NSEC are stable.

Main air pollutants in urban zone are SO_2 and PM_{10} (particulate matter 10 micrometers (μ m) or less in diameter, it can enter into the respiration system). Half of cities in the NSEC are the acid rain control region including Kunming, Yuxi, Gejiu and Kaiyuan. The frequency and intensity of acid rain occurred is light.

Drivers of trends

1) Dust pollution: mainly come from the city infrastructure construction, industrial dust.
2) Vehicle emission pollution.

Vehicles are heavy emitters of particulate matter, SO_2 and other pollutants. Vehicles numbers are growing rapidly in the NSEC. The growing size of vehicles fleets is only part of the problem; however, low emissions standards and outdated technology also contribute to levels of air pollution.

Indicator: Surface water quality

1) surface water quality meet environmental standards in the motoring pilots of 6 main river system

2) Drinking water quality meets national standards in the main cities

Target:

1) surface water quality: exceed or equal 65% (in the whole province)
2) water quality of drinking water sources

Table 3: target of water quality of drinking water sources in the NSEC （%）

prefecture	Target
Kunming	urban zone:≥80% other counties: ≥60%
Yuxi	Data is unavailable
Pu'er	urban zone:≥95% rural: ≥80%
Honghe	≥95%
Xishuanbanna	100%
Yunnan	≥60%

Source : Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC

During 10th Five Year Plan period (2001-2005), water quality of 6 main river systems in Yunnan including Lancang and Honghe river in the NSEC was stable or did not get worse by reducing the volume of industrial and domestic waste water discharged. In 2005, 58% of fixed monitoring spots in 77 rivers can reach grade 1 to 3 (good water quality in national environmental standard of surface water, annex 3). 62% of fixed monitoring spots can meet the environmental functional demands. In addition, 60.4% of fixed monitoring spots in 53 lakes and reservoirs and 70.6% of drinking water sources in 20 cities can reach the environmental functional standard.

Generally, Water quality of Langcang and Honghe river in the NSEC are in the medium degree of national standard system. In 2006, 61.1% of 36 fixed monitoring spots in 36 rivers of Langcang river-system can reach their environmental standards. The main pollutants are COD, NH_3-N and volatile hydroxybenzene. 69.2% of 26 settled monitoring spots in 26 rivers of Honghe river-system can reach their environmental standard. The main pollutants are plumbum and hydrargyrum ? Compared with water quality in the 10th five-year period, the pollution status of Langcang and Honghe river decreased slightly.

Except The Dianchi Lake in Kunming, water quality in the 5 plateau lakes in the NSEC can reach grade 3 in 2005. Water quality of The Yangzonghai Lake got better and others are stable during 10th Five Year Plan period by point and non-point pollution sources reducing and some protection project implemented in the lakeshore,such as artificial water land

Drinking water safety issue is still serious in the 10th five-year period. Rate of standardized water quality is from 70.6% to 83.8%, water quality in the main cities can meet the environmental functional demands, but water quality is on downtrend generally. 30% of drinking water sources in 20 cities can not reach the environmental standard. Only 33% of drinking water sources in the NSEC can reach the environmental standard in 2006. Total nitrogen and total phosphorus is the main pollution index in drinking water sources.

Drivers of trends:
1) industrial and domestic water pollutants discharged
2) rural pollutants discharged especially non-point pollution
Rural non-point source pollution is increasingly serious. Especially livestock breeding has been the main pollution source of rural water quality gradually. Rural non-point water pollutants sources mostly are livestock and poultry farms, surface stream in the farmland with fertilizer and pesticide residue in the soil and rural domestic waste water. The contaminations are always scattered and with more difficult in pollution control, resulting in a worsening of the rural environment and directly threatening drinking water safety and other physical health of rural residents.

According to the investigation of pollution sources within the livestock raising sector in Yunnan, the amount of livestock and poultry excrement and COD in 2002 already reached 1.03 million tons and 3.334 million tons. The total volume of fertilizer and pesticide use respectively increased 55.4 ten thousand tons and 18.7 ten thousand tons from 1980s to 1990s.

Indicator: Waste water discharged
Reduced rate of total volume of COD and NH_3-N discharged in 2010

Target: Table4: COD and NH_3-N target in the NSEC （%）

prefecture	COD reduced rate%	NH_3-N reduced rate %
Kunming	10	no indicator
Pu'er	0	0
Honghe	5	5
Xishuangbanna	-22.2%	-23.4%(increasing)
Yunnan	4.9	12.4
China	10	

Sources: Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC

Trends: Two key indicators of water pollution are COD and NH_3-N in Yunnan. The former is the amount of oxygen required to oxidize all compounds, both organic and inorganic in water. The greater the COD and NH_3-N, the greater the degree of organic pollution.
Compared with 2000, rate of standardized discharged of waste water decreased 16% and total volume of COD and NH_3-N discharged decreased 4.2% and 3.5% by waste water recycling and disposal in 2005 in Yunnan. Total volume of COD in industrial waste decreased 40% and the recycling rate of industrial waste water increased to 85.31%.

In the 11th Five Year Plan period, total volume control for water pollutants is still crucial on water quality protection in Yunnan. Relevant research shows if calculated with current economy increasing model and pollution control level, volume of COD discharged in Yunnan will increase 32% than the volume in 2005. In 2006, total volume of waster water discharged reached 804.8 million ton, involving 42.6 percentage of industrial waste water and 57.4 percentage of domestic waste water. Total volume of COD discharged increased to 293 thousand ton (up 3.1%), and volume of NH_3-N emission increased to 19.5 thousand ton in 2006.

In the NSEC, volume of waste water and COD discharged in Kunming and Honghe city are in the first and third place in whole province. Volumes of NH_3-N discharged in Honghe, Kuming and Pu'er are in the five maximum orders in Yunnan. Main pollution sources with 87.1% rate of waste water discharged are farm & sideline products processing industry, chemical material and products industry, ferrous and nonferrous smelting industry, paper-making industry. (annex 1)

Drivers of trends:

Industrial and domestic pollutants discharged: During 10th and 11th Five Years Plan period, main sources of industrial waste water are farm & sideline products processing industry,

chemical material and products industry, ferrous and nonferrous smelting industry, paper-making industry, accounting for 87.1% of total volume of industrial waste water discharged in Yunnan. With high-speed economy development, high energy consumption industry is been sustaining development in the next 5 years. Volume of pollutants from those industries will increase.

Now, disposal rate of urban domestic waste water is only 40.47% in Yunnan, additionally current incomplete wastewater collection, disposal system and management mechanism, most of domestic waste water discharge to the river directly as a result of serious water pollution. With population growth and urbanization developing, increasing total volume of domestic waste water is another inducement of water pollution.

In Yunnan province, rural non-point source water pollution is serious increasingly. Livestock breeding has been the main pollution source of rural water quality gradually. Water pollutants sources of rural non-point mostly are livestock and poultry farms, surface stream in the farmland with fertilizer and pesticide residue in the soil and rural domestic waste water. The contaminations from above-mentioned sources are always scattered and with more difficult in pollution control, resulting in a worsening of the rural environment and directly threatening drinking water safety and other physical health of rural residents.

Relevant laws, policies, plans and institutional arrangements:

1) laws and policies

- air, water pollution control law
- EIA law
- Cleaner Production promotion law (2002)
- Cleaner Production review regulation (SEPA ,2004)
- check and measure regulation for vehicles exhaust gas emission
- compulsive elimination policies for the outdated techniques and products with serious pollution

2) Standards for air and water quality and pollutants discharge
In order to control air and water pollution effectively, air and water quality and pollutants discharge standard system on national and provincial level were established and amended incessantly in the past 30 years. National standards for industrial air and water can be categorized as integrated and industrial emission standard. Integrated emission standards for air and waster water including 33 types of air pollutant and 69 types of waste water pollutant can be applicable as universal emission standard except some industrial pollutant discharge standard, such as air pollutants discharge standard for industrial kiln and furnace, cement industry, coke oven, coal-burning oil-burring gas fired boiler, thermal power plants, water pollutants emission standard for steel, textile, offshore petroleum development industry, meatpacking industry, etc. Furthermore, some pollutant control assessment index of cleaner production is very important standard for industrial air pollutants.
3) Plans
11th Fiver Year Plan for Acid Rain Control Region and SO_2 Control
11th Fiver Year Plan for Environmental Protection
Pollutants Emission Permission Regulation
Clean energy generalization project: coal gas and solar energy, etc.

Problems and issues encountered during data collection:
Indicators in each prefecture are very different in the NSEC. Usual indicators are selected in the template, but data of the few indicators can not found in the prefecture level.

Summary of main concerns for the NSEC:

- **SO2 pollution increasing:** SO_2 discharged in Yunnan increased 35.2% from 2000 to 2005 due to increasing coal consumption in the raw and processed materials and thermal power industry. Industrial sources account for 82% of the SO2 emissions.

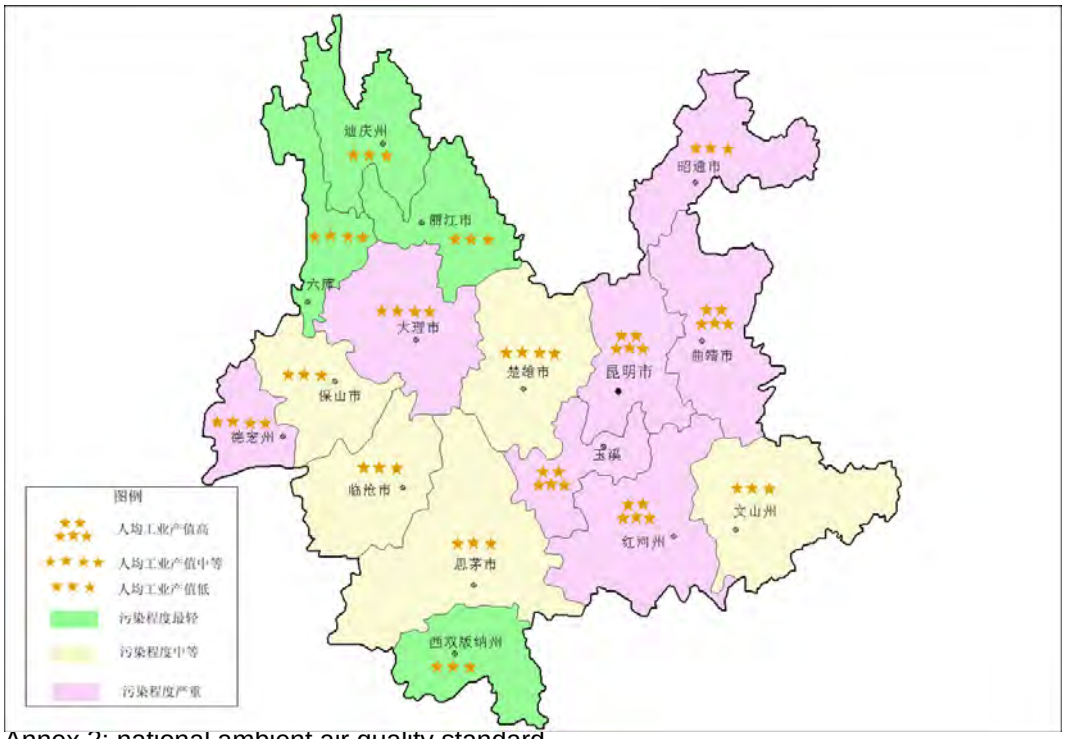
- **Vehicle emission increasing:** Vehicles are heavy emitters of particulate matter and SO_2. Vehicles numbers are growing rapidly in the NSEC. The growing size of vehicles fleets is only part of the problem; however, low emissions standards and outdated technology also contribute to increasing levels of air pollution.
- **Drinking water quality is getting worse:** In 2006, only 33% of drinking water sources in the NSEC met environmental standards.
- **Rural non-point source pollution is increasingly serious in the NSEC**. Sources mostly are livestock and poultry farms, increasing fertilizer and pesticide use and rural domestic waste water.
- **Waste water discharged is on the increase in the NSEC:** COD discharged in Yunnan will increase 32% in volume over the three years from 2005.

References/sources:

1) Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC
2) Yunnan statistics Year Book (2005,2006)
3) 11th Five Year Plan of Environmental protection in China
4) National EIA/SEA criteria system collection book
5) State of Environment of Yunnan and 5 prefecture in NSEC (download from website): 2006
6) Yunnan Environmental Quality Report (2006)

Annexes: (eg. maps, diagrams, tables)

Annex 1: map to show the relationship between industrial value per capita and pollution degree in 2005



Annex 2: national ambient air quality standard

Grade	air quality	Environmental function
I	Good ↑	Nature Reserve, Scenic and Historic Interest Area
II		Residential area, mixed area with business, resident and traffic, industrial and rural area.
III	worse	Particular industrial area

Annex 3: national environmental quality standards for surface water

Grade	Water quality	Environmental function
I	Good	Water source, water in national nature reserve
II	↑	Drinking water source(core protection region), habitat of

		spare aquatic wildlife, spawning and feeding ground of fish and shrimp
Ⅲ		Drinking water source (buffer protection region), wintering ground and migration channels of fish and shrimp, aquaculture area, swimming area
Ⅳ		Industrial water
Ⅴ	worse	Agricultural water

Abbreviations:
COD: chemical oxygen demand
NH_3-N: ammonia nitrogen
PM_{10}: particulate matter 10 micrometers or less in diameter
API: air pollution index

Environment
Template 13: Water resources
Key issue EN3: Unsustainable use of resources (forest, land, water)

Introduction: There are abundant water resources in Yunnan province. Over 800 rivers fall into 6 water system, including Yangtze River, Pearl River, Honghe River, Lancang River (Mekong River), Nujiang River and Irrawaddy (Salween River). Average total volume of surface runoff per year is 221 billion cubic meter which in the third place in China. Over 40 limnetic plateau lakes are in the province with 1164 square kilometres and 29 billion cubic meter capacities. Upstream of Yangtze River, Honghe River and Lancang River flow through and 6 bigger limnetic plateau lakes located in the NSEC. It is the most important water sources of agricultural, industrial, domestic and environmental service.

In 2005, volume of water supply in the NSEC is 14.7 billion cubic meter of which surface water is 95.5%, groundwater is 4.1% and other sources are 0.4% in 2005. Main water uses include 76.0% agricultural use, 12.9% industrial use, 1.4% serving industrial use, 9.1% domestic use, and 0.6% ecological service use.

The rate of water resources use is very low due to the unbalanced spatial-temporal distribution of water resources (map 1), absence of sufficient investment on water conservation construction and water pollution. In the province, rate of water resources use is only 6.6% during 10th fiver year period, lower than average rate (20%) in China. Water supply amount is 14.3 billion cubic meter in 2005, but volume of water demands calculated with population and economy development rates is 18.6 billion cubic meter. The lack of water supply is 4.2 billion cubic meter and it will respectively increase to 6.9 billion and 10.5 billion cubic meter in 2010 and 2020. Water resource effective utilization and management is the crucial insurance for economy sustainable development.

Please consider current state & recent & future trends (including government targets)

Indicator: Area of effective irrigated farmland

Area of effective irrigated farmlands means the flat farmlands with irrigation facility, which can be irrigated normally in the normal rainfall year. It is the integrated indicator of the level of agricultural use of water resources.

Official target:

Table 1: target of irritated farmland in the NSEC (2010)

prefecture	Target
Kunming	rate of effective irrigated farmland increased to 80%
Yuxi	No detailed indicator value in the 11th five-year plan
Pu'er	32 thousand hectare, rate of effective irrigated farmland increased to 39.79%
Honghe	rate of incremental area of farmland with effective irrigation facilities increased to 40%
Xishuangbanna	data is unavailable
Yunnan	incremental area of effective irrigated farmland increased to 133.3 thousand hectare

Source: 11th Five-Year Plan for Economic and Social Development in Yunnan and 5 prefecture plan, 11th Five-Year Plan for water conservancy in Pu'er, 11th Five-Year Plan for Agricultural development

Trends:

According to the water resources state in the province, volume of water supply is 14.7 billion cubic meter of which surface water is 95.5%, groundwater is 4.1% and other sources is 0.4% in 2005. Main water uses include 76.0% agricultural use, 12.9% industrial use, 1.4% serving industrial use, 9.1% domestic use, and 0.6% ecological service use.(diagram 1)

In Yunnan, spatial-temporal distribution of water resource is very unbalanced. 55.3% areas of farmlands but 29% volume of water resources are concentrated in the middle and east of

Yunan such as Kuming and Yuxi, but in the south and west such as Honghe, Pu'er and Xishuangbanna, status is converse. Volume of surface runoff in the rain season from May to October account for 80% of total volume per year, but the volume in April and May with the biggest water demands on agricultural use, only accounts for 20% to 30%. Consequently, rate of water resources utilization for agricultural use mostly depends on the water conservancy projects in the province. In additional, although rate of agricultural use is over 70% of the total amount in each prefecture except Kunming(47.5%) in the NSEC（annex 3）, total volume of irrigation supply is more than the demands of crop planting.(Yang, 2004), which with the rate of 60% of total water supply.

In order to alleviate the waste of water resources, water conservancy projects and agricultural water saving projects were implemented in the past 40 years especially in the 10th five-year plan period. Compared with 2000, total area of effective irrigated farmland increased to 1485.4 thousand hectare, accounted for 35% of total area of farmlands in Yunnan, which is lower 8% than the level in China. The area of irrigated farmland in the NSEC increased to 323 thousand hectare with the least rate in Honghe and the most rates in Kunming. The rate of effective irrigated farmland will be continuously increasing in the 11th five-year plan period.

Drivers of trends:
Continuously increasing on water conservancy projects and agricultural water saving projects in Yunnan in the 11th five year plan period.

Indicator: Volume of industrial use of water per 10000 Yuan (RMB) of industrial production value

Target:

Table2: volume of industrial use of water per 10000 Yuan (RMB) of industrial production value in the NSEC (2010) （m^3）

prefecture	Target
Kunming	Total water volume per GDP $\leqslant 45$ m^3
Yuxi	No indicator in the 11th five-year plan
Pu'er	No indicator in the 11th five-year plan
Honghe	decrease 12%
Xishuangbanna	No indicator in the 11th five-year plan
Yunnan	decreased to 300

Source: 11th Five-Year Plan for Economic and Social Development in Yunnan and 5 prefecture plan

Trends:
According to the water resources state in the province, total volume of industrial use of water is 1.897 billion cubic meter in 2005, accounting for 12.9% of total volume of water use. In the NSEC, the rates are from 4.2 (XSBN) to 34.9% (KM), but the recycling rate of industrial use of water is only 20%, total volume of waste water is 0.38 billion ton, account for 49% of total volume of waste water discharged. With the current GDP increasing rate, water demands on industrial use in the province will increase to 2.7 billion cubic meters in 2010 and 3.87 billion cubic meter in 2020.

As the very important sustainable indicator, water volume for industrial incremental value per ten thousand Yuan is taken into the indicator system for 11th Five-Year Plan indicators system. Compared with 2002, Total water volume per GDP decreased to 420 cubic meter (down by 35%) and total volume of water for industrial incremental value per ten thousand Yuan (RMB) decreased to 131 cubic meter in 2005 and will be increased to 300 in 2010.

Drivers of trends

1) In the 10thh and 11th five year plan period, SEA/EIA, clean production review, compulsive elimination policies for the outdated techniques and products with serious pollution are implemented strictly
2) Environmentally friendly techniques are introduced into industrial sectors with high

pollution and high energy consumption sectors gradually.

Indicator: Volume of domestic use of water
Target: in 2010, mostly domestic water demands can be satisfied by water supply in urban and rural of Yunnan province.
Source: 11th Five-Year Plan for Economic and Social Development in Yunnan and 5 prefecture plan

Trends:
According to the water resources state in the province, total volume of domestic use of water is 1.338 billion cubic meter in 2005, account for 9.1% of total volume of water use. In the NSEC, the rates are from 5.6(XSBN) to12.5% (KM). With the current population increasing rate, water demands on domestic use in the province will increase to 2.29 billion cubic meter in 2010, including 72% of urban use and 28% of rural use. Lack of domestic use of water is serious gradually due to the water sources pollution and population growth.

Compared with 2002, average supplied water amount of domestic use decreased 14% in 2005.For example, in 2002, water utilization rate is 23.8% and average domestic water use is 237 liter per man-day in Kunming. In 2005, although the water utilization rate increased to 31.7%, which is the highest rate in Yunnan, but the average volume decreased to 214 liter per man-day.

Drivers of trends
1) Water sources pollution: drinking water safety issue is still serious in the 10th and 11th five-year period. 30% of 34 Drinking water sources in 20 cities can not reach the environmental standard for drinking water in Yunnan. Only 33% of drinking water sources in the NSEC can reach the environmental standard in 2006.
2) Water demands increasing with population growth and urbanization extending.

Relevant laws, policies, plans and institutional arrangements:
1. Laws
National level
1) Water Law
2) Soil Erosion Protection Law
3) River way Management Regulation
4) Flood Preventing and Control Law
Local level
1) Langcang River Protection Regulation in Xishuangbanna prefecture
2) 5 plateau limnetic lakes Protection Regulation , including Dianchi Lake, Fuxianhu Lake, Yangzonghai Lake, Xingyunhu Lake, Yilong Lake.

2. Policies
1) Water price reform policy: increase the water price in order to protect water resources effectively.
2) rural hydropower support policy: encouragement policy to develop rural hydropower (<0.5MW) as the alternative energy in order to protect the fuel wood and utilize water resources effectively
3) Policy research on establishment the water management mechanism and eco-compensation mechanism in river basin scale.

3.Plans
1) 11th Five-Year Plan for Water Conservancy Development in Yunnan and 5 prefecture plan
2) Water Saving Plan in Kunming(2006)
3) Environmental Plan in Langcang River Basin(1996)

Problems and issues encountered during data collection:
1) Indicator and target: very different on the water resources indicators in the 11th five year plan in each prefecture in the NSEC.

2) Some data of water resources in the NSEC is unavailable.

Summary of main concerns for the NSEC:

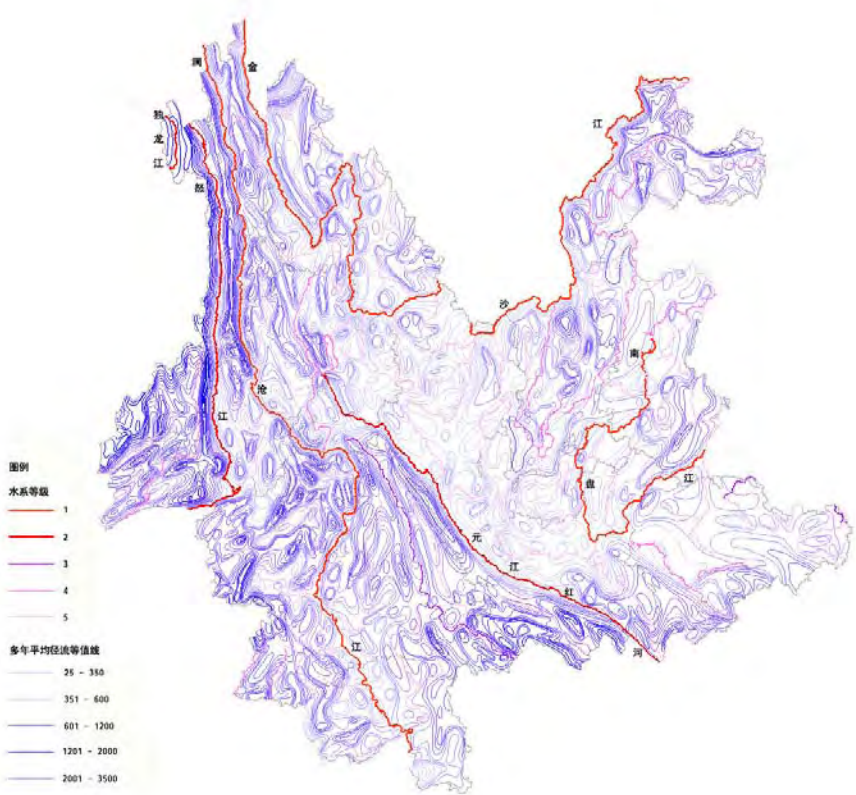
- **Water is used wastefully** by agriculture and industry with only 20% recycling by industry
- **Water pollution** limits the accessibility of water for economic and domestic uses
- **Soil erosion** reduces the life of water management infrastructure such as reservoirs and is a key cause of reduced water quality
- **Environmental flows** are not adequately considered in the development of water resources

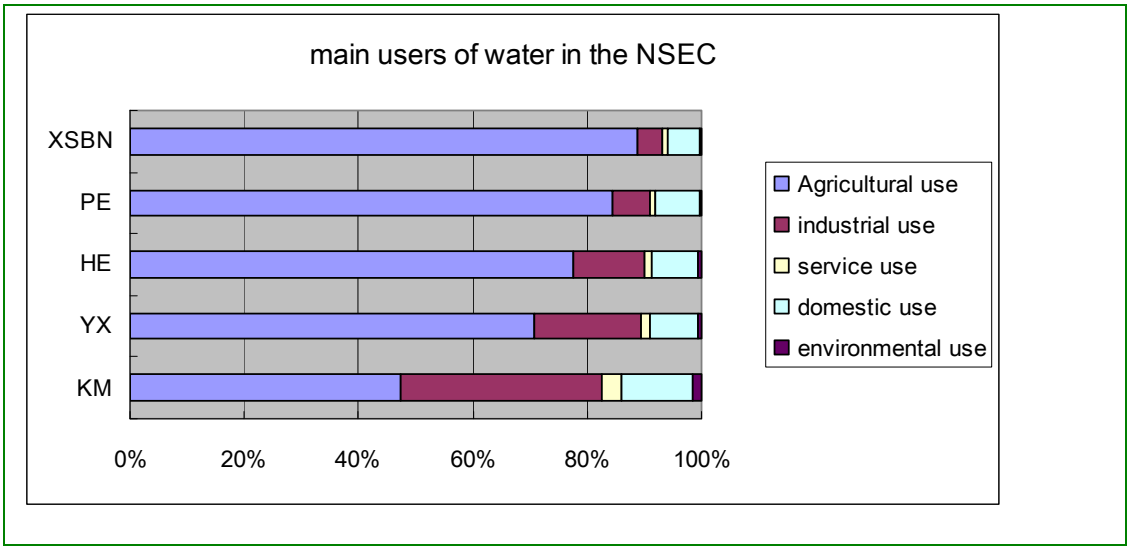
References/sources:

1) 11th Five-Year Plan for Economic and Social Development in Yunnan and 5 prefecture plan
2) State of Yunnan water resources (2002,2003,2005)
3) Yunnan Resources Book, Yunnan people congress
4) Yang, Y.(2004) in Preliminary Study on Water Resources Sustainable Development and Utilization: Water Resources Protection, 51-53,1004-6933(2004)02-0051-03

Annexes: (eg. maps, diagrams, tables)

Map1: Main rivers and its isoline of average runoff volume red line means river system degrees, 1 means main stream of riverblue line means isoline of average runoff volume




main users of water in the NSEC
XSBN
PE
HE
YX
KM
0%
20%
40%
60%
80%
100%
Agricultural use
industrial use
service use
domestic use
environmental use

Environment
Template 15: Biodiversity
Key issue EN4: Biodiversity loss and ecosystem fragmentation (loss of ecosystem services)

Introduction:

Yunnan Province is located in the Southwest China, accounting for 4% of the total land area of China. It is the core area of the Eastern Himalayas that is one of the 'hot spots' of biodiversity in the world. The forest ecosystem include 169 types of habitat, accounting for 80% of the national total, the number of species is close to half of the national total and rare species account for 67.5% of the total. Yunnan Province is located at the upstream of key local and international rivers of China and the Southeast Asian countries, including the Yangtze River, the Pearl River and the Mekong River. Biodiversity conservation and management in this area effects the maintenance of ecological balance of the whole region.

Now, nature reserves are one of the biodiversity protection measures and the strictest type of protected area in China. In 2005, the number of nature reserves increased to 198, with a total area of 3.55 million hectors, accounting for 9% of Yunnan. Management boards were established in all national level nature reserves and 70% of provincial level nature reserves.

Key issues: biodiversity protection status
Indicators:
1) area of nature reserve
2) management capacity of nature reserve

target:
1) Rate of area of nature reserve in Yunnan increase to 10% or exceeded 10 %(Pu'er: 5%, Honghe 8.5%), increase at least 1 percentage.
2) improve management capacity of the nature reserve : the rate of standardized construction for nature reserve in Yunnan is 30% or exceed 30% (capacity building)

Status and Trends:

1. Biodiversity status

1) Terrestrial biodiversity:
In the NSEC, forest ecosystems cover tropical ecosystem including tropical forest and monsoon forest, subtropical ecosystem including evergreen broad-leaved forest and coniferous forests, additionally with the vertical mountainous ecosystem. The geographical zoning of tropical forest and monsoon forest in the NSEC are mainly in Xishuangbanna and Pu'er, with the height of vertical zonation less 800m or 900m. Tropical forest and monsoon forest refer in particular to dense and lush forest vegetation that occurs in humid or semi-humid tropical regions with incredible complexity of structure. There are usually 60-70 species of trees with a height of over 5 m in an area of 0.25 hectare. In Xishuangbanna, tropical forest is the main habitat of Elephas and Gaur.

The vast subtropical ecosystem in the NSEC extends to mid-elevation areas, with the height of vertical zonation from 600m to 2600m. Main types of subtropical ecosystem are semi-humid evergreen broad-leaved forest, monsoon evergreen broad-leaved forest, mid-mountainous humid evergreen broad-leaved forest, which with abundant species although the areas of each type are not board, even less well preserved. In addition, although species is less abundant, subtropical coniferous forests are very broad distribution with important ecological services such as CO_2 absorbing and soil holding in the NSEC.

In the province, forest ecosystems are threatened by natural forest destroyed and fragmentized in the past 50 years for crop cultivation, timber cutting and simplex economic

trees plantation. There are 254 protected wild plants and 164 wild animals in the national level protected lists promulgated in 1999 and 1988. But now, at least 500 types of plants are threatened by habitat loss, environmental pollution, over grazing and invasive species (Eco-environmental Status in Yunnan, 2004). Additionally, 3.54% of mammals, 0.51% of Aves and 4.47% of reptiles (IUCN Read List of Threatened Species 2000) are threatened. (ADB, Environmental Performance Assessment programme).

2) Aquatic biodiversity

In the NSEC, abundant, rare and special aquatic species are in the water system and plateau limnetic lakes, including 134 endemic species of fish in Langcang River and 107 species in the 6 plateau limnetic lakes, account for 55.8% of amount in Yunnan. For independence of different water system, species in each water systems and lakes are very different with high scientific and protection value. Recently, as a result of water pollution, reservoir construction, over fishing and exotic species introduction, one third of endemic species is threatened or endangered (Cheng, 1998). Aquatic fascicular species decrease from 45 to 20 (Eco-environmental Status in Yunnan, 2004). For example, Sinocylocheilus grahami is an endemic fish with great numbers in Dianchi Lake 30 years before, but now, it has disappeared from the lake due to water pollution and economic fish species introduction.

2. Biodiversity Protection Status

Since 1990s, relevant laws, policies and management mechanisms on biodiversity protection have been implemented more effectively and improved, and biodiversity loss trend are controlled effectively. Up to 2005, there are 8 national level and 23 provincial level nature reserves with types of forests and wildlife protection, lake, water land and geographical & geological relics in the NSEC. Total area of nature reserves increased to 9595 km^2, accounting for 7.1% of the total area in the NSEC. The most important tropical and sub-tropical ecosystem, typical mountainous ecosystem and rare species with national and global value were protected in 31 nature reserves in the NSEC (Table 2 and Map 1)

In the 8 national nature reserves, typical tropic, sub-tropic forests are protected effectively including tropic rain forest, monsoon forest, sub-tropical monsoon ever-green broad-leaved forest, Mid-mountainous humid ever-green broad-leaved forest and mountainous mossy ever-green broad-leaved forest from 76.4m to 3306 altitude. In the 23 provincial level nature reserves, typical and special ecosystems including monsoon forest, Shrubs in temperate dry valleys, sub-tropical monsoon ever-green broad-leaved forest, Mid-mountainous mossy ever-green broad-leaved forest. Rare communities such as Cycas revoluta community, Dracaena cambodiana pierre ex Gagnep community and some species such as Gaur, Cyatheaceae, Nycticebus Coucang are protected in the forest ecosystem.

For example, Xishuangbanna nature reserve was established in 1958, which is one of the most eerily nature reserve in China. In 1993, the reserve is as a member of Man and Biosphere Reserve Network. In 2000， the reserve was admitted as the National Science Propaganda Base and Yunnan Provincial Science Propaganda Base by the central government and Yunnan provincial government. In the past 30 years, area of natural forests increased from 198 thousand hectare in 1975 to 240 thousand hectare in 1995, with 3.98% increasing rate of covering. As the key species in nature reserve, the amount of Elephas maximus community increased from 100 in 1975 to 250 of 20 communities in recent years. Another good example is in Wuliangshan national level nature reserve. Since reserve established in 1995, Selenarctos thibetanus, minate Macaca mulatta and Presbytis phayrei reappeared in the nature reserve.

Although as the strictest measure for biodiversity protection, nature reserve is still challenged by population growth and economy development within and surrounding it. For example, in Xishuangbanna nature reserve, the habitat of wild animals has been threatened by the crop, rubber and tea planting surrounding nature reserve resulting in fragmentation of natural forests. The conflicts between farmers and elephants occurred increasingly in recent years. Even several affairs were reported that elephant attacked human beings for foods. In addition, five sub-reserves as Mangao, Menglun, Mengla, Mengyang and Shangyoun were segmented

by the town, farmland, rubber lands or badlands. Now, biodiversity corridors from Mengna to Sangyong, Mangao to Nabanhe reserve will be implemented by reforesting in order to connect each other.

Except Nature reserves, with relevant laws of biodiversity implemented and improved, biodiversity are protected effectively in the Natural Forest Protection Programme (NFPP) region (refer to forest resources template), forest park and Scenic area. In the 11th Five Year Plan period, protected regions with crucial ecosystem services function, biodiversity corridors in Xishuangbanna and several propagation centers for rare & endangered species will be established to protect biodiversity in Yunnan.

Drivers of trends:
advantageous Drivers:
1) Biodiversity protection awareness was promoted in recent years.
2) Relevant laws, policies and management mechanisms on biodiversity protection have been implemented more effectively and improved
3) Capacity building investment increased on biodiversity protection management through official and other sources such as NGOs and international organizations. Standardization management for nature reserve including biodiversity monitoring system are placed in the main projects list and considered in the total budget of environmental protection.
4) biodiversity protection policies and programme implemented
With the SEA/EIA development, impacts assessment from infrastructure construction was given more attention by official, developer and the public. Now, very strict regulation for the projects passing the nature reserves and specific policies and measures for biodiversity protection through SEA/EIA are implemented in China.

Recently, the Sloping Land Conversion Programme (SLCP), alternative plantation projects and some new technology spreading to increase the crop outputs was implemented for Forest degradation and biodiversity protection.

Disadvantageous Drivers:
1. Population growth: population growth is a key driver of biodiversity loss, through such effects as land clearance for agriculture and settlements, over fishing (UNEP, TEI). Population growth and poverty is still the main pressure on the biodiversity protection.
2. Forest degradation: with population growth, increasing area of crop planting by deforesting to meet the food supplies in the mountainous area. It is the main inducement of forest degradation and biodiversity loss.
3. Road, reservoir construction is been the main factors of biodiversity loss. But, with SEA/EIA development, disadvantageous impacts are alleviated gradually in the whole construction process by protection measures, including avoiding the sensitive region in the project planning stage, animal passage, fish proliferation, transplant for rare & precious species, etc.

Indicator: Biodiversity used by local communities for subsistence or as an income source
Target:
No official target about this indicator.

Status and Trends:
Yunnan is a typical mountainous province for 84% of mountainous region, 10% of plateau region and 6% of basin. Abundant biodiversity resources almost concentrate in the mountainous region with low economic development rate and poverty communities. Except crop planting, crucial livelihood sources provided by biodiversity resources include aquatic organisms, timber and non-timber forest products (NTFPs) such as resins, fuel wood, wild edible fungus, medical plants in the mountainous region. With the strict forbidden regulations on natural forests cutting implemented, income from timbers decreased obviously, NTFPs has been the main livelihood and income sources for local people. Livelihood data on NTFP use by rural communities in the NSEC are limited, but it is possible to gauge their importance from

some examples. (table 1)

Table 1 some examples of biodiversity used by local communities in the NSEC

example	residential point	population	minority	livelihood
Wuliang-Shan NR	6	——	Yi, Miao, Lisu	Fuel wood: 30t per year for a household with 4 persons NTFPs: edible fungus, feedstuff, bamboo woods and shoots
Caiyanghe NR	Within NR: 1 Surrounding:18	2953	Yi、Dai, Hani, Wa,Bai, Jinuo	NTFPs: 865 thousand ton per year including wild edible fungus, feedstuff, and bamboo woods and shoots which 80% of the NTFPs come from forest. Total volume of income is 214 thousand RMB; the average income per household is 390 Yuan.
Xishuangbanna NR	Within NR: 122 Surrounding:138 In 2002	Within NR: 18415 Surrounding:29714 In 2002	13 types such as Dai, Hani, Lahu, Bulang	NTFPs: bamboo shoot, agaric, wild edible fungus gathering, total value is 248 thousand RMB in 1995 Rubber planting: 4178.3 hm^2 within and surrounding NR, total volume of products is 37778.96 ton. Fishery: 756 thousand RMB in 1995 within and surrounding NR.

Source:
1) Master Plan of Xishuangbanna national level nature reserve
2) Case Study on Biodiversity protection and Local Community Development in Wuliang Shan Nature Reserve, Wang Lida, 1006 - 947X (2003) 03 - 0031 – 03, Environmental Science Survey
3)Investigation and Research on Community Management in Caiyanghe Nature Reserve (website: www.cnki.net)

Table 1 detailed the status of biodiversity used by local communities as crucial livelihoods within and surrounding 3 nature reserves in the NSEC. In additional, forests are threatened by wood cutting for fuel and house building threatened for the limited cutting quota. Now, alternative energy policies and projects were implemented to alleviate the impacts of fuel wood cutting, such as rural hydropower (<0.5MW) support policy, new techniques introduction for saving fuel, solar, marsh gas, etc.

There is only few cutting quota to local communities for fuel wood and house building.

Drivers of trends:
1) Poverty: often, the poor the people, the more closely their welfare is linked to the condition of the natural resources besides biodiversity resources they rely on. The poorest are often most adversely affected by the degradation of environmental resources besides biodiversity loss. (UNEP,TEI)

Relevant laws, policies, plans and institutional arrangements:

1. Laws and policies:
National level:
1) Forest Protection Law
2) Wild Animals Protection Law and its supplementary rules
3) Regulation of Wild Plants Protection
4) Regulation of Nature Reserve Management
5) Regulation of Management on the type of Aquatic Wildlife Nature Reserve
6) EIA law
7) Note for relevant environmental management issues related to nature reserve on the construction projects

Provincial level:
1) Regulation of Yunnan Province on the Conservation of terrestrial Wild Animals and its supplementary rules: identified very clear measures concerning conservation & management, domestication & reproduction and development & utilisation of those wild animals that are brought under the national and provincial key protection, and also those that have important economic or research values.
2) Regulation of Yunnan Province on the Protection of Rare Tree Species: identified detailed plans and protection measures for only 59 species of trees that are listed as rare & precious tree species by the province, and is very limited. The Regulation of Yunnan Province on Environmental Protection and other rules & regulations just makes some stipulations in principle, not any specific measures for conservation and management.
3) Biodiversity impact assessment indices systems in SEA. (TNC & YEPB): the result of the study will be used to improved the technological guidelines of biodiversity impact assessment in SEA

2. Plans:
1) 11th fiver year plan for environmental protection
2) Biodiversity Conservation and Development Action Plan for the Northwest of Yunnan (1997)
3) Yunnan Biodiversity Conservation Action Plan (2003)
4) Plan of Yunnan Province for Biodiversity Conservation (2005)
5) Conservation and Exploitation Plan for Biological species Resources
6) Plan for protected Regions with Crucial Ecosystem Services Function
7) supplementary plan for Natural forest protection projects

3.Institutional arrangements:
Yunnan Province has established two coordination structures for biodiversity conservation at the provincial level, namely 'Yunnan Biodiversity Conservation Committee' (in 1994) and 'Yunnan Inter-Departmental Joint Meeting System for Biological Species Resources Conservation' (in 2005). The members of the former one were leaders or experts from Yunnan Provincial Government (YPG), relevant governmental agencies and research institutions related to biodiversity conservation; the membership of the latter one included relevant governmental agencies and research institutes related to biodiversity conservation, which was led by the Yunnan Environmental Protection Bureau (YEPB).

Problems and issues encountered during data collection:
1) More details about the rare & endangered species in the nature reserve are unavailable, besides the distribution map of all nature reserves in the NSEC.
2) Scientific investigation research in most of the nature reserve in the NSEC is still on going or unavailable for the sensitive. In the 11th Five Year Plan period, most impartment contents of standardization construction for the nature reserve in Yunan are to develop the environmental monitoring pilot's stations in the national level nature reserve.

Summary of main concerns for the NSEC:

- **Forests are threatened** and fragmented by encroachment for crop cultivation, timber cutting and commercial tree plantation such as rubber, also by wood cutting for fuel and house building
- **Species loss**: At least 500 types of plants are threatened by habitat loss, environmental pollution, over grazing and invasive species. One third of endemic species are threatened or endangered as a result of water pollution, reservoir construction, over fishing and invasive species introduction
- **Road and reservoir construction** is a major cause of biodiversity loss.

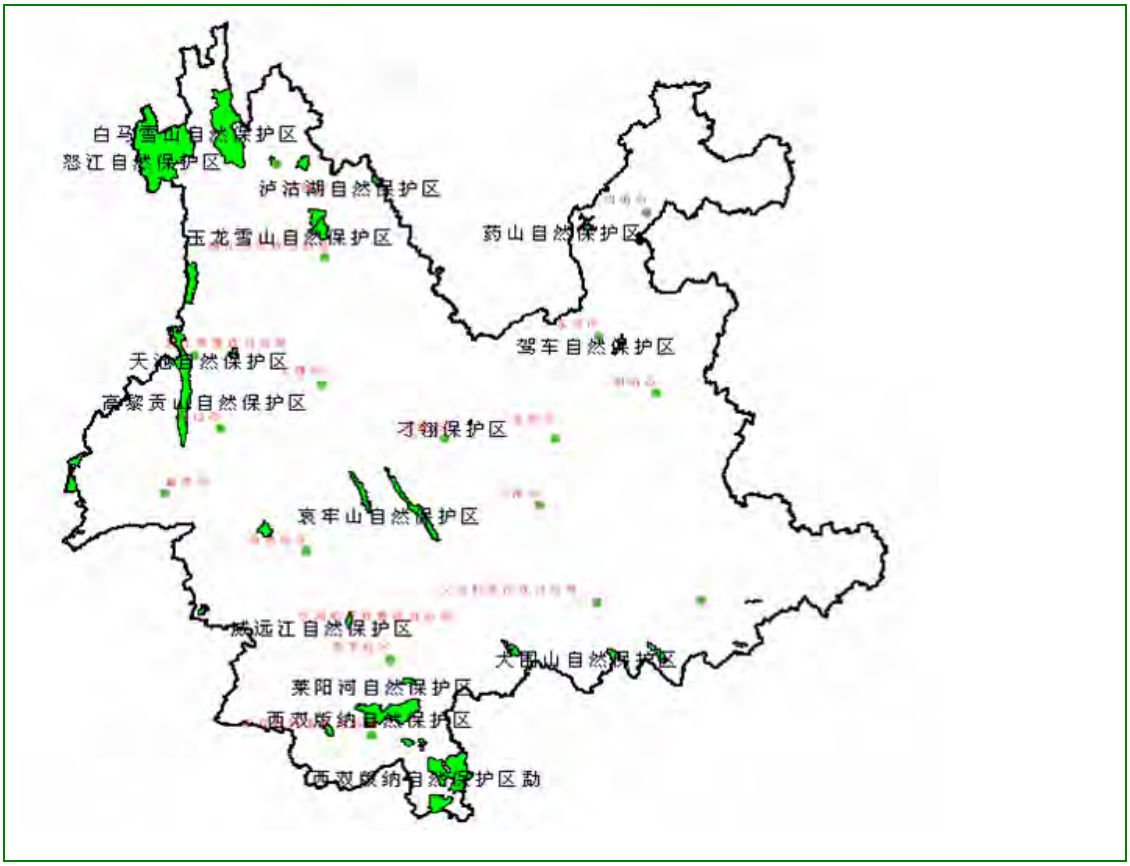
References/sources:

1) Vegetation Ecological Landscapes of Yunnan(1994)
2) Cheng Y.R. , Yang J.X. , The Diversity and Present Status of Fishes in Yunnan Province , HINESE BIODIVERSITY 6 (4) :272～277 , November , 1998
3) UNEP,TEI, Greater Mekong Environment outlook (2007)
4) Biodiversity in Yunnan (1998)
5) Master Plan of Xishuangbanna national level nature reserve
6) Eco-environmental status in Yunnan (2004)
7) Case Study on Biodiversity protection and Local Community Development in Wuliang
8) Shan Nature Reserve, Wang Lida, 1006 - 947X (2003) 03 - 0031 – 03, Environmental Science Survey
9) Investigation and Research on Community Management in Caiyanghe Nature Reserve (website: www.cnki.net)

Table 2 the types of 8 national NR in the NSEC:

No.	NR name	Protection objects/values	Area(hm^2)	Altitude	location
1	Xishuangbanna	tropic rain forest, monsoon forest, southern sub-tropical monsoon ever-green broad-leaved forest, wildlife	241776	470 ～ 2429 m	Xishuangbanna
2	Nabanhe	tropic rain forest, tropical monsoon forest, monsoon ever-green broad-leaved forest, monsoon ever-green broad-leaved forest, wildlife	50360	980～ 1698	Xishuangbanna
3	Caiyanghe	Monsoon forest, plateau lake and waterfowl	30938	730～	Pu'er
4	Ai Naoshan	Mid-mountainous humid ever-green broad-leaved forest ,wide life	26067	2080 ～ 3165.9	Pu'er
5	Wu Liangshan	hylobates concolor.、migration habitat for migratory bird, Mid-mountainous humid ever-green broad-leaved forest	7035	1760 ～ 3306	Pu'er
6	Fenshuiling	monsoon ever-green broad-leaved forest, mountainous mossy ever-green broad-leaved forest	42027	1020 ～ 2597	Honghe
7	Daweishan	tropic rain forest, monsoon forest, mountainous mossy ever-green broad-leaved forest	43993	76. 4 ～ 2364	Honghe
8	Huanglianshan	Subtropical ever-green broad-leaved forest, rare wildlife Nycticebus Coucang	65058	320 ～ 2637	Honghe

Map 1: main nature reserves in Yunnan (green parts)


白马雪山自然保护区
怒江自然保护区
泸沽湖自然保护区
玉龙雪山自然保护区
药山自然保护区
驾车自然保护区
天池自然保护区
高黎贡山自然保护区
才翁保护区
哀牢山自然保护区
澜沧江自然保护区
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Environment
Template 14: Forests and land resources
Key issue EN3: Unsustainable use of natural resources (forest, land, water)

Introduction:

Total land area in Yunnan province is 383 thousand square kilometer, the eighth largest in China. In 2003, average land area owned per capita is 13.13 mu. exceeding the average level (11.4 mu.) in China. Yunnan is a typical mountainous province with 84% mountainous region, 10% plateau region and 6% basin. It is the very important base for economic and social development in the 6% basin region with the best fertile lands, developed cities and half of population volume in Yunnan. But abundant forests resources are distribute in 94% of the mountainous region with low economic development rate and poor communities. In Yunnan, area with slope less than 8 degree accounts is only 8.87% of the total area in Yunnan, but the rate of sloping field area exceeding 25 degree is 39.27%. With the population growth and economic development, limited land and forest resource is threatened by soil erosion, poverty and urbanization. Land and forest resources sustainable management are two key issues on sustainable development strategy.

Forest restoration: From 1960 to 1992, forest covering rate in Yunnan increased from lowest rate of 27.5% in 1960 to 35.2% in 1992. Since 1997, forest covering rate increased from 35.91% to 49.91 % in the past 10 years. From 2000 to 2007, 3.26 million hectare of natural forests were protected in the NSEC, accounting for 18.6% of total protected area in Yunnan, 415 thousand hectare of badlands were covered with trees, accounting for 15.7% of total area of afforestation in the whole project in Yunnan. And in SLCP , there are 106 thousand hectare of steep sloping Land over 25 degree were conversed to the afforestation from 2000 to 2007, accounted for 29.8% of total area of afforestation in Yunnan.

Indicator:
Retaining amount of farmland
Official target:

Table 1: target of Retaining amount of farmland in the NSEC (2010) （thousand ha.）

prefecture	Target
Kunming	No indicator in the 11th Five Year Plan
Pu'er	Increase to 632.8 (up 5.1%)
Honghe	595.8
Yuxi	107.6
Xishuangbanna	200
Yunnan	Increase to 6100

Source: 11th Five Year Plan for economic and social development

Trends: Compared with 1996, total volume of farmlands in Yunnan province decreased 361.6 thousand hectare in 2005. The possessive area per capita decreased 0.02 hectare (0.345 mu.). In 2010, the target of farmland areas in Yunnan will increase to 6100 thousand hectare, the rate will increase 0.7%.

In the NSEC, total volume of farmland is 2.178 million hectare in 2003, accounting for 35.2% of total volume of farmland in Yunnan, and 16.5% of total volume of land area in the NSEC (annex 1). Compared with 1996, the area of farmland increased 25.3 thousand hectare. But the average possessive volume per capita decreased due to the population growth. Except farmlands which slope less than 15 degree, the rate of sloping farmlands fitting farming with well irrigation facilities and light soil erosion are from 67.85% (Yuxi) to 83.05% (Xishuangbanna) of total volume of sloping farmland in the NSEC. Averagely, 27% of sloping farmland is not fit for farming for poor fertility and irrigation facilities, serious soil erosion including swidden.

Drivers of trends:

1) Land degradation

Increasing steep slope farmlands along with population growth is been the main inducement of land degradation. According to the result of Yunnan sloping farmland resources investigation , the rates of farmland which slope exceeds 15 degree in the NSEC are from 25.68%（XSBN）to 72.62% (PE) , including the farmland which slope exceeds 25 degree which account for 26.2% of the total volume of the sloping field. Farming on sloping field especially slope exceeding 25 degree is the main inducement of soil erosion and land degradation.

According to the results of soil erosion survey in 1999, soil erosion status is mainly the light and medium degree (annex 2, 3) with the rate of 98% of the total area of soil erosion in the NSEC. Compared with the results of soil erosion survey in 1987, the area of soil erosion in Kunming, Honghe and Xishuangbanna in the NSEC decreased by the implement of the project of Soil Protection Projects in the Upper Yangtze River in Yunnan and terracing project for the slope fields. But the status in Yuxi and Pu'er is opposite by the area of farming slope fields increasing

2) Land use of Construction increasing with the economy development is another main drives of farmland decreased. In addition, new soil erosion as a result of poor measures of soil erosion protection in the process of construction is an indirect inducement of soil quality worsened. Now, strict soil erosion protection policies and projects are implemented together with EIA in the whole process from design, construction and running.

Indicator: Area of soil erosion protected

Target: Area of soil erosion protected in the NSEC by 2010（km^2）

Prefecture	Target
Kunming	area of soil erosion protected increased to 1251
Yuxi	area of soil erosion protected increased to 450
Pu'er	350
Honghe	No indicator in the 11th Five Year Plan
Xishuangbanna	No indicator in the 11th Five Year Plan
Yunnan	12000

Trends:

Yunnan is one of the most seriously affected provinces by soil erosion with one third of area of soil erosion. According to the results of soil erosion survey in 1999, area of soil erosion is decreased to 141.3 thousand square kilometre (down by 3.48%) compared with 1987. Soil erosion status is mainly the light and medium degree (annex 2, 3) with the rate of 98% of the total area of soil erosion in the NSEC. Compared with the results of soil erosion survey in 1987, the area of soil erosion in Kunming, Honghe and Xishuangbanna in the NSEC decreased by the implement of the project of Soil Protection Projects in the Upper Yangtze River in Yunnan and terracing project for the slope fields. But the status in Yuxi and Pu'er is opposite by the area of farming slope fields increasing.

Soil erosion is been the serious factor threatening economic development and poverty alleviation in Yunnan. Up to 1999, 238.75 million stere of reservoir were filled up, 379 hydro-power stations are damaged by soil erosion. Average soil erosion amount per year is 0.5 billion ton, equal to 160 thousand hectare of farmlands are lost. Area susceptible to soil erosion protected is one important indicator. The area vulnerable to erosion protected is increasing gradually during the 10th Five Year Plan period. Up to 2004, total area protected is 39.8 thousand square kilometre, accounting for 28% of total area in Yunnan.

Drivers of trends

1) steep slope land cultivation

Increasing steep slope farmlands along with population growth is been the main inducement of land degradation. According to the result of Yunnan sloping farmland resources

investigation, the rates of farmland which slope exceeds 15 degree in the NSEC are from 25.68%（XSBN）to 72.62% (PE) , including the farmland which slope exceeds 25 degree which account for 26.2% of the total volume of the sloping field. Farming on sloping field especially slope exceeding 25 degree is the main inducement of soil erosion and land degradation.
2) Soil erosion from the infrastructure construction: Now, strict soil erosion protection policies and projects are implemented together with EIA in the whole process from design, construction and running.

Indicator: Forest cover

Official target:

Table 2: target of forest cover in the NSEC (2010) （t% ）

prefecture	Target
Kunming	55%(up 3.8% from 2005)
Pu'er	≥65%
Honghe	≥40%
Yuxi	≥50%(up 2%)
Xishuangbanna	70%
Yunnan	53% (up 3%)

Source: 11th Five Year Plan for economic and social development

Trends: From 1960 to 1992, forest cover in Yunnan increased from 27.5% in 1960 to 35.2% in 1992. Since 1997, according to the new calculated standard system, the results of forest resources lasting monitoring and survey shows that forest cover increased from 35.91% to 49.91 % in the past 10 years. The area of forest per capita increased to 0.34 hectare in 2006 with the Natural Forest Protection Programme (NFPP), Sloping Land Conversion Programme (SLCP) implemented in Yunnan province. Up to 2007, near 52% of natural forests in the forestry lands were protected in the NFPP region.

All prefectures in the NSEC are in the programme region. From 2000 to 2007, 3.26 million hectare of natural forests were protected in the NSEC, accounting for 18.6% of total protected area in Yunan, 415 thousand hectare of badlands were covered with trees, accounting for 15.7% of total area of afforestation in the whole project in Yunnan. And in SLCP , there are 106 thousand hectare of steep sloping Land over 25 degree were conversed to the afforestation from 2000 to 2007, accounted for 29.8% of total area of afforestation in Yunnan.

Now, commercial timber cutting is forbidden by the law inside the NFPP region. There is only few cutting quota to local communities for fuel wood and house building. Strict timber cutting quota policy is implemented elsewhere even in the commercial forests in Yunnan. Now, illegal logging decreased gradually in the NSEC.

There are abundant medical plants, wild edible fungus, and wild vegetables and flowers resources of NFPP in Yunnan. With the natural forests protected effectively, main dependence on forest resources for local communities shifted from timber cutting to NTFPs in the NSEC. Total production value of NTFPs in Yunnan is 25.3 hundred of million according to the forestry department statistic in part. Now, several NTFPs corporation of Forest food (bamboo shoots, tea), landscape trees and flowers base, edible fungus and medical plants exploitation are developed in the NSEC. according to the NTFPs Industrial Development Plan in Yunnan Province, several key bases of forest medical plantation, wild edible fungus collection and processing, forest vegetables plantation, landscape plants, wild tea tree and pine pollen collection will be developed in the NSEC.(annex 1)

Drivers of trends:

1) Natural Forest Protection Programme
Since 1998, the programme was implemented by ceasing timber cutting in the natural forest and reforesting in badlands in 13 prefectures besides all prefectures in the NSEC. Up to 2005, the rate of forest covering is nearly 50% and average reduced amount of soil erosion is 16.3 million ton per year.

2) Sloping Land Conversion Programme (SLCP), which aims to reduce erosion by converting cropland on steep slopes to grass and tree cover.
The programme was implemented from 2000 to 2010. Up to 2003, 1.80 million hectare of steep sloping Land over 25 degree were conversed to tree cover. According to the results of monitoring spots for the region in the programme, the volume of runoff per year can be reduced 82% of total surface runoff and the sediment in the runoff can be reduced 98% of total volume of sediment when arbour reforesting in the steep sloping Land over 25 degree.

3) Other Programme: protection forest programme in the upper Yangtze River and Lancang River drainage area.

Relevant laws, policies, plans and institutional arrangements:

1. Laws and policies

1) Land Management Law in National and provincial level

2) Basic Farmland Protection Regulation
3) Farmland Afresh Cultivating Regulation
4) Policies of Strict Farmland Protection in The Road Construction Project
5) Soil Erosion Protection Law

2. plans

1) Land Resources Exploitation and Protection Plan (1996-2010)
2) Basic Farmland Protection Plan (1996-2010): to confirm the basic farmland protection area for the protection on the farmland with well irrigation facilities and high outputs.
3) Land Exploitation and Restoration Plan (2001-2010): to restructure the land use based on the assessment of the potential of land use and restoration.
4) Implementation Plan for Natural Forest Protection Programme in each year
5) Implementation Plan for Sloping Land Conversion Programme
6) NTFPs Industrial Development Plan in Yunnan Province

Problems and issues encountered during data collection:
More details of Illegal logging are unavailable.

Summary of main concerns for the NSEC:

- **Expansion of plantations:** Commercial plantations, especially rubber, are replacing areas of degraded natural forest and agricultural land.
- **Soil erosion:** One third of Yunnan suffers from soil erosion problems. Farming on sloping field especially slope exceeding 25 degree is the main inducement of soil erosion and land degradation. Average soil erosion amount per year is 0.5 billion ton, equal to 160 thousand hectare of farmlands are lost.
- **Construction of infrastructure** including roads, power and irrigation is a key cause of land degradation.

References/sources:

1) 11th Five Year Plan for economic and social development
2) Land Resources Exploitation and Protection Plan (1996-2010)
3) Land Exploitation and Restoration Plan (2001-2010)
4) NTFPs Industrial Development Plan in Yunnan Province

Annexes: (eg. maps, diagrams, tables)

Diagram 1:

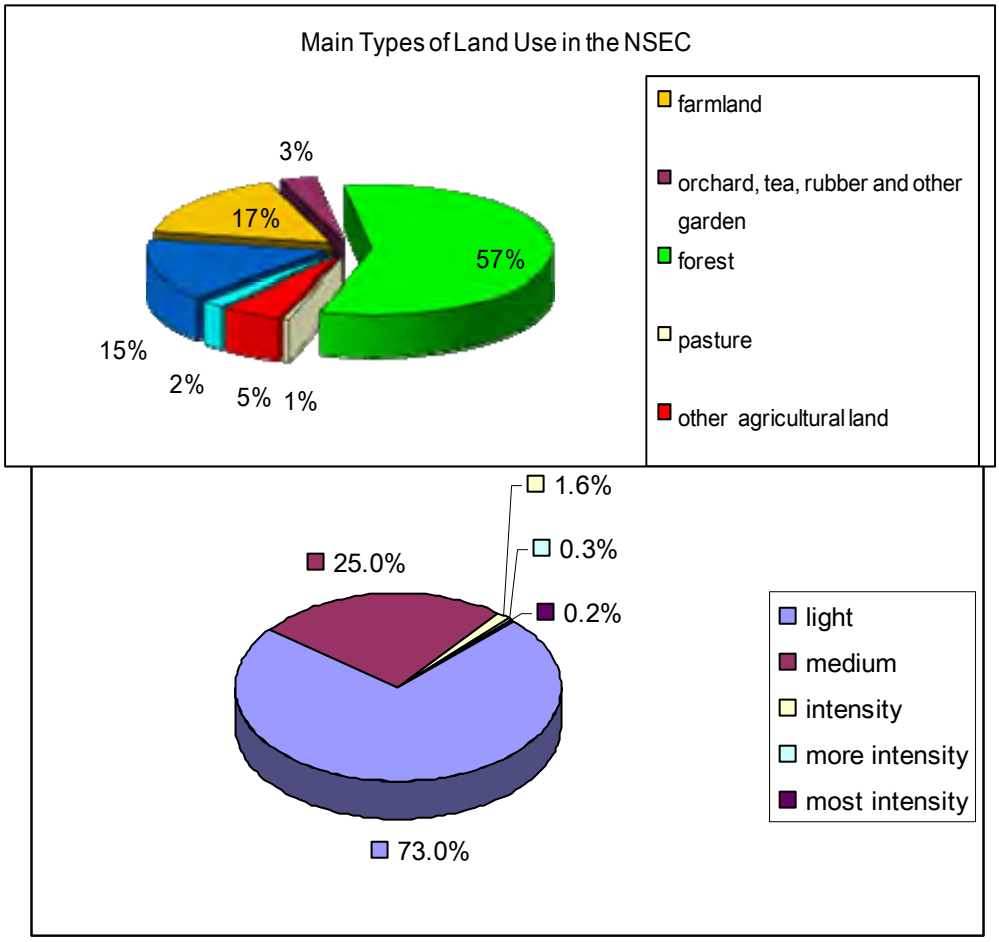


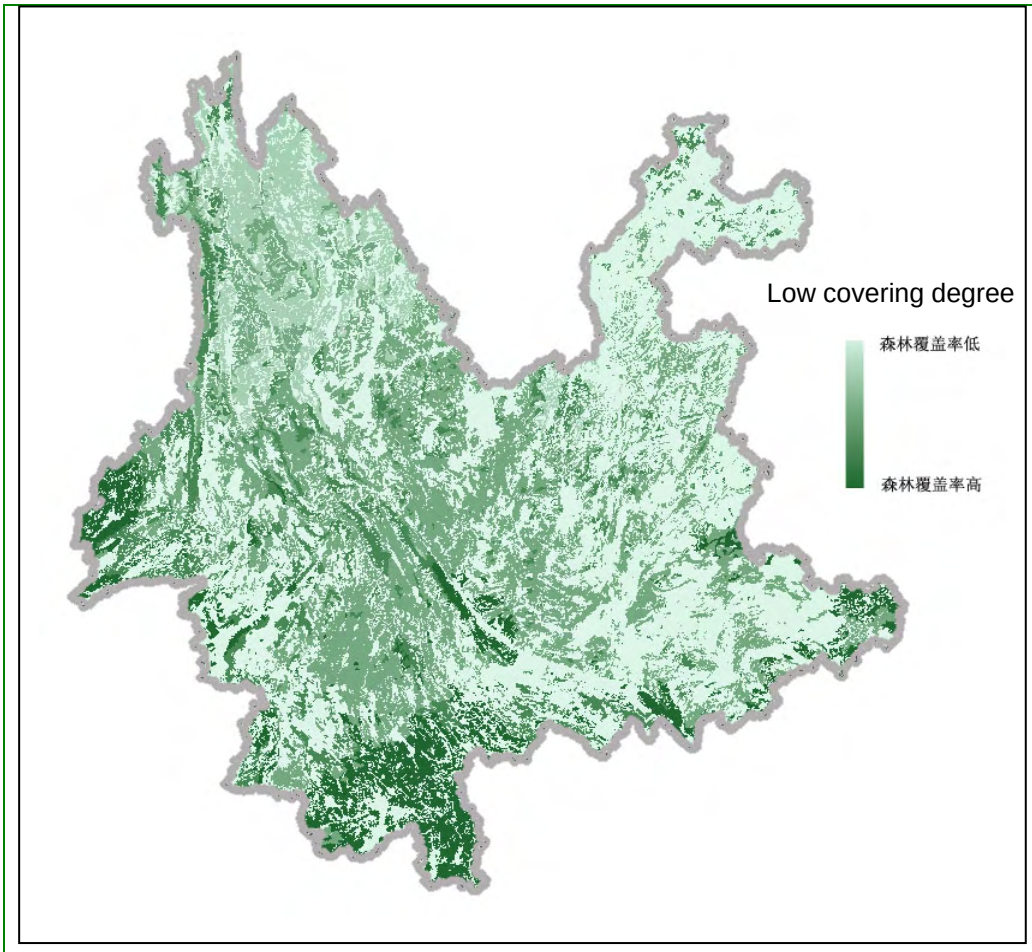
Table1: soil erosion intensity degree Standard

degree	Average soil erosion modulus (t/km^2 • a)
Light	500-2500
Medium	2500-5000
Intensity	5000-8000
More Intensity	8000-15000
Most Intensity	>15000

Table2: Key NTFPs bases in the NSEC

projects	location
forest medical plantation	XSBN, Pu'er, KM,HE
wild edible fungus collection and processing	KM,YX,HE
forest vegetables plantation	XSBN, Pu'er, KM,HE,YX
landscape plants	KM,YX,HE
wild tea tree	XSBN, Pu'er
pine pollen collection	KM,YX

Map 1 forest covering degree in Yunnan



Abbreviations:
KM: Kunming
YX: Yuxi
HE: Honghe
XSBN: Xishuangbana
PE: Pu’er

Environment
Template 16: Waste
Key issue EN5: Waste management (eg transport & storage of hazardous wastes, management of solid waste)

Introduction: The main types of waste generated in the NSEC can be categorized as industrial solid waste, domestic waste and hazardous waste.

With policies of Recycling Economy and Cleaner Production implemented, although volume of industrial solid waste generated in Yunnan increased 45.83% from 2000 to 2005, discharged volume decreased near 1 multiple and the rate of integrated utilization increased to 35%. Now, Main sources of industrial solid waste are chemical industry, coal mining, ferrous and nonferrous smelting industry, accounting for 83.7% of total volume generated and 98.7% of total volume discharged in the NSEC.

In the province, urban domestic waste is disposed by sanitary landfill, compost and incineration. 31 sanitary landfill plants of domestic waste and 4 compost plants were established with 9332 ton of disposal capacity till 2005. The rate of non-hazardous disposal increased to 41.91%. Rural domestic wastes mostly discharge directly and scattered around residential area, resulting in worsening of the rural environment and directly threatening drinking water safety and other physical health of rural residents.

Hazardous wastes management begun very late in Yunnan, and that leads to the difficulty to report and count the quantities of the waste and the unreasonable management and disposal. Now, integrated management system was established on the whole in the 10th Fiver-Year period. According to 11th Five Years Plan for Environmental Protection, 2 hazardous waste disposal plants will be built in Kunming and Honghe city, centralization disposal centre of medical waste will be established in each prefecture in Yunnan.

Indicator: Rate of disposal of domestic waste

Official target: Table 1: target of non-hazardous disposal of domestic waste in the NSEC (2010) **（%）**

prefecture	Target
Kunming	≥96%
Pu'er	≥80%
Honghe	≥60%
Yuxi	≥70%
Xishuangbanna	≥60
Yunnan	≥60

Source: Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC

Trends: In the province, urban domestic waste is disposed by sanitary landfill, compost and incineration. 31 sanitary landfill plants of domestic waste, 4 compost plants and were established with 9332 ton of disposal capacity till 2005. The rate of non-hazardous disposal increased to 41.91%.

Most volume of domestic waste generated in NSEC is in Kunming. In 2005, total volume of domestic waste generated in Kunming is 1.69 million with 68% of urban domestic waste. 93% of domestic wastes in Kunming were disposed through sanitary landfill and incineration. The rate of non-hazardous disposal exceeds 51.1% of the rate in Yunnan (41.91%, lower 9% than national rate). The rate in other cities of the NSEC is lower. Now, sanitary landfill plants for urban domestic waste disposal were established in each prefecture in Yunnan, however, actual disposal facility and capability can not meet the landfill demands resulting in serious secondary pollution.

Rural domestic wastes in the NSEC mostly discharge directly and scatter around residential area, resulting in worsening of the rural environment and directly threatening drinking water

safety and other physical health of rural residents.

Drivers of trends:
1) Population growth and accelerated urbanization
During 11th fiver year period, average increasing rate of GDP per year will exceed 8.5%. The rate of urbanization will reach 35% with 16.10 million persons in the urban zone. As a result, domestic waste will increase obviously during 2006-2010 period.

2) Lower domestic waste management capacity in Yunnan.
Now, domestic waste management is only focus on the disposal but not on generated sources control, additionally most disposal investment depends on the local government, as a result of higher volume of generating and lower rate of integrated utilization. In the 11th fiver year period, domestic waste management will stress on the classification collection, improving the system of collection, carrying and recycling.

Indicator: Rate of recycling and reuse of industrial solid waste

Target:Table 2: Target for reuse of industrial solid waste in the NSEC (2010) %

prefecture	Target
Kunming	＞90%
Pu'er	≥50%
Honghe	≥30%
Yuxi	70%
Xishuangbanna	100%
Yunnan	≥50

Source: Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC

Trends: With policies of Recycling Economy and Cleaner Production implemented, although volume of industrial solid waste generated in Yunnan increased 45.83% from 2000 to 2005, discharged volume decreased near 1 multiple and the rate of integrated utilization increased to 35%. In the first year of 11th Five Year Plan (2006), the rate of integrated utilization for solid waste increased to 41%.

In the NSEC, the volume of industrial solid waste generated is 36.4 million ton in 2006, the most is in Kunming and the least is in Xishuangbanna. The volume of utilization is 12.31 million ton. The average rate of utilized is 33.8%, lower than that of rate in Yunnan (41%). The volume of stored is 8.95 million ton and the volume of discharged is only 0.35 million ton which generated in Kunming. Now, Main sources of industrial solid waste are chemical material and products industry, coal mining industry, ferrous and nonferrous smelting industry, accounting for 83.7% of total volume generated and 98.7% of total volume discharged in the NSEC.In the 11th five-year period, industrial solid waste utilized focus on the waste generated from coal mining, metallurgy and architectural material industry, such as gangue, smelting waste residue, bags. A network of community collection sites will be established for wasted electronic equipment (Yunnan statistic Year Book 2006)

Drivers of trends:
With high-speed economy development which the average increasing rate of GDP per year exceed 8.5% during the 11th fiver year period, high energy consumption industry is been sustaining development, such as metallurgy, electric power, nonferrous smelt industry, chemical industry and construction material industry. Relevant research shows that If calculated with current economy increasing model and pollution control level, the total volume of solid waste will be increased 29.8% more than that of volume in 2005.

Indicator: % of hazardous waste treated
Target: hazardous waste can be safely disposed on the whole.
Table 3: target of hazardous waste disposal in the NSEC (2010) （%）

prefecture	Target
Kunming	100%

Pu'er	hazardous waste can be safely disposed on the whole
Honghe	hazardous waste can be safely disposed on the whole
Xishuangbanna	≥70(up 55%)
Yunnan	hazardous waste can be safely disposed on the whole

Sources: Yunnan 11th Five Year Plan of Environmental protection, prefecture 11th Five Year Plan of Environmental protection in the NSEC

Trends: In Yunnan, main types of hazardous waste generated are organic phosphorus waste, lead, waste acids, cadmium, zinc, arsenic and chrome, account for 98% of the total volume generated in the province. It mainly comes from chemical material and production industry, non-ferrous mining and smelting.

Hazardous waste management begun very late in Yunnan, that leads to the difficulty to report and count the quantities of the waste and the unreasonable management and disposal. Now, hazardous wastes management system was established on the whole when the plan for hazardous and medical waste management was implemented in the 10th fiver-year period. In 2006, the volume of hazardous waste discharged is 0.45 ton including medical waste.

According to the Solid Waste Pollution Control Law (2005) in China, the institutes and corporations generated hazardous wastes must be declared and registered by local environmental protection department. Hazardous waste disposal and management must be permitted by the local environmental protection department. In 2006, All the institutes about 3466 institutes or corporations generated hazardous wastes were declared and registered. Now, hazardous waste centralization disposal projects in the NSEC are on going or finished. In the 11th five years plan for environmental protection, 2 hazardous waste disposal plants will be built in Kunming and Honghe city, centralization disposal centre of medical waste will be established in each prefecture in Yunnan.

Drivers of trends:
Growth of metallurgy and chemical industry during 11th Five Year Plan period with high speed economy development in the NSEC.

Relevant laws, policies, plans and institutional arrangements:

1) Main Laws ,regulations
- Solid Waste Pollution Control Law (recension, 2005)
- Medical waste management regulation (2002)

2) Environmental Standard system: industrial solid waste pollution standard for non-ferrous industrial solid waste, radioactive substance for industrial waste sludge used in building material, urban waste for agricultural use, poly chlorinated biphenyls for wastes, landfill site for domestic waste, hazardous wastes incineration, municipal solid waste incineration, hazardous waste storage, security landfill site for hazardous wastes, storage and disposal site for general industrial solid wastes, medical waste transport and incineration, etc.
3) Plan
- Disposal Facilities Construction Plan for Hazardous and Medical Waste Disposal Facilities Construction in China
- Yunnan 11th Fiver-Year Plan of Harmless Disposal Facilities Construction for Domestic in the Cities

Problems and issues encountered during data collection:
More details about waste generated and disposed are unavailable in the NSEC, such as volumes, types. Data mostly come from the 11th Five Year Plan and Environmental

state in Yunnan.

Summary of main concerns for the NSEC:

- **Industrial solid waste on the increase in the NSEC:** The volume of industrial solid waste generated in Yunnan increased 45.83% from 2000 to 2005 (chemicals industry, coal mining, metal smelting industry).
- **Rural domestic solid wastes** on the increase mostly discharged directly in the environment without treatment.
- **Land fill sites in the NSEC cannot cope** with the increasing volume of solid wastes generated
- **Hazardous waste on the increase in NSEC:** In Yunnan, main types of hazardous waste generated are organic phosphorus waste, lead, waste acids, cadmium, zinc, arsenic and chrome, account for 98% of the total volume generated in the province. It comes mainly from the expanding chemical industry and metal smelting.

References/sources:

Yunnan 11th Five Year Plan for Environmental Protection

1) State of environmental status of Yunnan and 5 prefecture
2) Yunnan Statistics Year Book (2006)
3) National EIA/SEA criteria system collection book
4) National EIA/SEA laws, policies collection book
5) State of Environment of Yunnan and 5 prefecture in NSEC (download from website): 2006
6) Yunnan Environmental Quality Report (2006)

Annexes: (e.g. maps, diagrams, tables)

Environment: Lao

Environment
Template 12: Air Pollution

Key issue EN1: Air pollution (road/transport, agricultural residual (slash & burn at a large scale & forest) fires, greenhouse gasses)

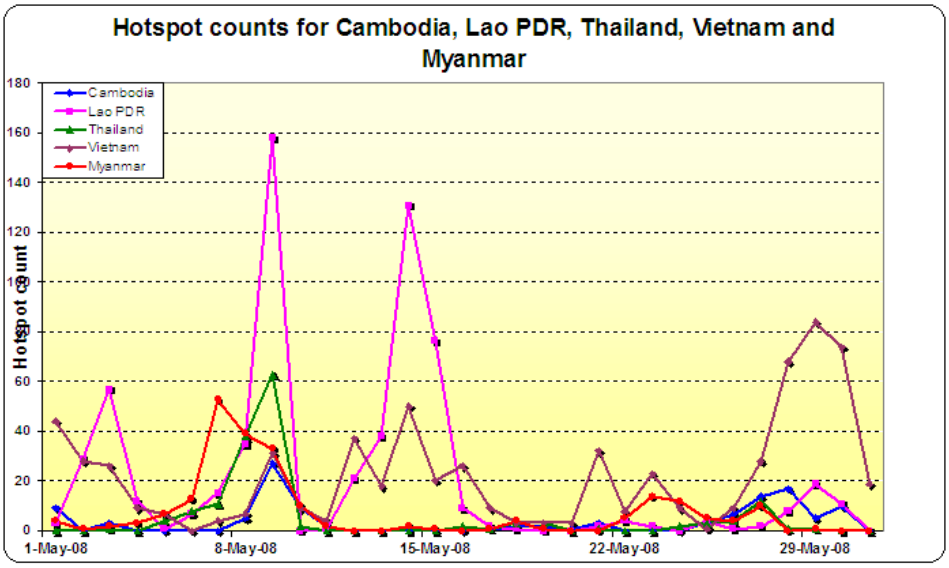
Introduction:

Air pollution data is not readily available in Lao PDR. A recent study by the ADB (2006) titled "A Country Synthesis Report on Urban Air Quality Management – Lao PDR: Discussion Draft 2006" states that the "compilation of emissions inventories for criteria air pollutants is not a routine task of the government" citing a lack of technical capacity and funding. This study presents results of two previous government studies, one between March and April 2004, the other in 2003 and 2004 – both in Vientiane Capital only. The conclusion of the ADB (2006) study was that "air quality in the Lao PDR is still generally good and an air quality management system is still not a major requirement".

Information about air quality in the NSEC is equally difficult to source. The few sources found indicate that the air quality in the NSEC is generally good, apart from the burn off season in February/March before the onset of the wet season when intense fires create a serious haze and smoke problem with implications for health and productivity and tourism development – as well as potential impacts on fauna.

The major sources of air pollutants result from:

Burning waste biomass – This includes slash and burn practices; rice paddy waste burn off in certain seasons and forest fires. These fires are interconnected – it is estimated that 90% of forest fires originate from slash and burn cultivation practices of upland farmers (Bouaket 1999). In terms of fire monitoring the SEA Fire Danger Rating System (FDRS) was developed in 1998 and forest fire 'hotspots' are now monitored on the Singapore Government's Meteorological website (http://www.mssinet.gov.sg) (see table graph below) but no total hotspot count could be sourced from this website.



(Source: http://www.mssinet.gov.sg)

According to a Bokeo Government Report (2005) shifting cultivation has been reduced 30% from 2448 ha in 2000 to 738 ha in 2005 with 102 villages practicing this type of agriculture. This suggests a sharp drop in air pollution produced by this agricultural practise over the last 5 years.

Fuel used for cooking – According to the 2005 Census (GoL 2006), nationally around 80% of households use wood as the main source for cooking, 15% carcoal and 1% electricity or gas. This is a major source of air pollution in villagers in the NSEC. In Luangnamtha and Bokeo, over 90% of households use wood. Nationally there has been an increase in wood fuel use in rural areas from 68.3% of households in 1995 to 88.5% of households in 2005.

Private Households Percentage Distribution by Main Source of Energy for Cooking (source: GoL 2006)

Province	No of HH	Electricity	Parafin	Wood	Coal	Charcoal	Gas	Other
Luangnamtha	25943	0.1	0	97.3	0	0	0.1	0
Bokeo	25470	0.3	0.3	90.9	0.1	0.8	0.4	0.1

Poverty and Indoor Air Pollution: As mention on table in above that more than 95% of the population use wood or charcoal for their daily cooking. The use of wood fuel and charcoal is far more prevalent among poor households than in the general population. People in the mountainous of northern of Lao PDR, they are colder climate, and different cultural of practices also housing styles that inspire more indoor cooking. In further, indoor air pollution may cause respiratory health problems for the poor people in upland area (WB, 2007).

Poverty and Environmental Quality in Lao PDR

Area	indicators	Poverty and Geographic Analysis
Poverty	Poverty incidence 1997/98	highest in the North
	Number of Poor 1997/98	
	Sloped land (% of total land)	Highest in the North and poorest group
Indoor air Pollution	Households using fuel wood (%) potential indoor air pollution problem	high in all regions and poverty groups (medium in Vientiane City and least poorest group)

Source: WB 2007

Dust emanating from unsealed roads: Dust is the big problem for local people who are living along the road; they are from road construction phase, especially in summer season such as big win and fast driving (2nd monitoring R3 June 2005).

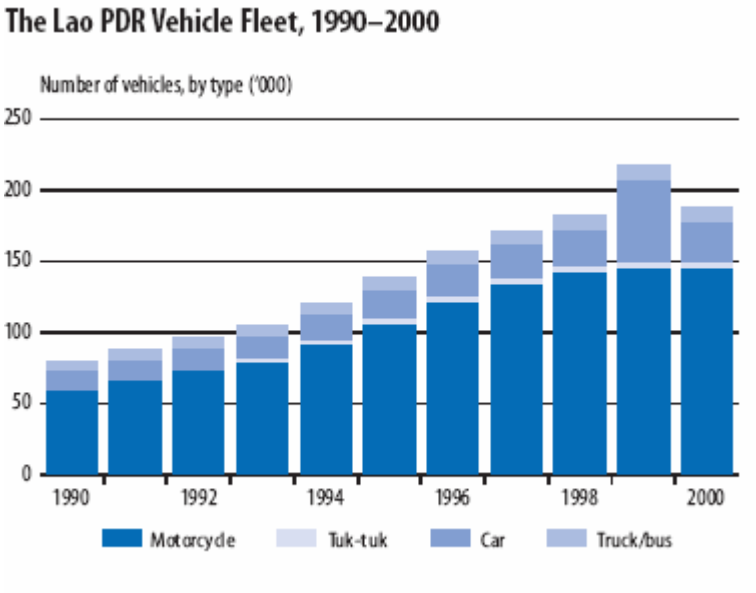
Dust may be appear by road construction equipment, and could be a significant impact during the construction phase. Dust impacts from traffic once the road is completed is expected to be eliminated, a big improvement over the present situation. Quarrying activities are not planned close to communities, limiting the impact of rock dust on human populations (EIA report, 2003).

Transport emissions: With the completion of R3 and the upgrade of road infrastructure in the NSEC it is also expected that emissions from freight vehicles and personal vehicles will have more of an affect. The Environment Assessment Report (Nathan Associates et al 2003) for the R3 project presents some information on transportation in Luangnamtha Province in 2003 (see table below). The report states that about 75% of vehicles do not officially enter into Lao but go only as far as the transhipment point. Once these barriers to through transportation are solved by R3 road transport and therefore pollution from this traffic will increase.

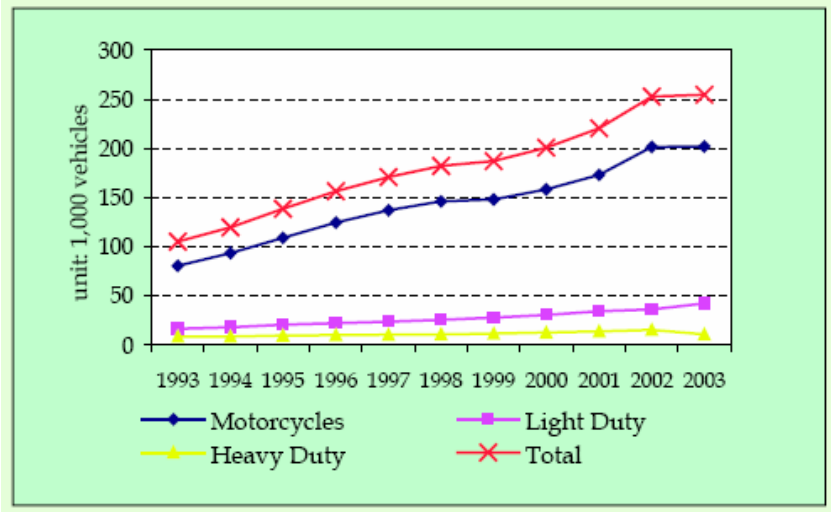
Vehicles Entering Lao PDR from China							
	Official	Tourist	Transport	Passenger	Private	Passing	Total
Lao	62	15	1289	3	296		1665
Chinese	178	67	212	117	563		1137
Thailand					3	33	36
Total	240	82	1501	120	862	33	2838

Source: Immigration Police at Boten (EIA report, 2003)

Vehicle ownership is another indicator of a rise in air pollution in Lao although the ADB (2006) report does not see this as an immediate issue because vehicle ownership is still considerably low, especially when compared to other countries (see figure below). However these are old statistics and vehicle ownership may be rising considerably in the last 8 years. Recent vehicle ownership figures still trying to being sourced.



Number of Vehicles in Lao PDR, 1993-2003 (WB, 2007)



The main air pollutants resulting from these sources include: Particulate Matter, Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x) ,

Particle Matter - traffic on the local roads is likely the main source of dust. In addition during times of road construction of upgrade, dust will be mixed with road construction equipment in different construction activities, and could be important impact to the air quality.

Sulphur Dioxide (SO2) - the fuel burning is likely the main sources of SO_2

Nitrogen Oxides (NOx) - traffic on the local roads is likely to be the main source of NO_x through vehicular emissions (see Section 6.9).

(i) Main geographic location of pollution concerns

The main locations of pollution concerns are:

Source	**Location**
Burning waste biomass	Upland Fields and Forests
Fuel used for cooking	Villages (outside rural centres)

Dust emanating from unsealed roads	Network of unsealed roads
Transport emissions	Major roads such as R3; bottlenecks such as checkpoints and border crossings; major rural centres

(ii) Trends in air quality in the NSEC

Source	**Trend**	**Source**
Burning waste biomass	Shifting cultivation reducing;	Government of Bokeo 2005 – Development Plan
Fuel used for cooking	Wood fuel increasing	GoL 2006 - Census
Dust emanating from unsealed roads	Dust from roads reducing with more paved roads being developed	EIA Report 2003
Transport emissions	Transportation emissions set to rise with completion of R3	Nathan Associates et al 2003

Implications for development in the NSEC, for natural systems and for communities
The NSEC developers must be considered for road watering in the area of construction should be conducted at least once everyday during the dry season and appropriate, scheduled road maintenance will be needed to retain a sealed surface, continuing the improved situation (WB, 2007).

Please consider current state & recent & future trends (including government targets)

Indicator: Level of smoke haze from forest fires
Target: Area of burn-off in the NSEC reduced by 50% by 2015
Trends: Smoke from fires continues to be a problem during February-March

Indicator: Households using wood for fuel with fuel efficient stoves
Target: All NSEC households have fuel efficient stoves by 2015
(include sources of indicator and target)
Trends: More than 95% of NSEC households use wood for fuel

Indicators: Pollution control devises installed in vehicles
Target: All vehicles using the NSEC have pollution control devises by 2015
Trends: No pollution controls on transport enforced in NSEC

Relevant laws, policies, plans and institutional arrangements:

- Vienna Convention on the Protection of the Ozone Layer
- Montreal Protocol
- Environment Protection Law 1999
- Decree on Discharges and Emissions 1994 MIH
- Decree on the control of Import, Export and Consumption of Ozone Depleting Substances (decree No. 162/PMO, 13 October 2003);
- Regulation on control of Import, Export and Consumption of Ozone Depleting Substances (regulation No. 2358/STEA-PMO, 16 November 2004);
- Draft Regulations for Adoption of Ambient Environment Standards 2005, STEA
- Lao PDR Environment Monitor (WB, 2007)

National standards for industrial air and water pollutants

- Regulation for the Adoption of Ambient Environmental Standard (DRAFT) (GOL, 1999). [This is in draft format only. According to STEA it is currently being revised and is due for release late this year].
- Draft Practical Guidelines for Health Impact Assessment (HIA) (GOL, 2007)

Problems and issues encountered during data collection:
Not much information in

The difficult part from provincial data collection and lake of air pollution information in project area

Summary of main concerns for the NSEC:

- **Smoke haze from forest fires** originating from slash and burn cultivation practices of upland farmers
- **Smoke from household cooking**: Most NSEC households use wood as the main source for cooking,
- **Dust from unsealed roads and construction sites**: A serious health problem for expanding settlements along road sides.
- **Transport emissions:** Road transport – especially heavy vehicles, expected to increase with no provisions for pollution control

References/sources:

1. Asia Development Bank, 2006, Country Synthesis Report on Urban Air Quality Management – Lao PDR : Discussion Draft, Philippines
2. Government of Lao 2006, Results from the Population and Housing Census 2005, Government Printing, Vientiane Capital.
3. London, S, 2001, Community-based fire management in Lao People's Democratic Republic: Past, Present And Future, FAO, cited http://www.fao.org/docrep/006/ad348e/ad348e0j.htm
4. Bouaket, S., 1999, Forest Fires in Lao PDR, cited www.fire.uni-freiburg.de
5. Nathan Associates, CPCS Upham Corp and CDRI, 2003., Preparing for the NEC – Environment Impact Assessment - Final Report,
6. Lao PDR Environment Monitor, WB 2007

Annexes: (eg. maps, diagrams, tables)

Environment
Template 12: Water pollution

Key issue EN2: Water pollution (road/transport, agricultural areas, industries)

Introduction:

The water quality in rivers within Lao PDR is considered to be 'good' (WEPA 2008). However, there are signs that pressures from rapid demographic growth, socioeconomic development and urbanization are increasing (WB 2007).

Surface Water - In Lao PDR, surface water is the major water source for urban water supply (World Bank 2007). There is very limited irregular water monitoring being carried out in urban areas – mostly in Vientiane.

Groundwater – According to the World Bank's Environmental Monitor (2007) **"**There is little information available on groundwater quality in Lao PDR, even though it is the main source of rural water supply. No systematic monitoring of impacts of fluoride, pesticide, nitrate from fertilizer and other chemical pollutants is carried out".

The Mekong River - The Mekong's water quality has been measured once or twice per month at 98 sites since 1985 until present time. Measures are taken to determine the amount of sediment in the water, its salinity, and level of nutrients. Base data shows that water quality in the Mekong, like other rivers in Lao PDR is generally good, especially when compared with many other great rivers in the world (MRC 2003). There is one MRC water quality station in Cheing Saen where the Mekong River enters Laos.

Table 1: *Water quality at 11 localities on the Mekong and its major tributaries (1985-2000)*
Source: MRC 2007

Parameters (grouped)	Organic matter	Nitrogenous matter	Nitrates	Phosphorous matter	Mineralisation	Acidification
Chiang Saen (Mekong)						
Luang Prabang (Mekong)						
Vientiane (Mekong)						
N. Phanom (Mekong)						
K. Chiam (Mekong)						
Pakse (Mekong)						
Chiang Rae (Nam Mae Kok)						
Ban K. Done (Se Bang Hieng)						
Rasisalai (Nam Mun)						
Yasothon (Nam Chi)						
Ubon (Nam Mun)						

Note; Red – bad, yellow – fair, green – good, blue – very good—according to the French water-quality classification system.

An MRC study conducted in 2007 "establishes current baseline conditions for environmental contaminants in the lower Mekong River and its major tributaries. The study found that:

- Concentrations of metals in water and sediment are mainly below any level of concern.
- Industrial contaminants and pesticides in water are all less than the detection limit and less than published criteria (where available) for biological effects.
- The environmental effect of pesticides on sediments cannot be determined as the detection limits available in this study were too high for most pesticides.
- The stretch of the Mekong River where it leaves China and enters Lao PDR is problematic - toxicity has been recorded

Main sources of water pollution in the NSEC have been identified as:

1. Sediment Loads - higher sediment loads are affecting several rivers including the upper and lower stretches of the Mekong. Loads vary considerably from 0.41 to 3.45 tones per hectare per year (WB 2007). While sediment loads are naturally at high levels in some of these areas, deforestation leading to topsoil loss in uplands and riverbank erosion and infrastructure such as concrete river embankments and hydropower dams that alter natural flow patterns is becoming an increasing issue (Lazarus, K et al 2006). Two hydropower stations have been built on the on the mainstream in China

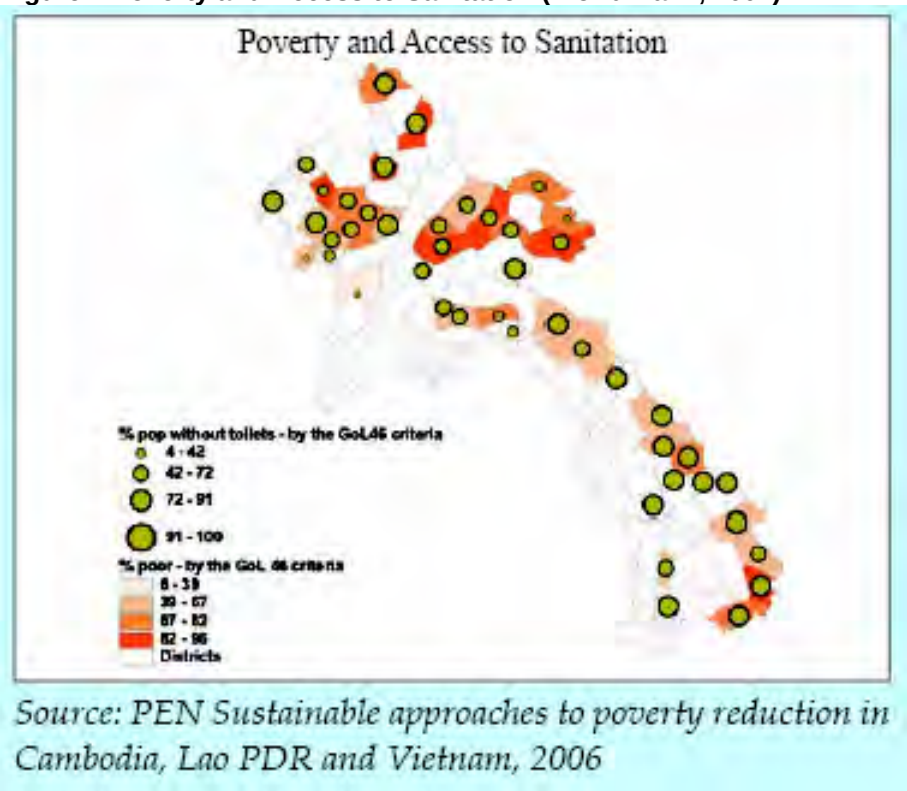
(Manwan and Dachaoshan) and six more are planned (MRC 2007). In Laos, feasibility studies are being conducted for a series of Mekong mainstream dams, one, the Pak Beng Project is located in Bokeo Province.

2. Agricultural pollutants – The transformation of the agricultural sector from subsistence framing to cash crop farming is steadily underway in the NSEC. This is being promoted by the government and is outlined in both the Bokeo and Luang Namtha Provincial Development Plans 2006-2010. With this transition comes more intensive farming with the use of inputs such as chemical fertilisers and pesticides. More intensive farming can lead to an increase of nutrients in water resources. There have been rising instances of the misuse of these chemicals by farmers resulting in water resource contamination (Vientiane 2008a). Recently the government announced that it is drafting a decree on the licensing of pesticide importers and traders (Vientiane Times 2008b)

3. Household Waste – According to the World Bank (2007) methods adopted for treatment and disposal of wastewater are generally still not satisfactory in Lao PDR. The Lao PDR Census (GoL 2006) reveals that 62% of urban households are still without toilet facilities. Most households rely on soak pits for wastewater disposal. "Access to sanitation in rural areas in 2004 was only 36 percent. Of these, flush latrines with septic tank or sewage system accounts for only 0.1 percent. The majority has no latrines, resulting in the use of fields, marshes, and watercourses for disposal of human wastes" (WB 2007).

Utility	**Toilet type (%)**					**Total**
Province	Flush	Septic tank	Other	No toilet	Not recorded	100
Bokeo	1.0	50.7	3.2	41.0	4.2	100
Luangnamtha	0.2	42.6	5.6	50.4	1.1	100

Figure 1 Poverty and Access to Sanitation (World Bank, 2007)



Source: PEN Sustainable approaches to poverty reduction in Cambodia, Lao PDR and Vietnam, 2006

Source WB 2007

4. Industrial waste

According to the World Bank's Environmental Monitor (2007) the growth of larger industry such as pulp and paper, timber, food processing and garment manufacturing in Lao is also presenting threats

to water quality. The limited wastewater treatment systems of these industries for reducing waste concentrations and loads in the final effluents to waterways are increasing the risk of pollution.

Industrial growth in Luang Namtha indicates that this is only a small pressure. At present there are only a few potentially high polluting outfits including 2 mining operations, and Iron processing plant, 1 cotton factory and 7 noodle factories. However with improving road access industry is expected to increase substantially in years to come.

Table 2 Industry Growth in Luang Namtha Province 1999-2007

Factory Type	1999-2003	2004-2007
Plastic	1	
Furniture	2	
Drinking Water	5	2
Mining	1	1
Sawmill/Timber	5	
Salt	1	
Brick	7	2
Ice	3	
Cotton	1	
Iron	1	
Ricemill	2	12
Alcohol	1	
Noodle	1	6
Fish Sauce	1	
Cigarette		1
Rubber	1	1
Jobs Tear		1
Traditional Medicine		1
Roofing		1
Charcoal		1
Rattan		1
Total	**33**	**30**

Main geographic location of pollution concerns

Source	Location
Sediment Loads	Mekong and tributaries
Agricultural pollutants	Sites where cash farming is most prevalent
Household Waste	Rural villages (who on the whole do not have adequate sanitation)
Industrial Waste	Sites of industrial development

Trends in water quality in the NSEC

Source	Trend	Source
Sediment Loads	No data (high and assumed increasing)	Lazarus, K at al 2006; MRC 2007
Agricultural pollutants	Nitrogen and Phosphorous levels good	MRC 2007
Household Waste	Decreasing as more households acquire adequate sanitation	WEPA 2008; WB 2007
Industrial Waste	Increasing as more industry comes to the area	WB 2007;

Implications for development in the NSEC, for natural systems and for communities

The ADB's Small Towns Development Sector Project (STDSP) and the Urban Development Administration Authority (UDAA) provide recommendations for pollution and waste management systems for provinces in Lao PDR including:

- Planning for future waste volumes under different scenarios (population growth, industries and factories growth, amounts of wastes produced, recycling practices, etc).
- Planning for increased coverage of households, factories and industries of service levels.
- Plan for gradually better sorting and safe disposal of all different kinds of dangerous waste, including waste from industries, factories, petrol stations, garages, etc.
- Planning for better local sanitation regulations, and their implementation

Sources: MCTPC and DHUP 2005

Indicator: Sediment loads in NSEC waterways (TSS and turbidity)
Official target: Ambient Water Quality Standards for Fresh Surface Waters (GOL, 1999).
Trends: There is a lack of historical data on sediment loads in NSEC waterways. The World Bank Economic monitor reports that higher sediment loads are affecting several rivers including the upper and lower stretches of the Mekong. Loads vary considerably from 0.41 to 3.45 tones per hectare per year.
Drivers of trends:

- Dam construction on the Mekong and its tributaries
- Deforestation of Mekong and tributary catchments

2. Indicator: Agricultural pollutants
The main compounds of fertilizer are Nitrogen and phosphorus.
Chemical Oxygen Demand (COD): is the total measurement of all chemicals in the water that can be oxidized. This could be assumed the amount of chemical contain in the water.

Official Target: Ambient Water Quality Standards for Fresh Surface Waters (GOL, 1999). Decree for licenses to import and sell pesticides, 2008 (drafting) MAF

Trends: According to the MRC Nitrogen and Phosphorous levels good (MRC 2007); expected increase in years to come with development of the agricultural sector.

Drivers of trends: Increase of intensive cash crop farming and use of agricultural inputs such as fertilizers, pesticides and herbicides

Indicator: Organic pollution in NSEC waterways
Feacal coliform; Biological Oxygen Demand (BOD)
Official Target: Ambient Water Quality Standards for Fresh Surface Waters (GOL, 1999).; Ministry of Health Drinking Water Quality Guidelines (GOL, 2004); Environment 2020 and Environmental Operation Plan 2006-2010 (LNT Government 2003)

Trends: Decreasing as more households acquire adequate sanitation (WEPA 2008; WB 2007)

Indicators: Industrial waste water in NSEC

Official Target: Regulation on Sewage and Waste Water for the Industrial Sector 2005 (MoIC)

Trends: According to the MRC (2007) diagnostic study on water quality, toxicity in the upper Lao stretched of the Mekong needs further investigation.

Drivers of trends

- Increasing as more industry come to the area as promoted in the government development plans
- the rapid development of the Lancang basin in China and increasing pollution in Chinese rivers raise concerns about a deterioration quality of the water arriving in the Lower Mekong basin from China in the future (WB 2007)

Relevant laws, policies, plans and institutional arrangements:

Regulation:

- The Water and Water Resources Law, October, 1996.
- Environment Protection Law 1999
- Decree on Discharges and Emissions 1994 MIH
- Regulation on Sewage and Wastewater Discharge for the Processing Industry 2006 (MoIC)
- Domestic Waste Water Regulation 1998 (STEA)
- Decision on the Management Standard of Drinking Water Quality and Household Water Use (MoH)
- Draft Regulations for Adoption of Ambient Environment Standards 2005, STEA
- Decree for licenses to import and sell pesticides, 2008 (drafting) MAF

National standards for industrial water pollutants

- Ambient surface water quality guidelines:
  - Ambient Water Quality Standards for Fresh Surface Waters (GOL, 1999).
  - Regulation for the Adoption of Ambient Environmental Standard (GOL, 1999)
- Drinking water quality guidelines:
  - Ministry of Health Drinking Water Quality Guidelines (GOL, 2004).
  - World Health Organisation Guidelines for Drinking Water Quality (WHO, 2004).
- Industrial Waste
  - Regulation on Industrial Waste Discharge 1999 (MIH)
  - Regulation on Sewage and Waste Water for the Industrial Sector 2005 (MoIC)

Strategy and Plans

- Bokeo Provincial Government (2006), Institutionalization and Economical-Social Development Plan of (2001-2005) and Economical-Social Development Plan (2006-2010), Houay Xai, Lao PDR
- Luang Namtha Provincial Government (2006), Strategy of Environment until 2020 and Environmental Operation Plan years 2006-2010, Luang Namtha, Lao PDR
- Luang Namtha Environment Stratgegy 2020 and Environmental Operation Plan 2006-2010 states that water resources are important to the provinces development and encourages the use of better technology to reduce potential negative impact from the industrial and agriculture sector. The Province plans to develop a strategy for water resource and water quality management.

Problems and issues encountered during data collection:

- Hard to get the information and take time
- The provincial level they are lack of systems for water pollution management in Provinces.

Summary of main concerns for the NSEC:

- **Cross border river pollution:** There is evidence that surface water entering Laos from Yunnan Province has been polluted raising the need for collaborative agreements on management of shared rivers
- **Localised industrial pollution:** industrial development is picking up in the NSEC – often with international investment in concession areas and zones. No pollution controls have been put in place and there is anecdotal evidence of localized pollution
- **Increasing use of agricultural chemicals in the NSEC:** Agriculture is intensifying and chemical uses is increasing and uncontrolled.
- **Uncertain impact of hydropower and multi-purpose reservoirs on water quality:** Mekong hydropower dam development in the area and the risk of the release of anoxic bottom waters from reservoirs

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16. Paper No. 15, Mekong River Commission, Vientiane. 57pp.

Annexes: (eg. maps, diagrams, tables)

Environment
Template 13: Water Resources
Key issue EN3: Unsustainable use of resources (forest, land, water)

Introduction:

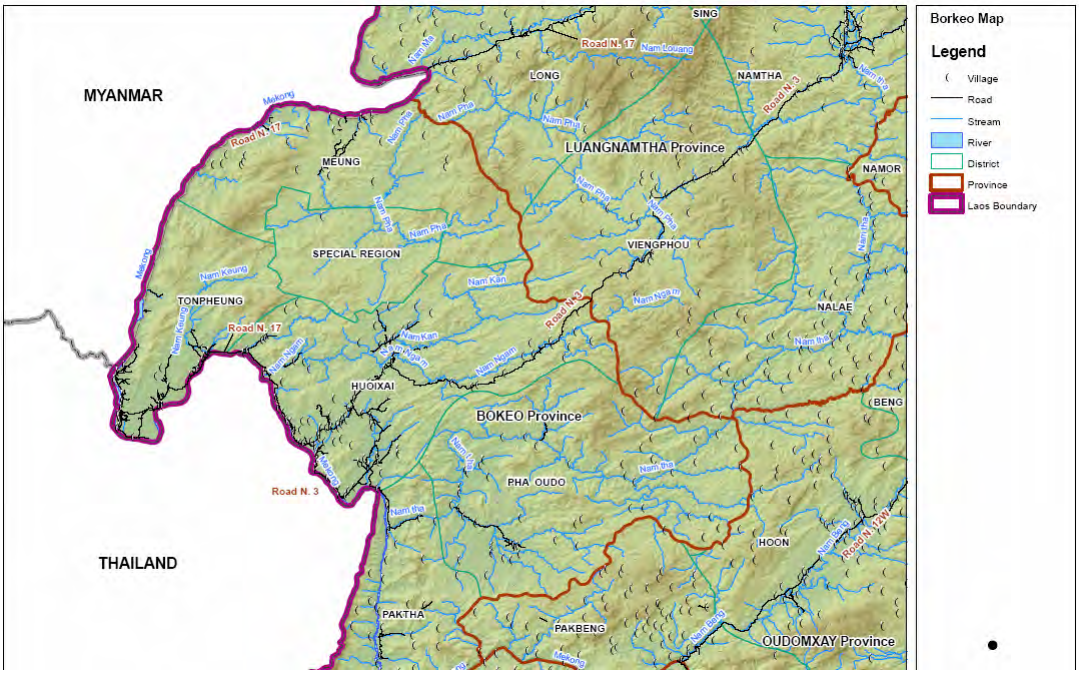
Water Resources in Lao PDR: Water resources in Lao PDR are the main support to socio and economic development, particularly, the hydropower, irrigation, transportation, agriculture, mining and industries sectors. Infrastructure related to water resources development is considered as one essential component of development plan of the Lao government country's strategy on poverty alleviation from now to 2020. The estimated area of inland water resources is 723,500 hectares. Of this, 200,000 hectares are from the Mekong River, 54,000 from other main rivers, 57,000 from reservoirs, 1,500 from swamps, 406,000 from rice fields and 5,000 from fish ponds (Philip et al, 2006).

Water Resources in NSEC

Surface water: The Mekong river is an important resource to the people in the NSEC, providing a wide range of aquatic resources for subsistence and trade, as well as water for drinking, bathing, and crop irrigation. The NSEC is part of the broader Mekong watershed. Major tributaries include the Nam Ngao, Nam Pha and Nam Tha. Along the R3, the Nam Hor flows southwestward directly into the Mekong. From Nalea to the Provincial boundary rivers in the vicinity of the Project Road all flow into the Nam Ngao than flow to westward. From the provincial boundary to Ban Phoulan the rivers are part of the Nam Pha watershed. Along the R3 the Nam Ngeun runs in a northeastward direction, the Nam Pha to the north, and the Nam Chouk to the southwest. The rivers from Ban Phoulan to Boten are all part of the Nam tha watershed. The Nam Pon, Nam ha and Nam Leu all flow in a northeasterly direction and the Nam Thaluang and Nam Ten both flow roughly to the southeast (Nathan Associate et al, 2003).

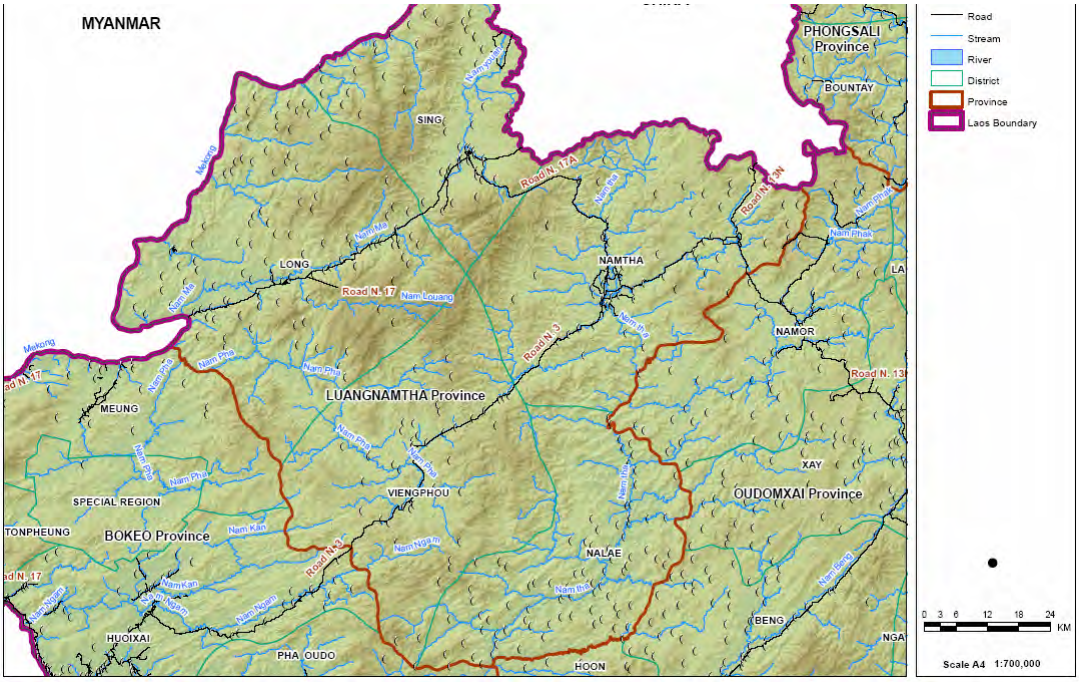
Ground water and flooding: In lowland areas along the R3 the water table is very shallow, in many places coming to the surface during the rainy season. This phenomenon is essential to the local economy because it allows for wet paddy rice production in these areas. Therefore, the NSEC road design has to incorporate a significant number of drainage structures and in some places will require raising the roadbed above the surrounding land. Flat areas to the northeast of Houayxay and Vieng Phoukha are particularly prone to flooding. Where deforestation has occurred hillsides are quickly destroyed and areas downstream experience flash floods during the wet parts of the rainy season in July and August. Similar with Bokeo province that the river Nam Ngao is low in dry season and flooding in the rainy season (Nathan Associate et al, 2003).

Figure 1 Water resources in Bokeo Province



Sources: National Geographic Department 2007

Figure 2 water resources in Luang Namtha Province



Sources: National Geographic Department 2007

Water Users in NSEC: Water users in the NSEC have been identified under the following categories

Community (settlements – villages; district towns): Communities in the NSEC rely heavily on the areas water resources for drinking and cooking. Statistics from the national population and housing census (GoL 2006) outlined in the table below show the importance of river, stream, dam and mountain water resources.

Table 1 Water users in NSEC

Provinces	No. of household	percent	Distance to water source			
			on the premises	<500m	500-1000m	>1000m
Luang Namtha	25943	100	51.7	43.1	4.9	0.3
piped water in/out side	2627	10.1	88.7	7.7	3.3	0.4
well/borehole protected	2195	8.5	54.9	41.4	3.7	0
well/borehole unprotected	3400	13.1	43.2	50.5	5.5	0.8
river, stream or dam	4767	18.4	14.5	73.7	11.7	0.2
mountain source	12540	48.3	48	48.5	3.5	0
rain water from tank	58	0.2	31	62.1	6.9	0
other	192	0.7	81.8	17.7	0	0.5
not stated	164	1				
Bokeo	25470	100	56	30.4	5.6	8
piped water in/out side	1866	7.3	92.6	4.6	1.2	1.7
well/borehole protected	2180	8.6	75.6	21.9	1.4	1.1
well/borehole unprotected	4746	18.6	63.2	35.1	1.6	0
river, stream or dam	2601	10.2	18.7	60.7	17.6	3
mountain source	13367	52.5	68.3	28.1	2.7	0.9
rain water from tank	82	0.3	43.9	53.7	1.2	1.2
other	112	0.4	29.5	8.9	13.4	48.2
not stated	516	2	0	0	0	0

Source: Results from the population and housing census 2005

Infrastructure

Agricultural users (irrigation): Most agriculture in the Project area is at a subsistence level. Rice is the most

important crop. Many villagers within the Project area experience rice deficits for several months of the year. Rice paddy land is in high demand, and is quite limited in the mountainous Project provinces. There is less of irrigated land, in dry season most lowland areas have to watered or irrigated to produce crops. Upland, swidden rice production supplement lowland paddy rice with a much lower yield per hectare (Nathan Associate et al, 2003).

Louang Namtha Province Agriculture: Luang Namtha Province produces cotton, root and leafy vegetable, maize, soybeans, peanuts, sugar cane, bananas and small quantities of other crops. There are tree plantations for rubber, teak, mulberry, and other species. Fruit trees are planted mostly for domestic use, with market access a major barrier to commercial production.

Luang Namtha population 83% practices swidden agriculture. Estimates of land under swidden production in 2003 was approximately 8454 ha (Gov LNT 2003). The province has delegated 240,050 ha of land, or about 26% of the total land in the province as agricultural production land, of which the following determinations have been made:

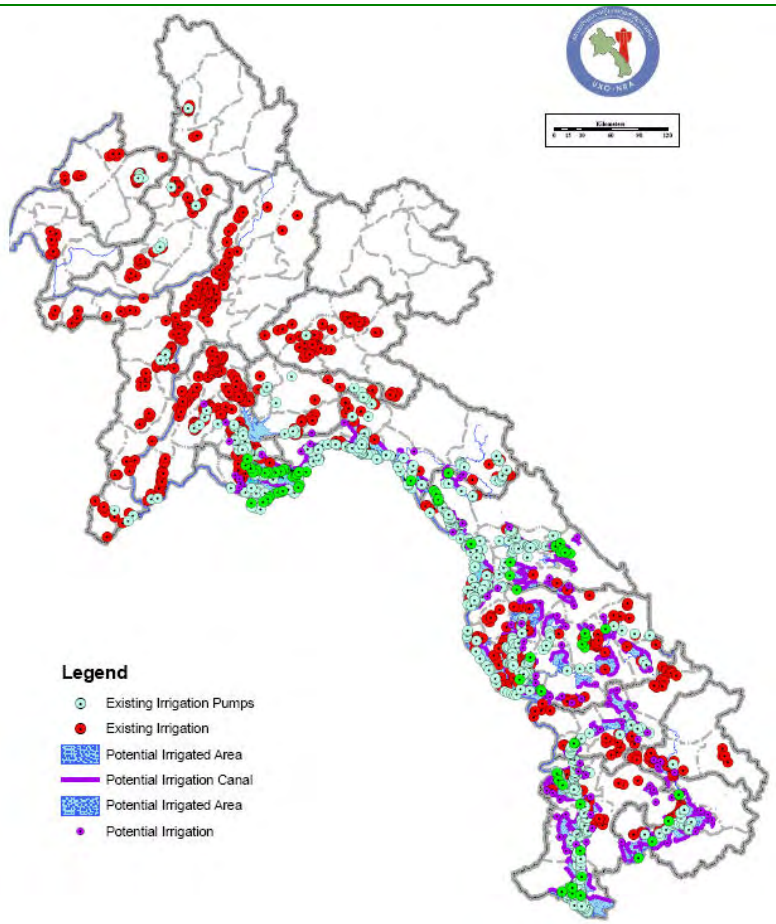
Suitable for paddy	16,900 ha	7.04%
Suitable for short-rotation cash crops	26,535 ha	11.05%
Suitable for rubber or eucalyptus plantations	196,615 ha	81.91%

Presently the Provincial Agriculture Forestry Office (PAFO) calculates the amount of land under paddy rice production in the province to be 10,386 ha. Villages along the Project road generally have more paddy land than province average, since much of the roadway is through valleys. Along the Project Road paddy land is most abundant in the Luang Namtha plain (Nathan Associate et al, 2003).

Bokeo Province Agriculture: The agriculture in Bokeo Province is in many ways similar to Luang Namtha. Bokeo Provincial Agriculture Forestry Office (PAFO) reported that the province has 47,820 ha of agricultural land. Estimates of land under swidden production in 2003 was approximately 738 ha down from 2448 ha in 2000 (Gov Bokeo 2005). Flat land is unevenly distributed, and there is land pressure on areas suited for rice paddy development. In the Houay Xay District, paddy land is abundant for the first 30 Km out of Houay Xay town, and every square meter of appropriate land is used for wet-rice cultivation. Low terraces extend the area of paddy land beyond the lowest places. The PAFO reports that in 2003 there was about 1,700 ha of dry-season irrigation in the province (Nathan Associate et al, 2003).

Many agriculture areas around two provinces have requested for government to develop more irrigation. Data from Department of Agriculture and Forestry in Bokeo Province shows that there are 17 irrigation projects that supply each district around the province and 4 projects are under construction and 5 projects are planned (PAFO, May 2008).

Figure 3 Status of Irrigation in Lao PDR (UXO & NRA, 2007)



Transportation users

Road Transportation: Water drainage is diverted by roadworks. This increases flows in the discharge area can cause severe erosion at the point where the water is released from the drainage structure, or further downstream where a number of drainage discharges come together to produce high flow volumes (Nathan Associate et al, 2003).

Water transportation: The Mekong river is a major transportation waterway. On Mekong River there are boats running both down river to Pak Beng and Luang Phabang, upper river to Xieng Kok. From Chiang Khong, Thailand there are long-tail boats serving as small passenger ferries to Houay Day's immigration port. Car ferries run across the Mekong River to Houay Xay's large boat port (Nathan Associate et al, 2003)

Management concerns regarding river transportation include:

- the need for river widening/blasting
- increased wash causing bank erosion
- disturbance of fish ecosystems

In Louang Namtha Province the Nam Tha River is used by boat traffic primarily in the wet season. Boats trafficking goods and people on the Mekong from the Lao PDR-Myanmar-China PRC border to Xieng Kok and Houay Xay come from PRC, Thailand, and Lao PDR and Myanmar. Altogether there are 260 small passenger boats registered for the province, 258 of which are restricted to the Nam Tha river (Nathan Associate et al, 2003). According to statistics from the Waterway Management Division, Ministry of Public Work and Transportation there are 85 commercial and passenger boats registered in the province. (see table 2)

Bokeo Province: Information from the Waterway Management Division, Ministry of Public Work and Transportation Summary of waterway transportation in Lao PDR, 2006 show that there are 483 boats commercial and passenger boats registered in the Province. (see table 2)

Table 2 Statistic of Waterway Transportation in Lao PDR year 2006

Provinces	Boat Register	Commercial Boat (Tones)			Passenger Boat (Person)			
		0.5-5	6-50	>50	Speed boat	5-15	16-50	>50
Louang Namtha	85	15	8	0	35	20	7	0
Bokeo	483	68	72	7	150	68	106	12

Hydropower users: Recently Laos has declared to be as an "Asian battery", this makes Laos stand as the most attractive country to provide hydroelectricity power in Asian. The need of hydroelectricity power has been increased rapidly among neighboring countries particularly Thailand, China and Vietnam.

Figure 4 Future hydropower projects (Thomas I., 2007)

In late 2007, Lao and Thai governments signed "The MoU called for Laos to provide 7,000 MW to Thailand" which means that Laos will provide energy about 5,000 MW to Thailand from now to 2015 and 2,000 MW after 2015. Moreover, Laos already agreed to provide energy to Vietnam about 3,000 MW from now to 2020. Further more, there are several hydroelectricity projects, which are under feasibility studies of Chinese companies and some hydropower has been already constructed. Similar to other foreign hydropower companies, all Chinese hydropower companies will sell the vast majority of energy to China and some small proportion of energy will used for domestic consumption.

Hydropower is a key sector for Lao PDR. The country is estimated to hold around 80% of the total hydropower potential in the lower Mekong basin and high investment and development priority has been placed on harnessing this resource.

- In 2004, exports of electricity of over US$100 million accounted for 18 percent of Lao exports.
- All past exports have gone to Thailand but new agreements and the development of the GMS grid will see electricity exports to Vietnam, China and other GMS countries.
- Upon completion of the Nam Theun 2 Dam in 2010, exports are expected to increase to US$354 million, with total government revenue from electricity exports of approximately US$100 million per annum.
- The total capacity of the country is estimated at 23,000 MW and 81% of all hydropower potential

in the Mekong basin south of China. (IISD, 2007).

There are a number of hydropower projects operating, under construction or under feasibility in the NSEC (see table below). Note that the Nam Tha project is the only hydropower project identified in the 1994 MIH list. A further 4 have been tabled on the recent NCE list 2008

Table 3 List of hydropower developments in the NSEC

	Project Name	Province	Installed Capacity	Year of Completion	Companies
1	Nam Tha 1 *	Bokeo	16	TBA	China Southern Grid Co.
2	Nam Khone	Bokeo/Luangnamtha	2.4	2010	Nam Khone Power Co
3	Nam Pha	Luangnamtha/Bokeo	70	TBA	Kobe Green Power
4	Nam Long	Luangnamtha	2.5	TBA	Luangaseut Contruction Company
5	Pak Beng	Oudomsai/Bokeo	1300	TBD	Datang International Power Generation Co.

* The Nam Tha 1 Project is the only project listed above that appears on both the 1994 and 2008 lists suggesting a strong trend in the promotion of hydropower development in recent years.

Source (Ministry of Industry and Handicrafts 1994); Lao National Committee for Energy 2008

Industry: There are a few medium-to-large size industries in the area. The provincial government is planning more industries related with the agricultural sector (LNT Provincial Government 2003). The Luang Namtha Provincial Industry Department has determined that the industrial zone is outside of town on the south side of the route 3. There are several industries making goods such as cotton and silk, handicrafts, agricultural and non-timber forest products.

Luang Nam Tha Province has five stone crushing factories. Three are north in Ban Tintok and two are in Ban Poulan. One of these factories is located in the Nam Ha National Protection Area. There are two motorcycle assembly plants, one in Lao at Ban Tintok and another Chinese owned is close to LNT city center near the road to Boten. Three other Chinese factories are soon to come into operation – one for rubber-processing, a laundry soap factory and pharmaceutical factory. There is one Lao sawmill which has operated for the last 50 years on Muang Sing road out side LNT city center.

Other local industries include a drinking water factory in Ban Phoe Sai, and a salt factory at Ban Boten. Another factory long located in LNT is concerned with non-timber forest products; another Garment factory in Ban Phon SaiSavang and some small furniture factories and brick factories for the domestic market (Nathan Associate et al, 2003). Figure 1 shows the number of industries in Luang Namtha Province in 2003.

Since 2003, Luang Namtha Province has attracted an increasing number of factories. Most are rice mill factories in Sing District, one a traditional medicine factories, 6 noodle factories and one job tear factory at Luang Namtha District (Figure 2 shows the number of industries in Luang Namtha province 2000-2007).

Viengphoukha District has one mining company near route R3, which brings some benefit to the district such us maintains Route 3 in section on Houei Sai district, Bokeo Province and manages for ferrying across the Mekong. Similar with a sawmill at Ban nam Fa also gives some benefit to the area village, such as providing iron sheets to rebuilding a village temple. Timber for village meeting hall (Strategy of Environment in 2020 and action plan in 2006-2010 of Luang Namtha Province 2003).

Table 4 Number of new factories opening in Luang Namtha Province 1999-2007 (GOL, 2006)

Factory Type	1999-20003	2004-2007
Plastic	1	
Furniture	2	
Drinking Water	5	2
Mining	1	1

Sawmill/Timber	5	
Salt	1	
Brick	7	2
Ice	3	
Cotton	1	
Iron	1	
Ricemill	2	12
Alcohol	1	
Noodle	1	6
Fish Sauce	1	
Cigarette		1
Rubber	1	1
Jobs Tear		1
Traditional Medicine		1
Roofing		1
Charcoal		1
Rattan		1
Total	**33**	**30**

Table 5 Number of new factories opening in Bokeo Province 2006-2007, (GOL, 2008)

Factory Type	Number
Gas	1
Leather	3
Machine	4
Sawmills	7
Furniture	20
Concrete	2
Drinking water	11
Ice	11
Rice	1
Traditional Medicine	1
Alcohol	8
Total	**69**

Please consider current state & recent & future trends (including government targets)

Indicator: Number of HH that have access to clean water in the NSEC (MDG and National Census 2005)
Official target: The country has committed to Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation: Proportion of population using an improved drinking water source; Proportion of population using an improved sanitation facility (UNDP 2007)
Trends: No trend info sourced but assumed increasing access to clean drinking water; degradation or destruction of catchment water supplies.
Drivers of trends:

- Increases in rural water supply due to rural development (sanitation and water supply) projects through the government (eg Poverty Reduction Fund) in association with international organisations
- Decreases in integrity of natural water supply from rivers and streams due to land clearing and water resources development.

Indicators: Rehabilitated area of degraded forest within the NSEC
Target: Rehabilitated forest area within, around and linked protected areas increases by 50% by 2015
Trends: Shifting cultivation is reducing as agriculture intensifies

Indicator: Rehabilitated area of degraded waterways within the NSEC
Target: Rehabilitation and conservation zones following all waterways in the NSEC formally established by 2015
Trends: Waterways within and outside protected areas seriously degrading due to road and other forms of development

Indicator: Number of river and road infrastructure projects; number of registered commercial boats in the NSEC
Target:

- Increasing river transport along the Mekong (eg Lancang-Mekong Navigation Channel Improvement Agreement 2000)
- Ministry of transport road plan or ADB NSEC plan

Trends: Increasing river and road transport infrastructure in the NSEC
Drivers of trends

- Transportation infrastructure development projects
- Regional integration policies

Indicators: Hydropower Infrastructure – Number of hydropower plants operating, under construction or planned in the NSEC
Target: To realize Lao PDR's full potential for hydropower production. National hydropower policy 2007
Trends: Substantial increase in hydropower development activity nationally and in the NSEC over recent years (NCE 2008).

Drivers of trends

- National development targets
- Electricity export targets and current agreement with neighbours such as Thailand

Relevant laws, policies, plans and institutional arrangements:

<u>Regulation</u>

- Water and Water Resources Law 1996,
- Decree on the Implementation of the Water and Water Resources Law

<u>Strategy and Plans</u>

- Government of Lao PDR Millennium Development Goals 2000
- Government of Lao PDR Hydropower Strategy 2007
- Bokeo Provincial Government (2006), Institutionalization and Economical-Social Development Plan of (2001-2005) and Economical-Social Development Plan (2006-2010), Houay Xai, Lao PDR
- Luang Namtha Provincial Government (2006), Strategy of Environment until 2020 and Environmental Operation Plan years 2006-2010, Luang Namtha, Lao PDR
- Luang Namtha Environment Strategy 2020 and Environmental Operation Plan 2006-2010 states that water resources are important to the provinces development and encourages the use of better technology to reduce potential negative impact from the industrial and agriculture sector. The Province plans to

develop a strategy for water resource and water quality management.

Problems and issues encountered during data collection:

- Lack of clear government targets for provincial development and water utilization
- Lack of historical statistics available to get trends

Summary of main concerns for the NSEC:

- **Watershed degradation** including forest and vegetation clearing and soil erosion due to infrastructure development, agriculture activities and settlements even within protected areas
- **Waterways and wetlands degraded** due to sedimentation, destruction of riverbanks, modification of water courses and encroachment on wetlands including within protected areas (eg Nam Ha NPA)

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Annexes: (eg. maps, diagrams, tables)

Environment
Template 15: Biodiversity
Key issue EN4: Biodiversity loss and ecosystem fragmentation (loss of ecosystem services)

Introduction:

Lao PDR is known for its high biodiversity and large forested area. It is very important for the country's development and for the livelihoods of local people. However Lao's biodiversity is declining. Key causes of biodiversity loss include:

- Agricultural expansion
- Continued logging of forests
- Development Projects (eg hydropower projects; mining and mineral export)
- Unplanned urban growth.
- Unsustainable extraction and trade

The NSEC has a number of biodiversity significant areas including the Nam Ha National Protected Area, the Nam Khan Provincial Protected area and the Mekong river and its major tributaries.

Species decline

Rare and Endangered Species: 13 species have become extinct in Laos over the last 100 years and according to IUCN, WWF, WCS (2007) at least 56 more are expected to fall below viable populations before 2013. The IUCN (2007) Red list for Laos has 157 endangered species listed over its 4 sub categories (Table 1)

Table 1: IUCN Red list 2007 Summary

	Endangered Species		
Group	**Critically Endangered**	**Endangered**	**Vulnerable**
Plant Species	5	7	5
Mammals	4	8	22
Birds	5	2	15
Reptiles	2	5	4
Amphibians	2	4	4
	18	26	50

http://www.iucnredlist.org
http://www.jica.go.jp/english/global/env/profiles/e99lao.pdf.

Loung Namtha Province Endangered Species: The Environment Impact Assessment of the NSEC (Nathan & Associates 2003) provides information on key species in the Corridor. There are at least 16 red listed species in Nam Ha NPA (Table 2) and a number of other species listed as near threatened or at risk in the region. There are more than twenty mammal species in Nam Ha NPA that are considered key species of conservation concern, including elephants, tigers and other wild cat species, wild cattle and deer species, gibbons, monkeys, and bears. At least a dozen bird species of special conservation significance have been reported in the Nam Ha NPA. Bird species, that are threatened or endangered include hornbills, pheasants, partridges, kingfishers, warblers, and parrot bills. There is limited data available on reptiles but one endangered species, the Rock Python, Python molurus, is known to inhabit the area, and the Siamese Crocodile is possibly present (NEI, 2003).

Table 2 Key Species of Conservation Significance in the Nam Ha NPA

Key Species	priority	Conservation Status	Remarks
Gibbon species	urgent	EN, VU	High trade/hunting treat
Tiger	urgent	EN	High trade/hunting treat
Asian Elephant	urgent	EN	small population, multiple threats
Dark muntjac species	urgent	DD	reported, widely hunted
Gaur	urgent	VU	few in remote areas
Asiatic Black species	urgent	VU	high trade treat
Sun Bear	urgent	DD	high trade treat
Rufous-necked Hornbill	urgent	VU	hunting threat
Pangolin species	High	NT	present, hunted and traded
Pig-tailed Macaque	High	VU	reported, hunted
Assam/Rhesus macaque	High	NT	present, hunted
Bear (stump-tailed) Macaque	High	VU	High trade/hunting treat
Golden Jackal	High	CS	reported, hunted
Dhole	High	VU	reported, hunted
Euraian/Smooth-coated Otter	High	NT	present, hunted and traded
Asiatic Golden Cat	High	NT	reported, hunted
Leopard	High	CS	Present, hunted
Sambar	High	Regional Risk	uncommon to fairly common
Chinese Goral/Southern Serow	High	CS	in steep, rocky areas
oriental Pied Hornbill	High	Regional Risk	hunting treat
Balck Giant Squirrel	Mid	CS	high hunting treat
Silver Pheasant	Mid	ART	fairly common resident
Gray peacock Pheasant	Mid	ART	common resident
Grey-headed lapwing	Mid	NT	uncommon winter visitor
Blyth's Kingfisher	Mid	VU	fairly common resident
Green Cochoa	Mid	NT	uncommon resident
Hill Myna	Mid	ART	uncommon resident
Rufous-throaated Fulvetta	Mid	NT	uncommon resident
Short-tailed Parrotbill	Mid	NT	reare resident
Slow Loris	Low	CS	common
Leopard Cat	Low	CS	relatively common
Rufous-throated Partridge	Low	ART	fairly common resident
and other bird species	Low		habitat destruction threat
Source: Nathan Associates Inc, 2003			

***CR**: Critically Endangered: Facing an extremely high risk of extinction in the wild in the immediate future*
***EN**: Endangered: Facing a very high risk of extinction in the wild in the near future*
***VU**: Vulnerable: Facing a high risk of extinction in the wild in the medium term future*
***NT**: Near Threatened: Of a lower risk than, but close to qualifying as vulnearable*
***DD**: Data Deficient: Inadequate information existes to marke a risk asessment for extinction*
***CS**: Of special conservation significance in Lao PDR*

***ART**: At risk in Thailand*

Bokeo Province Endangered Species: There are some endangered species live in Nam Kan Provincial Protected Area (PPA) a few of tigers, Leopard, Clouded Leopard, Bantend, Pygmy Loris, Black Bear, monkeys, otters, Green Peafowl, Siamese Firebaack Pheasant, and Reticulated Python. (Of national conservation significance in Lao PDR). (NEI, 2003). Along the NSEC in this province there are Tigers, Asian Elephants. Banteng, and other species that used to be found in the area are completely or nearly extirpated. Pangolins are reported as formerly common and now rare. Information on bird species as of 1997 indicated the presence of key bird species of conservation significance including: Ruddy Kingfisher, Watercock, and Short-tailed Parrotbill (NEI, 2003).

The Mekong River: The Mekong river is a significant source of aquatic biodiversity. The endangered Giant Catfish is known to inhabit the stretch of the Mekong River near the town of Houayxay (IUCN 2005). Fish species in general are being impacted by increasing development such as hydropower and navigation along the river.

Forests Decline

Forests in Luang Namtha Province: Forests are key habitats for the countries flora and fauna biodiversity. Loss of forests cover is highly correlated with loss of biodiversity. While the country is still the most forested country in South-East Asia, forest cover is declining - now at 41.7% down from 47% in 1991 due to a variety of pressures (State basin report MRC, 2003). Satellite imagery from 1990 shows that 57% of Luang Namtha Province was covered by forest. In 2003 officials in Loung Namtha Province identified 550,400 ha of province as "Forested" land. A breakdown of "Forest" categories indicates that actual present forest cover is probably in the range of 25% to 30% of land area. Table 3 provides the Provincial Agriculture and Forestry Office figures on forest cover in Luang Namtha (NEI, 2003).

Table 3 Forest land (550,400 hectares):

National Protected Area Forest	71,910.37 ha	13.07 %
Provincial Protected Area Forest	40,243.39 ha	7.31 %
District Conservation Forest	27.872.11 ha	5.06%
Mixed Forest	146,204 ha	26.56%
(bamboo and unstocked forest)		
Scrub or fallow	264,170.13 ha	48%

Forests in Bokeo Province: Satellite imagery from 1990 shows 50% forest cover in Bokeo province (MAF and Lao –Swedish Forestry Cooperation, December 1992). In 2003 Bokeo Province Provincial authorities identified 593,000 hectares of the land area under forest cover (NEI 2003). The official provincial count 355,000 hectares or 60% of land as presently forested, another 236,000 hectares is scrub and 2,000 ha is barren land.

Protected areas in and near to the NSEC

Key protected areas in the NSEC are presented in Table 4 and in Figure 1 below. They include a mixture of national, provincial and district protected areas.

Table 4 Protected Areas along the Project Area (EIA Report 2003)

Protected Area	Location	Size in Hectares
Phou Chom Chouk DPA	Houayxay, south of the Project Road	3,200
Nam Kan PPA	Bokeo, north of the Project Road	77,500
Phou Mot DPA	Viangphoukha District	214
Phou Pheung DPA	Viangphoukha District	773
Nam Ha NPA	Luang Namtha (all districts)	222,400
Combined area of DPAs	Namtha Distirct	2,151

Figure 1 Protected Areas of Bokeo and Luang Namtha Provinces (EIA Report 2003)

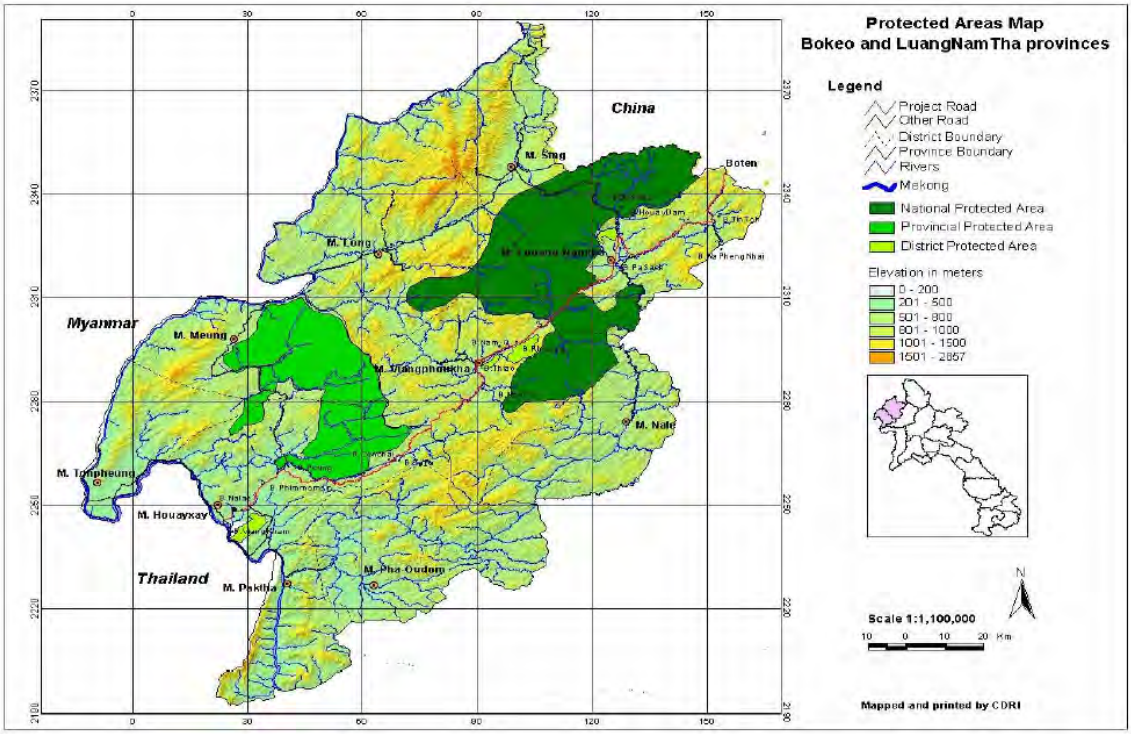
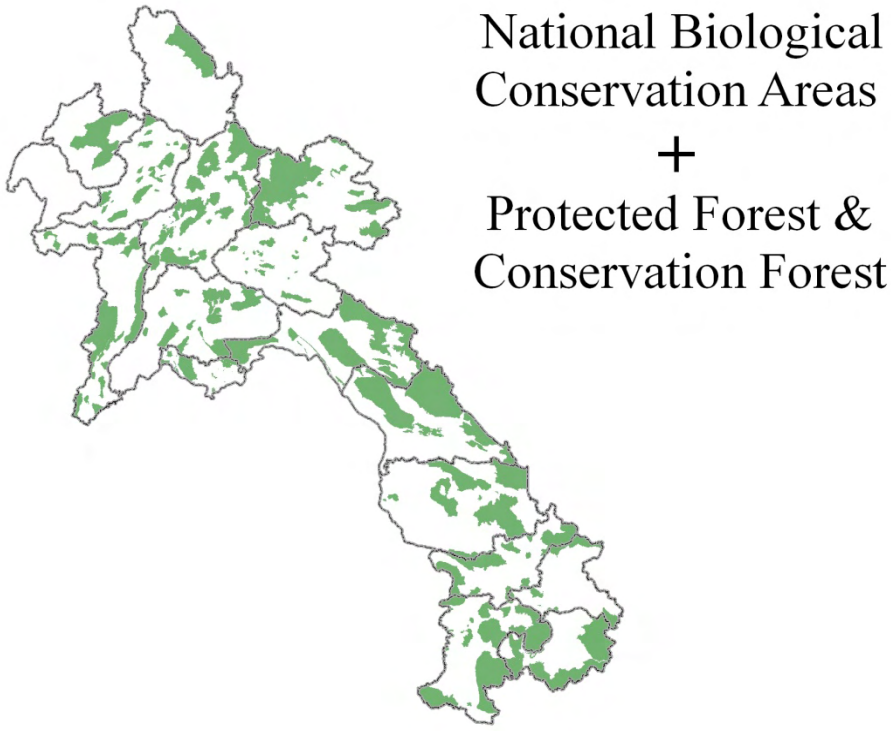


Figure 2 The National Biological Conservation Areas combine with Protected Forest and Conservation Forest



Source: National Regulatory Authority (NRA, 2007)

The Protected Area Policies: Policies for the PA or NPA management include:

- Biodiversity conservation (PM Decree 164)
- Maintenance of ecological stability (PM Decree 164)
- Protection of areas of scenic beauty for leisure and research (PM Decree 164)
- Protection of large natural areas of cultural significance (Forestry Law, Art 18)
- Watershed protection (Forestry Law)

a. Legal Framework: A set of legal instruments exists for PAs ranging from establish laws, PM's decrees and ministerial directives to advisory notes.
b. Prime Minister's Decree 164 (1993): PM's Decree 164 legally established a National Protected Areas system in 1993 for Nam Kan NPA this year. This decree has three objective:

- Protection of forest, wildlife and water
- Maintenance of natural abundance and environmental stability
- Protection of natural beauty for leisure and research

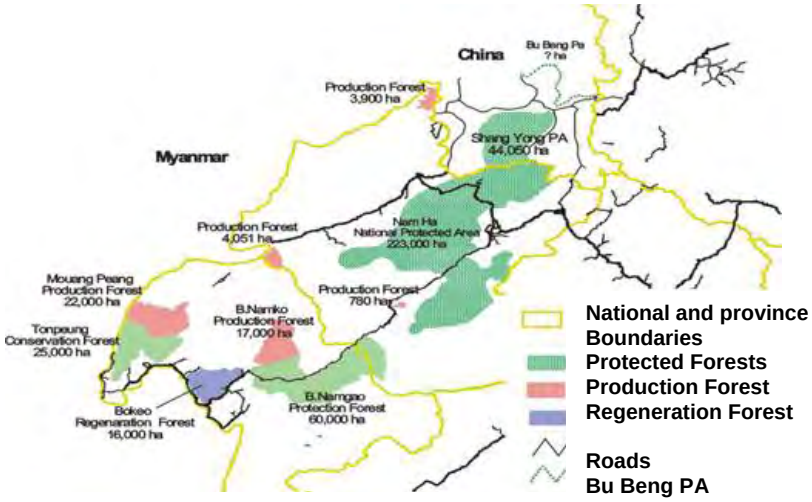
c. The Forestry Law (1996): The Forestry Law objective: - The Forestry Law created a framework for the general zoning within Pas into 'Totally Protected Zones" and 'Controlled Use Zones'. The controlled use zones allow people limited use, but control must be developed from specific regulations. It is mean that villagers will have right and management role in CUZs

National Protected Areas : A National Protected Area system was established in 1993. Referred to the decree of Prime minister of Laos and of Deputy Minister of Ministry of Agriculture and Forestry and the regulation number 0525 of MAF **(Mr. Singphone, Interviewer 29 July 2008.** The majority of literature covers the two largest protected areas of Nam Ha and Nam Kan.

a. Nam Ha (Loang Namtha): The Nam Ha National Biodiversity Conservation Area was established in 1993 under the NBCA decree 0525. It is located in Luang Namtha Province and

originally covered an area of 690km^2. In 1995 the area west of the Nam Ha (956km^2) was added. Similar with Nam Kong 348km^2 areas as a provincial protected area. However, Nam Kong area is along the Lao/China border and adjacent to the Shangyong Nature Reserve in Yunnan. Therefore, it was recommended that Nam Ha (west) and the Nam Kong provincial protected area be added to the existing Nam Ha to form a single administrative unit. This amalgamation occurred in 1999. As shown in figure 3 below - Regional protected areas and production forests (Biodiversity Report, 2003).

Figure 3 Regional protected areas and production forests



Source: Biodiversity Profile for Luang Namtha Province, 2003

The Nam Ha NPA now covers an area of 2,230 km^2 or 24% of Luang Namtha Province and also covered in five districts. The national protected area Nam Ha is divided into four zones for management see table 5 Nam Ha National Protection Area Core Zones, based on the regulation from MAF issued in 1997.

Table 5 Nam Ha NPA Core Zone. (MAF Regulation 1997)

Zone	Altitude	Dominant vegetation types	Other
Luang Namtha Plain 221.3 km^2	540-1000 m	• Evergreen forest • Secondary evergreen forest • Secondary moist riparian evergreen • Abandoned settlements with disused orchard trees • Mosaic of human-modified habitats including bamboo stands, secondary evergreen forest types • Various stages of secondary scrub and regrowth	Crossed by two wide rivers and many smaller streams
Northern Highlands 444.7 km^2	1000-2094 m	• Mature old-growth moist evergreen forest • Secondary dry hill evergreen forest • Submontane evergreen forest	Patchy but extensive areas cleared for swidden

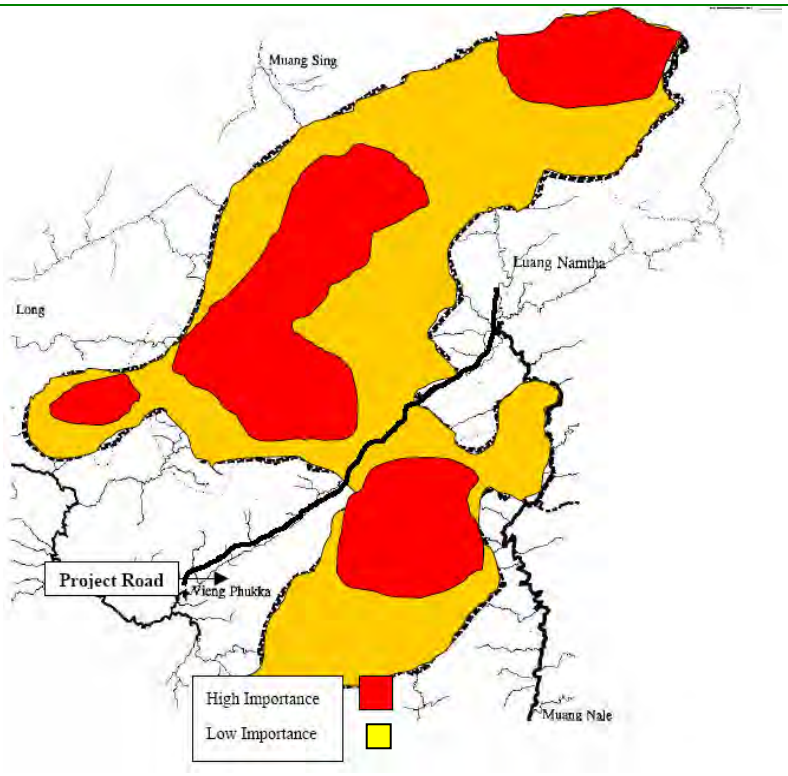
		• Montane evergreen forest • Extensive tracts of tall bamboo • Large fields of imperata grass	agriculture Several peaks> 2,000m
Southern highlands 43.5 km^2	1000-1572 m	• Large tracts of dry evergreen forest • Mosaic of cultivation, and regenerating scrub and secondary forest	Two peaks > 1500 m
Nam Kong 155.5 km^2	600-1556 m	• Secondary evergreen forest • Mosaic of cultivation, and regenerating scrub and secondary forest	Few peaks over 1000 m

Nam Ha NPA is a multiple use protected area with pockets of high biodiversity importance with little impact from human activity and areas of lower importance that are being used by local communities. Figures 3 and 4 highlight these areas - 71.3 km2 of the NPA is considered high importance and 104.8 km2 of the protected area is land use. About 17.8km2 is forest re-growth and 6.69 km2 under intense land use such as paddy land. Moreover, village settlements cover 22.3 km2 (NEI, 2003). Figure 4 shows that the NSEC road construction has cut off opportunities to rehabilitate a corridor within the park between two areas of high biodiversity value.

Table 6 Percentage and the Area of different land use intensities in the Nam Ha (Gov Report 2003)

Multiple Land Use	**Percentage**	**Area (km2)**
Settlements	10%	22.3
Young regrowth	8%	17.84
Forest	32%	71.36
Modified	47%	104.81
Intense use	3%	6.69
Total		**2,230**

Figure 4 Nam HA NPA Preliminary Zoning (NEI, 2003)



b. Nam Kan (Bokeo): The Nam Kan National Protected Area has been established this year with the letter number 853 in 12 May 2008 from the Prime Minister of Laos and Deputy Minister of Ministry of Agriculture and Forestry. This NPA was formed by combining four Provincial Protected Areas - Nam Nga and Nam Ngao 30,000 ha and Nam Mueng 56,000 ha and Nam Kan 50,000 ha creating Nam Kan NPA with 136,000 ha **(Mr. Khampheng, Interview 29 July 2008).**

c. District and other Protected Areas (see Table 2): In Luang Namtha Province, Viangphoukha District's Phou Mot Protected Forest to the south and east of the roadway near to the town of Viangphoukha. The district's other protected forest in Luang Namtha Province called Phou Pheung located in the south of the Project Road between Ban Nam Sing and Ban Nam O. Nam tha District and Houayxay District each have protected forests that are several kilometres away from the R3 project (NEI, 2003)

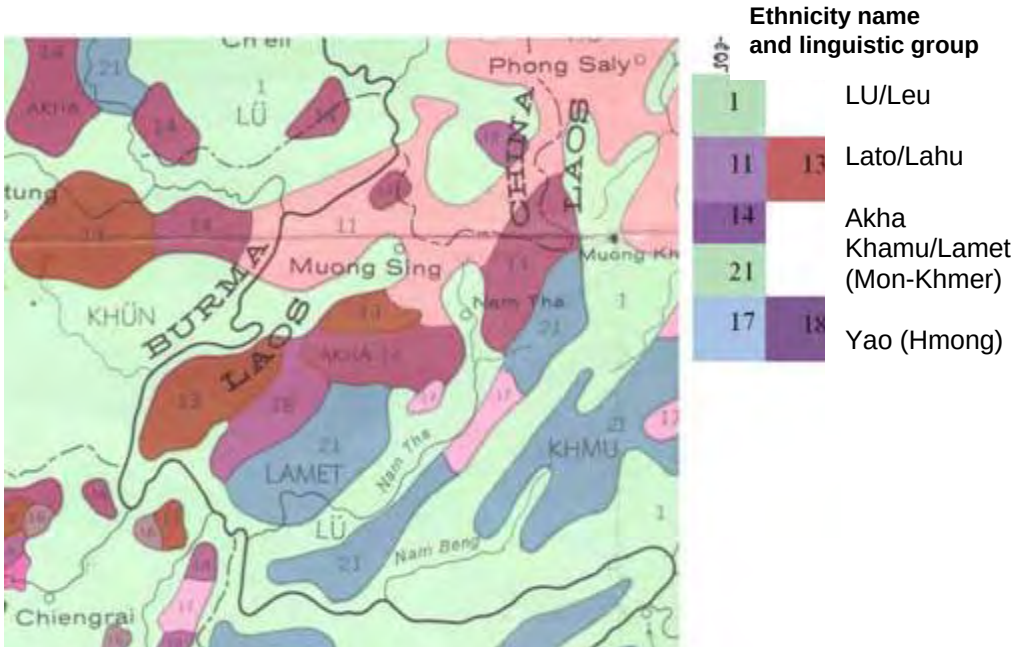
Populations living within and surrounding each protected area – number and ethnicity
People in north area especially in Luang Namtha and Bokeo Provinces have rich of cultural diversity from many ethnic groups. In Luang Namtha - the Akha, Khamu, Hmong and Lamed and in Bokeo - the Khmou, Lue, Lao, Hmong and Lamed (ESL Namtha Report 2007). The highest percentage of ethnic groups is in Loungnamhta Province. 25.1% or 36531 people of population in Loungnamtha Province is Ahka ethnic group, Khummu 24.5% or 35,659 and almost 12% or 17,705 people is Lue ethnicity. There are 49 ethnic groups in total.

Table 7 Distribution by Sex and Ethnic Group in Lao PDR (Population and Housing Census 2005)

Sex and Ethnic	Akha	Khamu	Hmong	Lamed	Lue
Female	45,135	307,018	224,257	10,367	61,954
male	45,563	306,875	227,689	9,460	61,100

Most of the population in Luang Namtha province are minorities. 29% is Lao Kang and 38% is Hmong ethnic. See Figure 5 below the Ethnic Groups in Luang Namtha and Bokeo Provinces (Biodiversity Report LNT Province 2003).

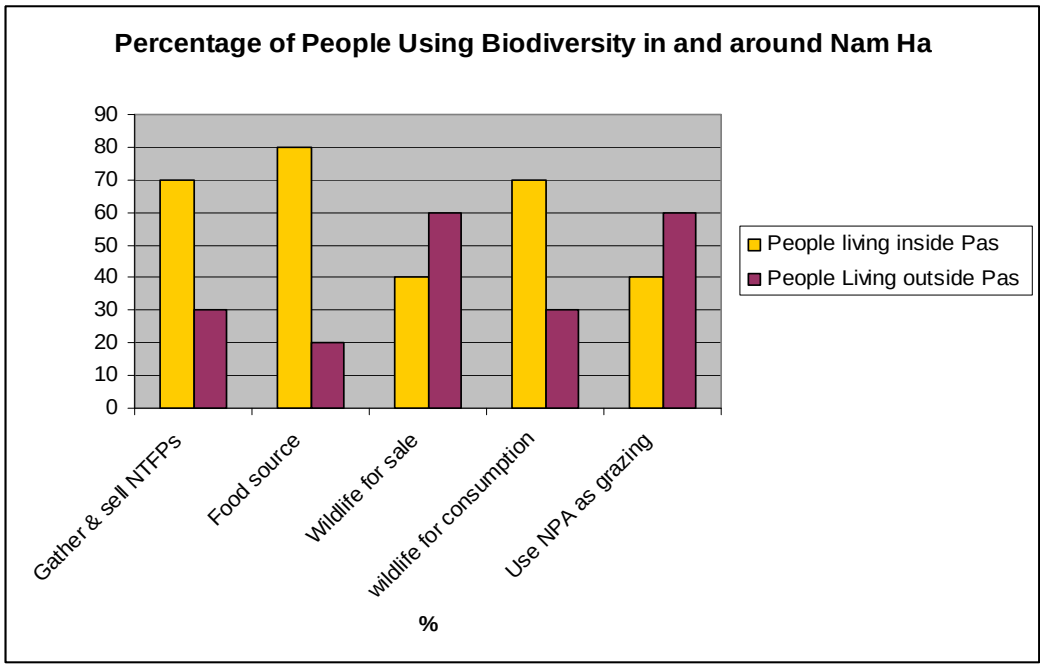
Figure 5 The Ethnic Groups in Luang Namtha Province (Government Report 2003)



What biodiversity is used by local communities for subsistence or as an income source (any facts and information on who, what, what, where and trends)? According to the R3 EIA Final Report (Nathan Associates 2003) "NTFPs make up a significant portion of both the subsistence needs and sources of income for villages in both provinces". This report has information on forest species used for construction, food and trade.

The Biodiversity Report for LNT province (GoL 2003) estimates that 70% of the communities living in Nam Ha PA gather and sell NTFPs and people outside sale of NPA 30%. Moreover, with wildlife villagers conduct 40% collection of wildlife for sale and people outside area 60%. Moreover with people conduct the wildlife for food resident is 70% and by outside people is 30%. Further more, resident, 40% and people outside 60% use lands inside the NPA for grazing of livestock (Biodiversity Report LNT Province 2003)(Appendix A)

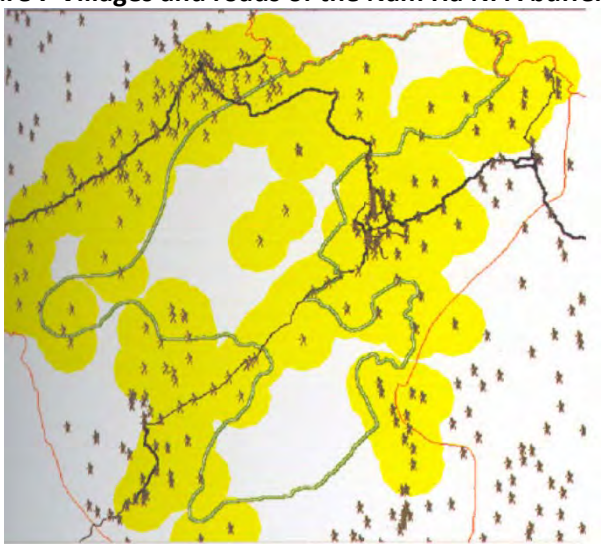
Figure 6: Percentage of People Using Biodiversity in and around Nam Ha



Source: Adapted from Biodiversity Report 2003

Nam Ha NPA Villages: There are 104 villages within 5 km of the Nam Ha NPA boundary. These villages utilise the biodiversity within the NPA (Figure 7). The area of human use in the protected area as predicted by buffering villages and roads to 5 km - 62.3% of the protected area is within 5 km. of a village or road and 37.7% is outside 5 km. Villagers living in or near the area conduct an estimated 90% of the shifting cultivation activity in the NPA. The NSEC road has significantly increased the potential risk to the core biodiversity areas in both the northern and southern portions of the NPA.

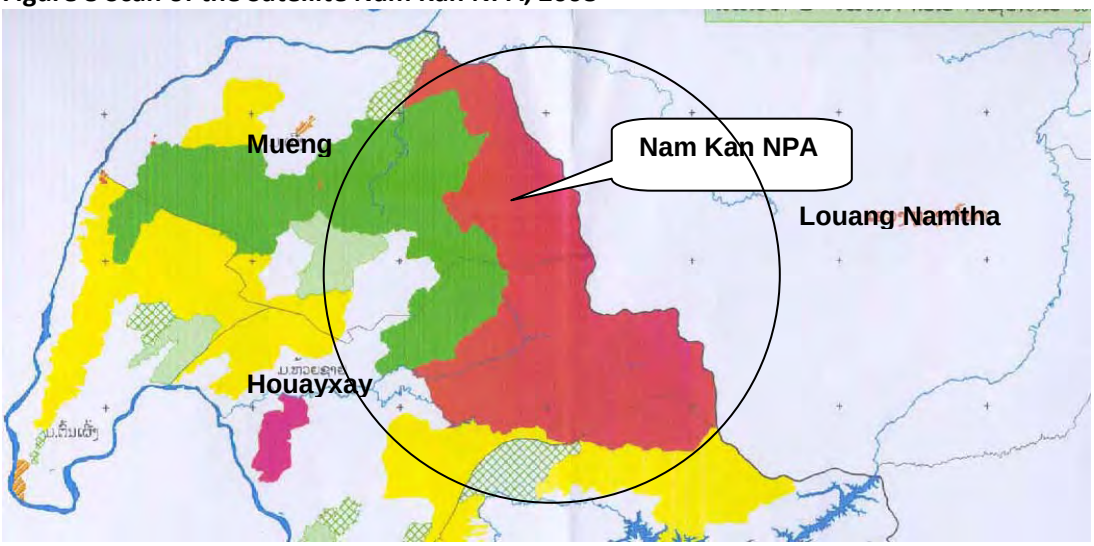
Figure 7 Villages and roads of the Nam Ha NPA buffered to 5 km



Source: Biodiversity Profile of Luang Namtha Province, 2003

Nam Kan NPA Villages: The information of villages along Nam Kan NPA in detail is not provided but from the satellite map project estimated. Nam Kan NPA covered in two districts is Mueng and Houyxay Districts (Department of Agriculture and Forestry Bokeo Province, June 2008).

Figure 8 Scan of the Satellite Nam Kan NPA, 2008



Source: Department of Agriculture and Forestry, 2008

Table 8 Village around Nam Kan NPA

District	Village Name	District	Village Name
Mueng	Chaka	**Houayxay**	Nam Laen
	Chakor		Tongkrang
	Chakhi		Phouti
	Huapor		On
	Ai Saeng		Thafa
	Mouang Kang		Chapor
	Nammeung		Namkor
	Huana		Thadeua
	Paxort		Namthoung
	Phoulao		Namxeo
	Phayaluang		Banpoung
	Noblaeb		Phiphonsib
	Huay or		Donpao
	Xiengdao		Naloung
	Morka		Namhork
			Phoulai
			Namthoung
			Nangam
			Houayha
			Mokhouk
			Bantoub
			Takophiengkham
			Donkham
			Donchai
			Satoun Nuea

Importance of each PA for ecosystem services (eg is it linked to a key water supply)
Watershed functions: Table 9 gives an indication of the important watershed function that

Lao's uplands play in the wider Mekong basin. Average the rainfall in northern of Lao ranges from 1,300 mm/year and will be highest elevations in the South every year it estimated that the rainfall is 3,700mm. Accordingly, Lao PDR has estimated that only half is to be runoff (WB, 2007).

Table 9. Lao PDR's Estimated Water Flows

	From	Flow estimate (billion m^3 /year)	Percentage
In:	Inflow from China, Myanmar, and Thailand	143	43%
	Lao PDR internal water resources (including 38 billion m^3/year of groundwater recharge)	190	57%
	Total inflow:	*333*	
Out:	Outflow to Cambodia	323	97%
	Outflow to Vietnam	9	2.7%
	Lao PDR Water usage	1	0.3%
	Total outflow:	*333*	

Source: FAO, 2003 – Review of world water resources by country and Aquastats 2003; WRI Country profile 2003 (earthtrends.wri.org)

Water supply to communities in this area

a. Water supply to communities in Bokeo Province: The two districts around the Nam Kan NPA are Meung and Houyxay Districts. Based on the provincial social and economic development plan from 2006-2010. The Provincial Government had been constructed Nam Lin Tank 142 Tanks and 71% of people in the Province have clean water used. Therefore, the people living in Meung District are provided the multiple water supplies as show in table 10 below.

Table 10 the access to the clean water at Meung District (Nam Kan NPA)

District	No. of Household	Percentage	The access to the clean water (m)					
			In side the house	<500	500-1000	>1000	N/A	total
Meung	**1314**	**100**	**83.9**	**15.4**	**0.8**	**0**	**0**	**100**
Clean water inside/outside house	0	0	0	0	0	0	0	0
Well with cover	0	0	0	0	0	0	0	0
Well no cover	36	2.7	19.4	69.4	11.1	0	0	100
River, irrigation	105	8	11.4	82.9	5.7	0	0	100
Stream	1171	89.1	92.3	7.7	0	0	0	100
Raining Tank	2	0.2	100	0	0	0	0	100
other	0	0	0	0	0	0	0	100
N/A	0	0	0	0	0	0	0	100

Houayxay	**9796**	**100**	**76.8**	**19.0**	**3.5**	**0.7**	**0**	**100**
Clean water inside/outside house	1481	15.1	93.7	4.9	1.5	0	0	100
Well with cover	1270	13.0	82.8	16.3	0.9	0	0	100
Well no cover	2215	22.6	78.7	19.3	1.9	0	0	100
River, irrigation	638	6.5	20.4	50.5	26.6	2.5	0	100
Stream	4105	41.9	77.9	20.0	2.1	0	0	100
Raining Tank	13	0.1	61.5	38.5	0	0	0	100
other	74	0.8	13.5	2.7	10.8	73.00	0	100
N/A	0	0.0	0	0	0	0	0	100

b. Water supply to communities in Luangnamtha Province: There is two districts around the Nam Ha NPA is Luangnamtha and Sing Districts. Based on the Environment Strategy Development Plan 2006-2010. The Provincial Government had been constructed Nam Lin Tank to 179 villages has 433 places or 76% people in the Province have clean water use. Therefore, the people living in Luangnamtha and Sing Districts are provided the multiple water supplies as show in table below.

Table 11 The access to the clean water (m)

			The access to the clean water (m)					
District	**No. of Household**	**Percentage**	**In side the house**	**<500**	**500-1000**	**>1000**	**N/A**	**total**
Luangnamtha	**7541**	**100**	**58.3**	**38**	**3.4**	**0.3**	**0**	**100**
Clean water inside/outside house	2275	30.2	95.7	3.7	0.2	0.4	0	100
Well with cover	928	12.3	58.4	35.6	6	0	0	100
Well no cover	1236	16.4	37.9	57.4	4.4	0.4	0	100
River, irrigation	1617	21.4	20.2	73.1	6.3	0.4	0	100
Stream	1319	17.5	54.5	42.3	3.2	0	0	100
Raining Tank	9	0.1	66.7	33.3	0	0	0	100
other	157	2.1	100	0	0	0	0	100
N/A	0	0	0	0	0	0	0	100
Sing	**5231**	**100**	**35.8**	**59.2**	**5.0**	**0**	**0**	**100**
Clean water inside/outside house	18	0.3	88.9	11.1	0	0	0	100
Well with cover	61	1.2	88.5	11.5	0	0	0	100
Well no cover	50	1.0	60	40	0	0	0	100
River, irrigation	709	13.6	4.1	78.8	17.1	0	0	100
Stream	4336	82.9	40.1	56.7	3.2	0	0	100
Raining Tank	24	0.5	16.7	79.2	4.2	0	0	100
other	33	0.6	0	100	0	0	0	100

N/A	0	0	0	0	0	0	0	100

Information on the status and pressures on each protected area
Nam Ha NPA have ten Landcover types were identified by the 75% upper mixed deciduous forest and 20% unstocked forest with 3% grassland and remaining 2% to be dry evergreen forest, rice paddy, hai, bamboo and towns. As show in table 12 The percentage of forest types in the Nam Ha NPA (WCS 2003).

Table 12 The percentage of forest types in the Nam Ha NPA (Bio LNT, 2003).

Forest Type	Percentage	Area (ha)
Not identified	0	0
Bamboo	1	2,224
Urban	0	0
Water	0	0
Ray	1	2,224
Grassland	3	6,672
Un stocked forest	20	44,480
Upper Mixed Deciduous	75	166,800
Upper Dry Evergreen	0	0
Total	**100**	**222,400**

What have been the effects of NSEC road and other developments on biodiversity
The Nam Ha NPA has many roads that have heavy use by communities within and near the protected area. Road infrastructure can have negative impacts on biodiversity including:

Current threats to the biodiversity of the conservation area include illegal hunting and logging. The National Road No. 3, which passes through the Nam Ha NPA, is likely to be used by Project staff as an access road between the construction site and southern China. This may result in increased exploitation of the wildlife and vegetation resources of the NPA, including the endangered species. The National Road No. 3 is reputed to be a popular route for the transport of illegal wildlife. Project related population increases around the upper part of the inundation area and resettlement areas may also increase the pressure on wildlife resources. Additional Project related vehicle traffic in the region of the Project Area will also put increased pressure on wildlife (IUCN 2007).

Animal movements may be impacted by the road construction of as the proposed route runs across a wildlife corridor which connects the major part of the Nam Ha NPA with the Shiang Yong Protected Area in China. In particular, a small population of about 10 endangered Asian elephants is present in the northern part of the Nam Ha NPA. These elephants migrate seasonally to China (IUCN 2007).

Figure 9 Wildlife Trade in Lao PDR

Source: IUCN, Consuming the Future, 2007

Small-scale hunting is widely practiced and has greatly reduced populations of mammals and larger birds. There is a large amount of trade in wildlife and wildlife parts throughout the region. One such market specializing in wildlife is situated near the provincial forestry office in Lampang. Sale of wildlife, though illegal, continues with little or no official interference.

Have other forms of development in the NSEC affected protected areas
Since 2002, rubber cultivation has become important activities in the province. The forested land available in the north of Laos. However, rubber plantation is loss of biodiversity due to conversion of natural forest to monocrop rubber and reduced harvests of non-timber forest products on cleared land.

The Namtha and Sing Valley watershed forests, soil erosion brought about by massive land clearance on steep slopes, and the social changes that this new agricultural production system is brining about. In 2005, over 4,850 ha of degraded forest and fallow swidden fields had been cleared and replaced with small rubber plantations around the Project Area. A large concession was recently granted to a Sino-Lao consortium which plans to plant up to 3,000 had on the south-western periphery of the PPA in Vieng Phoukha (Juth Pakai April 2007).

Aquatic biodiversity – what locations within or close to the NSEC is of high aquatic biodiversity value? Lao's aquatic biodiversity are experiencing degradation too leading to signs of reduced fisheries and loss of livelihoods, especially for aquatic products (Acres/RSW/HQI, 1997). Aquatic resources are highly diverse and are a primary source of dietary protein in the project area. More than sixty fish species have been identified in the Nam Tha. Carp and catfish species are the most abundant groups. Conditions in the Nam Tha are very good for the spawning of many species, including local species and migratory species from the Mekong

mainstream. The succession of rapids and pools, and the presence of sand and gravel alluvium along the river, are known to provide important spawning sites during the wet season (Acres/RSW/HQI, 1997).

Manufactured wetlands also produce aquatic resources. Many of villages have fish ponds and assist by non-governmental organizations (NGOs) such as in Louang Namtha Province, a private development company. Further more, the wet rice paddy fields yield high quantities of aquatic resources important to local subsistence needs, including fish, frogs, snails, crabs, shrimp, eels etc. (EIA report 2003).

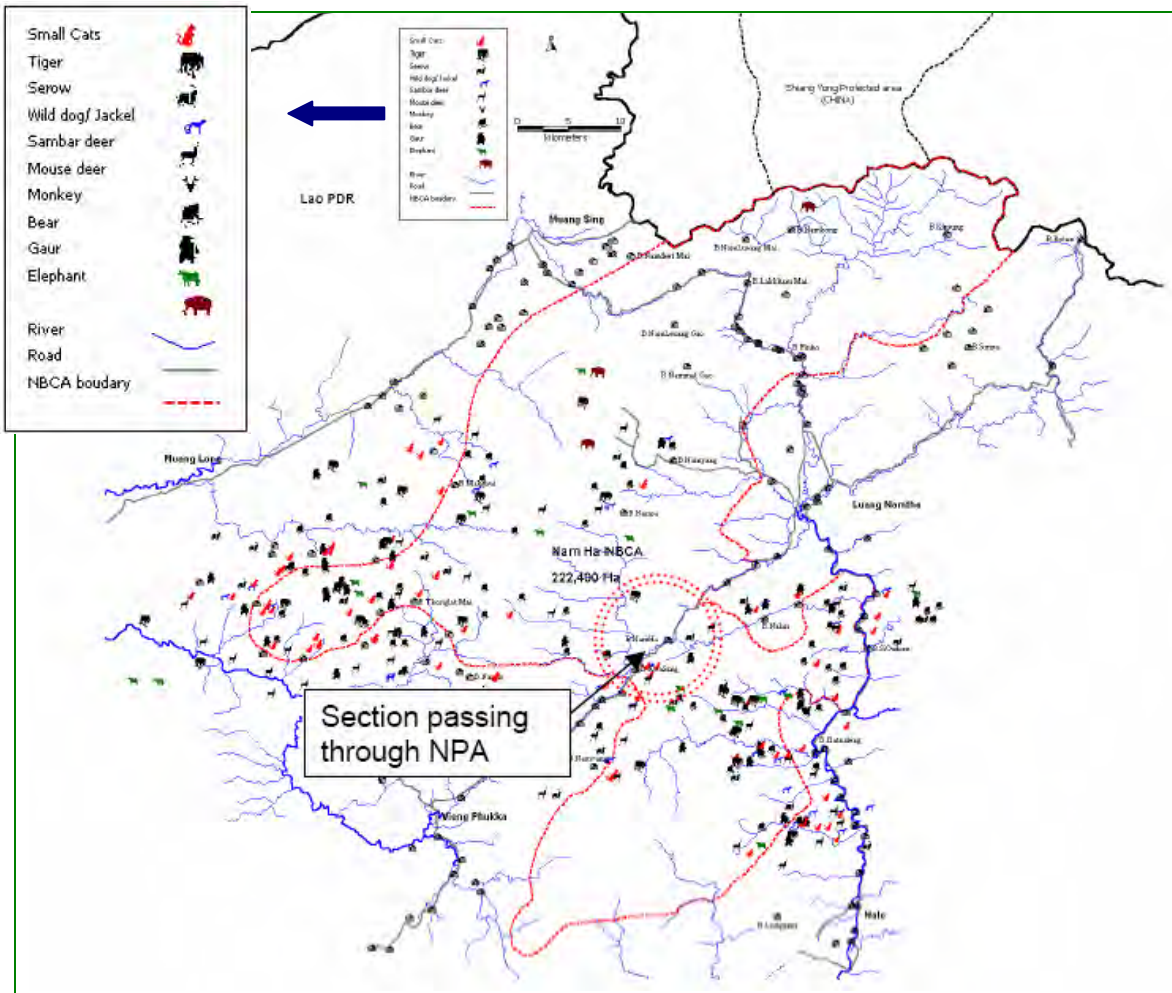
What are the trends in biodiversity? The major declines in large water bird populations have occurred in the upper Mekong within the past 50 years, with some species now locally very rare. Many species of aquatic avifauna and herpetofauna have been subjected to commercial trade in the region, where hunting of wildlife is a widespread practice. Increasing river traffic, especially large boats, this result in disturbances to nesting fishes along the river channel. Moreover the insistent residues of such chemicals could lead to adverse impacts on aquatic biodiversity and adverse health impacts among local communities (IUCN 2005).

Houay Xai is the large area and home for many species of aquatic and terrestrial birds, especially during the dry season, but they are frequently visited by hunters.

Lao PDR law prohibits all hunting of endangered species and all sale of wildlife. Both domestic and international illegal wildlife trade are currently widespread in the project area. The barrier for the local government is lack of resources as the major factors inhibiting the enforcement of wildlife laws. Policies designed to curb illegal wildlife trade, such as collection of riles and hunting equipment from local villagers (NEI, 2003). There are largely inadequate to the problem. Several arrests of wildlife trader are made each year in Luangnamtha and Bokeo. Overall efforts to enforce the law have driven most trade in endangered species underground. (NEI, 2003).

What habitats are being fragmented – where, what and why?

Figure 10 The section passing through NPA (IUCN, 2007)



The GMS countries (e.g Thailand and Myanmar) have a long history of designate of protected areas, but not unlike Cambodia, and Lao. Most of the Lao Protected areas were established in 1993, by the Prime Minister's Decree No. 164. Loss of biodiversity in Lao PDR and in other GMS countries is national priority concerns but loss of biodiversity is also a global concern and global problem. Loss of forest habitat mainly for mammals and birds. Loss of wetland and grassland habitats also for mammals and birds is also threatening biodiversity. Hunting and gathering have and perhaps still are major factors (Biodiversity Strategy to 2020, 2003).

The National Biodiversity Strategy to 2020 and management plan supported long-term development has issued the strategy to 2020:

- The sustainable utilisation of natural resources as well as the protection and conservation of the environment and ensure the sustainable development of the country, the reduction of poverty and the enhancement of the quality of life and health of all the people in Lao PDR.
- The forest of the Lao PDR should remain rich and productive, through sustainable and productive management, and where necessary through conservation and protection.
- To increase the capacity of the management unit to do conservation extension, monitoring, patrolling and enforcement and natural resource management.
- To increase knowledge and awareness in the province, districts and villages on direct treats to biodiversity.
- To reduce threats to an acceptable level by implementing rules for sustainable use of aquatic and terrestrial wildlife, NTFPs and timber.
- To increase communication and cooperation among government and non-government

agencies to sustainable manage natural resources.

- To increase biodiversity (NTFP, cultivation, sustainable harvest, nature-based tourism).

Indicator:

(i) **Forest cover** in affected provinces
(ii) Ratio of Natural Forest to Plantation Forest in affected provinces
(iii) Area of rubber plantation in affected provinces

Trends: natural forest covers continues to reduce due to encroachment, illegal logging and fires
Target: (include sources of indicator and target)

Indicator:
(i) Biodiversity corridors linking protected areas and important forest habitat
(ii) Protected Area as Percent of Total Land Area in affected provinces

Target:
(include sources of indicator and target)
Trends: Protected areas natural forest area reducing in quality and cover

Indicator:
Target
(include sources of indicator and target)
Trends:
Drivers of trends

Indicators:
Target:
(include sources of indicator and target)
Trends:
Drivers of trends

Relevant laws, policies, plans and institutional arrangements:
International
Convention on Biological Diversity
Convention on the International Trade of Endangered Species
Cartagena Protocol on Bio safety

National
Environmental Protection Law 1999
Aquatics and Wildlife Law 2007,
Decree 164/PM on the Establishment of the Lao PDR National Protected Area System (1993),
Regulation on the Management of NBCAs, Wildlife and Aquatic Animals No. 0360 (2003),
Council of Ministers Decree No24 Forest and related resources protection, Ministry of Agriculture and Forestry
Execution of Council of Minister's Decree No118 on the Management and Protection of Wildlife, Hunting and Fishing

Strategies and Plans
National Biodiversity Strategy to 2020 and Action Plan to 2010

Reports
National Human Development Report, International Trade and Human Development Lao PDR (UNDP 2006)
Biodiversity Profile for Luang Namtha Province (Country Report 2003)

Problems and issues encountered during data collection:
No support letter to enable easy data collection

Summary of main concerns for the NSEC:

- **Illegal logging** in protected areas
- **Forest and agricultural fires** encroaching on protected area core zones and reducing biodiversity throughout the NSEC
- **Hunting:** Small-scale hunting is widely practiced and has greatly reduced populations of mammals and larger birds.
- **Wildlife trade:** There is a large amount of trade in wildlife and wildlife parts throughout the region. One such market specializing in wildlife is situated near the provincial forestry office in Lampang.
- **Cutting of biodiversity corridors:** The route runs across a wildlife corridor which connects the major part of the Nam Ha NPA with the Shiang Yong Protected Area in China (Asian elephant). Also cuts corridor between northern and southern portions of Nam Ha NPA.
- **Expansion of rubber plantations:** Since 2002, rubber cultivation has reduced biodiversity

due to conversion of natural and degraded forest and reduced harvests of non-timber forest products. In 2005, over 4,850 ha of degraded forest and fallow swidden fields had been cleared and replaced with small rubber plantations around the NSEC.

- **Soil erosion:** soil erosion brought about by massive land clearance on steep slopes for intensive agriculture
- **Degradation of aquatic habitat:** Aquatic biodiversity are experiencing degradation too leading to signs of reduced fisheries and loss of livelihoods, especially for aquatic products

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(iii) Wildlife Conservation Society (WCS), Biodiversity Profile for Luang Namtha Province, Wildlife Conservation Society (WCS), 2003.
(iv) Wildlife Conservation Society (WCS), Biodiversity Country Report, Wildlife Conservation Society (WCS), 2004.
(v) Wildlife Conservation Society (WCS), National Biodiversity Strategy to 2020 at action plan to 2010, Vientiane, Wildlife Conservation Society (WCS), 2004.
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(viii) SPB Hydro-Power Co., Ltd (Acres/RSW/HQI), Nam Tha 1 Hydropower Project Feasibility Report, Volume 3- Environmental and Resettlement Assessment, Acres/RSW/HQI, 1997
(ix) Earth Systems Lao Co., Ltd (ESL), Nam Tha 1 Hydropower Project Water Quality Baseline and Impact Assessment, ESL, 2007
(x) IUCN, WWF, WCS, Consuming the Future, IUCN, 2007
(xi) IUCN, Redlist, IUCN, 2007
(xii) IUCN, Monitoring of Infrastructure Impact on Biodiversity: Nam Ha National Protected Area, Ms. Latsamay Sylavong, IUCN, 2007
(xiii) Scan of The Satellite Map of Nam Kan Protected Area, June 2008

Annexes: (eg. maps, diagrams, tables)

Environment
Template 14: Forests and land resources
Key issue EN3: Unsustainable use of natural resources (forest, land, water)

Introduction:

Land Use Planning and Land Allocation (LUPLA) has been carried out in almost all of the villages along the NSEC road and in a number of other villages within the NSEC districts. Land has been designated as agricultural land residential land, village forest for use, village conservation forest. The main objective for LUPLA is to limit the amount of land under swidden cultivation (Nathan Associated et al, 2003).

Land degradation in the NSEC: 85% of the land area in the NSEC provinces is mountainous with a wide variety of terrain from towns surrounded by broad, flat plains cultivated with rice paddies, through narrow valleys, across rolling hill and mountain ridges. The highest mountain 2,094m is Vieng Phouka, (Nathan Associated et al, 2003). In mountainous areas soil erosion and loss of fertility occurs when they cleared of vegetation or natural forest. It takes more than 15 years for soils to recover their qualities. Upland soils which have been deforested are easily eroded. Land use changes and erosion are likely to increase sediment in surface water. Less vegetation cover might cause more pronounced floods, yielding even more erosion and sediment transportation.

Major causes of land degradation in the NSEC are:

- Logging and Agriculture activities
- Road construction
- River transportation and riverside development

Landmine_Mapper@hotmail.com <Landmine_Mapper@hotmail.com>

Figure 1 Draft Landuse Plan for 2020 (Thomas I., 2007)

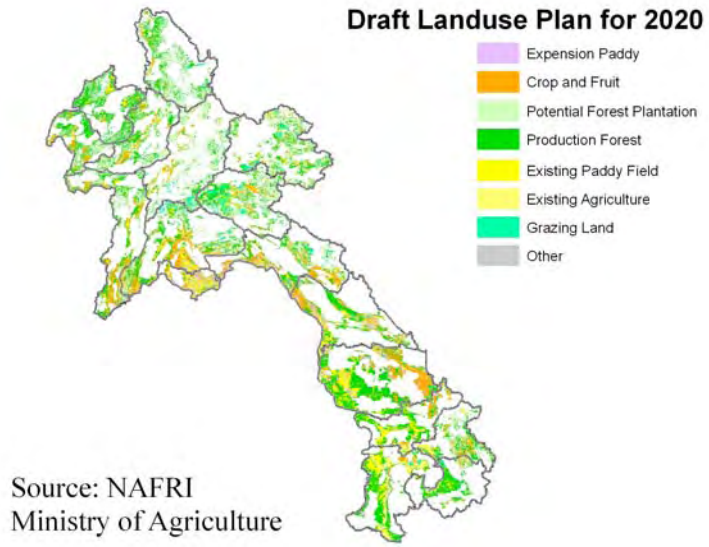
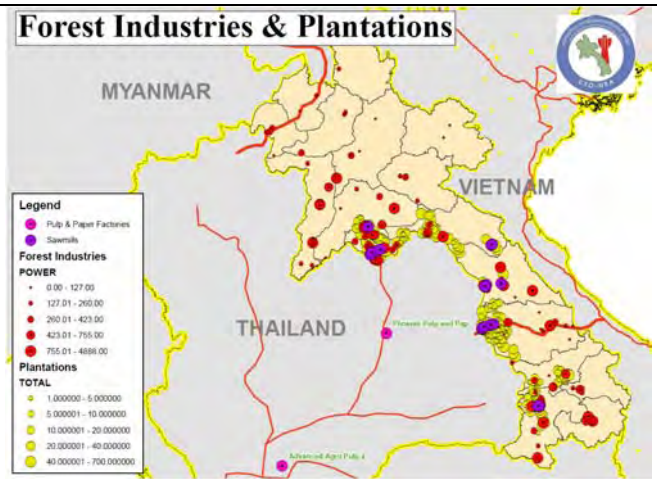


Figure 2 Draft Forest Industries & Plantations (Thomas I., 2007)



Effects of NSEC road and other developments on land and soil (eg road bank erosion)

Roads: The drainage is diverted by roadwork, it is increasing flows in the discharge area and they can cause severe erosion at the point of water drainage structure, further more with downstream where a number of drainage discharge come together to produce high volume of flow (ERI and IUCN, 2006) (TPM, 2006).

Logging and Agriculture activities: Forest Cover; Soil Erosion : Much of the forest cover within the NSEC area has been drastically altered within the last decades due to uncontrolled logging activities and shifting cultivation. In 1994, approximately 38% of the Nam Tha catchment area was forested, as shown in Table 1 (Acres/RSW/HQI, 1997).

In the Northern Laos (including Luangnamtha, Bokeo, Luangprabang and Oudomxai) trends are apparent from 1993 (Sithong Thongmanivong and Yayoi Fujita (2006):

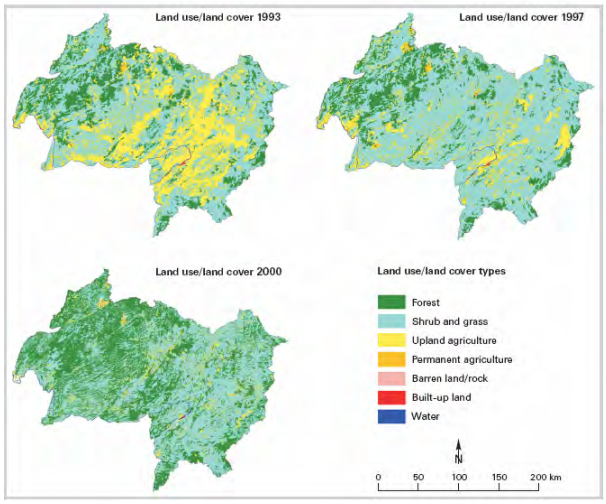
- the area of traditional upland agriculture and swidden farming (ie shifting agriculture) has decreased, while permanent intensive agriculture has increased.
- There is some evidence that forest cover has increased since 1997, probably as a result of the succession of abandoned swidden areas to secondary forest, but the quality and extent of this forest cover remains unclear.
- Agricultural sector analysis in the 4 Northern provinces supported the land use data, showing a rise in commercial agricultural production of cash crops (including sugar cane, paddy rice, and maize) at the expense of subsistence agricultural production.

Land use cover and land use changes (in Ha) 1993 – 2000

Source: Sithong Thongmanivong and Yayoi Fujita (2006)

Classification	1993	1997	2000
Forest (including plantations)	862,712	816,680	1,883,082
Shrub and grass	2,353,429	3,283,856	2,508,578
Upland agriculture	1,546,592	652,429	343,243
Permanent agriculture	39,278	49,047	65,167
Barren land/rock	225	225	573
Built-up land	1,251	1,251	1,356

Land use cover and land use changes (in Ha) 1993 – 2000
Source: Sithong Thongmanivong and Yayoi Fujita (2006)



Luang Namtha population 83% practices swidden agriculture. Estimates of land under swidden production in 2003 were approximately 8454 ha. The province has delegated 240,050 ha of land, or about 26% of the total land in the province as agricultural production land. Presently the Provincial Agriculture Forestry Office (PAFO) calculates the amount of land under paddy rice production in the province to be 10,386 ha. The agriculture in Bokeo Province is in many ways similar to Luang Namtha. Bokeo Provincial Agriculture Forestry Office (PAFO) reported that the province has 47,820 ha of agricultural land. Estimates of land under swidden production in 2003 were approximately 738 ha down from 2448 ha in 2000 (Nathan Associated et al, 2003).

Deforested areas in the NSEC are susceptible to significant soil erosion. According to the *Nam Tha 1 Hydropower Project Feasibility Report,* heavy rains during the wet season wash away significant amounts of topsoil from cleared areas in the catchment (Acres/RSW/HQI, 1997). Likewise, WCS has reported that deforested hillsides are quickly eroded and areas downstream experience flash floods during the wettest parts of the rainy season in July and August (Luang Namtha Biodiversity Profile, 2003).

Table 2 Characteristics of the Nam Tha catchment (IRC, 1994).

Parameter	Nam Tha catchment	Upper Nam Tha sub-catchment	Lower Nam Tha sub-catchment
Elevation			
Average elevation	890 m	927	839
Minimum elevation	500 m	800	500
Maximum elevation	1,200 m	1200	1000
Slope			
Flat to gently rolling plains	0%	0.0	0.0
Rolling or dissected plains	1.4%	0.7	2.5
Hills	4.9%	8.0	0.3
Mountains	93.3%	90.6	97.3
No data	0.4%	0.0	0.0
Forest cover			
Forested area (approximate)	3,400 km^2	2,360 km^2	1,050 km^2
Percentage of area forested	38%	44%	29%
Soil types			

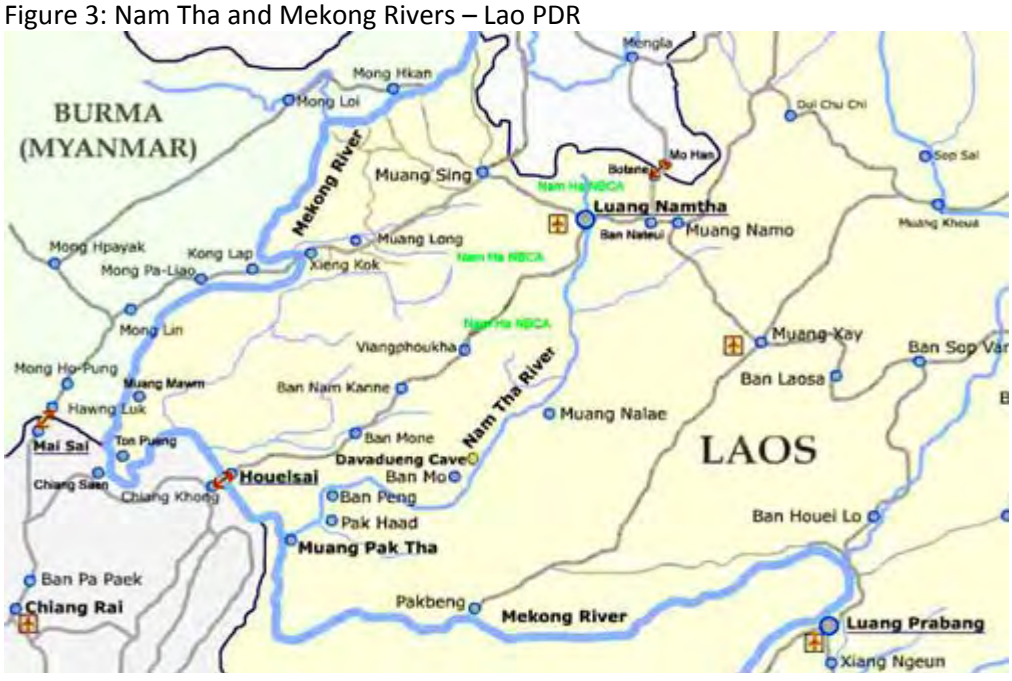
Poorly-drained alluvial soils	0.7	1.1	0.0
Latosols and red brown earths	0.0	0.0	0.0
Regurs and latosols	0.0	0.0	0.0
Low humic gley soils	0.0	0.0	0.0
Red yellow podzolic soils	2.5	0.9	4.8
Grey podzolic soils	0.0	0.0	0.0
Rendzinas and brown forest soils	0.0	0.0	0.0
Shallow soils, undifferentiated	96.9	98.0	95.2
Geology			
Sandy alluvium	2.4	1.7	3.5
Sandstone and conglomerate	71.5	62.8	84.4
Basalt	0.0	0.0	0.0
Limestone	3.8	4.0	3.5
Sedimentary rocks	3.0	4.9	0.0
Gneiss, schist, quartzite, granite, gabb	0.4	0.7	0.0
Shale and impermeable rocks	6.1	7.1	4.6
Various	12.7	18.6	4.1

River transportation and riverside development: River Erosion

The Nam Tha catchment has a very critical risk of soil erosion, with 65% of the total area classified as WSCP classes 1 and 2 without forest cover in 2001 (MRCS, the Watershed Classification Project (WSCP), Mekong River Commission Secretariat. 2001).

The issue of erosion has been raised by many local inhabitants. Many villages have been established on the banks of the river, some for several generations. Several of those villages are located in areas of the river that are susceptible to erosion along meanders, where the eroding that creates meanders is clearly illustrated in the area near Chiang Saen, Thailand. The case of Ban Don Savan, a village located in Bokeo province opposite the Thai port of Chiang Saen is particularly dramatic (IUCN, 2006)

Figure 3: Nam Tha and Mekong Rivers – Lao PDR



Serious river bank erosion has been observed along the Nam Tha, and in some areas, villagers have had to

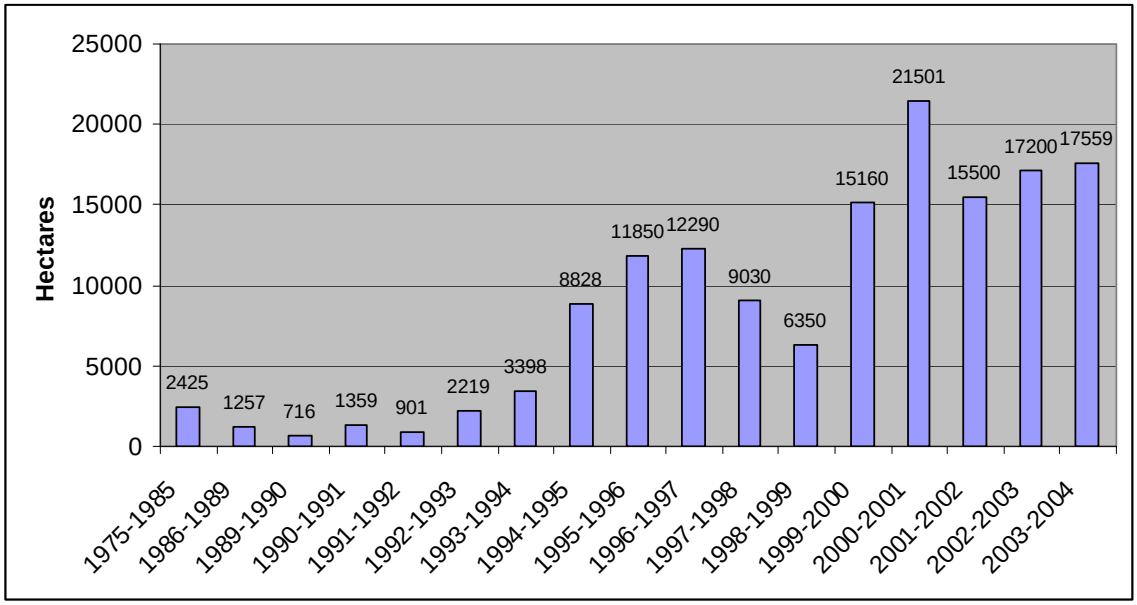
move or abandon their houses (Acres/RSW/HQI, 1997). Bank erosion occurs in the upper part in Nale District, where a thick sandy and silty soil layer is found; bank scour also occurs where vegetation cover is damaged (Acres/RSW/HQI, 1997).

Data on legal timber extraction – amount of timber and value (annual figures and trends)

Nationally, logging, both legal and illegal is possibly the most important cause of deforestation (Philip et al, 2006). Through a series of Prime Ministerial Orders (11/1999, 10/2000 & 15/2001) in 2001 the Government of Lao banned the export of raw logs (Sayakoummane & Manivong 2007). There were initially some loop holes. Existing export quotas were still are filled. Big wood slabs called "sawn wood" could still be exported and were exported to the large buyers such as Thailand, Vietnam, China and Japan (UNDP & MPI, 2006). However in recent years regulations have strengthened and in 2004 the government ordered a reduction in the export of sawn wood (Sayakoummane & Manivong 2007).

To reduce the burden on natural forest and to meet increasing regional demand for wood and wood products the government through the Forestry Strategy 2020 is actively promoting plantations. Figure 4 below provides an indication on the growth of this industry.

Figure 4 New plantation Areas in Lao PDR 1975-2004 (UNDP & MPI**, 2006)**



In terms of the NSEC, timber and plywood is first and second in gross value of goods exported to Yunnan Province from Lao PDR. Bokeo has experienced a much higher volume of timber exploitation than Luang Namtha Province over the past twenty years (EIA report, 2003). In 1980-1996 the official report from Ministry of Agriculture and Forestry recorded that in Bokeo Province and forest were logged 41,300 hectares in volume of 193,009 cubic meters. And in LNT Province in the same time period the forest were logged in 6,400 hectares in volume of 24,000 cubic meters. In 2001, Luang Namtha Province timber production was 2,300 cubic meters and Bokeo Province was 500 cubic meters. Show in detail of table 4 logging in Luang Namtha and Bokeo Provinces

Table 4 Logging in Luang Namtha and Bokeo Provinces (1996-2001)

	Louang Namtha		Bokeo	
Year	Planned Quota (m3)	Actual Utilization(m3)	Planned Quota (m3)	Actual Utilization(m3)
1996-1997	3000	3000	2500	290
1997-1998	3300	2172	3000	3000

1998-1999	2300	4160	1000	1613
1999-2000	2000	2000	500	500
2000-2001	2300	2320	500	500

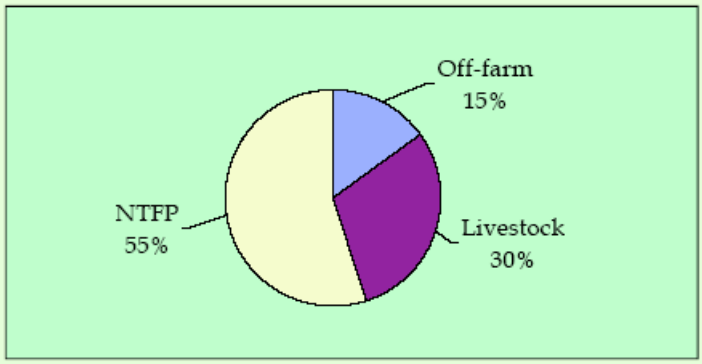
Sources: Nathan Associated et al, 2003

The government has decreased logging in two provinces in the last few years and they plan that in next four years the level of logging will be reduced by a further 30% of current logging levels.

Extent of illegal logging: Many issues come up as concerned with the forest exploitation including the prevention of the illegal logging and illegal trade in wildlife. The forest commercial logging had been comparing between NSEC countries, Lao PDR is highest percentage of forest commercial logging (50%), Cambodia (40%) then Vietnam (5%) and Thailand (5%) (MRC State of Basin Report 2003).

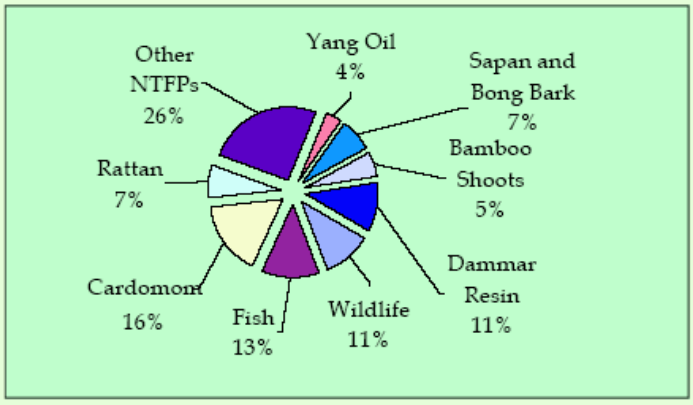
Use of non-timber forest products (NTFPs): Non-timber forest products is the most important for local people especially, woman and children in NSEC area. This is leading to increasing income-earning for villagers in both provinces. The yields incomes from NTFPs in upland conditions are good economic value per hectare if compared with rice cultivation and shifting cultivation (MRC, 2003). An average rural family consumes the equivalent of US$280 per year in NTFPs. This is of particular note since the average per capita income is about US$402. In addition, collection and sale of NTFPs provide on average 55% of family cash income referred to figure in below.

Figure 6 Lao PDR Household Income



Source: IUCN, www.iucn.org/places/asia/pdf/Ntfplao.pdf

Figure 7 Income from NTFPs



Source: IUCN, www.iucn.org/places/asia/pdf/Ntfplao.pdf

Many of the species people rely on for their daily needs. Hundreds of forest species are use for food, roofing,

building materials, utensils, containers, rope making, dyes, medicines, fish poisons and etc. the most important species for domestic use is bamboos. They are use in home building and for making common in everyday for tool and containers. Common foods are including wild taro, bamboo shoots, mushrooms, wild tree fruits, wild herbs, and vegetables. Non-timber forest products value of plants for commercial are include bamboos, rattan, fruit from forest tree, broom grass, tree resins, and medicinal plants. Cardamom and palm fruit is the most important commercial species. A species of bamboo shoot (Nor Khoum) is collected in forests in the NSEC area, they make a processed locally and exports to Thailand, China and overseas (EIA report, 2003).

In Bokeo Province exports palm hearts in 260T/year. It was estimated in per household is more than 2,000,000 k/year from selling of NTFPs. Moreover, some villages in the central section of the Project Road could sale palm skin on 2000k/kg and sometime near Chinese border they could sale on 3000k/kg (Nathan Associated et al, 2003).

Processing and export of timber and NTFPs – sources and destination: In 2000-2001, the forestry sector nationally (including NTFPs) accounted for 3.2% of national GDP (UNDP & MPI, 2006) and 27% of merchandise exports (including electricity). Table 2 below shows the value and percentage of total national exports of NTFPs from 2000 to 2004.

Table 5 the value of timber exports (Millions of US$) and as a percent of total exports 2000-2004 (UNDP & MPI**, 2006)**

	2000		**2001**		**2002**		**2003**		**2004**	
	US$	**%**	**US$**	**%**	**US$**	**%**	**US$**	**%**	**US$**	**%**
Timber Exports	70.1	18.1	106.8	26.6	114.3	28.4	128.4	25.7	144.9	24.7
Total Exports	387.9	100	401.8	100	402.6	100	500.2	100	586.6	100

Sources: UNDP & MPI, 2006, National Human Development Report: International Trade and Human Development, Lao PDR, Vientiane, UNDP 2006.

Table 6 the number of forest reliant factories opening operations in Luang Namtha Province 2000-2007

Year	**Furniture**	**Sawmill**	**Rubber**	**Timber**	**Rattan**
1999	1				
2000	2	1			
2001		1	1		
2002					
2003		1			
2005			1	2	
2007					1
Total	**3**	**3**	**2**	**2**	**1**
				Total	**11**

Source: Industry Growth in Luang Namtha Province 1999-2007, Department of Industry of Luang Namtha Proivince, Fax document, May 2008.

Enforcement capacity: The Government strategies to improve law enforcement in the forestry sector are:

- Strengthening implementation of policies and regulation on illegal logging and illegal log exports;
- Cooperating with trading partners in Europe and in the region on law enforcement, good governance and trade;
- Cooperating with customs, police and special task forces in the region to control trade in illegal timber.
- Strengthening monitoring of logging outside authorized areas to discourage unauthorized logging;

- Strictly implementing the ban on the export of raw logs in order to ensure that only processed wood products are exports, contributing to objective of adding value to downstream processing industries in the sector; and
- Ensuring logging quotas are strictly approved based on harvesting plans and that harvesting does not take place without approved quota.

Source: (Nathan Associated et al, 2003).

Please consider current state & recent & future trends (including government targets)

Indicator: Forest Cover

Official target: To improve the quality of existing forested areas, which are about 70% of total land area by regenerating up to 6 million ha and planting trees up to 500 000 ha. (Forestry Strategy 2020)

Trends:
- Declining natural forest
- Increasing plantation forest

Drivers of trends:
- Logging activities
- Plantation promotion policies
- Clearance for development projects such as roads

Indicator: Shifting cultivation

Target: Stabilize shifting cultivation through land allocation and sustainable land use (NGPES 2020)

Trends:
- Decreasing levels of shifting cultivation

Drivers of trends
- Government policy – Shifting cultivation stabilisation programs

Indicator: Forest Resources (NTFPs)

Target: To provide a sustainable flow of forest products for domestic consumption andto generate household income through sale and export … (Forestry Strategy 2020)

Trends: Declining forest resources (NTFPs)

Drivers of trends
- Regional demand for forest resources
- Increasing export of forest products to regional neigbours
- Unsustainable extraction of forest resources

Relevant laws, policies, plans and institutional arrangements:

Regulation

- Forestry Law 1996
- Water and Water Resources Law (1996)
- Land Law (1997)

Policies, Plans and Strategies

- Forestry Strategy to the Year 2020
- Bokeo Provincial Government (2006), Institutionalization and Economical-Social Development Plan of (2001-2005) and Economical-Social Development Plan (2006-2010), Houay Xai, Lao PDR
- Luang Namtha Provincial Government (2006), Strategy of Environment until 2020 and Environmental Operation Plan years 2006-2010, Luang Namtha, Lao PDR
- Luang Namtha Environment Strategy 2020 and Environmental Operation Plan 2006-2010

Problems and issues encountered during data collection:

Could not get the information about illegal logging from Department of Forestry, they are not allowed to provide it.

Summary of main concerns for the NSEC:

- **Forest loss through logging:** The commercial logging always carried out on cross border basis stemming from demand for wood in Thailand, Vietnam and China.
- **Forest fire:** Shifting cultivation and agricultural burning prevent forest rehabilitation and destroy natural forest fringes
- **Riverside development and dredging**: Road construction, settlements and land disturbance close to waterways is causing degradation of aquatic habitats and loss of biodiversity as is mainstream dredging and blasting.
- **Soil loss:** Deforested areas in the NSEC are susceptible to significant soil erosion. Heavy rains during the wet season wash away significant amounts of topsoil from cleared areas in the catchment. Deforested hillsides are quickly eroded and areas downstream experience flash floods during July and August.

References/sources:

1. Acres/RSW/HQI (1997). *Nam Tha 1 Hydropower Project Feasibility Report, Volume 3 – Environmental and Resettlement Assessment*. April 1997
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18. UNDP & MPI, 2006, National Human Development Report: International Trade and Human Development, Lao PDR, Vientiane, UNDP 2006.

Annexes: (eg. maps, diagrams, tables)

Environment
Template 16: Waste
Key issue EN5: Waste management (eg transport & storage of hazardous wastes, management of solid waste)

Introduction:
Advice to local consultants – this template needs to cover:

Type of waste in NSEC area are:

Solid waste (Urban and Commercial) – The State of Environment Report 2000 (STEA 2001) shows average waste production at 0.75kg per capital per day in urban areas. Composition of solid waste is presented in Table 1. According to this report 3 principle methods are used to dispose of waste: 1) municipal landfills; 2) open burning; 3) dumping.

Table 1 Urban and Commercial Waste make up

Waste Type	Percentage of total
Organic material	30
Plastic	30
Glass, cans and other materials	25
Paper	15

Source: STEA 2001; Keodalabong 2007

At the time of the SOE report only 5 towns had solid waste collection systems and elsewhere, waste was disposed randomly. Information collected from Bokeo and LNT UDDA provides information on waste management in the NSEC.

Hazardous waste – According to the National Environment Performance Assessment (STEA/UNEP 2006) the use of hazardous substances in Lao is on the rise. The report sites agricultural chemicals as the largest volume of hazardous wastes and lists a variety of other hazardous materials (see Table 2). Hospital waste has been the subject of much attention in recent years, a study revealing that on average waste generated from provincial hospitals is 1.8 kg per bed per day and district hospitals 1.6 kg per bed per day (DETHOUDOM 2008).The recent growth in heavy industry such as the mining sector also presents new issues concerning hazardous wastes such as cyanide and mercury.

While hazardous wastes are separated and managed in Vientiane and Luang Prabang, everywhere else, hazardous wastes are mixed with the non hazardous waste (STEA/ÚNEP 2006).

Table 2 Principle sources and types of hazardous waste in Lao PDR

Sectors/Exposure Areas	Type of Waste
Agriculture; Planted areas; crop storage areas	Herbicides, insecticides, rodenticdes, used chemical containers
Households	Used florescent tubes, batteries, drugs, cosmetics, vehicle materials
Hospitals or clinics	Medical waste: infected human issues and organs, sharp instruments, lab equipment etc
Commercial establishments – Vehicle servicing, dry cleaning, electrical transformers	Hydrocarbons: oils, hydraulic fluids, halogenated solvents Polychlorinated biphenyl's (PCBs)
Small-scale industry: photo finishing, textiles, printing, leather tanning	Solvents, acids, silver, cadmium, mineral acids, solvents, inks, dyes, chromium

Source: STEA/UNEP 2006

Liquid Waste (sewage and waste water) – is generated by households and industry and according to the EPA (STEA/UNEP 2005) the majority of this waste remains untreated.

Solid waste in the NSEC: The main type of waste have been generated in the NSEC is because of the number increase of the population and based on development of economic and especially people insensible of environmental protection.

Households and industry are the main source of solid waste and liquid waste.

Figure 3 Total population by gender and number of village and households by

district

Loung Namtha Province

District Name	Population (person)			Number of Village	Number of Household	Average Household Size
	Female	Male	Total			
Nam Tha	22233	22376	44609	79	7652	5.8
Sing	15459	15160	30619	95	5888	5.2
Long	14383	14252	28635	81	5325	5.4
Viengphoukha	9787	9105	18892	46	3489	5.4
Nalae	11662	10814	22476	79	3759	6
Total	**73524**	**71707**	**145231**	**380**	**26113**	**5.6**

Figure 4 Total population by gender and number of village and household by district

Bokeo Province

District Name	Population (person)			Number of Village	Number of Household	Average Household Size
	Female	Male	Total			
Houyxai	28874	28118	56992	121	10174	5.6
Tongpheung	12711	12110	24821	59	4837	5.1
Meung	5445	5754	11199	33	1936	5.8
Pha Odom	18022	17561	35583	94	5739	6.2
Paktha	8554	8770	17324	47	2946	5.9
Total	**73606**	**72313**	**145919**	**354**	**25632**	**5.7**

Figure 5 Number of toilet in Luang Namtha and Bokeo Provinces

Provinces	**No. Toilet**	**percentage**
Bokeo	12093	54.46%
Loung Namtha	23240	89%

Agricultural waste (Hazardous) – The EPA Report (STEA UNEP 2006) cites hazardous agricultural wastes as having the highest volume in Lao PDR. While no statistics on the use of these chemicals can be sourced, given that the NSEC agricultural sector is making the transition from subsistence to cash crop they are therefore considered as a key source of waste in the area.

Industry Hospitals (Hazardous) – Hospitals generate significant amounts of waste (Table 7). Of this waste, between 25 and 33 percent is medical waste (Dethoudom 2008). It is not clear whether this waste is properly separated and dealt with.

Table 7 Estimated Hospital Waste in the NSEC

	Provincial Hospital			**District Hospital**			**Clinic**		
	Unit	Total Beds	Waste kg/yr	Unit	Total Beds	Waste kg/yr	Unit	Total Beds	Waste kg/yr
Bokeo	1	70	45990	6	100	65700	27	91	n/a
LNT	2	75	49275	5	70	45990	15	43	n/a

Compiled from: LNT & Bokeo 2008; Dethoudom 2008

Road Construction - waste management in road projects like the R3 have been generally seen as inadequate to date. Such projects produce biodegradable and non-biodegradable both of them are non-hazardous waste. Biodegradable (non-hazardous) are mostly from the vegetation and food scraps. Non-biodegradable (non-hazardous) are mostly from the hard plastics, glass, metal, processed timber, paper/cardboard, tyres etc (UDAA, 2006).

Bokeo and Luang Namtha Provinces are becoming more concerned about waste and waste management plan . Provincial authorities are encouraging villagers to be aware of environmental

protection and are training local people in waste management practices in villages and districts (UDAA, Bokeo May 2008).

In provincial level in Loung Namtha district they provided the information and regulation, especially, the provincial governor keep on practice and more strictly with management unit and UDAA in the province (UDAA, LNT May 2008).

In Bokeo Province most problems from people lack of knowledge for waste collection management in their own house and in each village. In contrast, in Luang Namtha Province most problems of waste collection management from public area for example hospitals, factories, markets and restaurant etc (UDAA, May 2008).

In Bokeo Province located in Ban Oudom far from Houaysay district 2500m. There are two pits. From 1997 the provincial government had been conducted to the private company reconstruction of some new pits (UDAA May 2008).

In Loung Namtha Province located Ban Phonexayxawang far from the Loungnamtha District 6km and the total area is 1.5 ha since year 2000 and at the present time they had been constructed a new pit far from the Loung Namtha District about 11km and the total area is 3.5 ha at Ban Soptud (UDAA, May 2008).

Table 8 the number of waste facilities

Provinces	Unit	Area (ha)	District	Year	Companies Name
Bokeo	2	4.5	Houyxay	1997	Market Group Co.Ltd
Loung Namtha	2	5	Loungnamtha	2000	UDAA Provincial

Source: UDAA, 2008

The provincial level should be conducted a special pit or area for hazardous waste. The bund will be designated for dumping of hazardous waste. There is presently no separate collection of such waste, but there should be in the future. Whenever, waste which is known as hazardous (such as waste from factories, hospital which do not have incinerators, etc) arrives at the pit area, the operator should guide the truck to dump such waste in the special area. No waste picking should be allowed in this area (STDSP, 2005).

Waste management in Lao PDR is working together with provincial level and local authority. They were supported by Non-government agency for example JICA and gtz and UN Habitat. And government responsibility section. In contrast we are not the recycle factory to reuse the waste and garbage. We are no money to establish the factory (UDAA, Bokeo May 2008).

Moreover, Loung Namtha provincial level and local authority they were supported and promoted with households, factories and industries for they cooperation and pay for waste management unit as show in table below. Some issues with local waste, they couldn't generate waste in differences garbage and no recycle company to buy. Most of the wastes are from household and construction area (UDAA, LNT 2008).

Table 9 The category waste payment in Bokeo and Loungnamtha provinces 2006

Category	Bokeo (k/month)	Loungnamtha (k/month)
Government offices	300/person	
Hospitals	50,000	
Schools	20,000	
Bus	20,000	
Boats	30,000	
Households	5,000	
Hotels	20,000	

Restaurants	20,000	
Factories	50,000	
Industries	500,000	

Please consider current state & recent & future trends (including government targets)

Indicator:
Official target:
(include sources of indicator and target)
Trends:
Drivers of trends:

Indicator:
Target:
(include sources of indicator and target)
Trends:
Drivers of trends

Indicator:
Target
(include sources of indicator and target)
Trends:
Drivers of trends

Indicators:
Target:
(include sources of indicator and target)
Trends:
Drivers of trends

Relevant laws, policies, plans and institutional arrangements:

- Industrial Waste Discharge Regulation 1994
- National Strategy on Environment to the years 2020 and action plan for the years 2006-2010
- Environment Protection Law 1999
- Land Law 1997
- Industry Manufacturing Law 1999
- Decree of the Council of Minister on the Management of the City and Public Places, 1991
- The Minister's Agreement on the Rules and Regulation for Town Planning, 1996
- Prime Minister's Decree on the Organization of Urban Development and Administration Authorities, 1997
- Industrial Wastewater Discharge Regulations, 1994

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- **Hazardous wastes from mining**: hazardous wastes such as cyanide and mercury
- **Agricultural chemicals**: their use and storage
- **Transport service and maintenance areas**: Vehicle servicing,
- **Small-scale industry:** especially located in concession areas and industrial zones - food and metal processing, textiles, printing, leather tanning and tourism facilities

References/sources:

1. Environmental Management Plan for Sepon Project Savannakhet Province 2006
2. Country Report on Waste working group session at WGIA, Jakarta, Indonesia 2007
3. Detailed Environmental Management Plan (DEMP) 2004.
4. 2nd Quarterly Environmental Monitoring Report (Gov, 2005)
5. Final Report Environmental Impact Assessment (Gov, 2003)
6. Urban Development and Administration Authority Bokeo and Louang Namtha Provinces 2008
7. Loung Namtha Strategy Environment Development Plan year 2006-2010 (Gov, 2003)
8. Department of Planning and Cooperation Report List (Gov, 2008)
9. Bokeo Strategy Development Plan Year 2006-2010 (Gov, 2005)
10. Operation and Maintenance manual for waste collection and treatment facilities (Small towns development sector project STDSP, 2005)

Annexes: (eg. maps, diagrams, tables)

Environment: Thailand

Environment
Template 12: Air and water pollution
Key issue EN2: Water pollution (road/transport, agricultural areas, industries)
Key issue EN1: Air pollution (road/transport, agricultural residual (slash & burn at a large scale & forest fires, greenhouse gasses)

Water pollution - Introduction:

In 2003, the Pollution Control Department (PCD) monitored the quality of 49 rivers and 4 lakes in Thailand. It found that surface water monitored in the Northern and Central regions of the country where the NSEC is located have fair to poor quality. Rivers in populated areas in particular were polluted due to the discharges of wastewater from various point sources. Thus, mitigation measures such as construction of wastewater treatment plants, hazardous waste treatment, agricultural waste management, industrial waste control, and management of other pollution sources are required.

Agricultural runoff, domestic wastewater and industrial effluent are responsible for the poor water quality. The dominant source for organic pollution is domestic wastewater, which is responsible for 54 percent of total national generation and an average of 60 percent across regions. Only small portion of total urban wastewater is treated. Nationally in 2005 water quality was found to be good in 20% of water bodies; fair in 48% and deteriorating in 27 %. Surface water quality varies widely in the different regions – and even within regions. Four of the top ten polluted river basins are in the Central region and one in the North – the Nan (Table 1).

The Central region and its Chao Phraya basin is the largest and most polluted owing to the diverse nature of economic activities in this area. Pollution is most severe in the lower reaches of the Chao Phraya and Tha Chin rivers, Lower Lam Takong and Songkhla Lake, due to high industrial and domestic wastewater discharge (DWR/MONRE 2007). For the region as a whole, domestic and agricultural sources constitute the largest shares in terms of organic pollution (BOD), with industry contributing to 24 percent of overall generation. Water quality in the Northern region is fair owing to the poor conditions for agriculture and the relatively low presence of industry. Agriculture and industry together account for 17 percent of total BOD generation while domestic wastewater discharges account for about 83 percent. During the dry months between May-July, when water flows are low, many rivers deteriorate to very poor water quality, for example, in the lower Chao Phraya River. Deteriorated and polluted waters are also periodically found in lower Pasak, Mae Klong, Ping, Wang, Yom, and Nan Rivers – all in the Central and Northern regions.

Chao Rhraya River basin:
The Chao Phraya river exhibited serious organic and bacterial pollution that was a threat to many species of aquatic life. Similarly, water quality in the Tha Chin River was heavily degraded, caused by the combined discharges of industrial, domestic and rural inflows. The overall water quality of the major rivers in the upper Chao Phraya Basin was found to be polluted or degrading, particularly near urban centres. Significant sources of pollution were identified in the upper reaches of the Ping River coinciding with urban development in Chiang Mai Province. In the Wang River, degradation of water quality near centres of urban population in Lampang was attributed to domestic wastewater discharge coupled with effluent discharges from commercial establishments and factories located on the river banks. Overall water quality in the Yom River had also deteriorated due to high bacterial contamination from municipal wastewater releases from households and business activities in urban areas in Pichit, Pitsanulok,

Sukhothai and Phrae Provinces. Water quality in the Nan River had deteriorated from heavy bacterial contamination attributed primarily to the rapid increase of urban development in Pichit, Pitsanulok, Uttaradit and Nan Provinces.

The extensive network of interlinked waterways associated with the main delta irrigation system also constitutes a diffusion network for diverse kinds of pollution. Water pollution is caused by the discharge of agricultural wastes (pesticides, fertiliser, pork farm effluent, etc.), sewer outlets and industries. It has an adverse impact on domestic uses along waterways, on human health, aquatic fauna and flora and on several agricultural activities. Organic load, with subsequent low levels of dissolved oxygen in the water is mostly caused by domestic waste and by waste water discharged from prawn, duck and pig farms. High densities of water hyacinth often exacerbate the situation.

The effects of urbanisation and agriculture are the most likely sources of groundwater contamination to be locally problematic in the future. It is also known from recent studies that urban contamination is already an identifiable problem in city areas including Chiang Mai in the Upper Ping basin. Similar contamination might be expected in the vicinity of each of the major centres located above unconfined aquifers throughout the catchment, due to a combination of sewage infiltration and industrial waste pollution. Over-pumping, for example in Bangkok, can also lead to groundwater contamination through inadvertent disruption of existing groundwater continuums. In some areas, Groundwater quality was found to be contaminated from agricultural run-off, pesticide residues as well as saltwater intrusion from over-extraction.

The Tha Chin River Basin, in the Central region, is the second most important basin in Thailand, covering 12,000 km 2 and a population of 1.2 million. The main stem of the river is about 320 km in length, and over much of that distance water quality has deteriorated significantly over the past two decades, largely as a result of waste inputs from municipal sewage, agricultural activities, and industrial operations. Most control actions to date have been local in nature, with the result that water quality continues to deteriorate in the river. Currently, the most urgent water quality problems relate to dissolved oxygen depletion and high loadings of ammonia, primarily from agricultural sources. Lower reaches of Chao Phraya and middle and lower reaches of Tha Chin are almost biologically dead, and is a major cause of public health concern.

In the Kok River Basin, in the North, surface water quality today is generally good, although there may be local and seasonal deteriorations. Disposal of untreated sewage from Chiang Rai is a particular problem. Also, the predicted future water quality is characterised as good, although slightly below the present level. This is because the effects of increased loadings from a growing population and industrial expansion are not fully compensated by the improvements obtained by upland reforestation and water reclamation. The water quality and the aquatic ecosystems are exposed to the combined effects of two threats: (i) The risk of a reduced stream flow in the dry season, caused by the increased demand for water; and (ii) the risk of an increased pollution load, caused by population growth, changed lifestyles, intensified tourism, and intensified agricultural and industrial production. There are no sewered areas in the basin, and no treatment plants have been established. Sewage stabilisation ponds are under construction to serve Chiang Rai Town. Industries are typically processing plants for fruits and vegetables, or noodle factories. They produce mainly organic sewage. Most industries are located around Chiang Rai, and in the Fang and Upper Lao sub-basins.

Indicator: (i) The number of waste water treatment plants, together with (ii) the volume of waste water released to inland waters

Target: Number of water resources having impaired WQ & severely impaired WQ, no more than 15% by 2012 (Thailand national water policy)
Trends: Surface water quality is deteriorating in all regions of the NSEC

Relevant laws, policies, plans and institutional arrangements:
The Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality 1997-2016 seeks to improve the quality of water and rehabilitate natural resources.

The Tenth National and Social Development Plan for 2007 – 2011 and the National Environmental Quality Plan for 2007-2011 aim to accelerate rehabilitation of water quality in major water resources, to reduce and control water pollution originating from domestic, industrial and agricultural activities, to apply the polluter pays principle and to promote and support private sector investment in solving water pollution problems.

The Pollution Control Department of MONRE is the key agency responsible for the maintenance of water quality. Other Ministries with water pollution control functions include: Ministry of Transport, Ministry of Interior, Ministry of Industry, Ministry of Public Health, and Ministry of Agriculture and Cooperatives.

The Enhancement and Conservation of National Environmental Quality Act 1992 provides the framework for effluent standards, ambient water quality standards and promotes a control and command approach.

National standards for ambient water quality and effluents have been announced under various government authorities as follows:

- Drinking Water Quality Standard from Notification of the Ministry of Industry, No. 332, 1978 issued under the Industrial Product Standards Act 1968 published in the Royal Government Gazette, Vol. 95. Part 68, dated July 4, 1978.
- Bottled Drinking Water Quality Standard issued under the Food Act 1979 published in the Royal Government Gazette, Vol. 98 Part 157 (Special Issue), dated September 24, 1981.
- Ground Water Quality Standard from Notification of the Ministry of industry, No. 5, 1978 issued under the Ground Water Act 1977 published in the Royal Government Gazette, Vol. 95 Part 66 dated June 27, 1978.
- Industrial effluents
  (1) Notification of the Ministry of Industry, No.12, 1982 issued under the Factory Act 1978, published in the Royal Government Gazette. Vol. 95 Part 33, dated March 5, 1982.
  (2) Notification of the Ministry of Industry, No. 10, 1978 issued under the Factory Act 1978, published in the Royal Government Gazette, Vol. 95, Part 132, dated November 28, 1978.
  (3) Notification of the Harbour Department, No. 214, 1982.
  (4) Notification of the Ministry of Industry, No. 2, 1996 issued under the Factory Act 1992.
  (5) Notification of Industry Estate Authority of Thailand, 1987.
- Building Effluent Standards: Notification of the Ministry of Science Technology and Environment, issued under the enhancement and Conservation of National Environmental Quality Act 1992.
- Effluent Standards from Housing Project: Notification of the Ministry of Science Technology and Environment issued under the Enhancement and Conservation of National Environmental Quality Act, 1992.
- Surface Water Quality Standards: Notification of the National Environment Board No. 8, 1994 issued under the Enhancement and Conservation of National Environmental Quality Act 1992.
- Coastal and Estuarine Water Quality Standards: Notification of the National Environment Board No.

7, 1994 issued under the Enhancement and Conservation of National Environmental Quality Act 1992.

Indicator: Percentage exceedences of national water quality standards for a suite of microbiological, bacterial and chemical water quality parameters
Target: Number of water resources having impaired WQ & severely impaired WQ, no more than 15% by 2012 (Thailand national water policy)
Trends: Percentage of exeedences for surface water quality standards is increasing

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

Lack of waste water treatment: In the Northern region of the NSEC domestic wastewater discharges account for about 83 percent of water pollution but industrial pollution in increasing in urban areas, both without treatment.
No environmental flows during dry season: During the dry months between May-July, when water flows are low, many rivers deteriorate to very poor water quality
Ground water threatened: Groundwater quality is increasingly contaminated from agricultural run-off, pesticide residues as well as saltwater intrusion from over-extraction.

Industrial pollution intensifying: Effluent discharges from commercial establishments and factories located on river banks and in urban areas is increasing chemical and hazardous pollution.
Waste water equipment malfunctions and failures: Collection efficiency is constrained by the reliance on old drainage systems comprised of canals or open sewers and poorly maintained drainage pipe networks with limited connections.

References/sources:

1. Department of Environment. 2005. Bangkok State of the Environment 2005. Bangkok Metropolitan Administration, Bangkok.
2. Department of Environment. 2007. Bangkok and Environmental Works. Bangkok Metropolitan Administration, Bangkok. (in Thai).
3. Office of Natural Resources and Environmental Policy and Planning. 2007. State of Environment 2006. Bangkok. (in Thai with English executive summary).
4. Department of Water Resources, 2007, IWRM 2005 Southeast Asia Project, Thailand National Report January 2007, Ministry of Natural Resources and Environment, Thailand http://www.ucc-water.org/iwrm05/Documents/Thailand_IWRM2005_Report_310107.pdf
5. Wijarn Simachaya and Isobel Heathcote, 1999, Integrated Water Quality Management in the Tha Chin River Basin, Thailand, Using the Linkage of a Simulation Model and a Desktop GIS, WRPMD'99 - Preparing for the 21st Century Conference Proceedings, Chapter 4G93, 10.1061/40430(1999)171
6. Office of National Water Resources Committee. 2000. National Water Vision: A Case Study of Thailand. http://www.unesco.org/water/wwap/case_studies/chao_phraya/index.shtml
7. World Bank, 2001, Water Quality, Environment Monitor 2, Bangkok, Thailand http://siteresources.worldbank.org/INTTHAILAND/Resources/Environment-Monitor/environment_monitor_2001.pdf

Websites

1. http://www.pcd.go.th/AirQuality/
2. state of water environmental issues http://www.wepa-db.net/policies/state/thailand/thailand.htm
3. Simachaya, W. 2000, Water Quality Management in Thailand, Water Environment Partnership in Asia, http://www.wepa-db.net/policies/state/thailand/thailand.htm

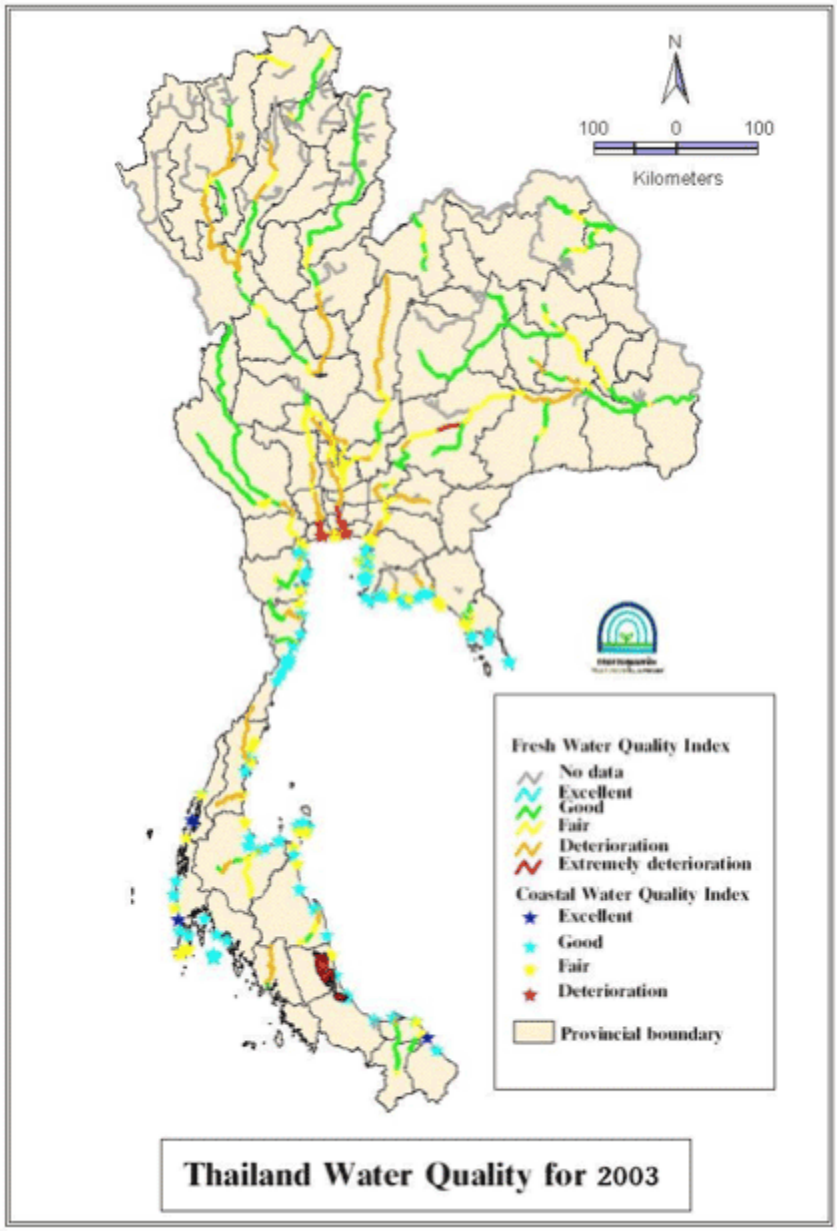
Annexes: (eg. maps, diagrams, tables)

Table 1: PM_{10} and AQI of Air pollution monitoring stations in Chiang Mai in 2007-2008

Year/ Month	Station location	No. of days exceeded standard level	PM_{10} 24 hr (ug/ m^3)[1]		AQI[2], Max
			Min-Max	Mean	
2008					
March	Chiang Mai	4	119.7-171.3	140.5	122
	Yuparaj	4	141.3-206.2	159.4	137
	Phunphing Palace[3]	4	120.6-154.6	135.1	115
April	Chiang Mai	0	NE	NE	NE
	Yuparaj	2	126.2-131.5	128.8	105
	Phunphing Palace	3	124.1-186.7	151.4	129
2007					
February	Chiang Mai	6	123.5-131.8	128.4	105
	Yuparaj	9	128.2-166.4	144.6	120
March	Chiang Mai	24	122.3-303.9	181.4	180
	Yuparaj	22	122.3-382.7	186.9	247
April	Chiang Mai	0	NE	NE	NE
	Yuparaj	1	156	-	116
Standard level of Thailand				120	100

Source: Department of Pollution Control (www.pcd.go.th/AirQuality/)

Remarks: 1=Particulate matter 10 micrometers or less in aerodynamic diameter
2=Air quality index
3=Station at Phuphing Palace started collecting PM10 on April, 2008
NE=No data exceeded standard levels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100 0 100
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Fresh Water Quality Index
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Excellent
Good
Fair
Deterioration
Extremely deterioration
Coastal Water Quality Index
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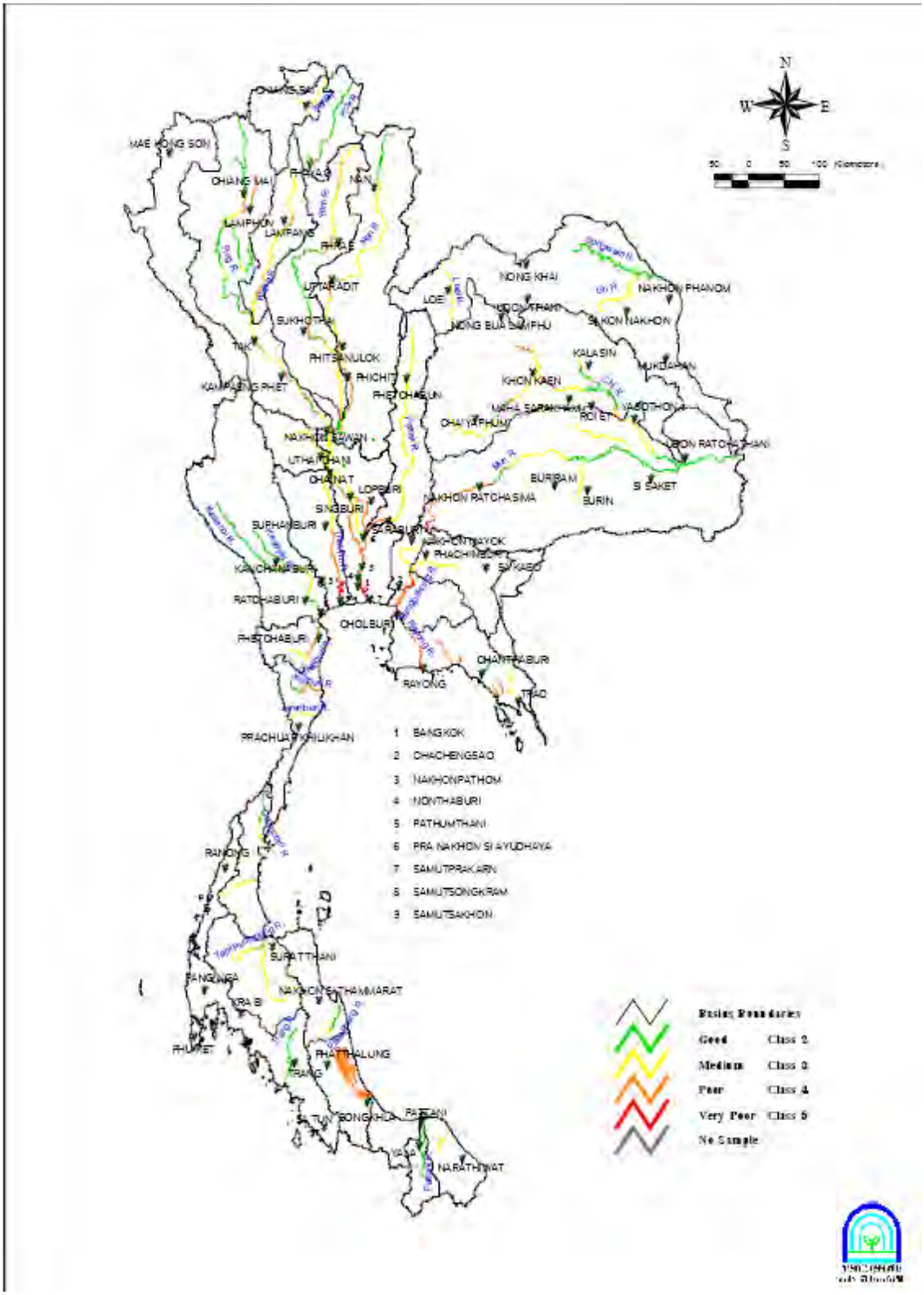
Provincial boundary
Thailand Water Quality for 2003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SUPHANBURI
ANGTHONG
AYUTTHAYA
KANCHANABURI
RATCHABURI
PHETCHABURI
CHOLBURI
RAYONG
CHANTHABURI
TRAT
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RANONG
SURAT THANI
PHANGNGA
KRABI
NAKHON SI THAMMARAT
PHUKET
PHATTHALUNG
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SONGKHLA
PATTANI
YALA
NARATHIWAT
NONG KHAI
LOEI
UDON THANI
NONG BUA LAMPHU
NAKHON PHANOM
SAKON NAKHON
KALASIN
MUKDAHAN
KHON KAEN
MAHA SARAKHAM
ROI ET
YASOTHON
CHAIYAPHUM
UBON RATCHATHANI
BURIRAM
SURIN
SI SAKET
NAKHON RATCHASIMA
NAKHONNAYOK
PRACHINBURI
SA KAEO
1 BANGKOK
2 CHACHENGSAO
3 NAKHONPATHOM
4 NONTHABURI
5 PATHUMTHANI
6 PRA NAKHON SI AYUDHAYA
7 SAMUTPRAKARN
8 SAMUTSONGKRAM
9 SAMUTSAKHON
Basin Boundaries
Good Class 2
Medium Class 3
Poor Class 4
Very Poor Class 5
No Sample

Table 1: Cumulative contribution of Top 10 water basins to total BOD in 1999

Cumulative contribution of Top 10 water basins to total BOD generation, 1999

Basin	Region	BOD [1] (Kg/Day)	Percent	Cumulative
Moon	Northeast	405,451	16.7	16.7
Chao Phraya	Central	363,705	15.0	31.7
Chi	Northeast	284,467	11.7	43.4
Mekong	Northeast	228,743	9.4	52.8
Tha Chin	Central	208,122	8.6	61.4
Mae Klong	Central	129,935	5.3	66.7
Pasak	Central	115,148	4.7	71.5
East Coast-Gulf	East	65,673	2.7	74.2
Nan	North	57,500	2.4	76.5
Bangpakong	East	56,743	2.3	78.9

1- Includes generation from industry, domestic, and agriculture
Source: Development Research Group, World Bank, 2001

Environment
Template 12: Air and water pollution
Key issue EN1: Air pollution (road/transport, agricultural residual (slash & burn at a large scale & forest) fires, greenhouse gasses)
Key issue EN2: Water pollution (road/transport, agricultural areas, industries)

Air pollution - Introduction

In 2002 the World Bank concluded that while overall air quality had improved over the preceding ten years, it is still a problem in traffic corridors and urban centers and.[1] Key air pollutants include dust, small particulate matter (PM10 and PM2.5), sulfur dioxide (SO2), lead (Pb), carbon monoxide (CO), nitrogen oxides (NOx), hydrocarbons (HC), and ground-level ozone (O3). Other transboundary air pollutants such as ozone depleting substances (ODS), greenhouse gases (GHG), and some persistent organic pollutants (POPs) have caused long term impacts. The major sources of air pollution are industry, power plants, transport (primarily motorcycles and automobiles), and area sources that include agricultural waste, and other biomass burning. Forest fires, agricultural burning and open cooking all contribute significantly to particulate pollution to an extent that is not fully understood. Among transport sources, two-stroke motorcycles (55% of air pollution), diesel trucks and aging buses are contributing significantly to air pollution in urban areas.

The Central Region through which the NSEC runs, accounts for 60-70 percent of all industrial emissions in the country but, as Map 1 shows, a number of urban centres in the North also have air pollution readings above national standards. Fossil fuel-powered thermal plants continue to generate SO2, NO2 and carbon dioxide (CO2) emissions, while PM emissions have been curbed. Key industrial contributors of PM, SO2 and NO2 within the Central Region are cement, lime and plaster manufacturing; iron and steel making; and other medium to heavy industries. Though emissions from industrial sources are much lower in other regions, major contributors to emissions there are cement, lime and plaster manufacturing; sugar mills; sawmills; iron and steel manufacturing; industrial chemicals production; and pulp and paper manufacturing. In the North, PM10 and TSP are of greatest concern followed by SO2 and NO2.

The main problem with the most serious health impact in urban areas will be particulate matter less than 10 microns (PM-10), which can enter the respiratory system, and still exceed health standards in some areas. PM-10 comes mainly from diesel engines, emission and open fires. Motor vehicles, two-stroke motorcycles, diesel trucks and old buses are contributing significantly to the problem in the cities. In 2001, airborne particulate matter was estimated to have caused 3,300 premature deaths and to have led to about 17,000 hospital admissions, at a health care cost of up to THB 6.3 billion (DKK 1.05 Billion). Nevertheless, the World Bank has found that lead, dust and carbon monoxide has decreased to an acceptable level in Bangkok and other urban centres. This is probably due to the Thai government's policy on phasing out leaded gasoline, improving diesel quality and using clean technology to reduce pollution.

Rural air pollution caused by airborne particulates comes from biomass open burning from cooking, heating in the cool season, burning agricultural wastes, burning agriculture residuals for land preparation, burning forest for product harvesting and clearing. In the North, more than 90 percent of

[1] Much of the material for this template is taken from the World Bank Environmental Monitor for Thailand on Air Quality 2002 and then confirmed and updated with information from the MONRE Pollution Control Department.

the population are farmers. These activities generate air pollution problems such as CO_2, CO, Volatile organic compounds, PM_{10}, all of which result in adverse effects on health, ecosystems and vision (impacting on tourism, worker productivity, traffic accidents and climate). Yet the damage cost of biomass open burning has not been evaluated.

In rural areas many sources go unreported such as road dust; open cooking using fossil fuels; and forest fires and agricultural burning. These sources of pollution are widespread, difficult to cover in inventories, and thus often overlooked. Forest fires in Thailand in 2000 were estimated to have generated approximately 40,000 tons of TSP (equivalent to total emissions for Bangkok for all sources). The burning of agricultural residues generated 319 tons of TSP, causing widespread sub-regional haze. Forest fires are a major source of TSP and CO in urban areas such as Chiang Mai Municipality. Other pollution sources that are usually overlooked are residential and commercial open cooking and refuse burning. Estimates for Chiang Mai show that CO and VOC emissions from these sources are estimated to be high; they contributed 693 tons of CO and 627 tons of VOC in 2001 (Table 1). In 2000, the World Bank estimated that in Chiang Mai PM10 caused USD56.8 million in public health costs.

In 2002, the World Bank found that, with the exception of particulates and O3, all pollutants now comply with the country's air quality standards. Ambient particulate matter, the pollutant with the most serious health impacts, still exceeds standards along traffic corridors and rural areas due to fire. Indoor air pollution remains a concern. Most indoor environments in Bangkok, for example, including shops, living rooms, and bedrooms, had levels higher than ambient levels of both PM2.5 and PM10.

Indicator: Emissions of CO2-Equivalent per Unit of GDP
Target: Emissions of C02-equivalent per Unit of GDP is halved by 2020
(include sources of indicator and target)
Trends: Emissions of green house gases are increasing

Indicator: CO_2, CO, Volatile organic compounds, and PM_{10} levels in rural areas
Target: Incidence of forest fires and agricultural burning is halved by 2015
(include sources of indicator and target)
Trends: Forest fires and agricultural burning are causing increasing PM and haze problems

Relevant laws, policies, plans and institutional arrangements:

In October 2002, a new Ministry of Natural Resources and Environment (MoNRE), with its Department of Pollution Control, was created to oversee environmental management, including air quality. The first comprehensive legislation on environmental protection was the Enhancement and Conservation of National Environmental Quality Act (NEQA), which was enacted in 1975. This act was superseded in 1992 by a newer act with the same title. The Constitution of 1997 deepened the state's commitment to environmental protection by including specific articles. The 1992 Act includes specific clauses on air quality.

National standards for air pollution

In Thailand, national standards for ambient air quality and emissions have been announced under various government authorities as follows:

- Standards on Air Quality and Noise Management for Ambient Air Quality Standards (including CO, NO_2, O_3, SO_2, Pb, PM-10, PM<100 um) from Notifications of National Environmental Board No 10,

1995 and No 24, 2004

- In Use Vehicles/ Emission Standards (including Diesel vehicles: Black smoke, noise level: Gasoline vehicles: CO, HC, noise level; Motor cycle: CO, HC, White smoke, Noise level) from Notifications of the Ministry of Science, Technology and Environment No 2, 1994; Nos 2 and 3, 1997; No 4, 1998 and Notifications of the Ministry of Natural Resources and Environment 2005
- Emission Standards for Municipal Waste Incinerator (including Total suspended particulate, SO_2, NO_x as NO_2, Opacity, HCl, Dioxin as Total Chlorinated PCDD plus PCDF) from Notification of the Ministry of Science, Technology and Environment 1997
- Emission Standards for Infected Waste Incinerator (including SO_2, NO_x as NO_2, HF, PCDD/ Fs as international toxic equivalent, Total suspended particulate, Opacity, Hg, Cd, Pb) from Notification of the Ministry of Natural Resources and Environment 2003
- Emission Standard for Steel Industry (including Particulate matter, SO_2, NO_x as NO_2) from Notification of the Ministry of Science, Technology and Environment 2001
- Emission Standards for Gold Smelting and Refining Process (including NO_x as NO_2) and Portland Cement Plant (including Particulate matter, SO_2, NO_x as NO_2) from Notification of the Ministry of Natural Resources and Environment 2004
- Opacity Standard for Smoke from Crematorium (including Opacity) from Notification of the Ministry of Natural Resources and Environment 2003
- The standards concerning agriculture activity and other important greenhouse gases such as CH_4 are not available.

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- **Forest fires, agricultural burning** and open cooking all contribute significantly to particulate pollution in rural areas with growing health and productivity impacts
- **Transport pollution is increasing along transport corridors and urban areas:** Motor vehicles, two-stroke motorcycles, diesel trucks and old buses are contributing significantly to the PM10 and Ozone problem in the cities

References/sources:

1. Department of Environment. 2005. Bangkok State of the Environment 2005. Bangkok Metropolitan Administration, Bangkok.
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Annexes: (eg. maps, diagrams, tables)

Map 1: Air pollution in Thailand 2002 (source: World Bank Environmental Monitory 2002)

Table 1: Estimated Emissions from Selected Area Sources, Chiang Mai Municipality 2001, Tons (source World Bank, 2002)

Source	CO	CH_4	NO_x	PM_{10}	SO_2	TSP	VOC
Residential/ commercial	693	-	19	8	3	1	627
Refuse burning	205	-	15	-	24	38	72
Agricultural burning	168	16	-	-	-	16	-
Forest Fires	10,280	-	294	-	-	624	1,767
Total	**11,346**	**16**	**328**	**8**	**27**	**679**	**2,466**

Environment
Template 13: Water resources
Key issue EN3: Unsustainable use of resources (forest, land, water)

Introduction:

In Thailand, the NSEC runs through 13 of Thailand's 25 watersheds (Map and Tables). The main watersheds affected by the NSEC are the **Kok and Ing River basins** in Chiang Rai and Phapoa Provinces, which flow N and NE to the Mekong River following the border with Lao PDR, and the Chao Phraya basin. The **Chao Phraya River Basin** covers approximately 35% of Thailand 's land mass and contains several large river watersheds, including the **Ping , Wang, Yom, and Nan Rivers.** It also includes many smaller river watersheds including the Tha Chin**,** Pasak and Lopburi Rivers **.** Water availability is the key factor constraining future developments in agriculture, industry and tourism in the NSEC. Water is the core of agricultural diversification and of multi-cropping. Water resources are coming under pressure and their management is the challenge for the future. The river basins in the north such as the Ping, Wang, Yom, and Nan contribute water supply to both north and central regions. According to the Water Resource Development Master Plan, water demand is projected to increase nearly 25 per cent over the next 14 years. In general surface water supply will not meet demand in the decades to come – and there will be greater reliance on ground water reserves. The World Bank considers water scarcity is of special concern to Thailand because it occurs against a backdrop of low availability, high pollution, and increasing per capita consumption. There is great pressure on Thailand's water resources, as the country ranks the lowest in Asia for annual per capita water availability, but it ranks 14th in the world in industrial organic water pollution (World Bank 2008).

The Kok River Basin: There is an evidence of annual rainfall recession in some river basins of the north region. Especially the Kok, Ping and Nan basins. This recession is relatively strong in the Kok basin (Bancha Kwanyuen, 2002, Comparative study of rainfall change in the north of Thailand). The Kok and Ing River Basins have been gradually degraded. They have stressed ecosystems, distorted water yields caused by deforestation, soil erosion, landslides and downstream sedimentation, and, in turn, reduced soil fertility caused by soil erosion and leaching of nutrients. Visible effects are lack of water in the dry season, lowering of the groundwater table, and increased floods in the rainy season. Upland areas and mountains are exposed to (i) population pressure by growth and migration; (ii) degradation caused by deforestation and excessive slash-and-burn agriculture; and (iii) forest fires.

Water demand and supply in the Kok Basin: There are two large waterworks in the Basin, operated by PWA: Chiang Rai and Fang. Another PWA plant is under construction in Chai Prakarn. Elsewhere, the domestic demand is served by small-scale facilities or individual withdrawals, based on either surface water or groundwater. The total present demand for domestic supplies (in the entire Basin) is around 2 m3/s. The corresponding return flows are estimated at 80 percent. The water consumption is estimated at 312 l/person/day in Chiang Rai municipality, and 200 l/person/day elsewhere. While the surface water resources are fully utilised, the groundwater resources are almost undeveloped. Well yields are generally characterised as 'high', and no shortages have been reported. There is no information available about the size and distribution of the groundwater resources.

Agriculture and irrigation: The agricultural sector is by far the largest water consumer in the basin. Existing irrigation schemes cover a total area of 675,460 rai (1081 km2). The schemes are either diversion schemes or pump irrigation schemes. All are based on surface water. 65 percent of the Basin is unsuited for cultivation because of steep slopes. There is no potential for expansion of the paddy cultivation area. A part of the area that is now used for upland crops is threatened by soil erosion. There are eight planned reservoirs in the Fang, Upper Lao and Suai sub-basins. They represent an expansion by 30

percent of the area that is irrigable today. Not all the present irrigation project areas receive water, particularly in the dry season (but in some cases not even in the rainy season). It is expected that irrigated areas will increase by 55 percent and 33 percent in the dry and the wet season, respectively.

Hydropower: There are three mini-hydropower plants in the project area. All are located in the Fang sub-basin. Two hydropower schemes are planned: (1) Nam Kok hydropower project (in Myanmar) (storage volume 3,033 Mm3); and (2) Upper Fang multi-purpose project. If the Nam Kok project is implemented, it will cause a general, positive change in the water availability in the Upper and Lower Kok sub-basins. There is scope for an additional (although moderate) development of hydropower in connection with some of the planned irrigation reservoirs. If energy prices will escalate over the next decades, there will be a strong motivation to implement schemes that are feasible or nearly feasible with today's cost-benefit ratio.

The Chao Phraya Basin: The headwaters of the Chao Phraya river originate in mountainous terrain in the northern part of the country. The main river system passes through or close to many of the major population centres of the country including the capital, Bangkok, which is situated at its downstream end. The four upstream tributaries (Ping, Nan, Wang and Yom) flow southwards to meet at Nakhon Sawan and form the Chao Phraya River. The river then flows southwards through a large alluvial plain, called the delta area, splitting into four channels. The flows in the Chao Phraya and its tributaries are dependent on the monsoon rains during May to October and are highly seasonal. Average annual precipitation in the Chao Phraya basin varies from a minimum of 1,000 mm in the western part to about 1,400 mm in the headwaters and up to 2,000 mm in the eastern Chao Phraya delta. Variations from year to year, which are responsible for floods and droughts, are key factors in determining the availability of the basin's water resources. About 85% of the total runoff occurs in the months of July to December, and natural flows are small in the January to June period.

Groundwater resources: Hydrogeologically, the Chao Phraya river Basin comprises of seven groundwater sub-basin; namely; Chiangmai-Lampoon Basin, Lampang Basin, Payao Basin, Prae Basin, Nan Basin, Upper Chao Phraya basin, and Lower Chao Phraya basin. Within these groundwater sub-basins, water is held in either confined or unconfined aquifers. Eight separate confined aquifers are located in the Upper Tertiary to Quaternary strata of the Bangkok area. The natural groundwater condition within this succession of aquifers is a high degree of confinement, providing artesian conditions in each. The ease of exploitation, as well as the high chemical quality, are the main reasons for the original development of this source. The basin faces a growing problem in the management of groundwater resources. Lack of investment in piped water systems has caused many municipalities and private users to install tubewells. Almost half of Bangkok's supply comes from groundwater exploitation that is not sustainable, and this problem is spreading to other parts of the Basin. Some of the more productive aquifers have low natural recharge and have become substantially depleted.

Flooding: Floods are a natural phenomenon in the Chao Phraya river Basin and while residents have historically adapted their lifestyle to deal with annual flood events they cause significant economic losses. The major causes have been (i) the decline of flood retention areas and the confinement of flood plains due to increasing development; (ii) rapid urbanization and (iii) the intensification of agriculture. In recent years, the Government has had some success in reducing the magnitude of flooding through the construction of multi-purpose reservoirs and other flood control infrastructure. Although the extent of flooding has been reduced through construction of dikes, this has resulted in a higher overall flood risk.

Irrigation: Irrigation development of the Chao Phraya basin began as early as the 1890's in the

southern Chao Phraya Plain. The Royal Irrigation Department (RID) was formed as the agency responsible for water resource development in Thailand. The development projects include large scale, medium and small scale and pumping irrigation projects. Since 1950 the Government has constructed some 3,000 dams to store the monsoon flows for release in the dry-season to exploit the Chao Phraya basin's vast agricultural potential and to meet the growing demands of industrial and urban users. The two largest dams constructed were the Bhumibol and Sirikit Dams to supply stored water for electricity generation, irrigation, and domestic and industrial water use. Together these two dams control the runoff from 22% of the area of the entire basin. A number of barrages have been constructed in the lower Chao Phraya Basin to control and divert the water in the canal systems that provide irrigation water to some 1.0 million hectares in this area. The use of groundwater for agriculture is mainly to supplement surface water supplies. Groundwater consumption is more acute during the dry season and in drought years for land preparation, crop needs in the early part of the wet season and as a supplementary source of water for farms located at the tail-end of distribution canals. Pumped irrigation schemes are at present being implemented by the Department of Energy Development and Promotion to secure adequate irrigation water throughout the year in the middle Basin area.

Hydropower in the Chao Phraya basin in managed by the Electricity Generating Authority of Thailand (EGAT). At present there are only two major hydropower installations, at Bhumibol (713,000 KW) and Sirikit (500,000 KW) reservoirs respectively, with a smaller installation at Mae Ngat (9,000 KW) in the Upper Ping basin. EGAT is not actively pursuing new hydropower projects in the basin. The construction of further large reservoirs with hydropower potential would involve large-scale resettlement making such projects problematic. New reservoir construction in the upper basin has also encountered increasing opposition on environmental grounds.

Domestic Water Use: Water supplies for domestic purposes are provided by water service facilities in urban areas and by wells in rural areas. At the provincial level, domestic water supply coverage is about 47% of all households. Water supply for domestic purposes for farm households is from piped schemes (56.8%), wells (37.2%) and rivers (6.4%). Overall, 62% of rural households consume water from unprotected sources, such as rainfall collection, rivers, canals and ponds. The amount of water used for industrial purposes in the Chao Phraya basin is uncertain but growing.

Water transport: Ships and barges provide a very important means of transport of commercial goods. However, the increasing diversion of river flow for irrigation has had the effect of reducing minimum flows in critical reaches of the river such that navigation by vessels over a certain size is now restricted during the dry season.

Key management issues confronting NSEC water resources

Watershed degradation and soil erosion: Forest loss and farming on sloping lands has resulted in severe soil erosion. Thailand's watersheds have been damaged extensively resulting in an exponential increase in sediment transport to drainage channels and reservoirs.
Infrastructure development damaging catchments: Construction of roads and establishing reservoirs inside or nearby protected watersheds has resulted in their degradation due to improved access for illegal loggers and forest conversion.
Slash and burn is degrading watersheds: For hill tribes, such as the Karen, Hmong, Lahu, Akha and Mian, the watersheds are their home and an intrinsic part of their cultural landscape. While some hill tribes have practiced an ecologically friendly method of rotational shifting cultivation, others practiced slash and burn techniques that causes adverse environmental impacts on upland watersheds (Srimongkontip

2000).

Settlements in Class IA watersheds: Class IA watersheds are for strict protection. In the north of the country this area has been traditionally occupied by a number of ethnic minority peoples. In principle communities have to be resettled to other areas outside the Class IA and IB watershed management zones, but many remain. The challenge has been to enable them to continue living in these areas while also playing a role in watershed protection.

Upstream – downstream conflicts over occupancy in protected watersheds: Sharing and managing the benefits between upstream and downstream users of watershed areas is an increasing problem in Northern Thailand. In the absence of any national processes for recognising local forest management agreements and regimes in Thailand, villagers, fieldworkers and local government officials are often left to settle conflicts over natural resource management on their own. Forest degradation, conflicts over water resources and increasing competition over land and natural resources, has exacerbated conflict between upstream and downstream people. The expansion of 13 national parks intensified the difficulties when more than 200 upland communities were relocated from their homelands (Srimongkontip 2000).

Enforcement of water quality control*:* Agricultural runoff, domestic solid waste and wastewater, and industrial effluent area responsible for the poor water quality of the water resources. The demand for increased agriculture productivity and the expansion of industry has caused a rapid increase in the use of chemicals. The lack of integrated approaches combined with lax law enforcement, weak capacity, insufficient investment, and poor operations and maintenance systems have exacerbated the pollution problems.

Water management and allocation: There are no standard criteria for water allocation during the dry season. Priority is given to power supply and urban uses. Serious shortages of water occur when environmental flows are insufficient to combat saline intrusion and pollution concentration. Effects water intakes for agriculture, domestic and industrial uses.

River bank and wetland protection: Natural areas along river banks are being development for residential and business purposes. This encroachment is increasing flooding and impacting on biodiversity. Efforts to conserve wetland areas which play a vital part in the water cycle and water resource management need to be given higher priority in development planning.

Deforestation: The loss of forest cover has adversely affected hydrological regimes, increasing the intensity of runoff and flooding, and reducing biodiversity.

Non-native species: Several non-native plant and animal species have been introduced to riverine environments distabilising ecosystems. The three species having the greatest impact are Water hyacinth, Giant Mimosa and the Golden Apple Snail.

Sand dredging: In recent years sand dredging has become large-scale commercial enterprise using powerful mechanical shovels. This causes intense sedimentation, fish kills and changes to river hydraulic regimes and erosion of banks.

Indicators:

(i) Forest Cover in the NSEC as Percent of Total Land Area
(ii) Protected Areas in the NSEC as Percent of Total Land Area
(iii) Reforested Area in the NSEC as Percent of Total Land Area

Target: Forest cover to no less than 33 percent with 18 percent as conservation forest
(Tenth National Economic and Social Development Plan)
Trends: Watershed degradation continues

Indicator:

(i) The percentage of total stream length with riparian vegetation per river watershed.

(ii) The extent and condition of wetlands in each river watershed.

Target: Riparian vegetation and wetland area increase by 50% in the NSEC region by 2015
(include sources of indicator and target)
Trends: River banks and wetlands continue to degrade

Indicator: Aquifers with falling water levels or well pressures.
Target: All aquifers in NSEC region have stabilized or have increasing water levels by 2015
(include sources of indicator and target)
Trends: Ground water levels are dropping in southern portion of NSEC region

Indicators: The number of waterways for which environmental flow provisions have been established, and the number where provisions are being met.
Target: Waterways with provision for environmental flows and associated management plans cover at least 50% of river basins in NSEC area by 2015.
(include sources of indicator and target)
Trends: Environmental flows are reducing as demands on water resources increase

Relevant laws, policies, plans and institutional arrangements:
Thailand has adopted a river basin approach to integrated water resources management. The Department of Water Resources within the Ministry of Natural Resources and Environment is responsible for the policy and overall planning of natural resources including water resources. The Ministry of Agriculture and Cooperative is mainly responsible for the implementation and operation of the infrastructure for the agricultural areas.

In October 2000, the government adopted the National Water Policy and the establishment of river basin committees (RBCs) for the country's 25 major rivers. During 2003-4, in the NSEC, integrated river basin plans were prepared for the Yom, Nan, Wang, Khong, and Chao Phraya. Drafting of a national water law is underway to review the various obsolete and fragmented water-related laws and to put in place a "master law" for water resources. By 2007, a National Water Resources Strategic Plan was developed and a National Water Resources Committee established chaired by the Prime Minister.

Key national policies are
Water resource management
1. Promulgate the water act
2. Promote water organization reform
3. Promulgation of regulations
4. Enhance and strengthen the river basin committees
5. Establishment of management organizations
6. Establish a national water resources information center
7. Establish a water resources fund
8. Support water resources sustainable management research projects

Flood management
1. Protect & rehabilitate upstream areas
2. Rehabilitate water resources, water way, wetlands
3. Develop & improve water resources, drainage system & diversion
4. Manage land use & flood protection for economic area
5. Improve agricultural pattern & use agricultural area as retarding pond
6. Flood management

Water quality
1. Rehabilitate water quality in critical basin & urgent
2. Oversee & control the waste and wastewater disposal
3. Enhance the participation of local authority & people

Problems and issues encountered during data collection:

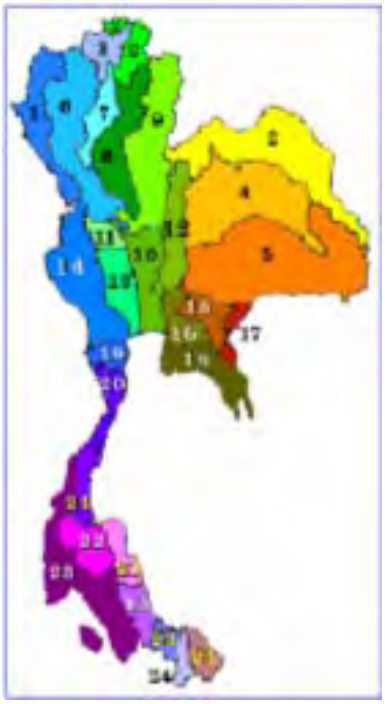
Summary of main concerns for the NSEC:
Watershed degradation and soil erosion: from forest clearing and farming on sloping lands has resulted in severe soil erosion, habitat destruction and reduced biodiversity.
Infrastructure development damaging catchments: due to improved access for illegal loggers and forest conversion.
Enforcement of water quality control*:* Agricultural runoff, domestic solid waste and wastewater, and industrial effluent area responsible for the poor water quality of the water resources.
Water management and allocation: Serious shortages of water occur when environmental flows are insufficient to combat saline intrusion and pollution concentration.

River bank and wetland protection: Encroachment and degradation is increasing flooding and impacting on biodiversity.
Deforestation: The loss of forest cover has adversely affected hydrological regimes, increasing the intensity of runoff and flooding, and reducing biodiversity.
Non-native species: Exotic plant and animal species have been introduced to riverine environments destabilizing ecosystems.
Sand dredging causing intense sedimentation of rivers which kills fish and changes hydraulic regimes, causing erosion of banks.

References/sources:

1. ICEM, 2003. *Thailand National Report on Protected Areas and Development.* Review of Protected Areas and Development in the Lower Mekong River Region, Indooroopilly, Queensland, Australia. 131 pp.
2. UNESCO World Water Assessment Program, 2007, Case study on the Chao Phyaya Basin. Prepared by The Working Group of the Office of Natural Water Resources Committee (ONWRC) of Thailand. http://www.unesco.org/water/wwap/case_studies/chao_phraya/index.shtml
3. Chao Phraya River and Watershed (http://www.premcenter.org/index.php?option=com_content&task=view&id=246&Itemid=830)
4. Department of Water Resources Planning, MONRE, 2008
5. World Bank 2008, Thailand Environment, Environment in East Asia and the Pacific, WB website

Annexes: (eg. maps, diagrams, tables)



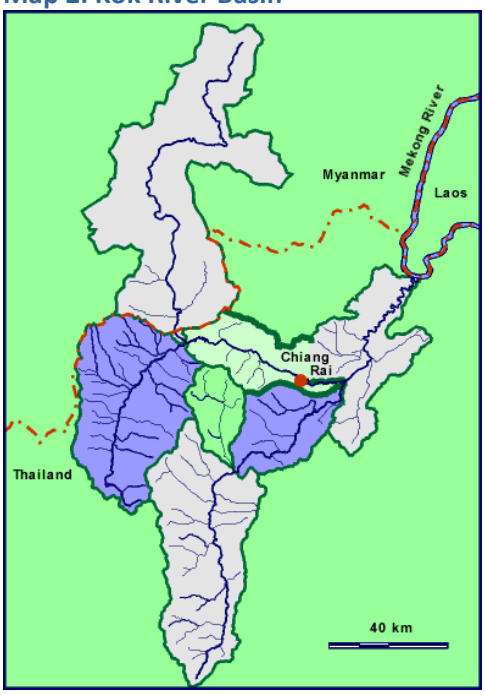
Map 1: Thailand's 25 watersheds Source: www.rid.go.th/main7.htm

Table 1: Key to watersheds of Thailand

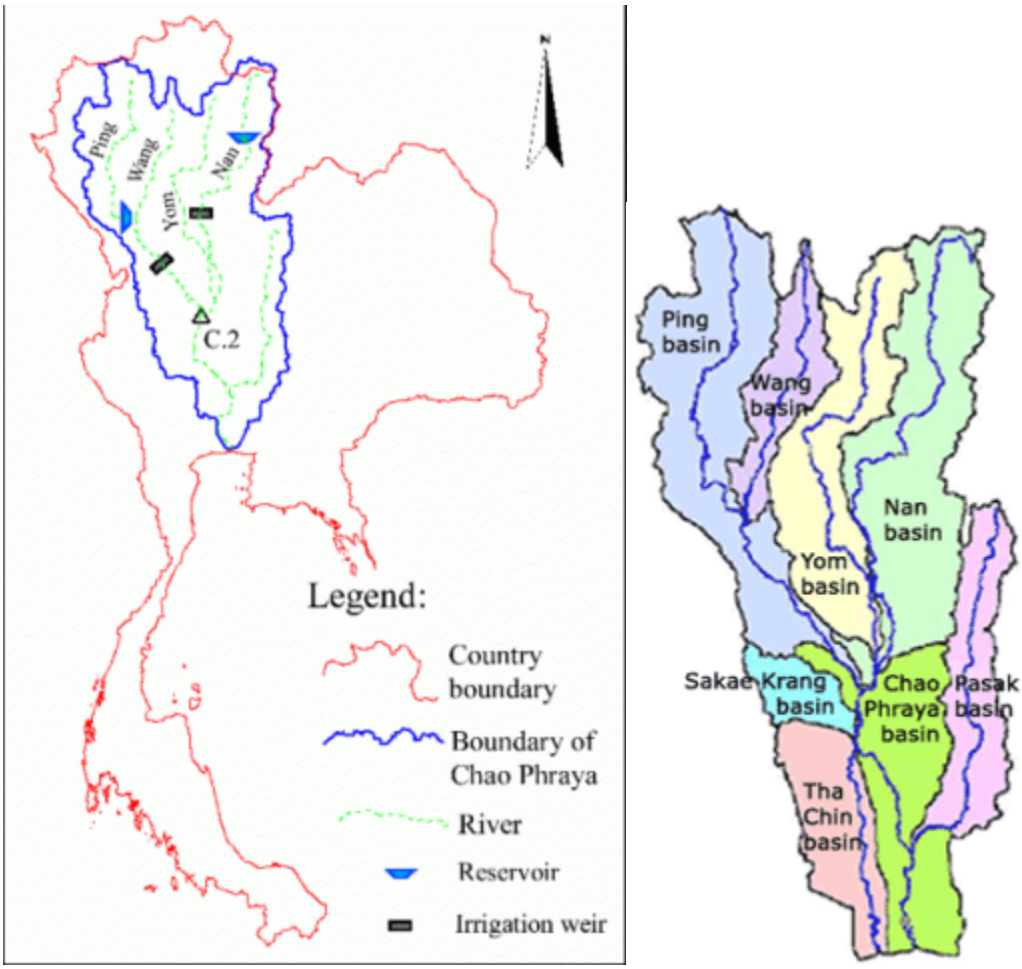
Number/ Region	Name
North	
1	Mae Nam Salawin
2	Mae Nam Khong
3	Mae Nam Kok
6	Mae Nam Ping
7	Mae Nam Wang
8	Mae Nam Yom
9	Mae Nam Nan
North-east	
2	Mae Nam Khong
4	Mae Nam Chi
5	Mae Nam Mun
Central	
10	Mae Nam Chao Phraya
11	Mae Nam Sakae Krang
12	Mae Nam Pasak
13	Mae Nam Thachin
East	
15	Mae Nam Prachin Buri
16	Mae Nam Bang Prakong
17	Thole Sap
18	East Coast Gulf
West	
14	Mae Nam Mae Klong
19	Mae Nam Petchaburi
20	West Coast Gulf
South	
21	Peninsula East Coast
22	Mae Nam Tapi
23	Thale Sap Songkhla
24	Mae Nam Pattani
25	Peninsula West Coast

Note: Mae Nam = River

Map 2: Kok River Basin

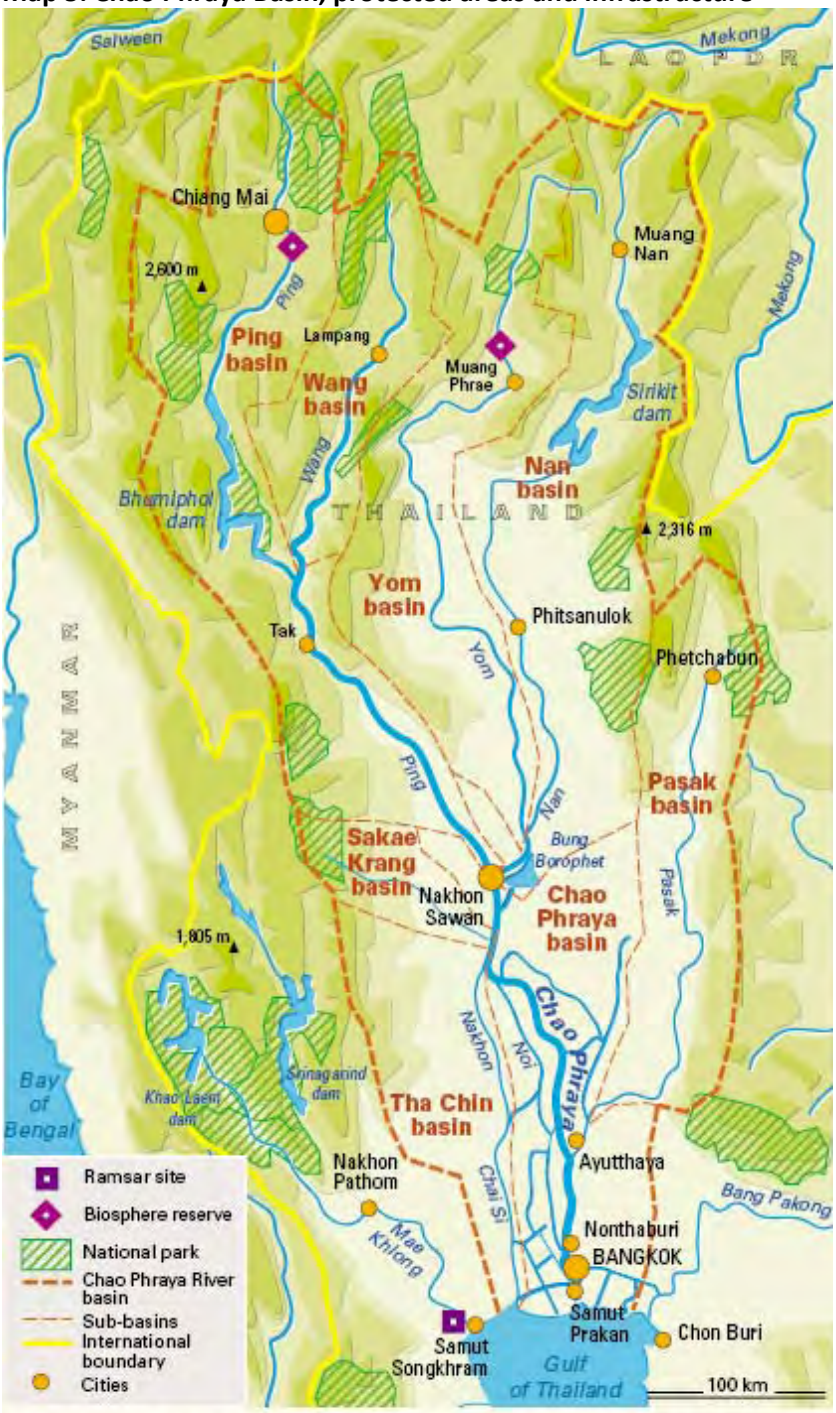


Map 3: Chao Phraya River Basin



Map 4: Chao Phraya River Basin watersheds

Map 5: Chao Phraya Basin, protected areas and infrastructure



Source: Prepared for the World Water Assessment Programme (WWAP) by AFDEC, 2002.

Table 2: The NSEC crosses 13 of Thailand's 25 watersheds

Province/ Region	Area (km^2)	*	Province	Average rainfall (mm/ year)	Average runoff (million m^3/ year)
North					
Mae Nam Salawin[1]	17,920	3	Mae Hong Son, **Tak**, **Chiang Mai**	1,354	8,376
Mae Nam Khong[1]	57,422	2	North: **Phayao**, **Chiang Rai** (7 provinces in North-east)	1,548	30,789
Mae Nam Kok[1]	7,895	2	**Chiang Rai**, **Chiang Mai**	1,478	4,177
Mae Nam Ping	33,898	5	**Chiang Mai**, **Lampang**, **Tak**, **Kamphaeng Phet**, **Nakhon Sawan**	1,125	8,725
Mae Nam Wang	10,791	2	**Lampang**, **Tak**	1,099	1,617
Mae Nam Yom	23,616	9	Phrae, **Nakhon Sawan**, **Phayao**, Nan, **Lampang**, **Kamphaeng Phet**, **Sukhothai**, **Phitsanulok**, Phichit	1,159	3,657
Mae Nam Nan	34,330	6	Nan, Uttaradit, **Phitsanulok**, Phichit, Phetchabun, Nakhon Sawan	1,273	12,015
Central					
Mae Nam Chao Phraya	20,125	11	**Nakhon Sawan**, **Sing Buri**, **Ayutthaya**, **Pathum Thani**, Nonthaburi, Samut Prakan, **Bangkok**, **Saraburi**, **Chai Nat**, **Lop Buri**, Ang Thong	1,084	1,732
Mae Nam Sakae Krang	5,192	4	**Nakhon Sawan**, Uthai Thani, **Kamphaeng Phet**, **Chai Nat**	1,234	1,125
Mae Nam Pasak	16,292	4	Phetchabun, **Lop Buri**, **Saraburi**, **Ayutthaya**	1,213	2,897
Mae Nam Thachin	13,682	5	Uthai Thani, **Chai Nat**, Ang Thong, Suphan Buri, Nakhon Pathom	1,041	1,364
East					
Mae Nam Bang Prakong	8,679	5	Nakhon Nayok, Chachoengsao, **Saraburi**, Prachin Buri, Chon Buri	1,346	3,344
West					
Mae Nam Mae Klong	30,837	8	Kanchanaburi, Ratchaburi, Samut Songkhram, Suphan Buri, Nakhon Pathom, Samut Sakhon, Uthai Thani, **Tak**	1,334	15,129
Total area of 13 watersheds	**280,679**				

Source: Adapted from www.rid.go.th/main7.htm

Remarks: *=Number of all provinces in the watershed

1=International river and watershed area is presented only in Thailand

The province in bold is the province in the NSEC of Thailand section

Table 3: Watershed area of the NSEC of Thailand section

Province/ Region	Area (km^2)	Precipitation				Sediment (ton/ km^2)	Soil loss rate
		Average per year		Season (million m^3)			
		m^3/ m^2	million m^3	Rainy	Dry		
North							
Mae Nam Salawin	17,920	0.35	6.27	5.02	1.25	-	-
Mae Nam Khong	57,422	0.60	5.59	-	-	-	-
Mae Nam Kok	7,895	0.61	4.84	3.54	1.30	116	0.10
Mae Nam Ping	33,898	0.19	6.41	3.14	3.27	62	0.16
Mae Nam Wang	10,791	0.11	1.91	1.46	0.46	374	0.85
Mae Nam Yom	23,616	0.15	3.54	2.73	0.81	66	0.32
Mae Nam Nan	34,330	0.35	12.02	8.17	3.84	67	0.72
Central							
Mae Nam Chao Phraya	20,125	0.20	3.97	2.42	1.54	63	-
Mae Nam Sakae Krang	5,192	0.15	0.98	0.70	0.10	-	-
Mae Nam Pasak	16,292	0.17	2.77	2.27	0.50	18	0.19
Mae Nam Thachin	13,682	0.13	1.73	1.22	0.51	-	-
East							
Mae Nam Bang Prakong	8,679	0.28	2.26	2.13	0.13	-	-
West							
Mae Nam Mae Klong	30,837	0.44	13.62	10.48	3.14	145	0.44, 0.18
Total area of 13 watersheds	**280,679**						

Source: Adapted from www.rid.go.th/main7.htm

Environment
Template 15: Biodiversity
Key issue EN4: Biodiversity loss and ecosystem fragmentation (loss of ecosystem services)

Introduction:

The NSEC road in Thailand, especially its northern half, runs within 25km of 18 protected areas (Table 1), and through three ecoregions of global conservation importance: (i) the Northern Thailand-Laos moist deciduous forests, (ii) the Northern Indochina subtropical forests and (iii) the Tropical and Subtropical Moist Broadleaf Forests ecoregions.

Thailand's protected area system is large but highly fragmented. Many of the areas may be too small to sustain their flora and fauna, especially populations of large mammals, including tigers, leopards, elephants and bears. Recent efforts to redress deficiencies in coverage of habitat include the declaration of 17 forest complexes, each comprising a number of protected areas in a shared geographic region. Another two complexes cover marine and coastal habitats. The NSEC passes through the Lum Num Pai - Salawin Forest Complex with 16 protected areas (Map 1).

In 2003, the list of threatened20 species of Thai plants and animals included 84 plants, 37 mammals, 37 birds, 19 reptiles, 35 fishes, and 1 mollusk. The number of threatened and endangered species has greatly increased during the last decade (WB 2004).

The main negative influences on biodiversity in the NSEC are fragmentation and facilitating access through road construction and transportation, illegal hunting, crop and forest burning, grazing by livestock, forest clearing, water reservoirs, destructive fishing practices, collection of forest products, illegal logging, tourism, research and development activities and environmental pollution (Office of Environmental Policy and Planning, 2002b).

The Northern Thailand-Laos Moist Deciduous Forests ecoregion[2] still retains large blocks of teak-dominated forests, but despite good coverage of protected areas, they contain little wildlife (WWF 2008). Most of the larger animals, such as tigers, have been driven to low populations or extirpation because of pervasive illegal hunting over the past fifty years. New biodiversity surveys are needed to reassess the status of wildlife in this ecoregion and to plan future conservation actions. This ecoregion is situated on the upper reaches of the Ping, Wang, Yom, and Nan rivers, tributaries of the Chao Phraya, and the upper Pasak River. Part of the area also lies in the Mekong Drainage. Most of the area is on steep hill slopes, interspersed with narrow, north-south-aligned valleys carrying alternately swift-flowing and slow-flowing rivers. Teak (*Tectona grandis*) is a co-dominant of the moist mixed deciduous forest characterizing this zone. Bamboo is common and is an indicator of high human disturbance.
Overall, because the area supports the highest proportion of woody cover of any region of Thailand, it continues to be of great conservation importance. Much of this area has not been surveyed and assessed for its biodiversity attributes.

The valleys of this ecoregion have long been cultivated, and shifting cultivation has been responsible for

[2] Much of the text and factual material relating to the ecoregions was modified from the WWF profiles on WWF, 2008, http://www.worldwildlife.org/wildworld/profiles/terrestrial/im/indo_ref.html

more recent destruction of upland regions. In Thailand, previously itinerant hill tribes such as the Hmong and Yao, who cultivate upland rice and opium replacement crops such as coffee, cabbage, and ornamental flowers, have settled illegally in many areas that are ostensibly protected. The subsistence and, increasingly, commercial agricultural activities of both upland shifting cultivators and especially lowland Thai farmers have been responsible for much of the recent degradation that has occurred inside and outside Thailand's protected areas. Large areas of forest land are now occupied by cotton fields and fruit orchards. Almost all remaining forest has been selectively logged and is significantly degraded, and has been damaged by burning and other disturbances. The predominance of teak probably has been increased by burning, although most large trees are gone. In addition, much of this area is also occupied by teak plantations rather than native forest.

The construction of a combined hydroelectric and irrigation dam on the Yom River inside Mae Yom National Park, which supports one of the best and most extensive remnants of teak-dominated forest, has been approved by the Thai government. Riverine habitat generally has been greatly altered in the NSEC region. River valleys were first settled and agriculture practiced along their banks. In silty areas, dry season cultivation follows the retreating water so that almost no undisturbed riparian habitat remains. Three of the four major rivers of northern Thailand now have hydroelectric dams. In addition, the spread of *Mimosa pigra* into disturbed areas has replaced areas of native riparian and floodplain scrub and low herbage. Construction of new roads and enlargement of existing roads under government development programs seem likely to further fragment the larger habitat patches.

Illegal logging carried out by influential businesses in conjunction with corrupt officials and police officers is a major threat. A Thai government body, the Forest Industries Organization, is empowered to remove and sell illegally felled timber from the forest, including inside protected areas. Therefore, there is no incentive to suppress illegal logging. In addition, many villages around Mae Yom National Park and other areas also continue a thriving, small-scale, illegal timber trade, assembling teakwood houses, which can be readily dismantled and sold. Fires set by farmers and hunters sweep through the region annually.

Northern Indochina subtropical forests ecoregion - Doi Suthep National Park, Thailand, is near the southern limit of this ecoregion, which includes a vast array of hills and valleys--and a rich community of birds and mammals. Cool winter temperatures and high elevations foster the growth of montane forests filled with oaks, magnolias, and chestnut trees. Here, open-canopy pine forests in the higher elevations give way to patches of tropical forests in the moist valleys below. Tropical seasonal rain forests sustain dipterocarp and fig species, while tropical montane forests are comprised of *Alstonia scholaris*, *Phoebe puwenensis*, and *Litsea pierrei* trees. Oak, tea, and chestnut species dominate the evergreen broad-leaved woodlands. Fire--whether natural or started by man--is a frequent occurrence here, resulting in the growth of palms and other species that are fire-tolerant. Birds thrive in this ecoregion. More than 700 species can be found here, including several species of pheasants and hornbills. These birds are considered valuable indicators of healthy forests, because they require intact, mature woodlands untouched by human development. They are also important to several species of forest plants, including trees and lianas, because they help disperse seeds in their droppings. The pheasant species here include the Blyth's tragopan, Temminck's tragopan, ring-necked pheasant, blood pheasant, and Siamese fireback. Hornbills include the great hornbill, plain-pouched hornbill, rufous hornbill, and Oriental pied-hornbill. Several threatened mammals find shelter in these forests as well: The endangered Tonkin snub-nosed monkey, tiger, Asian elephant, and gaur share this ecoregion with more than 180 other mammalian species. Threats to the biodiversity of this ecoregion stem from road development, logging, land clearing for shifting cultivation, and hunting for food and income.

Tropical and Subtropical Moist Broadleaf Forests ecoregion represented in Thailand by the **Chao Phraya freshwater swamp forests is** Critical/Endangered. This once was a land of tigers, Asian elephants, and Javan rhinoceroses but they are among a growing number of animals that have not been seen in this ecoregion for decades. Surrounding one of Asia's most populous cities, Bangkok, the ecoregion's natural habitat has been severely degraded. Rivers are the dominant force in this ecoregion, creating vast alluvial plains that support swampy freshwater forests. Although virtually none of the original vegetation remains, at one time these swampy lands included open water, mats of floating vegetation, scrub, and forests of towering dipterocarp trees that gradually give way to mangroves along the coast. Marsh grasses were once widespread as well but have now disappeared and been replaced by the non-native *Typha angustifolia*, a narrow-leaved cattail. As habitat has been increasingly converted to agricultural uses, birds and mammals alike have been severely threatened or extirpated entirely. In addition to larger mammals, a species endemic to the ecoregion, the Schomburgk's deer, has virtually disappeared. Oriental darters, Sarus cranes, vultures, white-eyed river martins, and other birds have not been seen in decades. Still, a few adaptable species manage to survive here. Most of Thailand's remaining colonies of large waterbirds roost in the wetlands, such as Asian openbills, painted storks, spot-billed pelicans, black-headed ibises, gray-headed lapwings, and several species of egrets. The Lyle's flying foxes make their home here as well. Rice paddies have replaced the original freshwater swamps and monsoon forests of this ecoregion. Although rice paddies offer a modified form of wetland habitat, they too are being replaced by other, more profitable types of agricultural production. Building and industrialization continue to take place without benefit of zoning or planning. Pesticide use is on the rise as well.

Overlapping with the Thai protected area system, are Important Bird Areas, wetlands, including Ramsar sites and Biosphere Reserves:

Important Bird Areas (IBA): are sites of international importance for bird conservation at the global, regional or national level, based on standard, internationally recognised criteria. They also typically support a wide range of other important animal and plant species. Thailand has 62 IBAs (Table 2). Chiang Mai Province has the greatest number of IBAs (6) with Phayao and Lamphang Provinces also being important for IBAs.

Wetland sites: Wetlands in Thailand cover an area of 36,616.16 km^2 or approximately 7.5 percent of the total area of the country. Freshwater wetlands account for 44.8 percent and coastal wetlands cover 55.2 percent. The two most important wetlands - the Gulf of Thailand and the Lower Central Plain, are the two largest. Of 10 Ramsar sites seven are in the South and one is in the North - the Nong Bong Khai Non-hunting Area in Chiang Rai (4.34 km^2) but many other wetlands are of national – and potentially of international importance within the NSEC .

For example, two other major wetlands located in Chiang Rai Province are Nong Luang and Nong Wiang in the Kok River basin. Both are partly regulated by structures, and are influenced by human settlement and use. Their ecosystems and biodiversity are not well known. Both areas are used as water sources and for fishing. No conservation measures have been imposed officially, but the local communities have regulated hunting and fisheries on a voluntary basis.
The river systems of the NSEC are under extreme pressure but still retain high biodiversity values. For example, there are 115 fish species in the Kok Basin and 1 family of freshwater prawn. There are several commercial species and exotic species, but no endemic, rare or endangered species. Several species migrate between the Kok Basin and the Mekong. The standing stock is estimated at 3-4 kg/rai, which is well below the 15 kg/rai found in productive rivers and reservoirs elsewhere in Thailand.

More than 329 fish species can be found in the Chao Phraya and its tributaries. Among them 10 threatened species, one of which, the freshwater 'Batfish' (*Oreoglanis siamensis*) is endemic. The Chao Phraya River is listed as one of 48 wetlands of national important (National Inventory of Wetlands in Thailand Project in 1995 - The World Bank, 2004). Bueng Borapet in Nakhon Sawan Province is central to the Chao Phraya River Basin. Bueng Boraphet is the largest freshwater swamp in Thailand. It has an area of around 212 square kilometers. It covers parts of Amphur Mueang, Amphur Tha Tako and Amphur Chum Saeng. In the past Bueng Boraphet was called "the Northern Sea " or "Chom Bueng" for its abundance of animal life (148 species of fresh water fish) and 44 species of plants. Rare animals include the white – eyed river – martin and the tiger perch. During November to March a large number of waterfowl migrate to the swamps – some parts (106 km2) have been declared the Bueng Boraphet Non – Hunting Area. The lake is in the flight path of various migrant birds and some 20,000 bird of at least 187 species nest in the lake. About 150 fish species are found in the lake. Bueng Borapet has a high economic value to local people. They can earn around 11,460 baht per year (The World Bank, 2004). The annual catch of fish reaches 1,200-1,500 tons from the lake and about 2,000 tons of cage fish and pond fish around the lake (Office of Natural Resources and Environmental Policy and Planning, 2003).

Biosphere Reserve Area (UNESCO): There are two biosphere reserves in the NSEC (of four nationally):

1. Huai Tak Teak Forest in Lampang: one of the best reserves of natural teak forest
2. Mae La-Huai Kok Ma Watershed in Chiang Mai: containing high biodivesity and Mae La sub-watershed

Please consider current state & recent & future trends (including government targets)

Trends: Forests continue to degrade in the NSEC region – by 8% in the three northern provinces of the NSEC between 2000 and 2006.

Indicators:

(iv) Forest Cover in the NSEC as Percent of Total Land Area
(v) Protected Areas in the NSEC as Percent of Total Land Area
(vi) Reforested Area in the NSEC as Percent of Total Land Area

Target: Forest cover to no less than 33 percent with 18 percent as conservation forest
(Tenth National Economic and Social Development Plan)

Trends: Fragmentation of forest habitat has continued during the past decade in the NSEC
Indicators: Number and area (ha) of biodiversity corridors linking protected areas
Target: Biodiversity corridors linking forests within forest complexes and between protected areas within the NSEC identified and rehabilitated
(include sources of indicator and target)

Trends: Riverine and wetland habitat continue to degrade during the past decade in the NSEC
Indicator:

(i) number of wetlands established within the NSEC with management plans;
(ii) area of riverbanks and wetlands rehabilitated
(iii) expert assessments of the status of freshwater fish and crustacean stocks.

Target: The number of listed Ramsar sites and Biosphere reserve sites within the NSEC increased to five for each category by 2015
(include sources of indicator and target)

Trends: Reducing diversity in species and habitats
Indicator: Number of species and ecological communities presumed extinct, endangered or vulnerable.
Target: The loss of species and habitats is reversed by 2015
(include sources of indicator and target)

Relevant laws, policies, plans and institutional arrangements:

Laws

In 1900, a law was promulgated governing the conservation of wild elephants, the first wildlife species to be protected. The deterioration of the forests in the 1930s led to the Forest Act 1941. In 1958 national parks and other protected areas were established. With the help of IUCN and the US National Park Service 14 sites were selected to become national parks and in 1961 the Wild Animals Reservation and Protection Act was passed followed by the National Parks Act in 1961. At present, protected areas are managed in conformance with this Act and the National Forest Reserve Act 1964 and Wildlife Conservation Act 1992, and for marine parks, the Fisheries Act revised in 1994 (The World Bank, 2004).

Policies and Plans

-National Policy, Strategies and Action Plan on Conservation and Sustainable Use of Biodiversity 1998-2002 (Office of Environmental Policy and Planning, 2002b)

After signing the Convention on Biological Diversity (CBD) in June 1992, the National Committee on the Convention on Biological Diversity under the National Environment Board (NEB) was established in 1993. In 1998 the Natural Resources and Biodiversity Institution (NAREBI) was founded and is responsible for the coordination in the field of natural resources and biodiversity policy and management. Thailand Biodiversity Center (TBC), established in 2000, is a national focal point on the access and transfer of biological resources. Since 1998, Thailand has implemented the National Policy, Strategies and Action Plan on Conservation and Sustainable Use of Biodiversity 1998-2002. The Policy is a national administrative framework to ensure that biodiversity activities do meet national interests as well as to prioritize actions required for achieving the objectives of the CBD. During the period of the first Policy Thailand had not ratified the CBD.

-National Policy, Strategies and Action Plan on Conservation and Sustainable Use of Biodiversity 2003-2007 (Office of Environmental Policy and Planning, 2002b)

With the start of implementation of the second Policy, Thailand ratified the CBD in October 2003. The objectives are to mitigate the loss of biodiversity in Thailand by ensuring that the country has a capacity to protect and maintain biodiversity and to make sustainable use of biodiversity for the best environmental conditions and life-qualities of Thai people.

-National Wildlife Management Master Plan 2004-2013

In the past wildlife conservation in Thailand had been executed under the “Wildlife Preservation and Protection Act”, no master plan had been available to guide national activities, set targets, and evaluate results. In 2003, the government set up a broad committee to draft the “National Wildlife Conservation Master Plan”. The Plan has 4 approaches, 18 strategies and 40 proposed projects.

Institutional arrangements

Responsibility for biodiversity is spread over a number of government organizations under at least 5 ministries, although Ministry of Natural Resources and Environment, specifically Department of National

Park, Wildlife and Plant Conservation is the main agency.

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- **Deforestation, habitat degradation and species loss** due to commercial logging, roads and infrastructure development, forestland conversion for agriculture.
- **Fragmentation due to Infrastructural development**: construction of roads and other infrastructure including hydroelectric and irrigation dams inside and close by protected areas
- **Illegal logging inside and close to protected areas** carried out by influential businesses in conjunction with corrupt officials and police officers.
- **Forest fires** set by farmers and hunters sweep through forests in northern regions of the NSEC region annually.
- **Illegal wildlife trade**

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Annexes: (eg. maps, diagrams, tables)

Table 1: Protected areas within 25km of NSEC road in Thailand

	Distance in KM

Name	Type	Minimum	Maximum	Mean
1. Tham Pha Tai	National Park	0.00	31.87	13.34
2. Mae Wa	National Park	0.79	25.50	11.18
3. Wiang Kosai	National Park	1.25	34.76	16.06
4. Doi Luang	Wildlife Sanctuary	2.80	29.28	15.77
5. Doi Luang	National Park	2.80	29.28	15.77
6. Lansahng	National Park	7.85	20.39	14.78
7. Phu Sahng	National Park	10.20	47.49	29.92
8. Mae Yom	National Park	13.15	43.77	26.13
9. Khlong Wangchaow	National Park	14.91	67.37	36.92
10. Taksin Maharat	National Park	15.25	37.00	25.74
11. Mae Ping	National Park	15.75	67.18	39.58
12. Mae Teun	Wildlife Sanctuary	15.88	64.68	39.79
13. Vienglaw	Wildlife Sanctuary	16.80	46.31	32.30
14. Doi Khuntan	National Park	18.31	42.64	27.83
15. Tham Jao Lam	Wildlife Sanctuary	18.93	40.28	30.45
16. Si Satchanalai	National Park	19.29	34.53	26.21
17. Doi Pha Maung	Wildlife Sanctuary	20.39	48.49	35.40
18. Chae Son	National Park	23.47	56.49	41.41

Table 2: Important Bird Areas in the Thailand NSEC

IBA code	IBA name	No of provinces in IBA	Provinces in NSEC
TH001	Doi Inthanon National Park	1	Chiang Mai
TH002	Doi Suthep-Pui National Park	1	Chiang Mai
TH003	Doi Chiang Dao Wildlife Sanctuary	1	Chiang Mai
TH004	Om Koi Wildlife Sanctuary	2	Chiang Mai, Tak
TH005	Mae Fang National Park	1	Chiang Mai
TH006	Mae Lao-Mae sae Wildlife Sanctuary and Doi Sam Meaun (within Huai Nam Dang National Park)	2	Chiang Mai
TH007	Chiang Saen Basin (including Nong Bong Kai Non-hunting Area)	1	Chiang Rai
TH013	Doi Pha Chang Wildlife Sanctuary	2	Phayao
TH014	Wiang Lor Wildlife Sanctuary and Adjacent Area to the East	1	Phayao
TH015	Doi Phu Nang	1	Phayao
TH016	Mae Yom Wildlife Sanctuary	2	Lamphang
TH019	Khao Yai National Park	4	Saraburi
TH023	Mae Wong National Park	2	Nakhon Sawan, Kamphaeng Phet
TH024	Umphang Wildlife Sanctuary	1	Tak
TH025	Thung Yai-Naresuan Wildlife Sanctuary	2	Tak
TH026	Huai Kha Khaeng Wildlife Sanctuary	2	Tak
TH030	Bung Boraphet Non-hunting area	1	Nakhon Sawan
TH031	Lower Central Plain	8	Bangkok, Ayutthaya,

			Pathumthani
TH032	Inner Gulf of Thailand	7	Bangkok

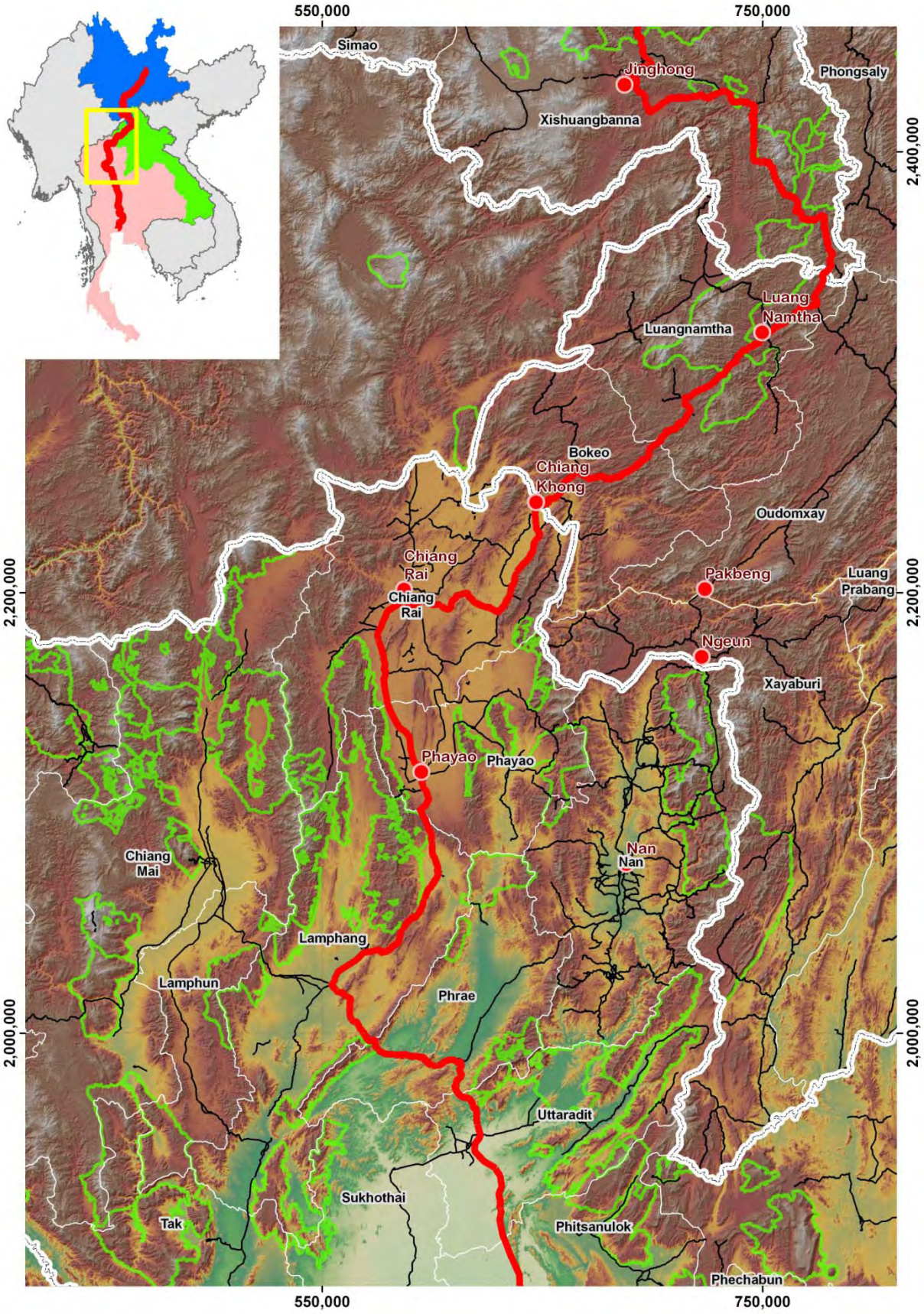
Source: Adapted from Office of Environmental Policy and Planning (2002b)

Table 3: Multilateral Agreements on natural resources and biodiversity

Name	Status of Thailand
Convention on Biological Diversity (CBD)	Ratified 31 October 2003
Cartagena Protocol	Accession 10 November 2005
Convention on International Trade in Endangered Species of Wild Fauna and flora (CITES)	Ratified 21 January 1983
International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)	Signed November 2001
Convention on Wetlands of International Importance as Waterfowl Habitat (RAMSAR)	Ratified 13 May 1998
Convention concerning the Protection of the World cultural and Natural Heritage (The World Heritage Convention)	Accession 17 September 1987
Man and Biosphere Programme (MAB)	Joined 1969

Source: Faculty of Environment and Resource Studies (2007)

Figure 1: Nong Luang wetland, Chiang Rai Province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Pakbeng
Luang Prabang
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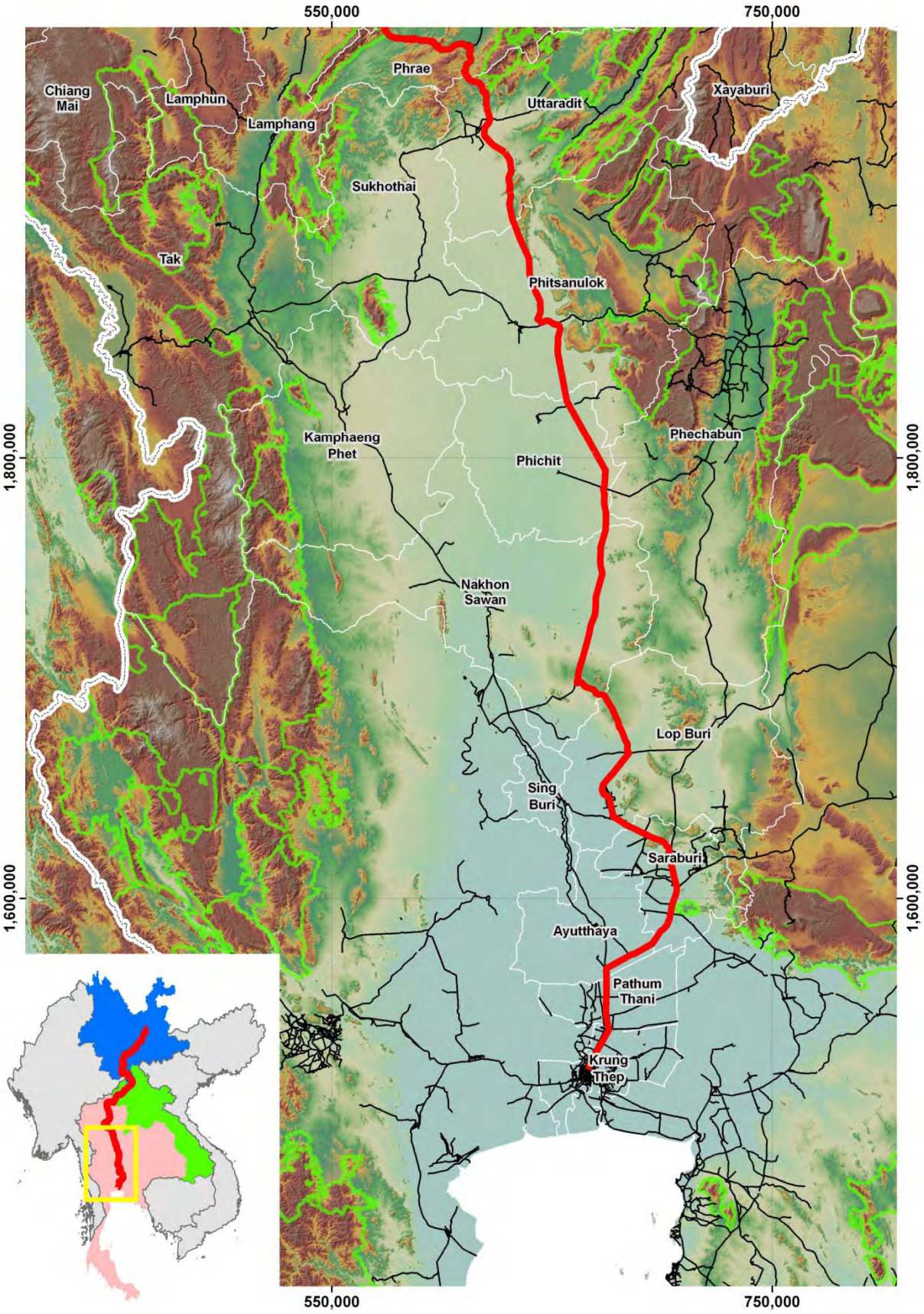
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Tak
Phitsanulok
Kamphaeng Phet
Phichit
Phechabun
Nakhon Sawan
Lop Buri
Sing Buri
Saraburi
Ayutthaya
Pathum Thani
Krung Thep

Environment
Template 14: Forests and land resources
Key issue EN3: Unsustainable use of natural resources (forest, land, water)
Introduction:

Over 40 years to the year 2000, Thailand's forest cover declined from 53.3 percent to 25 percent of total land area. The national logging ban in 1988 slowed annual loss of natural forest from 0.9% before 1989 to 0.4% in 1995 and 0.2% in 1998. Yet, during 2000 to 2006, the area of forests in Chiang Mai, Chiang Rai and Phayao Provinces in the north reduced by 8% (Table 1).

Areas of teak and other planted species designated as forest plantations continue to be made available for harvesting by the para-statal Forest Industry Organization (FIO). Now the great majority of log production is from plantations. In 2003, Thailand imported 354,000m^3 of tropical hardwood from Lao PDR and four times that quantity from Malaysia and Myanmar. Imports of timber from Lao PDR and Myanmar will be facilitated by the NSEC development.

Two major types of forest found in Thailand are (i) the deciduous forests in the drier (<1500 mm of precipitation) areas and (ii) the evergreen forests in the wetter (>1500 mm of precipitation) areas. The deciduous forests are further subdivided into mixed and dry dipterocarp forests. The country can be divided into four geographical regions with their particular assemblage of forest types: the North, the Northeast, the Central Plains, and the South. The NSEC passes through the Northern region and Central Plains. The North is mountainous and forested, containing many of the country's major watersheds. The Central Plain is a lowland area drained by the Chao Phraya and its tributaries flowing to Bangkok and the sea. The evergreen forests include the rainforests of the South, the monsoonal evergreen forests of the South and Southeast, dry evergreen forests, montane forests above 1000 m and the specialized mangrove, peat swamp and limestone forests.

The North mountainous region is divided by a number of north-south hilly ridges. The region is drained via the Ping, Wang, Yom and Nan rivers southward into the Chao Phraya River of Thailand's Central Plains. Small areas in the north of this region, mainly in Chiang Rai and Phapao Provinces, drain into the Mekong River via the Kok and Ing river basins, while parts of the west lie in the watershed of the Salween River in Chiang Mai. Virtually the whole area lies above 200 m elevation, and there are large areas of uplands above 1,000 m. Among the few peaks above 2000 m is Doi Inthanon, Thailand's highest mountain (2565 m). Average annual rainfall in the lowlands varies from 1000-1500 mm over most of the region. Deciduous forests dominate the lower elevations and the climax vegetation of the higher mountains (above 800 m) is broad-leafed montane evergreen forest, sometimes referred to as hill evergreen forest. Native pines are also fairly widespread. The area of both lowland and montane forests has been much reduced and most of what is left is extensively disturbed (ICEM, 2003)

The NSEC passes through the Lum Num Pai - Salawin Forest Complex (one of 19 forest complexes in Thailand) in the more remote north and west. It covers parts of the Salaween, Kok and western Ping watersheds. It includes a fairly loose assemblage of 16 protected areas in a still-well-forested portion of the north. It includes large areas of dry evergreen and mixed deciduous forest, with smaller areas of upper and lower montane forests, dry dipterocarp forest and pine forests.

The Central Plains comprises the alluvial basin of the Chao Phraya River, which flows into the Gulf of Thailand at Bangkok. Most of the Central Plains lies below 50 m elevation and some parts in the south are less than 10 m above sea level. The only significant uplands are jagged limestone outcrops and low

spurs extending from hill ridges of the surrounding regions. The average annual rainfall may reach 1400 mm on the coast around Bangkok, though rainfall is substantially less (around 1100 mm) in the north of the region, towards Nakhon Sawan. The formerly extensive swamps and lowland forests of the Central Plains were mostly lost by the early twentieth century, as rice became a major export crop.

Over 90% of the NSEC area is either covered with forest or used for agriculture, the proportions varying as the Corridor moves north to south. Most forest cover occurs in the northern areas where the percentage of forest varies from 50-75% in Kok-Ing, Ping , Wang, Yom and Nan to 30% in Pasak and only 7% in Chao Phraya. In recent years there has been steady encroachment of people into forest areas for conversion to agricultural purposes while cultivated land near urban centers has been converted to residential or industrial use. Agricultural land is concentrated in the southern sub-basins and ranges from 78% in Chao Phraya , 63% in Pasak and 55% in Tha Chin compared to 20 to 45% in the four northern sub-basins (Kok-Ing, Ping , Wang, Yom and Nan). The need to protect the northern catchments from further degradation and soil erosion has been identified as a priority by government. Urban land use ranges from 1 to 3% in all sub-basins except the Chao. The national logging ban in 1988 removed the pressures on natural forests by legal concessions but steady encroachment and degradation of forest systems continue.

Community use of forest products: Local villagers in the NSEC region collect a wide range of non-timber forest products, medicinal plants and fuel wood in forests, wetlands and most protected areas, and a minority fell timber and shoot wildlife. NTFPs for rural people include foods (mushroom, bamboo shoots, wild fruits and insects) for self consumption and selling, shelter and medicine (teak leaves, shrub, bark). Nationwide, villagers obtain ecosystem products equivalent to 75-300 billion baht per year or 1-5 % of GDP (The World Bank, 2004).

Key forest issues in the NSEC region include:

Continuing forest loss: Two main causes of deforestation have been the increasing demand for land for agriculture to meet the needs of the growing population and commercial logging. The demand for land depends on land prices, agricultural productivity, prices of agricultural products, alternative sources of off farm employment and income and population growth. The intensity of logging, whether legal or illegal, is influenced by wood demand and prices, forest accessibility, and population growth (ICEM 2003). Factors of special importance for the NSEC and effecting deforestation include:

- Forest accessibility. The accessibility of the forest affects both logging and land clearing. The most easily accessible forest is logged or cleared first. Remaining forest may be economically inaccessible. This slows down deforestation, while the opening of new roads increases access and the demand for new land.
- Infrastructure: Significant forest area has been replaced by government infrastructure developments, including highways, dams both for irrigation and electricity generation and industrial estates. Normally, these developments have been followed by immigration and settlements. (National Report to UNFF 5, 2005)
- Population growth following infrastructure development. Population intensifies demand for new land and for timber and non timber forest products.
- Wood demand and prices. High demand for tropical hardwood and high wood prices are likely causes of deforestation. Yet, logging has had a greater effect on deforestation indirectly, by the construction of roads which made the forests easily accessible.

Forest fires are reducing forest area, structure and diversity. They are a growing problem in the NSEC region**.** Three major causes of forest fire in 2002 are harvesting forest goods, hunting and burning of

croplands, contributing to 2,828, 1,805 and 1,385 incidents of forest fires, respectively and affecting 87,844, 64, 656 and 36,457 km2 of forest area, respectively nationwide. Other causes included pasture burning, illegal logging, tourism and carelessness. The Forest Fire Control Office, Royal Forest Department is responsible for control of forest fire (Office of Environmental Policy and Planning, 2002b).

Smoke haze is affecting public health, tourism and productivity in other sectors. The main cause of smoke haze is the burning of grassland by hunters and uncontrolled burning of upland fields for agriculture. Other sources of smoke are burning of grassland by graziers, urban and roadside fires, and burning of paddy rice straw. Forest fire legislation could not be effectively implemented as it created antagonism between forest officials and communities. Many villages already have their own regulations and fines against uncontrolled fires yet, in many cases, they could not be enforced due to fires spreading from neighbouring villages, or being lit at night by hunters.

Soil loss, especially on steep slopes is reducing agricultural productivity and affecting aquatic environments**.** The major cause of soil erosion is from forest loss and poor agricultural practices. In the northern section of the NSEC, around 65 percent of the land is unsuited for cultivation because of steep slopes. There is no potential for expansion of the paddy cultivation area. A part of the area that is now used for upland crops is threatened by soil erosion. There is a need of protecting the remaining forest areas from fires and encroachment. Certain steep headwater areas should be reforested. Agriculture in the area is constrained by: (i) soil erosion in areas with steep slopes; (ii) use of land that is unsuited for cultivation; (iii) encroachment of forests causing soil erosion and high runoff; (iv) low soil fertility (due to soil properties, poor management, or soil erosion); (v) lack of water; (vi) landholdings being too small, and lack of ownership; (vii) excessive use of fertilisers and pesticides; (viii) lack of knowledge about new technologies; and (ix) government policies that are not accepted by the target groups. In the Kok basin for example, the average soil erosion is estimated at 6.4 t/ha/year (a classification of 'moderate'). In 30 percent of the basin, the soil erosion is classified as 'severe', and nearly 1 percent is classified as 'very severe', applying the OEPP (1995) criteria for soil erosion severity. The major part of the basin is influenced by human activities. This is most evident for the agricultural farmlands, but even the upland forest areas largely appear as disturbed, encroached, partly cultivated, or recently re-planted. The forests have been under strong pressure for many decades, being felled for timber and for expansion of agricultural land.

Forest restoration and rehabilitation not focusing on environmentally sensitive areas: Waterways are especially sensitive to disturbance and tend to be overlooked as targets for forestry interventions. Historically, they have been areas of high population density and highly degraded habitats. Appropriate reforestation strategies are needed for riverine and wetland environments to enhance conservation and development benefits. Similarly greater attention should be given to establishing forest corridors between protected areas within the NSEC.

Since 1989, there has been no commercial forestry in Chiang Rai and other northern provinces. Forest areas are now regenerating and under restoration, following over-exploitation in the past. The restoration process is supported by the national ban on logging. In the long term, there is a clear scope for commercial forestry. Once restored, and with proper management, a part of the forest area will become an important commercial asset.

Government policies and plans for forest management: The Tenth National Economic and Social Development Plan, targets expansion of forest cover to no less than 33 percent with 18 percent as conservation forest.

Trends and targets

Trends: Forests continue to degrade in the NSEC region
Indicators:

(vii) Forest Cover in the NSEC as Percent of Total Land Area
(viii) Protected Areas in the NSEC as Percent of Total Land Area
(ix) Reforested Area in the NSEC as Percent of Total Land Area

Target: Forest cover to no less than 33 percent with 18 percent as conservation forest (Tenth National Economic and Social Development Plan)

Trends: Forest fires are reducing forest area, structure and diversity.
Indicator:

(i) Number of forest fires reported in the NSEC region
(ii) Area of forest burnt in hectares in the NSEC region

Target: Forest fires (and smoke haze) reduces by 50% in NSEC region by 2015

Trends: Increasing soils loss from forest clearing and poor agricultural practices
Indicator: Tons of soil lost from land area in hectares
Target: Reduction in rate of soil loss in NSEC region by 50% by 2015

Relevant laws, policies, plans and institutional arrangements:

The 9th NESDP (2002-2006) included a national forest policy aiming for 25 % of total country area as conservation forest and 15% of economic forest. The 10th National Economic and Social Development Plan aims for forest cover to no less than 33 percent with 18 percent as conservation forest.

Nine acts relate to timber and non-timber products are:
1. The National Constitution, (latest amended in 1997)
2. Forest Act, 1941 (revised in 1948, 1951 and 1960)
3. National Forest Reserve Act, 1954
4. National Parks Act, 1961
5. Wildlife Preservation and Protection Act, 1960 (amended 1992)
6. Forest Plantation Act, 1992
7. Customs Act, 1926 (latest amended in 1991)
8. Export and Import Control Act, 1979 (replaces the old Act of 1939 but keeps the regulation made under it)
9. Export Control of Community Products Act, 1977

Institutional arrangements:
The Ministry of Natural Resources and Environment (MoNRE) was established in 2002 for the management of natural resources. There are three key departments in MoNRE responsible for forest resources: (i) the Royal Forest Department, originally attached to Ministry of Agriculture and Cooperatives (MoAC) is responsible for management of economic forest and forest product utilization, (ii) the Department of National Park, Wildlife and Plant Conservation (DoNP) has its duties on forest conservation and protected areas management and (iii) the Department of Marine and Coastal Resources (DMCR) is responsible for mangrove conservation and management. In addition there is the state enterprise agency - the Forest Industry Organization (FIO) which manage the government commercial plantation sector authorized to buy and sell confiscated teak logs.

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- Continuing forest loss through increasing accessibility and infrastructure development:
- Forest fires are continuing to reduce forest area, structure and diversity.
- Smoke haze is affecting public health, tourism and productivity in other sectors.
- Soil loss, especially on steep slopes is reducing agricultural productivity and affecting aquatic environments.
- Forest restoration and rehabilitation not focusing on environmentally sensitive areas.

References/sources:

1. Office of Natural Resources and Environmental Policy and Planning. 2007. State of Environment 2006. Bangkok. (in Thai with English executive summary).
2. The World Bank. 2004. Thailand Environment Monitor 2004. Bangkok.
3. Peter Hoare, 2004, A process for community and government cooperation to reduce the forest fire and smoke problem in Thailand, Capacity Building in Biodiversity Project, Chiang Mai Thailand
4. http://www.forest-trends.org/documents/publications/Thailand%20Report%20New.pdf
5. ICEM, 2003, Protected Areas and Development – Thailand national report.
6. Forest Statistics of Thailand (http://www.forest.go.th/stat/stat_th.htm)
7. http://www.rid.go.th/main7.htm

Annexes: (eg. maps, diagrams, tables)

Table 1: Periodic change of forest area between 2000 and 2006 and National forest reserve area

Province	Province Area[1]	Forest Area[2] * (2000)	Forest Area[2] * (2006)	National Forest Reserves[3] **
1 Chiang Rai	11,518.37	5,238.60	4,918.56	10,433.10
2 Phayao	6,335.00	3,457.30	3,012.32	682.81
3 Chiang Mai	20,107.06	16,448.50	15,243.98	19,555.83
4 Lamphang	12,533.96	8,900.80	7,926.24	8,573.70
5 Lamphun	4,505.88	2,725.10	2,575.53	2,928.06
6 Sukhothai	6,596.09	2,306.90	2,091.30	2,769.56
7 Tak	16,518.65	13,503.60	12,180.80	12,108.43
8 Phitsanulok	10,815.80	3,860.20	3,820.79	5,083.68
9 Kamphaeng Phet	8,607.50	2,184.70	1,899.85	5,241.55
10 Nakhon Sawan	9,597.68	873.30	817.85	2,110.87
11 Chai Nat	2,469.75	54.60	56.75	125.33
12 Sing Buri	822.48	0.00	0.00	0.00
13 Lop Buri	6,641.86	670.10	691.22	1,776.17
14 Saraburi	3,576.49	826.20	701.98	628.58
15 Ayutthaya	2,556.64	0.40	1.47	0.00
16 Pathum Thani	1,525.86	0.00	0.00	0.00
17 Bangkok	1,565.20	3.20	3.09	0.00
Total area	**126,294.26**	**61,053.50**	**55,941.73**	**72,017.67**
Country total area	513,115.55	170,110.78	167,590.98	230,370.39

Source: Forest Statistics of Thailand (http://www.forest.go.th/stat/stat_th.htm)

Notes:
1: Royal Thai Survey Department
2: Management and Restore Forest Conservation Office, National Park, Wildlife and Plant Conservation Department
*: Forest area in Table 1 means forest of all types such as evergreen, pine, mangrove, mixed deciduous, dry dipterocarp, scrub, swamp, mangrove and beach forest etc., either in the national forest reserves, national parks, wildlife sanctuaries, forest working plan with an area of 5 hectares (3.125 rai) or more with tree taller than 5 metre or more and with canopy covering more than 10% of the ground area.
**: The areas of the provinces, regions, and country are based on the calculation of the Royal Thai Survey Department in 1978 and declared by Cabinet resolution on 12 July 1983. The areas of new provinces (Nongbua Lumphoo, Umnad Chareun and Sa Kaew) are based on the calculation of the Local Administration Department on 30 December 1993.

Table 2: Type and area of conservation forests in the NSEC
(File name: Table 14.2) – to be provided by Raywadee

Table 3: NSEC watershed classification and forest cover

Province/ Region	**Area (km^2)**	**Watershed classification (%)**				**Forest area (%)**
		1A	**1B**	**2**	**3-5**	
North						
Mae Nam Salawin	17,920	-	-	-	-	75.0
Mae Nam Khong	57,422	-	-	-	-	37.0
Mae Nam Kok	7,895	36.0	4.0	16.0	44.0	34.0
Mae Nam Ping	33,898	36.0	2.0	14.0	48.0	49.0
Mae Nam Wang	10,791	23.0	1.0	14.0	62.0	61.0
Mae Nam Yom	23,616	18.0	1.0	13.0	68.0	33.0
Mae Nam Nan	34,330	20.0	1.0	18.0	61.0	43.0
Central						
Mae Nam Chao Phraya	20,125	1.5	0.1	0.5	98.0	1.5
Mae Nam Sakae Krang	5,192	9.0	0.1	7.0	84.0	28.0
Mae Nam Pasak	16,292	11.0	4.0	7.0	78.0	18.0
Mae Nam Thachin	13,682	5.5	0.0	1.3	93.0	16.0
East						
Mae Nam Bang Prakong	8,679	-	-	-	-	19.5
West						
Mae Nam Mae Klong	30,837	38.0	0.30	14.0	47.7	53.0
Total area of 13 watersheds	**280,679**					

Source: www.rid.go.th/main7.htm

Table 4: Forest fire and value of loss between 1992 and 2002

Year	Forest area[1] (km^2)	Area affected by forest fire (km^2)	Percentage of area affected by forest area	Value of loss (million baht)
1992	136,698.05	19,408.72	14.20	95,484
1993	133,553.55	14,596.17	10.93	71,808

1994	133,553.55	7,636.48	5.72	37,568
1995	131,485.06	6,438.05	4.90	31,673
1996	131,485.06	4,903.03	3.73	24,121
1997	131,178.16	6,602.08	5.02	32,479
1998	129,722.28	11,454.52	8.83	56,352
1999	129,722.28	2,949.01	2.27	14,508
2000	172,049.99	933.24	0.54	4,591
2001	172,049.99	761.89	0.44	3,748
2002	172,049.99	239.82	0.14	1,179

Source: Office of Environmental Policy and Planning (2002b)

Note: 1. Forest area from 1992-1999 was interpreted by aerial photographs while the areas from 2000 onwards are from satellite images – one possible explanation for the apparent dramatic reduction in fire area and damage from 2000 onward.

Environment
Template 16: Waste
Key issue EN5: Waste management (eg transport & storage of hazardous wastes, management of solid waste)

Solid and hazardous wastes[3]

Thailand produces nearly 22 million tons of waste annually. Municipal solid waste produced by households and businesses makes up 67 percent of the total waste generation, while non-hazardous waste produced by industries accounts for 27 percent. The remainder of the waste, though produced in lower volumes, is potentially more dangerous due to its hazardous or infectious properties. This includes infectious waste from hospitals and hazardous waste produced by industries and communities, including households and small businesses such as petrol stations and transport maintenance and storage garages.

A small group of generators produce a large proportion of the waste. Nearly two-thirds of the industrial hazardous waste comes from metal and electronic industries, while more than half of the community hazardous waste is created by automotive service stations, and nearly all infectious waste comes from hospitals. Tourism areas produce some of the highest quantities of solid waste per capita due to the high influx of tourists and supporting businesses. Projections based on current manufacturing composition and waste practices indicate that, in the current decade, hazardous waste generation could grow up to 70 percent with high economic growth (ie an average of 6 percent annual GDP growth). Only 18 percent of industrial hazardous waste is reused or recycled.

From 2002 to 2012 community hazardous waste (eg spray cans and cleaning solvents) are expected grow 35 percent while infectious waste from hospitals, clinics and primary care units could grow 28 percent over this perid. Tourists commonly produce more than twice the amount of waste of households. National Parks, unlike municipalities, are not well positioned to manage solid waste as they have limited expertise and budget resources. For National Parks in Thailand, this problem is leading to the accumulation of waste due to poor waste collection and the existence of open dump sites in protected areas (World Bank 2003).

Solid waste generated in 2004 was at 39.40 tons/day and increase of 1.82% on 2003 (Office of Natural Resources and Environmental Policy and Planning 2008). It is expected that over the next ten years to 2010, municipal waste generation would have grown 25 % and industrial hazardous waste would have grown 35 %. Of the total annual volume in 2003, 25 % of solid waste was dumped in open unmanaged sites, 55 % in off-site random disposals, 12 % in sanitary landfills, and 7 % was recycled. By 2007, the percentage of solid waste recycled or reused increased to 21% of solid waste. Less that 1 % of waste is incinerated or decomposed. There is a large untapped potential in recycling and waste reduction. Safe and effective municipal waste collection, treatment, reducing and recycling of waste as well as disposal systems are only just beginning to take shape in most areas of the country. Safe hazardous and infectious waste treatment and disposal systems need to be built to keep pace with the growth in waste.

Bangkok and the surrounding provinces produce 30 percent of the municipal solid waste, 40 percent of the infectious waste, and 43 percent of the industrial waste in the country (Map 1 and Table 1). In the

[3] The material for this template was taken largely from the World Bank Thailand Environment Monitor on Solid Waste 2003 with updating and additional material for the other references cited.

rest of the country, waste generation is more dispersed with larger production in the more populated and industrialized provinces such as Songkhla, Nakhon Ratchasima, Chon Buri and Chiang Mai. Chiang Mai produces about 250 tons of garbage and solid waste a day. In 2003 it produced almost 4% of the nation's infectious wastes.

In 2004 there were 425 disposal sites (95 landfills; 330 open dumps) in Thailand and an estimated methane emission of 115.4 Gg/year was generated based on this practice. It is anticipated that methane emission in Thailand will rise from 115.4 Gg/year to 118.5 Gg/year if the largest open dumpsites in provinces with no existing landfill are upgraded to sanitary landfill; and it will increase to 193.5 Gg/year if the existing sanitary landfill is upgraded to integrated waste management facilities. Bangkok metropolitan has the highest methane emission (54.83 Gg/year) among all the regions in Thailand. The methane emission forecast of 339 Gg/year by 2020 provides a stimulus to create a comprehensive plan to capture and utilize methane as an energy source (Chiemchaisri et al 2007).

Please consider current state & recent & future trends (including government targets)

Indicator: % of industrial hazardous wastes effectively treated
Target: All industrial hazardous wastes are effectively treated by 2015
(include sources of indicator and target)
Trends: Industrial hazardous wastes increasing as a proportion of total solid wastes

Indicator: % of community hazardous wastes from transport service stations effectively treated
Target: All transport service stations in the NSEC have effective treatment, storage and transport facilities and arrangements by 2015
(include sources of indicator and target)
Trends:

Indicator: % of national parks with effective solid waste treatment facilities
Target: All national parks have effective solid waste treatment facilities by 2015
(include sources of indicator and target)
Trends: As tourism increases, solid waste management is becoming a higher priority for national park managers

Indicators: (i) % of landfill sites with methane capturing technology, (ii) % of methane from landfill sites captured as a source of energy
Target: Landfill sites in the NSEC are making a significant contribution to local energy requirements for communities in the NSEC by 2015
(include sources of indicator and target)
Trends: Methane form landfill sites forecast to be 339 Gg/year by 2020

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- Industrial hazardous wastes are growing in quantity, complexity and diversity
- More than half of community hazardous waste is created by transport service stations – a growing source of pollution in transport corridors and urban areas.
- Tourism is a growing source of solid waste. For National Parks this problem is leading to the accumulation of waste due to poor waste collection and the existence of open dump sites in what should be a natural protected areas
- Methane emissions from landfill sites are forecasts to be 339 Gg/year by 2020. This is a challenge and opportunity.

References/sources:

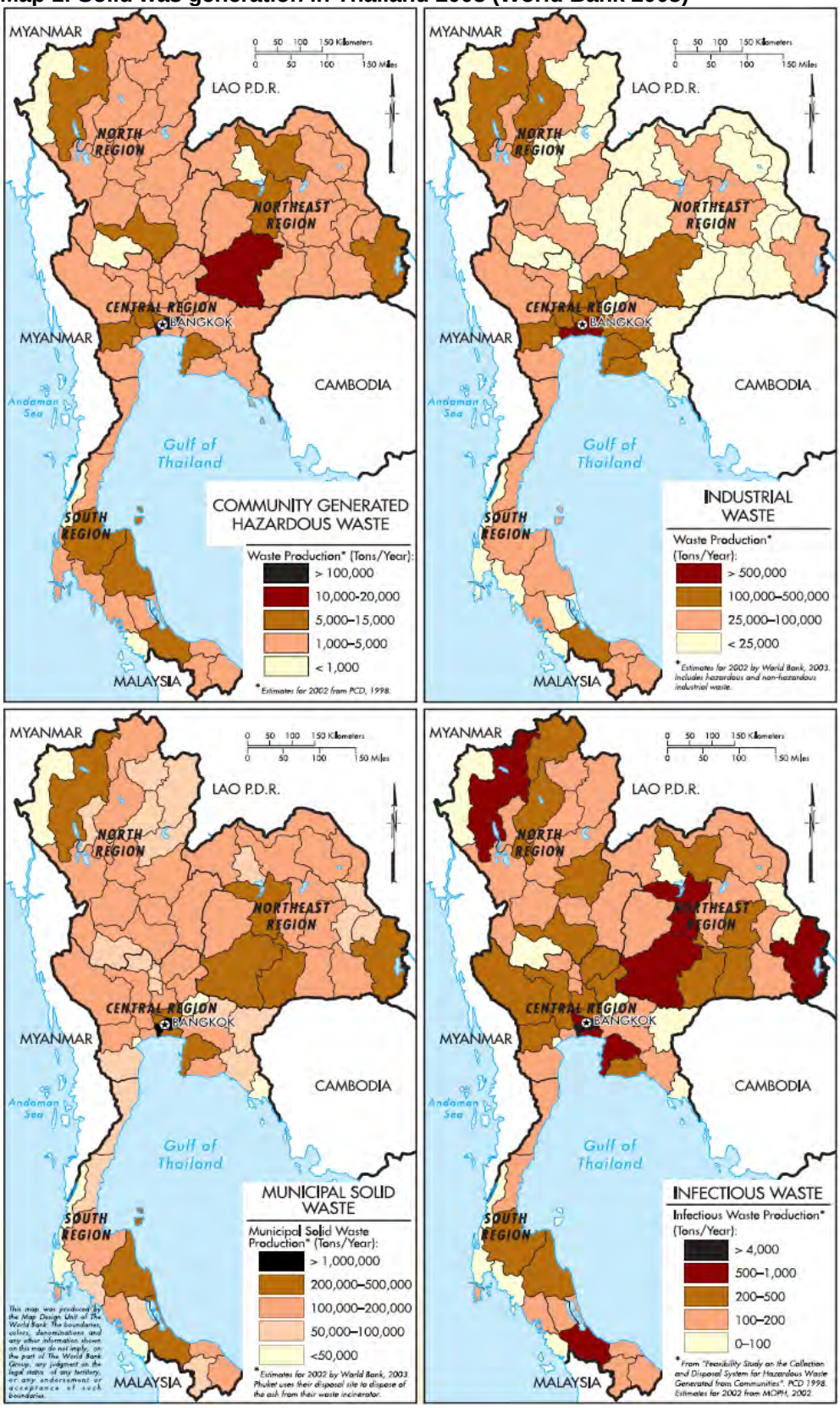
(i) Department of Environment. 2005. Bangkok State of the Environment 2005. Bangkok Metropolitan Administration, Bangkok.
(ii) Department of Environment. 2008. Bangkok and Environmental Works. Bangkok Metropolitan Administration, Bangkok. (in Thai).
(iii) Office of Environmental policy and Planning. 2007. Report on Environmental Quality 2006. Bangkok. (in Thai with English executive summary).
(iv) World Bank, 2003, Thailand Environment Monitor – Solid and hazardous wastes.
(v) http://www.worldbank.or.th/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/THAILANDEXTN/0,,contentMDK:20206649~menuPK:333323~pagePK:141137~piPK:217854~theSitePK:333296,00.html
(vi) C. Chiemchaisri, J. P. Juanga and C. Visvanathan, 2007, Municipal solid waste management in Thailand and disposal emission inventory Environmental Monitoring and Assessment Journal, Springer Netherlands, Volume 135, Numbers 1-3 / December, 2007

Annexes: (eg. maps, diagrams, tables)

Table 1: Solid waste management in 2003 (World Bank 2003)

Indicator	Value
Municipal solid waste (tons/year)	14.4 mil.
Hazardous waste produced by community activities	0.38 mil.
Hazardous waste produced by industries (tons/year)	0.96 mil.
Non hazardous waste produced by industries	5.9 mil.
Hazardous and infectious waste generated by medical facilities (tons/year)	21,300
Share of municipal waste generated that is collected • Bangkok • Medium sized cities – (Muang municipalities)	 > 99% 86%
Number of solid waste disposal sites nationwide • Sanitary landfills • Engineered Landfills and Controlled Dumps • Open Dumps	 5 99 >1000
Percentage of infectious waste treated	46%
Percentage of community-generated hazardous waste treated and reused	53%
Percentage of industrial hazardous waste treated in centralized treatment facilities (Bangkok and vicinity)	24%
Municipal waste recycling and reuse as a percent of total waste generated • National • Municipal area • Non-municipal	 11% 16% 5-8%
Recycling by industries as a percent of total waste generated (Bangkok and vicinity) • Hazardous waste • Non-hazardous waste	 18% 78%
Local government SWM staff having received education above high school (sample of 8)	15%

Map 1: Solid was generation in Thailand 2003 (World Bank 2003)



Social Templates

Social: China

Social

Template 8: Education and capacity

Key issue S2 Education and capacity building HRD

Introduction:

Education in Yunnan moved into a new phase after the development in the 10th Five Year Plan period (2001-2005). By the end of 2006, nine-year-compulsory-education (6 years of primary school and 3 years of middle school education) has been achieved basically in Yunnan province, of which only 8 counties failed to satisfy the dissemination of nine-year-compulsory-education out of all the 129 counties. The gross new student enrollment rate of senior high school reached 45.71%, the gross enrollment rate of school-age students in middle school reached 99.63%, in primary school attained 106.64%, and enrollment rate in tertiary education was 14.61%. In 2007, student population arrived 12.58million, the number of full time teachers was 500,000, and the budgetary disbursement on education was RMB17.8billion Yuan.

Secondary education was introduced in Yunnan in 1905, and a rapid growth has been seen since the reform and opening policy was implemented in 1978 in China. Between 2001 and 2006, the gross new student enrollment rate of senior high school has been increased from 28% to 45.71%, and the number of student enrollment has been increased from 633,9000 to 948,700; the quantity of first level completed senior high schools have been increased from 67 to 94, somehow alleviated the tension of senior high school demand. However, the senior high school education still remains a big gap compared to the average level of China. In 2006, the average senior high school education capacity of China was 72.9%, which was only 47.7% of Yunnan. In 2007, the national new student gross enrollment rate of senior high school was 66%, which was only 45.71% of Yunnan. The enrollment rate of middle school graduates entering to senior high schools was also lower in Yunnan than the average level of China, which was 60.23% in 2007 while that of China was 79.3%. The secondary education structure was unbalanced between regular senior high school and secondary vocational schools, which was 1:0.75, while the national ratio was 1:0.93, remaining an obvious gap to satisfy the average level of China.

See annex Table 8-1 for general Information of all levels and types of schools and students in Yunnan in 2007 and Table 8-2 for Education Institutes and Quantity of Students in the NSEC Municipality/Prefecture in Yunnan in 2006.

Presently the direct and indirect employee in tourism industry in Yunnan is about 1.7million, accounting for 7.2% of the total employees of Yunnan. One of the objectives in the Yunnan Tourism Development 11th Five Year Plan indicates that by 2010, the direct and indirect employee in tourism will reach 2.5million in Yunnan. A training system including primary and higher education of tourism has been developed in Yunnan, and a mechanism of “Twin Certificates for the Post” in tourism industry has been implemented which requires both diplomat of education and vocational qualification certificates for employees to guarantee the improvement of education and service in tourism industry. It is also a must for Yunnan to greatly improve the education and training level for tourism industry facing the education degrees of tourism practitioners that has restrained growth of tourism industry due to a lower level of education. Irrational knowledge structures, lack of higher learning professionals, and the balance of local and external employees. It is also aimed to provide first aid and emergency reaction training for

guides and employees in hotels and scenic spots.
Source: Yunnan Tourism Development 11th Five Year Plan

Indicator: Number of years attained education per capita is an average indicating the number of years attained education of and above a certain age of population of a country or a region, which is an integrated indicator to reflect the education degree of a population.

Census of the year 2000 showed that the number of years attained education per capita including and above 6 years old in Yunnan was 6.32 years, which increased to 6.61years in 2005, an increase of 0.29 years per capita.
According to the population survey in 2005 and 2007, the percentage of population including and above 6 years old who haven't access to schooling was reduced by 2.87%, and the elementary schooling population percentage raised by 1.1%,. Junior high school population raised by 2.28%, the undergraduates college and postgraduate schooling percentage raised by 0.25%. See the following table for details.

Education Degree of Population including and above 6 Years Old in Yunnan in 2005 and 2007

Unit: %

Year	Population including and above 6 years old	Un-schooling	Primary School	Middle School	Senior High School	Junior College	Undergraduate college & Postgraduate
2005	100.00	17.98	47.63	24.71	6.30	2.19	1.18
2007	100.00	15.11	48.73	26.99	6.08	1.65	1.43
Increment/ Reduction	--	-2.87	1.10	2.28	-0.22	-0.53	0.25

Source: Yunnan Population Development Statement since the 16th People's Congress of the CPC,

Nov.2002, Population and Employment Division of Yunnan Provincial Statistic Bureau, Jan.2008)

Trends:

The education degree of Yunnan population takes the following features:
--The illiteracy takes a large proportion of the population including and above 6 years old. Although the illiteracy population is in a decreasing trend, it is till higher than the average level of China, only next to Qinghai and Tibet.
--Female illiteracy stands out of the population over 15 years old.
--The education degree is low and lack of people obtained higher learning. Data of 2003 about the population obtained education in Yunnan indicated that 51.92% of the population above 6 years old has obtained primary education, the least educated among all provinces in China. And the population obtained junior college or above level of higher education was only higher than Tibet. The rural population obtained higher education was even less, which made a big challenge for Yunnan to

improve the literacy level for rural population in the context of social and economic development of the Great West Development Program. (Source: www.yn.gov.cn, Population Development of Yunnan province in 2006)

Indicator: Senior High School Education, including regular senior high school and secondary vocational education

Official target:

In Oct. 2007, the 17th National Congress of CPC put forward the strategy of education development first and builds a powerful human resource country, and the task of boosting dissemination of senior high school education and greatly development of vocational education.

The objectives for boosting senior high school education are as following:

- By 2012, the gross new student enrollment rate of senior high school shall reach 70%
- The quantity of student's enrollment in senior high school will be 1.6million. Among which the quantity of secondary vocational school students shall raise to more than 800,000.
- All types of vocational training institutions shall provide trainings to 1.5million person-time. The regular senior high school and secondary vocational education shall keep a balanced development and a matched scale of 1:0.9 in terms of student enrollment.
- Enhance teacher's capabilities and upgrade teaching effectiveness constantly.
- Based on educational resources integration, 100 pilot secondary vocational schools will be build in Yunnan, among which 50 will be national key schools and 50 provincial key schools.
- Establish 10 vocational education groups and 60 newly added non-government senior high schools and the first level completed senior high schools will be growing into 150.
- Set up 7 key public training bases at Kunming, Qujin, Yuxi, Chuxiong, Dali, Honghe and Zhaotong, and build key technical training base in 50 secondary vocational schools.
- Increase 50,000 regular senior high school teachers by the end of 2012, with an annual rate of 10,000.
- Secondary vocational school teachers increase to 30,000, with a growth rate of 2,250 per year.
- By the year 2017, the gross new student enrollment rate of senior high school shall reach 85%, and basically disseminate senior high school education in Yunnan; the student enrollment ratio of regular senior high school to secondary vocational schools shall reach 1:1, and in some areas the quantity of students in secondary vocational schools shall be higher than that of regular senior high schools.

Another target is the education development in rural countries. The objective is:

- to build up a long- effectiveness mechanism to guarantee the budget funds for rural compulsory education to completely exempt tuition and fees for compulsory education in rural countries
- continue implementation of the policy to provide free textbooks for poverty students and subsidy for boarders, so that to ensure all children from rural villages may go to school.
- carry out the construction project of rural boarding schools, and the telecourse project for rural middle and primary schools.
- actively promote elementary education, vocational education and adult education and the rural science and technology education.

The average education years per capita shall reach 8 years.

Trends:

Since 2004 Yunnan province enlarged the enrollment of secondary vocational education, and the new student enrollment increased from 90,000 of 2004 to 180,000 of 2007. And the students at school reached 432,100 added 60,500 than 2006. The ratio difference of students at school between secondary vocational schools and regular senior high school has been narrowed from 0.67:1 to 0.75:1.

The teaching level also improved and the employment rate of the secondary vocational school graduates remained above 95%. There are 50 national level secondary vocational schools in Yunnan, and 56 provincial level ones. The field training bases for secondary vocational education have been constructed and improved. In 2007, Yunnan provincial government budget RMB15million Yuan to create 1000 full time teacher post for secondary vocational education, which greatly alleviated the tension of lack of good teachers in the vocational schools. Meanwhile, the central and provincial governments budgeted RMB225milllion Yuan in 2007 as subsidy to support 290,000 students of grade 1 and 2 in the secondary vocational schools to finish their learning smoothly.

In 2007 the rural adult literacy and technology schools offered 5.13million person-time training courses for farmers; the Warmth Project—Million Farmer Training Program supported by Li Zhaoji Fund have invested RMB11.61million and carried out training courses for 38,700 rural surplus labors, and the labor transfer and employment reached above 95%.

In 2008 the aim of new student enrollment of secondary vocational education will enlarge the enrollment to be 20,000 based on the enrollment of 180,000 in 2007. And 5million rural labors will be trained. Actively promote the construction of a learning society and sufficiently play a good role of secondary vocational education to carry out technical trainings for employees, un-employees, rural surplus labors and community residents.

During the 11th Five Year Period, central government plans to invest more than RMB10billion Yuan in Yunnan, plus the provincial budget of RMB1.5billion Yuan to reinforce vocational education capacity building, the priority will be supporting secondary vocational education; and set up the mechanism of stipend to assist secondary vocational students.

Drivers of trends:

Secondary vocational education has been recognized as a historical task of education to support the realization of modern socialism in China. In order to convert population pressure into human resource, the priority will be education development. It is an urgent task for Yunnan to improve the employees' capacity in learning technology and create skilled workers by secondary vocational education. Secondary vocational education will be an opportunity for people to receive secondary education. Many counties of Yunnan have achieved the dissemination of nine years compulsory education to cover primary and middle school education, and it is necessary for people to continue with high school education to learn skills and technology to find job opportunities. Secondary vocational education will create the conditions to satisfy people's demand on learning skills and knowledge for employment, which is also an important task to promote fair education in Yunnan.

Relevant laws, policies, plans and institutional arrangements:

The Action to Prosper the Border Area and Enrich Border People was initiated in 1999 by National Ethnic Minority Commission, integrated with NDRC and MoF, with the aim to prosper the border area and enrich the border people of China. The objectives of the Action's 11th Five Year Plan will improve the infrastructure, guarantee subsistence conditions for the border people; promote social undertakings development, buildup the county level economic development capacity, develop the border trade, make progress in environmental protection and conservation at border area, a stable society and great unity of all ethnic minorities. (Source: 11th Five Year Plan of the Project to Prosper the Border Area and Enrich Border People, www. gov.cn)

Yunnan province implemented the Project since 2005 in 8 prefecture/municipality and 25 border counties, and has achieved good results. From 2008 to 2010, another 3-year Project to Prosper the Border Area and Enrich Border People will be implemented with 6 interventions, such as infrastructure construction, subsistence guarantee (food, clothing and housing), industry cultivation, education improvement, social security and environment protection, the total investment will be RMB98.7billion Yuan.

Education will play the strategic role in the Project to implement and solidify the effects from the Project by provide sustainable human resource. There are 1,049,078 students at school in the 8 prefecture/municipality and 25 counties, among which 21 counties have achieved dissemination of nine year compulsory education, and the gross enrollment rate for senior high school is only 32%. Yunnan Education Department will promote modern education in the border area to create faire education opportunities, balanced education system and speedup secondary vocational education in next 3 years. Source: www.yn.xinhuanet.com

Problems and issues encountered during data collection:

It's difficult to gain specific data from the relevant prefecture/municipality on education and training. Some existing data of student's enrollment on specific year could be found the statistic statements but no percentage to the population. The template has provided only data from national and provincial context.

Summary of main concerns for the NSEC:

- Based on the Working Report of Mar. 2008 from the Working Office of Yunnan Participating in GMS Economic Cooperation, Yunnan provincial government departments of Commerce, Public Security, Science, Agriculture and Education have been working closely with GMS countries on human resource development, and have provided training courses in various fields. By the end of the first half of 2007, Yunnan province has enrolled 5855 students from other countries, in which 70% come from GMS countries. Yunnan provincial government will implement the strategy of "outreach education" to deepen communication with GMS countries on enrollment student abroad, Chinese learning, and technology and skill training in the area of agriculture, forestry, resource development and utility, laws, foreign trade and tourism management.
- To date, there has not been any specific training programme targeting the NSEC development area. The NSEC is likely to provide an incentive for local economic development and will give rise to training in knowledge, skills and technology in relevant industries, sanitation, etc.
- Compared to China as whole, Yunnan has fairly low percentages of senior and middle high school capacity and enrolment rates. For instance, national enrolment rate of senior high school was 66% versus 45% in Yunnan.
- In addition, the ratio of regular high school enrolment versus vocational high school is lower than the national one. (1:0.75 versus 1:0.93). The percentage of degree graduates was lowest in China except for that of Tibet.
- The rates of illiteracy, particularly in women, are also higher than national rates. Yunnan is also the province with the lowest percentage of over 6 years old that have obtained primary education (52%).
- The lack of skilled workers and capacity in knowledge and technology will reduce Yunnan's ability to capitalize on the opportunities that will be provided by the NSEC.

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Information on Employment in Tourism in NSEC Prefectures/Municipalities

Kunming: Air Service 2653; Highway transportation9395; Railway transportation50118; Commercial 16316; Restaurants service13125; Hotel service 21469; Culture and Entertainment3673; travel agent 5982; Gardening 2062; Scenery spots3110; Health service2715; Public Bus Service1054; Taxi service 4138; Post and Communication1014; Insurance 298. In total there are 137122 employees serve to tourism industry in Kunming.

Source: General Information of Tourism Industry in Kunming, by Information Division of Kunming Municipal Tourism Administration Bureau, Jul.11,2008

http://www.kmta.gov.cn/html/_trs_3_001_/_AOY703_9190_2370_kmtatl_18_/2008-07-11/lytj/fxbgnr_26.html

Yuxi: By end of 2007 there are 48 hotels, 22 travel agencies and more than 700 companies doing

business for tourism. Over 100000 employees serve in tourism industry in Yuxi.

Source: The Tourism and Culture Industry Development Situation in Yuxi,

http://www.yn.xinhuanet.com/nets/2007-12/12/content_11924657.htm

Pu'er: Tourism development infrastructures and software in Pu'er municipality has been built up. Presently there are 771 hotels, 30 standard restaurants, 17 domestic travel agencies and 1 international travel agency in Pu'er.

Source: New opportunities for Pu'er by the Big Routeway, reported by Yunnan Daily, Apr.23,2008, http://www.169trip.com/yunnanlvyou/16978.html

Honghe Prefecture: There are more than 20000 employees serve directly or indirectly in tourism industry in Honghe prefecture.

Source: The 11th Five Year Development Plan for Tourism in Honghe

http://www.hh.xxgk.yn.gov.cn/hhzfmh/77136349966565376/20080526/19967.html

Xishuangbanna: There are 44 star hotels, more than 800 travel vehicles and 1500 tour guides in Xishuangbanna prefecture. The direct tourism employee amounts to 16000.

Source: Another Success of Tourism Development in Xishuangbanna, by Mr.Xu Haidong, Beijing University, Oct.2,2006. http://www.xsbnly.com/info/4616-1.htm

In 2007 there were 262 training programmes held for 38000 employees in tourism industry in Yunnan Province.

Source: Report on Investigation to Yunnan Tourism Industry Development Situation, Jun.3, 2008, http://www.hebeitour.gov.cn/?action=zjym&id=3390

Annexes: (eg. maps, diagrams, tables):

Table 8-1. General Information of all levels and Types of Schools and Students in Yunnan, 2007

	No. of Schools	No. of Classes	Graduates	New Student Enrollment	Student Enrollment			Students of the Graduate Classes	Faculty	
					Subtotal	Thereinto：Female	Thereinto: Ethnic Minority		Subtotal	Full-time Teachers
Postgraduates of Research Institutes	6	0	192	262	818	345	50	291	0	0
Students for a Doctorship	0	0	87	92	302	120	26	121	0	0
Students for a Master’s degree	0	0	105	170	516	225	24	170	0	0
Postgraduates of Regular Institutions of Higher Education	11	0	4063	6287	17540	8253	2313	5376	0	0
Students for a Doctorship	0	0	120	313	1205	432	174	594	0	0
Students for a Master’s degree	0	0	3943	5974	16335	7821	2139	4782	0	0
Regular Tertiary Education	0	0	73039	99150	311111	157840	71970	80593	0	0
Undergraduate college	0	0	33377	51611	184474	92441	40090	39148	0	0
Junior college	0	0	39662	47539	126637	65399	31880	41445	0	0
Regular Institutions of Higher Education	51	0	66065	99150	302120	153179	70850	74058	33911	21233
Undergraduate college	17	0	33377	51611	184474	92441	40090	39148	0	0
Junior college	34	0	32688	47539	117646	60738	30760	34910	0	0
Institutions of Adult Higher Education	0	0	6974	0	8991	0	1120	6535	0	0
Adult Higher Education	0	0	62373	53700	155337	79719	43383	49832	0	0
Undergraduate college	0	0	15040	23220	61065	32759	15725	15150	0	0
Junior college	0	0	47333	30480	94272	46960	27658	34682	0	0
According to types of institutions: colleges	0	0	60877	53553	153876	79008	43056	49149	0	0

Adult colleges	2	0	1496	147	1461	711	327	683	1842	898
1.Radio and TV College	1	0	1469	147	1196	653	268	534	1750	848
2.Employee College	1	0	25	0	265	58	59	149	92	50
3.Educational college	0	0	0	0	0	0	0	0	0	0
According to forms of running a school: Correspondence Schools	0	0	34182	33980	99845	47234	0	32772	0	0
Sparetime Schools	0	0	10978	11026	32886	21115	0	8069	0	0
Full-time Schools	0	0	17213	8694	22606	11370	0	8991	0	0
Secondary Vocational Education	399	0	93140	152616	372249	198171	109367	106552	25164	17497
Technical Secondary Schools	93	0	50701	69158	186287	109811	57586	56257	10120	6300
Technical Secondary Schools for Adult	135	0	5195	2200	7461	2977	1583	2666	3758	2493
Vocational Senior High Schools	171	0	37244	81258	178501	85383	50198	47629	10889	8466
Regular Middle Schools	2281	44984	762148	885937	2517692	1192110	821544	785481	164588	143111
Senior High School	465	10505	153311	203315	576448	282132	167240	177791	0	36788
Junior High School	1816	34479	608837	682622	1941244	909978	654304	607690	0	106323
Vocational Junior High Schools	11	311	7957	6039	17917	8003	9278	5547	470	414
Primary Schools	17163	141816	714598	754596	4533150	2128723	1516185	738453	235153	222676
Kindergartens	2760	28413	485405	678640	863121	397901	224573	0	33826	21251
Special Education	25	264	2398	4747	24092	8397	6914	0	738	569
Servitor School	1	9	63	30	111	23	0	0	49	39
Primary Schools for Adult	212	6868	128824	0	152156	67403	27487	0	1735	515
Elementary Course Class	203	1573	54036	0	65590	31369	0	0	386	137
Illiteracy Elimination Class	0	5251	74548	0	85886	35595	0	0	1338	370

Vocational and Technological Training Institutions	11385	39392	5137352	0	3611047	1792962	1027018	0	4233	1281
Rural Village Training School	11321	39153	5105307	0	3586100	1779729	0	0	4152	1209

Source: Yunnan Education Plan and Statistics, http://ghtj.ynjy.cn

Table 8-2 Education Institutes and Quantity of Students in the NSEC Municipality/Prefecture in Yunnan in 2006

NSEC Municipality/Prefecture	No.of the Institutes		New Students Enrollment	Students at school	Graduates
Kunming	College/University	32	67300	206400	47000
	High Education Institutes for Adults		39500	140700	11400
	Regular Secondary Schools	290	97500	279500	80400
	Primary Schools	1464	91000	517400	71500
Yuxi	All kinds of institutes and schools	941	129000	407000	108000
Pu'er/Simao	Normal College	1	1021	3119	
	Yunnan Tropical Vocational Institute	1	543	1412	
	Trade Schools	All kinds	2100	5307	
	Vocational Junior High Schools		3223	6926	
	Junior High Schools		40277	115750	
	Primary Schools		31953	194352	
	Technical Training Programme for Adults				320923
	Training for adults to eliminate illiteracy				16527
Honghe	College	1		7059	
	Vocational Junior High Schools	39		25286	
	Junior high school	198		229473	
	Primary Schools	1792		415126	
Xishuangbanna	Junior College		782	1836	

	Senior High School		4499	11839	3439
	Junior High School		15066	45281	14737
	Primary School		15223	93091	15721
	Primary schools for adults				2149
	Technology trainings for adults				88808
	Illiteracy elimination class for farmers				1276

Source: 2006 National Economy and Social Development Statistic Statements of the 5 NSEC municipality/prefecture

Social

Template 7: Poverty reduction

Key issue S1: Poverty reduction (improve the standard of living, local community development, ethnic minority well-being)

Key Issue S5: Retention of ethnic cultures and traditions (Impact to Mekong culture diversity)

Key Issue S6. Empowerment of disadvantaged groups (information, participation in decision making)

Introduction:

By the end of 2006, there was 6.708million poverty population in Yunnan province, accounting for 11.8% of the total poverty population in China, with a poverty incidence of 18.7%, nearly 13% higher than the average national level of 6%. Among which, the absolute poverty population was 2.284million, and low income population 4.424million, occupied 10.6% and 12.5% of those of national level respectively. There are 80 key impoverished counties of all the 129 counties in Yunnan, of which 73 counties are state-supported, about 12.3% of those in China. See table 7-1 and figure 7-1 and 7-2.

Yunnan is different to other provinces in terms of ethnic minority's composition and distribution. There are 25 ethnic minorities' resident for generations in Yunnan, with a population over 5000 each. 15 ethnic minorities uniquely to be found in Yunnan, and 16 ethnic groups living trans-boundary between China and neighbouring countries. Yunnan is also ranked the first in China by the quantity of 8 ethnic minority autonomous prefectures and 29 ethnic minority autonomous counties administering 78 counties/municipalities and 18 ethnic minorities. The ethnic minority autonomous area occupies 70% of the total of Yunnan, and nearly half of total population in Yunnan. By end of 2006, the population of 25 ethnic minority groups is 15.183million, occupied 33.9% of the total population in Yunnan. There are 7 ethnic minorities of Dulong, De'ang, Ji'nuo, Nu, A'chang, Pu'mi and Bulang listed as the less-population groups in China, which made Yunnan heavily burdened with the task to support development of the less-population groups. After the establishment of New China in 1949, 11 ethnic minority groups of Yunnan leapt over to socialism from primitive society, slavery system and feudary system. These direct-transition ethnic minority groups of 1.25million people made the most peculiar phenomenon in China even in the world regarding ethnic minority issues. The settlement of ethnic minorities in Yunnan is featured as assembly inhabitation in a small area mostly in remote and mountainous areas, while mixed with other nationalities in a wider region. Because of the features of multi-ethnic minorities, complicated natural environment, unbalanced socio-economic development, diversified cultures and vulnerability to external impact, it is extremely important, special and difficult to address ethnic minority issues in Yunnan. (www.ynethnic.gov.cn)

The NESC passes through Yi Minority Autonomous County of E'shan in Yuxi, Hani, Yi and Dai Minority Autonomous County of Yuanjiang in Yuxi； Hani Minority Autonomous County of Mojiang in Pu'er, Hani and Yi Minority Autonomous County of Ning'er in Pu'er；Xishuangbanna Dai Minority Autonomous Prefecture, and touches the Honghe Hani and Yi Minority Autonomous Prefecture. See a detail description of these minorities in the annex. (Yunnan Statistic Yearbook of 2007)

By the end of 2006, the traditional resident ethnic minority population (which has been residents for more than 100 years at a place) in the five NSEC prefectures and municipalities occupied respectively

14.77% in Kunming, 32.5% in Yuxi, 57.1% in Honghe, 59.4% in Pu'er and 76.6% in Xishuangbanna. The highest minority populations are found in Honghe and Pu'er.
In Kunming, the average annual growth rate of minorities' population is 4%, which is much higher than the 2% of the Han, which indicates obvious effects of the policy to support minority development. See table S1-3 for detail minority population in the NESC municipality and prefecture. (Statistic Statements of the National Economic and Social Development of the relevant prefectures and municipalities from internet.)

Indicator: absolute poverty population and poverty incidence

According to present Chinese official statistic criteria, the absolute poverty line is less than RMB693Yuan of annual income per capita; the low income line is between RMB693 to RMB958Yuan per capita per year. In line with these criteria, by end of 2006, the rural absolute poverty population and low income population amounted to 57million in China. While the poverty population in China will be 135million, including 126million living in rural countryside, if estimated by WB criteria of USD$1 per capita per day.(How many poverty population in China, http://www.cpad.gov.cn/, Dec.2007)

By end of 2006 the absolute poverty population was 2.284million in Yunnan province, and low income population 4.424million, occupied 10.6% and 12.5% of those of China respectively.

The details of poverty population and poverty incidence for China, Yunnan province and the 5 NSEC municipalities and prefectures see table S1-2.
The highest poverty occurs in Puer municipality, followed by Honghe prefecture, and Xishuangbanna Prefecture. Yuxi Municipality has the lowest poverty, followed by Kunming Municipality.

Target:

By 2010, gradually enhance poverty aid, increase poverty-alleviation levels and strengthen the support to old revolutionary districts, ethnic nationally regions, border areas and impoverished counties. By 2020, basically achieve the elimination of poverty phenomenon. (Source: 11th Five Year Plan; Report to the 17th National Congress of the Communist Party of China on Oct.15, 2007 by President Hu Jingtao)

Trends:

In the past 30 years, the rural poverty population has seen a dramatic reduction in China from 250million in 1978 to 21.48million in 2006, the poverty incidence declined from 30.7% to 2.3%; and the low income population has been reduced from 62.13million in 2000 to 35.50million in 2006, reflecting the changing of low income population to the total rural population from 6.7% to 3.7%. Meanwhile the social undertakings in the impoverished regions have been greatly improved in education, medical care and infrastructures construction. The objectives of the 8th Seven Year Poverty Alleviation Program (1994-2000) have been achieved basically.

From 2001-2006, the rural poverty population has been reduced 3.513million with a speed of 585,500 per year in Yunnan, and poverty incidence has been reduced from 29.6% to 18.7%. Peasant's annual net income per capita has been increased gradually from RMB1103Yuan to RMB1706Yuan in the 80 impoverished counties. The following data illustrates that growth rate of some main indicators of these counties is higher than the average level of other counties in Yunnan.

	GDP (RMB Billion Yuan)	Gross Output Value of Farming, Forestry, Animal Husbandry and Fishery (RMB Billion Yuan)	Gross Output Value of Industry I(RMB Billion Yuan)	Local Government Revenue (RMB Billion Yuan)	Primary School Enrolment Rate
2000	59.796	22.413	22.056	3.362	87%
2006	130.606	61.322	82.331	6.495	96.57%
Annual Growth Rate	14%	18%	25%	12%	

Source: http://www.cpad.gov.cn/

In 2006, Yunnan reduced the absolute poverty population of 670,000 and ranked No.2 in quantity in all such provinces, and made a great contribution to poverty reduction in China. The poverty-alleviated population of Yunnan accounted for 74% in the 12 western provinces. Given these achievements, Yunnan's position as the leading rural poverty province hasn't been changed much in terms of the poverty population quantity and poverty incidence.

	Yunnan	12 Western Provinces	China	
Rural Absolute Poverty Population	2,284,000	11,750,000	21,480,000	
Percentage of Yunnan's Poverty Population		19.4%	10.6%	
Rural Poverty Incidence	6.4%	5.1%	2.3%	

Source: collected and compiled from website of China Statistic Information and Poverty Alleviation & Development Office of the State Council of China.

Presently there are 7 less-population ethnic minority nationalities (population proportion is less than 1% to that of China) remaining a high poverty incidence of 74.2%; 16 minority groups of 1.04million people living by the border remain a high poverty incidence of 45.2%; and another 12 directly-transition ethnic minorities about 1.38million people located in 8 prefectures and 25 counties, basically living in poverty situation as a whole.

It would be a high challenge for Yunnan province to fulfil the target for poverty alleviation set in the 11th five year plan under these conditions.

Drivers of trends

Economic growth, specific poverty alleviation program and government policies to support and be beneficial to peasants are the drivers for absolute poverty population reduction in China and Yunnan province.

Between 2001 and 2006, central and provincial government have invested RMB7.88billion Yuan in poverty alleviation in Yunnan, utilized bank loans of RMB9.473Billion Yuan, poverty aid RMB2.63Billion Yuan, and integrated government sector funds RMB2.874Billion Yuan to support the impoverished natural villages program.

Natural-village-based Poverty alleviation program has been implemented to integrate various projects and funds, such as transmission of surplus labours from rural areas, pro-poor industry, resettlement, pro-poor science-technology development, micro-credit, and loans from WB and grants support from the society and foreign governments.

A series of policies have been enacted with respect to the situation of Yunnan to reinforce poverty alleviation. E.g. Rural Poverty Alleviation and Development Program of Yunnan (2002-2010), The Decision on accelerating Rural Poverty-alleviation and Development in the 11th Five Year Period, The Opinion of Giving Classified Guidance to Rural Poverty Alleviation Process, The Opinion of How to Improve the System of Poverty-alleviation Responsibility for the Provincial Government Agencies and Public Institutions. These important policies have specified the primary approach, goals and countermeasures for poverty alleviation work in Yunnan Province.

Presently, the system of guarantee of subsistence allowances for both urban and rural residents is being implemented as a basis to address hunger and warm issues for the absolute poverty population. Guarantee of subsistence allowances for urban and rural residents is a more standardization legal system of social security, which will be even effective to combat poverty in China. The system initiated from middle of 1990s and by 2007 it extends the coverage from urban to rural residents. The urban and rural guarantee targets include all those households whose annual net income per capita is lower than the local rural/urban minimum subsistence standard. The system is an important component to the national social security system.

Yunnan Province has formed the Strategy of Overall Poverty Reduction in the rural impoverished areas. From beginning of 2008, RMB834million Yuan has been raised to cover 228,400 rural absolute poverty population under the Rural Low Income People Insurance Program; arranged provincial financial budget RMB166million Yuan to exclude and rebuild the unsafe school buildings for rural schools; planned to invest RMB1.1billion Yuan to implement the new type of rural medical care system in all administrative villages; and to invest RMB500million Yuan to reinforce or rebuild houses for 100,000 extremely poor rural households to meet the standards of resisting 6 grade of quake; and Implement the engineering construction projects for the 25 border counties and 3 Tibetan counties to address Five Difficulties in going to school, seeing a doctor, watching TV and listening to radio, going to theatre, and learning scientific knowledge.

Description: Directly-transition minorities/Less-population Minorities

Owing to historic and natural reasons, the social development between different regions in Yunnan is unbalanced for the 25 traditional resident ethnic minorities. Particularly Lisu, Dulong, Nu (in north and northwest of Yunnan), Jinpo, De'ang, Wa, Bulang, Jinuo and part of Lahu (in middle and south of Yunnan, and the NESC area), have been shifted directly to socialism society from primeval or slavery society. The gap of development between these direct-transition ethnic minorities and other nationalities in China has been enlarged during the development process.

Kemu and Mang are the least-population ethnic groups in China, who haven't been identified to group to any other ethnic minorities yet. Kemu people live in 19 natural villages of 738 households with a population of 3291 in Mengla county and Jinghong municipality in Xishuangbanna. According to local government data, there are 150 households of 605 of Kemu people living in extreme poverty nearby the border area, with an annual income per capita of only RMB400Yuan.

Mang ethnic people live in 4 natural villages of 114 households with a population of 687 in Honghe Hani and Yi Ethnic Minorities Autonomous Prefecture. In 1950s Mang people was resettled from deep mountains nearby the border to Vietnam to the mountain area nearby towns, and make a living by farming from slash and burning. Mang ethnic people still keeps traditional primitive cultures today.

(Source: www.yn.xinhuanet.com and www.ynethnic.gov.cn)

Target

Poverty reduction of the ethnic minority in natural villages: to vigorously improve the production and subsistence conditions for the people, develop income-increasing industry, enhance capacity building of the labors and strengthen local people self-development capacity; give priority to education to young generation, and speed up culture and health care undertakings.

(Source: Speed up the Extremely Impoverished Ethic Minority Development, Mr. Wang Chengcai, Director of Yunnan Provincial Ethnic Minority Affairs Committee, www.ynethnic.gov.cn)

Trends:

In 2005, the State Council made a decision to support development of the less-population minorities. Among these minorities, Dulong, Nu, De'ang, Jinuo and Bulang, whose population is less than 100,000 each have seen an obvious improvement in production and subsistence conditions, as well as standard of living, which made a great impact not only in the minority areas but also to home and abroad. Nevertheless, there are 4 minorities of Jinpo, Wa, Lahu and Lisu of 1.7million people that still remain the least developed and the extremely impoverished minority groups of Yunnan.

"Gan Lan " building has been the traditional settlement pattern from ancient Yue to today's Dai and other ethnic minorities for thousands of years. Although the pattern is maintained, construction materials have been changed from completely bamboo to wood and tile then to concrete buildings, particularly in some places near to towns, tourism development zones or main roads.

Drivers of trends

The strong support of policies and funds from central and provincial government is the important driver for these directly-transition and less-population ethnic minorities to change poverty status and improve to better off life.

From May, 2008, Plan to Support Mang People and Kemu People on Poverty Reduction and Development have been implemented by Yunnan Provincial Government with an aim that in 3 years time to support 90% of these ethnic peasants to command 1-2 practical skills, enrollment for right aged

children will reach 100%, every people will be covered by medical insurance, and reach the above middle living standard in the local area. The estimated budget will be over RMB100million Yuan. (Source: Plan to Support Mang People and Kemu People on Poverty Reduction and Development, www.ynethnic.gov.cn).

According to plans from State and Provincial Ethnic Minority Affairs Committee, investigation on support the development for the 4 least developed ethnic minority groups will be implemented in 2008 to address poverty reduction and development issues for these people with an aim to build up the internal mechanism of the least development ethnic groups to adapt modern development requirements. (source: news report by www.ynethnic.gov.cn)

As a consequence of economic globalization, market economy and the mainstreaming Han Chinese culture, some of the ethnic minority cultures, languages, settlement patterns and customs are likely to change, phase out and disappear.

Main drivers leading to these changes are population growth, science and technological development, national political power and economic development and improved standard of living.

Relevant laws, policies, plans and institutional arrangements:

Poverty Reduction Policies and Plans

1. Rural Poverty Alleviation and Development Program of Yunnan Province (2002--2010), enacted in 2001.
2. Decision on the Acceleration of Rural Poverty Alleviation and Development in the 11th Five Year Period, by CPC Yunnan Commission and Yunnan Provincial Government, in which 10 policies of poverty alleviation have been brought forward, enacted in 2003
3. Opinion on Implementation of Classified Guidance to Speed up Rural Poverty Reduction Process
4. The Opinion of Giving Classified Guidance to Rural Poverty Alleviation Process
5. The Opinion of How to Improve the Poverty-alleviation Responsibility System for the Provincial Government Agencies and Public Institutions
6. Poverty Reduction Budget Management Manual of Yunnan Province
7. Opinion on Reinforce Natural Village Based Poverty Reduction Implementation
8. Poverty Alleviation Interest Subsiding Loans Management Manual of Yunnan Province
9. Micro-credit Management Manual of Yunnan Province
10. Temporary Manual of Training Special Funds for Rural Labour Transfer of Yunnan Province
11. Plan to Support Mang People and Kemu People on Poverty Reduction and Development, 2008

Ethnic Minority Laws, Policies and Plans

1. Ethnic Minority Regions Autonomy Law of the People's Republic of China approved by people's congress in 1984 and revised in 2001. The law stipulates the general principles, establishment and composition of corporations and autonomous regions, autonomy power of the corporations, people's court and public prosecutor office, ethnic minority relationships within the autonomous regions and the responsibility of the higher level state departments. The Law is guarantee to secure ethnic minorities equal political power and development rights.
2. Regulations to carry out the Ethnic Minority Regions Autonomy Law of the People's Republic of China in Yunnan Province, enacted in 1988
3. Statute of Ethnic Minority Administration Work in Township, approved by State Council in 1993 and

enacted by National Ethnic Minority Affairs Committee, aimed to promote economic, cultural undertakings development in ethnic minority townships, and ensure the lawful rights of ethnic minorities and strengthen solidarity of all nationalities.

4. Statue of Ethnic Minority Administration Work in Cities, , approved by State Council in 1993 and enacted by National Ethnic Minority Affairs Committee, aimed to reinforce ethnic minority administration in urban cities, secure urban ethnic minority lawful rights and promote economic and cultural undertakings development adapted to the needs of urban ethnic minorities.
5. Statute of Accelerating Science and Technology Progress in the Ethnic Minority Regions in Yunnan Province, approved and enacted in 1993, to support science and technology advancement in ethnic minority regions and speed up economic and social development.
6. Statute to Protect the Ethnic Minority Folk Traditional Cultures, 2000, to strengthen the protection, heritage and carry forward the excellent ethnic minority traditional cultures in Yunnan.
7. Program to Build Yunnan an Ethnic Minority Culture Intensified Province, 2000, identified the ethnic minority culture development goal
8. Opinions on the Implementation of Establishing Ethnic Minority Culture Intensified Province of Yunnan, Apr.2008, to carry out the requirements by the 17th National Congress of the Communist Party of China regarding the promotion of socialism culture development and flourish, to be more consciously and proactively accelerate the establishment and development of cultural industry, secure people's primary cultural rights and enrich the cultural activities, realize the goal to build a advantaged ethnic minority culture province of Yunnan.
9. The 11th Five Year Plan for Cultural Industry Development of Yunnan Province

11th Five Year Plan for Ethnic Minority Career, approved by State Council in 2007, to reinforce and further persist in and improve the system of ethnic minority autonomy, to boost the autonomous regions development, secure ethnic minority lawful rights, solidify and develop the equal, united, interdependent and harmonious socialism nationality relationships, and ultimately boost the mutually solidarity and strive for a co-prosperity for all nationalities in China. 6 indicators have been selected to monitor the progress of ethnic minority regions development: income of the urban and rural residents, 9 years primary and middle school education covered population, infant mortality, publications in ethnic minority languages, professionalized persons proportion and urbanization level.

Problems and issues encountered during data collection:

Since the data of poverty population and incidence are collected and compiled from published news report and officials speeches from website of China Statistic Information and Poverty Alleviation & Development Office of the State Council of China, we take them as have been verified by relevant government agencies.

Summary of main concerns for the NSEC:

- Yunnan contains almost 12% of the total poor population of China and 18% of their population lives in poverty.
- Yunnan is also ethnically diverse, with 25 ethnic minority groups with a population of more than 5,000, 15 minority groups only found in Yunnan and an additional 16 ethnic groups living transboundary between China and other countries.
- There is a great gap in terms of development and poverty levels between some ethnic minorities present in Yunnan and the NESC area and other nationalities in China.

- March.21 2008 a big ceremony was hold in Kunming to celebrate the Kunming to Bangkok international road section in Yunnan of China open to traffic officially. The 1818km long international routing between Kunming to Bangkok has been recognized as an important north to south economic corridor connecting GMS countries with focus on logistic, commercial and tourism development.
- The NSEC road will greatly accelerate poverty reduction in Yunnan, particularly to the linked prefectures and municipalities of Pu'er and Xishuangbanna where the corridor goes through or bypass will provide more opportunities for local people to access tourists services, transportation and business.
- Given the positive impact of NSEC to economic growth for these regions, it will inevitably accelerate the interference to ethnic minority culture and folk customs by increase the frequency of communication of local ethnic minority groups with the external world, expose to more tourists from GMS, changing their livelihood, and produce both positive and negative impacts on ethnic culture and folk custom. Tourism may help to build up the ethnic minority groups awareness and confidence to their traditional culture and tradition after exchange with more tourists from GMS countries bearing a context of similar religion, language and culture. On the other hand NSEC could create different opportunities for ethnic minority groups in this area that might lead to unbalanced development. Minority people's strong will to upgrade living standards and more income may further change their traditional cultural carrier, e.g. settlement patterns, agriculture mode, costumes and language.
- Since change is inevitable to ethnic minority cultures and folk customs along with the changing existence conditions and environment, a flexible approach and methodology must be taken to adapt to the changing context. Chinese and Yunnan governments' laws and policies for ethnic minority poverty reduction, socio-economic and culture developments have laid the basis to support and conserve the ethnic cultures in many ways.

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11.2006 National Economy and Social Development Statistic Statement of Simao/Pu’er Municipality, http://www.petj.gov.cn/dispaly_news.asp?n_fileid=2007731152948

2006 National Economy and Social Development Statistic Statement of Xishuangbanna Prefecture, http://zshgdslj.blog.hexun.com/19421506_d.html

Annexes: (eg. maps, diagrams, tables):

Table 7-1 Rural Poverty Monitoring Results of China, Yunnan Province and the NSEC M/Ps in 2006

	Total Population of Absolute Poverty and Low Income	Absolute Poverty Population	Low Income Population	Proportion of the Absolute Poverty and Low Income Population	Poverty Incidence	Low Income Proportion
China	56,980,000	21,480,000	35,500,000	6%	2.3%	3.7%
Yunnan Province	6,708,000	2,284,000	4,424,000	18.7%	6.4%	12.3%

Kunming Municipality	225,600	60,000	165,600	7.6%	2.0%	5.6%
Yuxi Municipality	102,900	20,000	82,900	5.8%	1.1%	4.7%
Pu'er Municipality	626,100	290,000	336,100	31.2%	14.5%	16.8%
Honghe Prefecture	734,400	280,000	454,400	21.6%	8.3%	13.4%
Xishuangbanna Prefecture	77,300	40,000	37,300	13.0%	6.7%	6.3%

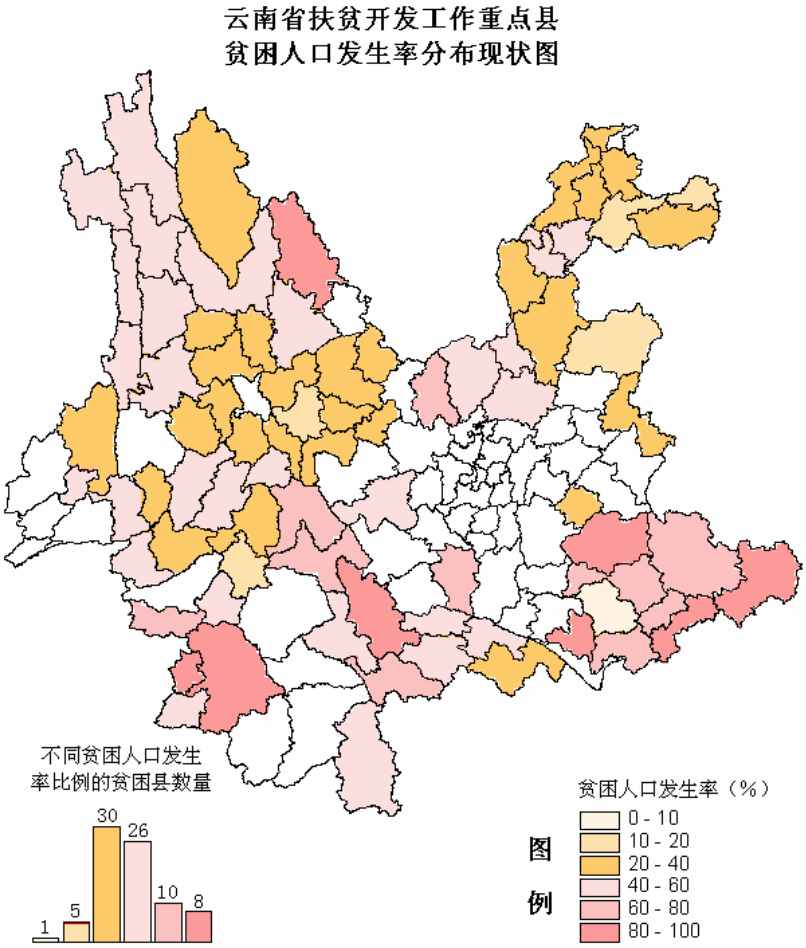
Source: collected and compiled from website of China Statistic Information and Poverty Alleviation & Development Office of the State Council of China.

Table 7-2 The traditional ethnic minority groups and populations in the NSEC by end of 2006

	Minority Pop.	Total Pop.	Percentage	Traditional Groups of Minorities
Kunming	759,500	5,143,000	14.77%	9: Yi, Moslem, Bai, Miao, Lisu, Zhuang, Dai, Hani, Buyi
Yuxi	684,000	2,160,000	32.5%	8: Yi, Hani, Dai, Moslem, Menggu, Bai, Miao and Lahu
Honghe	2,353,431	4,121,096	57.1%	3:Yi, Hani and Zhuang
Pu'er	1,528,400	2,573,000	59.4%	14: Hani, Yi, Dai, Lahu, Wa, Bulang and Yao.
Xishuangbanna	681,693	889,873	76.6%	12: Dai, Hani, Yi, Lahu, Bulang, Jinuo, Yao, Miao, Moslem, Wa, Zhuang and Jingpo

Source: The National Economy and Social Development Statistic Statements by relevant Statistic bureaus of the NSEC prefecture and municipality.

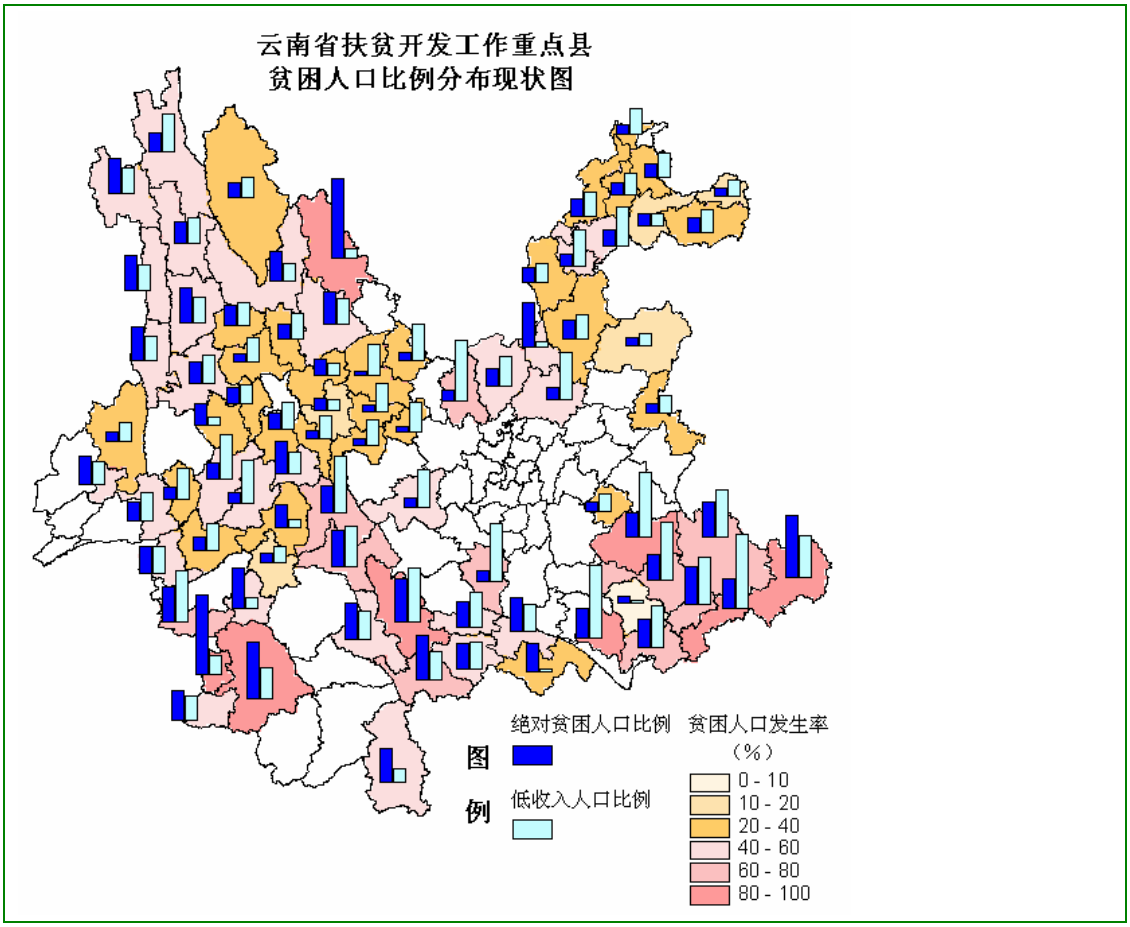
Figure 7-1 Status of Poverty Population and Poverty Incidence in the 80 impoverished Counties in Yunnan Province



Legend: No. of Counties by different poverty incidence **Legend**: Poverty Incidence (%)

Source: Integrated Strategy for Environmental Development and Poverty Reduction in Yunnan, Yunnan Environmental Development Programme, 2005

Figure S1-5 Status of Absolute and Low Income Population Distribution in 80 key counties in Yunnan



Legend: absolute poverty population percentage; low income population percentage; poverty incidence (%)

Source: Integrated Strategy for Environmental Development and Poverty Reduction in Yunnan, Yunnan Environmental Development Programme, 2005

Social

Template 9: Public health

Key issue S3: Quality of Life (including: public health, safety, noise, smell, communicable disease)

Introduction:

The commonly and frequently-occurred infectious disease has been under effectively control in China since the end of 1970s. Incidence of infectious disease has been reduced sharply, but the risks of some serious communicable disease and public health incidents still endanger people's health and safety, i.e. plague, cholera, venereal disease, medicine-resistant tuberculosis, and virus hepatitis. Some endemic has a strong tendency of prevalence, e.g. schistosomiasis, of which Yunnan province is one of the main prevalence areas in China due to the geographic and climate environment in the mountainous area suitable for existence and transmission of the pathogen; additionally flood and floating population have increased the transmission of schistosomiasis. Prevention and treatment of infectious disease faces a big challenge in China.

(Source: Work Report of the Prevention and Treatment of Current Fatal Infectious Disease, by Gao Qiang, Administrative Vice Minister of Ministry of Health of China, May 6, 2005, http://www.100kang.com)

During the 10th Five Year Plan Period of 2001 to 2005, disease control and prevention infrastructure investment reached RMB26.954millionYuan, and 147 projects were completed. In 2004, the communicable disease epidemic report network covered to villages and towns, which could be delivered by computer network at a daily base, while in 2000 it was monthly reported by printed diagrams from county level. The emergent public health accidents reporting system was improved to computer network directly from means of telephone or fax through levels of agencies. The quality of communicable disease monitoring report was also improved and delivered in time; SARS incidence zero case in Yunnan; transmission of bird flu to human beings was effectively under control; tuberculosis and plague prevention made good performance; the Implementation Plans for Comprehensive Treatment of Schistosomiasis was issued; malaria prevalence was steady and reduced. There was no epidemic of cholera in 2001-2005.

HIV/AIDS prevention and control made new progress in this period. Yunnan Province HIV/AIDS Prevention and Treatment Measures and six matching projects were implemented, providing strong policy support to combat AIDS in Yunnan. The institution arrangement was completed by setting the working commissions and offices at levels of governments and forming the intervention taskforce of more than one thousand of staff from province to prefecture and county levels. Yunnan Province HIV/AIDS Clinic Therapy Management Manual and Technical Proposals on HIV/AIDS Treatment by Chinese Herb Medicine and the Combined Chinese and Western Medicine were prepared to provide technical support for Aids treatment in Yunnan.

Source: Yunnan Public Health Development 11th Five Year Plan, from Yunnan Provincial Dept. of Health, www.xxgk.yn.gov.cn

Based on reported infectious disease data of Yunnan from 2002 to 2005, analysis showed the main communicable diseases are types of intestine, respiration and venereal.

The accumulated incidence of infectious disease between 1989 and 2000 in Yunnan was 1,085,915，

of which 4,523 dead. The first ten communicable diseases in terms of annual incidence in Yunnan were: diarrhea, hepatitis, malaria, tuberculosis, typhoid, hives, gonorrhea, scarlatina, cephalitis, and chincough. And the increasing infectious diseases were plague 0.09/100,000, HIV infected 0.10/100,000, gonorrhea6.01/100,000, syphilis 0.17/100,000, malaria 37.96/100,000, tuberculosis 33.50/100,000. In 12 years of1989-2000 the 25 kinds of legal infectious disease were reported in Yunnan except kala-azar.
Source: The prevalence situation of and the countermeasures for communicable disease in Yunnan (1989-2000), from Yunnan Provincial Center for Disease Control and Prevention

During 2003 to 2007, the incidence of legally reported communicable disease in Yunnan Province was 229.57/100,000, which was lower than the average incidence of China (248.77/100,000) in the same period of time.
(Source: Speech on the Conference of 2008 Yunnan Provincial Disease Prevention and Control, Director General of Yunnan Provincial Health Department, Chen Juemin, Mar.18, 2008, from Yunnan Provincial Centre for Disease Control and Prevention)

The Public Health Development 11th Five Year Plan of Yunnan Province has indicated that by 2010, the average life-span anticipation will increase to be 68.5 based on 68 of 2005; mortality of infant and children under 5 years old shall reduce by 20% to be 19.7‰, pregnant women mortality will reduce by 25% to be 49.10/1000,000. Infectious disease incidence will be kept within the average in the same period of that of China.
Source: Task of the Health Development of Yunnan in the 11th Five Year Plan, from Yunnan Daily, www.xxgk.yn.gov.cn

See Annex for the Legal Reported Communicable Disease of China

Indicator: Malaria
Target: Infectious disease incidence will be kept within the average in the same period of that of China.
Trends:
Among 63 562 malaria cases reported from 2001-2005 from 129 counties of 16 prefectures in Yunnan province, the average annual malaria incidence was 3.049/10 000 with an increase of 4.67% since the previous 5 years. There were two peaks of malaria incidence: May to August and October to November. Five prefectures with the highest malaria incidence were the prefecture bordering to the southern nations, and counties that are part of the first top ten places of malaria incidence were all at the first line border areas except for Liang He County which is in the second line border area. There were 23 counties with malaria incidence higher than 5 per 10,000 occupying 80.31% of all cases in the province but only 12.74% of the population. 87.30% of the cases and 79.36% of the death occurred in those under 45 years old. Malaria incidence and death rate between male and female were 3.44:1 and 6:1 respectively. Farmers, laborers and students were at the high risk of malaria infection. Floating population accounted for 17.06% of the cases and 23.42% of the death in the province. Malaria is still an important part of public health in Yunnan Province, and people younger than 45 years old, farmers, laborers and moving population are at the high risk for malaria infection.
The 5 municipality/prefecture of the top cases of malaria are: Dehong Prefecture, Baoshan Municipality, Xishuangbanna Prefecture, Pu'er Municipality and Honghe Prefecture, among which the last 3 are within the NSEC area.

Source: Analysis of the Malaria Epidemic Situation of Yunnan Province from 2001 to 2005, Li Huaxian, Chen Guowei, Yang Ruanzhou, Jiang Hua, China Journal of Parasitology and Verminosis, Feb.2008, Vol.26, No.1.

Drivers of trends

From 2001 to 2005, malaria incidence was slightly decreasing, except in 2003 the incidence increased sharply because of the transmission from Myanmar and Jinsha River area. Compared with the previous five years (1995-2000), malaria incidence, cases and epidemic area increased.

Regarding the situation that malaria incidence and death cases mostly occurred in the prefectures and counties bordering with other nations, it is necessary to reinforce the control of malaria in the border areas, increase investment for treatment and prevention, and organize and implement combined control of malaria along the border areas. Since imported epidemic and cases from abroad will impact to malaria prevalence in Yunnan, it will be important to seek support from home and abroad to complete and further malaria control and prevention in the GMS regions together. Furthermore, it's urgent to pay attention to the failure of malaria report in border areas, which was as high as 88.8% of fail to report of malaria in 2000.

As a tourism industry supporting province of Yunnan, the flow of tourists and rural surplus labors is frequent in the province which increases the transmission of malaria.

It would be necessary to monitor and control the epidemic of malaria in the high risk groups of farmers, rural surplus labors and students before the peak of malaria in Yunnan every year.

Description: Communicable Disease Control

Official target:

For Yunnan Province:

By 2010, a relative completed Chinese and western medicine treatment health system will be established to meet the requirement of people's health needs and affordability in Yunnan province. Guarantee medical security; narrow the health service gaps between urban and rural, different regions and communities; improve equity and availability of health service and further develop people's health level in urban and rural areas.

Source: Yunnan Public Health Development 11th Five Year Plan, from Yunnan Provincial Dept. of Health, www.xxgk.yn.gov.cn

10 specific tasks have been proposed in the plan: infectious disease incidence will be controlled within the average of China during the same period of time; inoculation of five vaccines from township above levels will be over 90%, modern tuberculosis control strategic coverage will be solidified at 100%; schistosomiasis will be controlled under the transmission standard in epidemic counties; investigate and find out the baseline of HIV/AIDS and reduce the average epidemic situation. More than 95% of counties achieve the elimination or reduce the key endemic of iodine and fluorin deficiency. Based on county levels, 90% above of the pregnant women and children will access to health care; 70% of the pregnant women may deliver in the hospitals, and mortality of pregnant women shall reduced to be 49.10/100,000, the mortality of infants and children under 5 years old will be reduced to 19.70‰、24.50‰ respectively.

Greatly improve the health care service in the rural area and the education and training levels to the health technicians. Over 90% of doctors shall obtain at least junior college education in medicine. 70% of rural villages access to tap water, and 55% of them may have sanitation toilet in house. The average life-span anticipation will increase to be 68.5 years in Yunnan by 2010.

Source: Yunnan Daily, The Tasks for Public Health 11th Five Year Plan of Yunnan, 2006-02-22

Kunming municipality:

By 2010, the average life-span of residents of Kunming may reach 75.5 years old; the mortalities of pregnant women and infants will reduce by 30% and 20% respectively, the incidence of infectious disease will reduce by 10%, getting close to the level of the developed regions of China. The new type of rural cooperative medical care coverage and the health service coverage for rural and urban will both reach 100%.

Source: Assessment Statement of the Implementation of Social Undertakings Development Objectives in the 11th Five Plan of Kunming Municipality, Kunming Development and Reform Commission, Dec.14, 2007, www.km.gov.cn

Yuxi Municipality:

By 2010, the incidence of the legally required to be reported infectious disease will be controlled within 250/100,000, immunity of children reaches above 98%, immortality of pregnant women and infants will be under 45/100,000 and 13‰, the new type of rural cooperative medical care coverage will reach 90%.

Source: The 11th Five Year Plan of Yuxi Municipality

Pu'er Municipality:

In 2001-2005, the infectious disease epidemic situation and public health emergency immediate

reporting network of Pu'er was established and covered city, county and township levels; SARS and bird flu maintained zero case; pushed forward the strategy for tuberculosis control; no epidemic of cholera and plague and malaria were under control.

The following indicators and targets are written in the 11th Five Year Plan for Health Development of Pu'er:

The average life-span will be 68.5 years old; mortality of pregnant women will be controlled with 65/100,000, and mortality of infants and children under 5 years old will be within19‰ and 23‰ respectively; the incidence of the legally required to be reported infectious disease will be controlled within the average of provincial level, epidemic of Aids will be kept within limits effectively.

New type of rural cooperative medical care coverage will cover more than 85% of rural population; 100% of urban residents and 95% of rural population will be informed of Aids knowledge; implement the strategy to control tuberculosis and maintain the coverage of 100%. 90% and 80% of pregnant women and children may access to health care service, and 70% of pregnant women may access hospitalization for delivery.

Source: The Health Development 11th Five Year Plan for Pu'er, www.pesfgw.gov.cn

Trends:

Communicable disease control faces serious situation in Yunnan province. The high risk groups: referring to the groups of drug abusers, sex workers and those who may have immediate contact with the above mentioned maintains at a high level. Communication level is high among the drug abusers by vein-injection; transmission by sex increased and the HIV/AIDS population ranked NO.1 in China.

The communicable diseases control tasks are heavy, esp. on tuberculosis, hepatitis, malaria and schistosomiasis. Plague, SARS, bird flu and zoonosis made big threaten to people's health.

After the development in the 2001-2005, the existing public health system of Yunnan has been improved greatly in terms of network of infectious disease immediate report system, disease treatment technology, health care and insurance. However, it is necessary to further develop capacity building, infrastructure and equipment and long term effective mechanism to sustain the full play of the public health system in Yunnan.

During the 11th Five Year of Plan period, Yunnan will prioritize the control and prevention of the following infectious diseases of HIV/AIDS, tuberculosis, hepatitis, malaria and plague, cholera, SARS, bird flu, and strengthen infrastructure constructions to control diseases.

Another three-year-campaign to combat drug abuse and Aids will further solidify the result of Aids prevention and control in Yunnan province. And the series of laws and regulations have been issued to guide HIV/AIDS control work in Yunnan.

Drivers of trends:

In general the tendency of infectious disease epidemic in China is that the total incidence and mortality are reduced; most of the communicable disease death rate is lowered; the structure of various transmissions changed and large scaled epidemic has been decreased. These changing trends owe to the change and improvement of vaccination, living environment, drinking water, food sanitation, nutrition, sanitation practice, medical conditions and production mode.

Source: The Actuality of and Countermeasures for the Communicable Diseases in China, Shen Jie, Deputy Director of China Centre for Disease Control and Prevention(CDC), Director of HIV/AIDS Control and Prevention Division of China CDC

Besides, population demographic is also one of the main reasons for the tendency of communicable diseases.

1. The population projection shows that China still faces the pressure of population growth in the 11th Five Year Period (2006-2010), but the health level still needs to be improved.

	Infant Disfigurement Occurrence	Disabled Population	Mental Deficiency	Hepatitis Virus Carrier	Endemic Sufferers
China	4-16%	60million	12million	120million	About 60million
Yunnan	1.1%	2.6million	730,000	3.1million	3million
Percentage of Yunnan occupied in the level of China		4.3%	6.08%	2.6%	5%

2. The gender ratio is unbalanced. In the past 20 years the gender is maladjustment between male and female by birth, from 108.5:100 at the beginning of 1980s up to 117:100 in 2000, which was 107:100 in Yunnan province. Gender discrimination still exists in the rural area in China, and the gender ration maladjustment is increasing.
3. Senior citizen over 60 and 65 occupies over 10% and 7% of the total population in China. The aged population takes 10.5% in Yunnan province, growing at a pace of 3.4% per year. The growing aged population makes the challenge to the structure of chronic and agedness diseases, the medical service and the reforming medical care insurance in China.
4. The flowing population is increasing. Urbanization is at the fast growing phase in China. According to general rules of urbanization and the results in China, in the upcoming 15 years the urbanization of China may increase 1%, which will improve the urban population from 39.1% of 2002 to 45% of 2010, and 55% by 2020, close to the middle developed country's level. The flowing population and urbanization made new challenge to the existing medical care system in China, which is primarily established based on households. Urban medical system has to burden more disease control and treatment, and the increasing urban population will increase the risk of communicable diseases also.

Indicator: HIV/AIDS

Target

National level: Further complete the prevention and treatment working mechanism of leading by government, shared responsibility by relevant departments and full participation of the society, to carry out all round prevention, control and treatment measures and reduce the impact to the HIV infected people, AIDS patients and families as well as the mass. By 2010, the HIV contracted population shall be limited within 1.5million in China.
(Source: Control, Prevention and Treatment of HIV/AIDS Action Plan of China (2006-2010))

Provincial Level: Carry out the national measures of "Four Frees and One Care" and the six matching projects under Yunnan Province HIV/AIDS Prevention and Treatment Measure, fulfil the tasks stipulated in the HIV/AIDS Prevention and Treatment Three Years Plan, and keep the HIV/AIDS rapid pervasive trend within limits.
(Source: Yunnan Public Health Development 11th Five Year Plan, from Yunnan Provincial Dept. of Health)

(include sources of indicator and target)

Trends:

Ever since the 146 HIV/AIDS contracted cases was identified for the first time among the drug abusers from the border area of Yunnan in 1989, HIV has been prevailed and spread continuously, which has been experienced the introduction, pervasion and rapid spread phases. By Sept.2007, the accumulated reports of HIV/AIDS contracted cases reached 56,054, and 5,036 AIDS patients and 2,211dead from the virus. According to expert's judgement, the population with HIV in fact would be over 80,000 in Yunnan province. The livability of the identified HIV infected has been improved from 18.6% of 2003 to 67.3% presently.

From 2005 to 2007, a three-year mass campaign of drug prohibition and HIV/AIDS prevention has been carried out in Yunnan province. Up to now a relative complete network for HIV/AIDS monitoring and tests has been built up in Yunnan with 1 HIV/AIDS corroboration canter and 17 laboratories, 197 screening laboratories, 97 HIV/AIDS monitoring station, 284 voluntary consultation office, 38 laboratory for testing CD4 and 12 laboratories for testing HIV carrying capacity. Preliminary formed the HIV/AIDS clinical treatment system of 146 antivirus free cure institutes, 8 Chinese herb medicine bases and 258 antiretroviral prophylaxis institutes. HIV/AIDS education and dissemination skeleton network and 11 AIDS orphan salvation institutes have been set up, and built up Yunnan Provincial HIV/AIDS Care Centre, which is the first professional clinical prevention and treatment technical guide centre in China.

Based on the formed monitoring and testing systems for HIV/AIDS, the covered area has been enlarged and 40,412 AIDS-infected patients have been identified and reported since 2004, which was about 3.06 times of the quantity of the previous 14 years. Large scale of HIV/AIDS information was disseminated in Yunnan, and the informed rural residents have been raised from 30% to 81%, and informed urban residents increased from 61% to 94%.

Interventions have been implemented to change the high risk actions of HIV/AIDS transmission in the past three years. Condom has been provided in 99.6% of the recognized hotels, 94.8% of private

guesthouse, 90.9% of drugstore, 87.7% of ballroom, and 83% of hairdressing shops. Aimed to extension use of condom and change the unsafe sex actions, Provisional Measures to Promote Use of Condom in Yunnan Province was issued at the beginning of 2007, in which stipulated that condom would be provided free in hotels, the intervention work force could access to public recreation ground to disseminate how to use condom, and medical examination for sex workers, education for the partners, and training program for the owners was required.

67 methadone maintenance therapy clinics including 8 mobile methadone vehicles have been provided, which made Yunnan the province obtained most of such clinics in China. By end of Sept.2007, accumulative 10,464 people obtained the therapy, and 5,160 addicts are taking methadone presently. 46 sanitary needles exchanges have been in operation.

The principle of scientific and normative therapy to cure all that needed has been applied in HIV/ADIS clinic treatment. By the end of Sept.2007, free antivirus therapy had been provided to 4,672 patients in Yunnan, the 8 Chinese herb medicine bases also provided free treatment to 1,691 patients. Antiretroviral prophylaxis was implemented in all of Yunnan and 910,000 pregnant women accessed to HIV/AIDS consultation and tests, antiretroviral prophylaxis was offered to 2006 pregnant women and 1245 infants. The Civil Administration Department brought impoverished sufferers into the minimum security system for urban residents or “Five Security” targets in rural area, subsistence relief were provided to 2000 poor HIV/AIDS patients, their relatives and 1491 AIDS orphans. The Education Department of Yunnan province arranged free education for 1100 right aged Aids orphans.

International cooperation and scientific research were carried out in Yunnan in HIV/AIDS field. A series of bilateral government and non-government projects were implemented between Yunnan and UK, USA, Australia and GEF, and Clinton Foundation, which greatly supplement the work on HIV/AIDS in Yunnan and the world understanding of HIV/AIDS in Yunnan. State Science and Technology Department supported Yunnan to carry out thematic research on HIV/AIDS prevention and treatment in the “10th Five Year Plan for HIV/AIDS research”, part of the results were used in the fields.

New approach adapt to the contest of Yunnan was used to combat HIV/AIDS in the key areas in west of the province, which was based on households and communities, guided with professional technology to prevent and cure AIDS. The approach was accepted by many other places in China.
(Source: Summary of the Three-Year People’s Combat to HIV/Aids in Yunnan Province(2005-2007), Yunnan Daily, www.yncdc.cn)

Drivers of trends

Government gave strong support to the combat of HIV/AIDS. Since 2005, a vast people’s combat to drug and HIV/AIDS was initiated in Yunnan. The targets stipulated by state congress in Work Plan for Further Support Yunnan Province to Reinforce Drug Prohibition and HIV/AIDS Control and in the Implementation Scheme of HIV/AIDS Control In Yunnan Province (2005-2007) were achieved basically; the zooming tendency of HIV/AIDS was kept within limits. The central government departments sincerely carried out the Work Plan by policy, budget, technology assistance and supervision. In 2004 the Yunnan Provincial HIV/AIDS Control Leading Group was renamed as Yunnan Provincial HIV/AIDS Control Working Committee, the members increased to 39. On Jan.2005, the Provincial Leading Group of Combating Drug and HIV/AIDS was established for coordination, under the leadership from the

governor of Yunnan directly. Mar. 2008, Yunnan Provincial AIDS Control Department was officially established, and Aids Control Working Responsibility and Targets Commitment was signed by levels of government agencies, which formed the mechanism to allocate Aids prevention and control works enlisted in the relevant departments daily work, and the members must work together with the local government agencies.

The Statute of HIV/AIDS Prevention and Control in Yunnan Province was initiated from Jan.1 2007, which legalized the requirements including informing testing results, free Aids consultation and test for marriage registers.

Yunnan received more than RMB400millionYuan from central government and departments, the international cooperation projects between China and UK, GEF, USAID on Aids control in Yunnan invested nearly RMB100million Yuan, which secured the implementation of interventions and measures, strongly supported HIV/AIDS control in whole of Yunnan.

Presently, the national policy of “four free and one care” has been carried out roundly in Yunnan, “One Statute and Six Projects” are under implementation thoroughly, antivirus therapy, antiretroviral prophylaxis and relief measures have been advanced.

(Source: Summary of the Three-Year People’s Combat to HIV/Aids in Yunnan Province(2005-2007), Yunnan Daily, www.yncdc.cn)

A new round of People’s Combat to Drug and HIV/AIDS in Yunnan Province was initiated in Jun.26, 2008, which will last from 2008 to 2010 for 3 years, with the aim to solidify and enlarge the outcome from the previous 3 years anti-drug and Aids control activities, and further eliminate the harm of drug and Aids to the society. By 2010. a long term effective working mechanism for Aids control and prevention shall be established in Yunnan, and HIV/Aids prevalence and transmission shall be effectively controlled and prevented in Yunnan province.

(Source: A New Round of Drug Banning and HIV/Aids Control and Prevention Initiated in Yunnan Province, from Yunnan Provincial Centre for Disease Control and Prevention, www.yncdc.cn)

Description: Traffic Accidents along the NSEC in Yunnan

Official target: NA

Trends

The section of Kunming-Bangkok Highway in China was open to traffic on Mar.21, 2008 although the section between Xiaomengyang-Mohan is yet to be competed at some parts. The Kunming to Yuxi expressway was built and opened in Apr.17, 1999, which was then the first expressway with 6 lanes in Yunnan.

3 months after the opening of the expressway, the monitored traffic flow exceeded 40,000 per day at the entrance of Kunming-Yuxi Expressway, the beginning of Kunming-Bangkok international highway. Along with the gradual completion of the sections of international highway in China, traffic accidents also increased. In 2007, 467 traffic accidents occurred within the precinct of Kunming-Yuxi expressway, 6 times more than in 1999. Source: The Traffic Flow over 40,000 per day on Kunming-Yuxi Expressway, ww.yn114.cn, Jul.13,2008

The expressway section of Yuxi-Yuanjiang was opened in Oct.2000, and Yuanjiang-Mohei was opened in Dec.2003. Up to Jun.2005, 59 died in the accidents on the two sections. Most accidents happened on the long downgrades of expressway. Presently a multi-departments integrated traffic control and management mechanism has been established in Yuxi to control traffic on the expressway, and measures have been adopted to prevent accidents by installation of wire netting to prevent passengers crossing over, setting more signs indicating caution and speed limit and building a truck escape ramp. Nearly a hundred trucks were saved by the escape ramp after 30 months of the operation of the Yuanjiang-Mohei expressway.

Source: Traffic Management on Yuxi-Yuanjiang and Yuanjiang-Mohei expressway, Yuxi Daily, www.old.yjx.gov.cn, Jun.27, 2005

Simao-Xiaomengyang expressway was opened in Apr.2006. In the first 4 months 7 accidents happened and 5 people died because of tyre explosion cause by overspeed. Effective measures were adopted by the traffic police brigade to provide safety check and mobile speed testing to control the traffic on the expressway. During Oct.2006 to Oct.2007, there's no death accidents happened along the expressway. The speed limit on this section has been upgrade to 120km per hour.

Source: 120km/hour speed limit on Simao-Xiaomengyang Expressway for the first time http://www.yndaily.com, Aug.09, 2007

The construction of the section from Xiaomengyang to Mohei is not completed yet due to geological reasons. Only parts of the highway were opened to traffic for test after Apr. 10, 2008. According to statistics, nearly 800 to 10,000 heavy trucks run to the highway every day ever since, besides tractors, motor cycles and passenger buses. By May, 96 accidents happened already on this highway, among which 24 died and 41 seriously injured. Traffic police department analysed the reasons of these accidents: driving without licence, drunk driving, overspeed, negligence, and overtaking blindly. Accidents happened on the forthright occupied 66%, and the motorcycle involved accidents amounts to 66% too. From June, the traffic police strengthened patrol and safety dissemination on the highway, toll management has been operated gradually, and the traffic accidents reduced obviously,

Source: 21 died on the uncompleted Xiaomengyang-Mohan highway, www.Chinahighway.com, Jun.04, 2008

Description: The Kunming-Bangkok International Highway Development Impact to Public Health

Machine noise, dust and waste water during the construction phase and noise, exhaust gas, dust, waste water from the surface and the risk of leaks during transport, in the operation phase, may all impact to public health in highway development.

Since 1999 of the beginning of gradual development of Kunming-Bangkok international highway section in China, experience and lessons on highway development, environment protection and pollution control have been accumulated to guide expressway development in Yunnan.

EIAs were carried out to the construction of the sections in Yunnan, esp. on the expressway from Simao to Xiaomengyang, by assessing the environmental, economic and social impact, and comparison of three route designs to minimize the impact to environment and integrate with the tropical rain forests. A set of integrated engineering construction measures, such as vegetarian conservation, water and sound environment and wastes disposal were developed to address environment protection and pollution control in the development of Simao-Xiaomengyang expressway, which have contributed as a model to address the similar issue in highway development in Yunnan and even in China. The solution of high bridges and tunnels has replaced traditional measures of impolder and excavation, approving to be an effective way of environmental protection in the intervention. Noise control measures were adopted for construction and operation phases, and disposal of construction wastes to rivers and channels were prohibited, remained the existing river course and wetland. First time in China to use soil infiltration system to treat waste water produced from the highway and annexe.
Source: Science and Technology Holding up the Eco-expressway, 2008, 1,30, www.yndaily.com

Green noise barrier is applied in noise control on Simao-Xiaomengyang expressway which has played an effective role to reduce noise impact to residential areas and schools, and beautified the highway also. Flowers and veins are planted on the noise barrier to make it green and increase the function of sound absorption and noise reduction, which is a high effective measure for highway noise control and worth to be extended.
Source: The Ecotype Noise Barrier Design for Simao-Xiaomengyang Expressway of Yunnan, Lei Xuedong, Shen Yi, Shan Xiaodong, www.jtzx.net.cn

Owing to geological reasons, the routes of sections of the NSEC in China were selected to pass through mountainous areas away from towns or cities for most of the journey, and so far there's no specific data indicating the immediate impact from the highway to public health, by such a way of polluted air or waste water or noise. Traffic accidents on this international highway stand out as the major impact to public safety, which has been a key issue for local government to address by adoption of various safety measures and management.

Relevant laws, policies, plans and institutional arrangements:

The Law of Infectious Disease Control and Prevention for People's Republic of China was implemented since 1989, in which 39 communicable diseases have been listed as the legally managed targets and the diagnoses criteria has been indicated. These 39 infectious diseases are classified in to three categories to be reported the epidemic situation.
The Law was revised and approved by State Council in Aug.2004 and implemented officially since Dec.2004. The Revision specifically requires all levels of governments list communicable disease managements into the national socio-economic development plans.
Source: news.xinhuanet.com/zhengfu/2004-08/30

Four Free and One Care policy: this policy was implemented since 2003 to control and prevent HIV/AIDS transmission in China. Volunteer and free blood preliminary screen and test for HIV/AIDS; free anti-virus treatment for rural and urban impoverished Aids sufferers; free school for Aids orphans and free Aids consultation, screen test and anti-virus treatment for pregnant women; cover the poor Aids patients and their families under government relief.
Source: www.news.xinhuanet.com

HIV/AIDS Control and Prevention Action Plan in China (2001-2005): To implement proactive and effective measures to control the fast increasing tendency of Aids epidemic situation, and reduce the incidence of Aids and social disease. By end of 2005, the annual growth of HIV infection and social disease patients shall be controlled within 10%; the HIV transmission by transfuse shall be reduced below 1/100,000, which shall be below 1/10,000 to 1/50,000 in the high prevalence area.
Source: Administration Department of State Council, www.gov.cn

HIV/AIDS Control and Prevention Action Plan in China (2006-2010): Further improve HIV/AIDS control and prevention joint mechanism under the leadership and organization of governments, shared responsibility by departments and participation by all levels of society. Entirely carry out the prevention, control and treatment measures to reduce the harm of HIV/AIDS to the infected, patients, their families and the public. By 2010, the HIV infected patients shall be controlled within 1.5million in China.
Source: Administration Department of State Council, www.gov.cn

HIV/AIDS Control and Prevention Statute of China was initiated in Mar.2006 to control HIV/AIDS occurrence and epidemic, guarantee public health by the State Council.
Source: Administration Department of State Council, www.gov.cn

HIV/AIDS Control and Prevention Statute in Yunnan Province
The Statute of HIV/AIDS Prevention and Control in Yunnan Province was initiated from Jan.1 2007, which legalized the requirements including informing testing results, free Aids consultation and test for marriage registers.
Source: www.yn.gov.cn

Substitute plantation investment in north of Myanmar and Laos:
From 1990s, supported by Yunnan provincial government, corporations from Yunnan began to invest in the north of Myanmar and Laos to substitute the plantation of opium poppy By the end of 2005, over

500million Yuan investment have been used to substitute 400000Mu of opium poppy and extend 70000Mu of crops and cash plants, such as rice, rubber, sugarcane, Longan, tea and so on. In the first half of 2006, about 29 corporations for Yunnan have invest 170million Yuan and increased 220000Mu of farming land to assist the reduction and banning of opium poppy planting, and solve drug problem from the origin. Substitution plantation not only address food and warm for local people, but also stimulates the infrastructure development and the growth of agriculture, food processing, tourism industries and border trade, which has achieved a win-win situation for Myanmar, Laos and China. According to the official report of Yunnan Public Security Department, in the next 5 years another 1.5million mu of land will be increased as the substitute plantation for Myanmar and Laos.
Source: Report by Xinhuanet, Aug.25, 2006, http://news.sohu.com/20060825/n245001844.shtml

Problems and issues encountered during data collection:

Communicable disease epidemic data are not available for the five municipality/prefectures in time series, only few monthly data could be searched from internet for Kunming but not appropriate. No data available to illustrate the impact of NESC development to public health. The traffic accident data also unavailable for the whole section of Kunming-Bangkok international highway in China, and only some segregated data may found by different sections in Yunnan from different years.

Summary of main concerns for the NSEC:

- The Kunming-Bangkok international highway runs from Kunming to Bangkok for 1800km, of which 688km in China, 229km in Laos and 890km in Thailand. The section in China was open to traffic on Mar.21, 2008. And the expressway between Simao-Mohei will be completed in 2009, which will connect the section in China all as high class highway. According to experts projection, after the construction and opening of the international highway, the annual trade between China and ASEAN will rise to USD$ 400billion, and 1/4 will be operated through the international highway, which means nearly 1000 trucks carrying 15 to 20 tons will be moving busily on the highway every year. About 5million person-time tourists will travel in and out from the highway. Source: Kunming-Bangkok Economic Corridor Initiated Today, www.clzg.cn/kmpap/2008-03/21
- The increasing development of NSEC based on the Kunming-Bangkok highway will bring in substantial increase of trade, logistic, and tourist exchange between China and GMS countries, but also increased the potential of communicable disease transmission to public. It will be necessary to reinforce the monitoring and inspection and reporting of communicable disease in the key towns and cities along the NSEC.
- Regarding some common communicable diseases, such as malaria, prevention and control will have to be reinforced at the border area by join efforts, increase investment and joint defence. It would be necessary to establish the cooperation mechanism to control and prevent communicable disease for the GMS countries under the support from home and abroad.
- Although the incidence of infectious diseases has been greatly reduced since the 1970s, risk of some serious communicable diseases is still significant including: cholera, venereal diseases, medicine-resistant tuberculosis, and viral hepatitis. Some endemic diseases have a strong prevalence, e.g. schistosomiasis, of which Yunnan province is one of the main prevalence areas in China.
- Malaria is still an important risk in the province particularly for under 45 year olds, farmers, labourers and transient population.
- HIV/AIDS was first detected in 1989 in the area with 146 cases. In 2007, the incidence of HIV/AIDS contracted cases reached 56,054 officially, however some experts believe the figure is over 80,000 in Yunnan province.
- Traffic accidents on this international highway stand out as the major impact to public safety, which has been a key issue for local government to address by adoption of various safety measures and management.

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Annexes: (eg. maps, diagrams, tables)

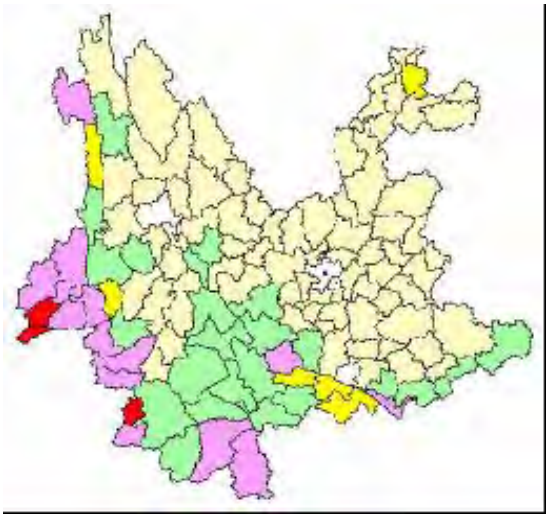

Fig.1 Stratification of malaria incidence in Yunnan in 2001-2005

Malaria Incidence/10 000

Yellow: 0.01~0.99 Green: 1.00~4.99 Maize: 5.00~9.99

Purple: 10.00~39.99 Red: 40.00~55.00

Source: Analysis of the Malaria Epidemid Situation of Yunnan Province from 2001 to 2005, Li Huaxian, Chen Guowei, Yang Ruanzhou, Jiang Hua, China Journal of Parasitology and Verminosis, Feb.2008, Vol.26, No.1.

Social

Template 10: Population, Migration and Trafficking

Key issue S4: Migration and trafficking (including: Demographics)

Introduction

Indicator: Natural Growth Rate of Population

Natural growth rate of population refers to the ratio of natural increase in population (number of births minus number of deaths) in a certain period of time (usually a year) to the average population (or mid-period population) of the same period which is often expressed in ‰. The formula is:
Natural Growth Rate of Population = Birth Rate – Death Rate

Based on the preliminary estimation, the total population of Yunnan in 2007 reached 45.14million, the birth rate was 13.08‰, death rate was 6.22‰, and the natural growth rate was 6.86‰.
Compared to 2006, net increase of population 310,000, the birth rate reduced 0.12‰, and death rate decreased 0.08‰, and the natural growth rate of population reduced 0.1‰.
Compared to 2000, the total population increased 2.777million, with an average growth of 397,000 per year. In 2007, the total increased population was 310,000, which was lower than the average of the past, indicating the implementation of a series of family plan policies has effectively reduced the birth rate, and maintained a low growth trend of total population. See Table 10-1 for the related indicators of population in Yunnan province from 2000 to 2007.

Official Target: By end of 2010, the total population in Yunnan shall be maintained within 46million
Source: The Outline of the 11th Five Year Plan for the National Economy and Social Development in Yunnan Province http://www.yn.gov.cn/yunnan,china/73468276046299136/index.html

Drivers:
Regulation on Encouragement for Rural Households Singleton (Interim):
In order to establish a new mechanism to control population quantity and improve the quality, the policy was initiated in 2003 targeting rural households' family plan in Yunnan province. Specific encouragement measures were included in the policy, such as bounty to singleton parents, preferential enrollment to secondary and higher education for rural singleton students, free tuition for singleton students in the 9 years compulsory education, and subsidy to singleton parents after 60 years old. Ever since the implementation of this policy, 517,000 rural households have abandoned voluntarily the reproduction to second child and registered as the singleton parents by end of Sept. 2007.
The policy is very effective in population control. From 2003 to 2006, the natural growth rate of population in Yunnan province reduced from 10.6‰ to 6.9‰, and the birth rate decreased from 17.9‰ to13.2‰.
In the past more than 30 years, family plan and population control in Yunnan reduced nearly 11million population.

By end of 2006, the population in NSEC regions was 16,373million, about36.52% of the total population of Yunnan province (44.83million). Kunming ranked the first with 6.152million, followed by Honghe with 4.345million, Pu'er with 2.573million, Yuxi with 2.246million, and Xishuangbanna with 1.057million.
The urbanization ratio in Kunming was 59%, higher than Yuxi 34%, Xishuangbanna 33%, Honghe 31%

and Pu'er 25%. Except Pu'er, the urbanization ratio of the other 4 M/P is higher than the average of Yunnan of 30.5%.

The Gender ratio of Kunming was 107/100, Yuxi 105/100, Pu'er 109/100, Honghe 107/100, and Xishuangbanna102/100. Except Pu'er, the gender ratio in the other 4 M/Ps was within the normal criterion (which varies from 102 to 107).

The highest population density appeared in Kunming with 285.1 persons/ km^2, and the lowest in Xishungbanna with 53.7 persons/ km^2.

See Table 10-2 for details in the 5 NSEC M/Ps and Annex Fig.8-1 and Fig.8-2 for the population density and urbanization in Yunnan.

The Natural Growth Rate of Population in Yunnan Province in 2006 was 6.9‰, which in the NSEC area are respectively for Honghe 7.99‰, Xishuangbanna 7.50‰, Kunming 6.47‰, Pu'er 6.01‰ and Yuxi 5.50‰. See Table 10-3 for details of birth rate and deaths rate in the five regions.

A population sample survey in Yunnan in 2007 indicates that the ethnic minority population has reached 15.13 million, an increase of 6.83% since 2000, and 1.64% since 2005.

The ethnic minority population ratio in the 5 NSEC regions in 2006 was 12.4% in Kunming, 30.5% in Yuxi, 56.4% in Honghe, 59.4% in Pu'er and 75.7% in Xishuangbanna, which indicates that Xishuangbanna, Pu'er and Honghe are the minority population centralized areas in the NSEC, and the development of NSEC shall benefit most of these ethnic minority people. See Table 10-4 for the details.

The urban households' annual disposable income (adic) per capita in the NSEC area is shown in Table 10-5. Data for Honghe are not available. Kunming has the highest adic, followed by Yuxi, Xishuangbanna and then Pu'er.

Description: Migration:

Indicator: Population Transfer provincial wide and within Yunnan Province

Target: NA

Trends

Census of 1990 shows that from 1985 to 1990, provincial-wide migration situation of Yunnan ranked No.20 in all 30 provinces in China. And the quantity of in-migrant was less than emigration. The majority of migration occurred inside the province. Of all the migration, 531,800 took place at provincial wide, accounted for 42.07% of all, among which in-migrant of 254,300 and emigrant of 277,400, the net emigrant reached 23,100. Most of the in-migrant came from southwest regions of China, secondly was from mid-south and east of China, very few from northeast of China.

Economy was the biggest driver for migration, which was revealed more obviously in the case of male than female, who was more prevalent for community driving migration. The census also revealed that the floating population in Yunnan amounted to 907,900, about 1.61% of the total population in the province.

Population migration and flow of Yunnan reflected the economic situation of less developed area, which was far different to the developed coastal areas in China. Along with the opening of west of China, and the enlarged border trade with the neighboring countries, migration of population takes a new look in Yunnan.

According to the Research on the Provincial Wide Population Transfer and Control for Yunnan by the State Statistic Bureau of China in 2005, the total migrant of Yunnan at provincial wide reached 1.5079 million, among which in-migrant 1.1644 million and emigrant 343,500, a net in-migrant of 820,900. The total migrant of Yunnan (including in-migrant and emigrant) accounted for 1.78% of that in China at provincial level. Most of the in-migrant flowed to the relatively developed areas in Yunnan, particularly to Kunming (accounted for 49.2% of all in-migrants from other provinces) and the centre/towns of municipalities and prefectures in Yunnan.

Most of the in-migrants came from southwest of China and the middle and down stream of the Long River; another majority came from the southeast coastal provinces and the middle and down stream of Yellow River.

The emigrants flew to the provinces of Jiangsu, Zhejiang, Shandong, Guangdong (coastal provinces in east and south of China) and Sichuan (southwest), and secondarily to Guizhou, Chongqing, Guangxi (southwest of China), Hunan, Henan, Anhui, Hebei and Shanxi (middle China). In general, the in-migrants were upgraded from county or township to the urban city and towns in Yunnan, while the emigrants from Yunnan flew in parallel to the places in other provinces.

Looking at the in-migrants occupation structures, most were operators for production machines, drivers, and employees in service (accounted to 81.17% of the employees of in-migrants). Among which 50.1% of males were operators/drivers, and 54.5% of females in service.

As high as 76.83% of in-migrants received only preliminary education (elementary and middle school). The in-migrants with secondary or higher education background mostly distributed in Kunming and other centre cities in the M/P in Yunnan.

Drivers of trends

A general trend analysis of migration of Yunnan indicated that most migration was driven by work opportunities and business reasons, about 65.06% of the total transmigrant, which revealed that economy were the decisiveness factor in population transfer, and it was related to the present economic development in China, and the strong potential of Yunnan in economic development in near future. It also reflected that in the market economy context human resource flow was much prevalent than before, and the flow of population provided considerable economic and social benefit. Social factors on population transfer mostly because of resettlement, marriage and family relatives, which accounted to 26.11%; the other factor driven transmigrant occupied 5.79%, i.e. transfer for jobs 2.38%, college graduates employee 0.17%, showing that Yunnan was not attractive for high education personnel. Population transfer at provincial level contributed to an overall increase of the population in Yunnan province. Considered the important policies and regional economic structures change, i.e. continues development in the west of China, the establishment of China-ASEAN free trade zone, and WTO membership; further development of regional economy, and phase out of the permanent residence registration, Yunnan would continue to keep the net increase of in-migrants from other provinces, and become an important receiving place for migration in China in a certain period of time.

The neighbor countries' policies also impacted to migration situation of Yunnan. In the recent years, preferential policy of free hospitalization, free schooling and free subsistence and production materials were implemented at the border areas of Vietnam and Myanmar, which influenced to the border minorities groups of Yunnan. According to incomplete statistic data, 7091 emigrants of 1841 households from 263 villages, 80 townships of the 18 border counties (cities) transferred to the neighboring countries ever since 1995. Due to the trans-boundary minority group's community

existence at the border area between China and the neighboring countries, it is hard to avoid population transfer from these minority groups.

Description: Trafficking:

Target: NA

Trends

Located at the southwest of China, with 94% land of mountains, the poverty incidence of Yunnan province still remains high. Women and children living in the poor areas have become vulnerable groups and also the target to human traffickers. From the late of 1990s, the crime of women and children trafficking increased in China, and Chinese police has strengthened combat to human trafficking. From 2000 up to now, human trafficking has taken the trend of decreasing gradually. In 2006, nearly 2,500 cases of women and children trafficking was solved, the case solve rate reached 80% to 90%.

Since the International Labor Organization (ILO) implemented the GMS Human Trafficking Prevention Project (the Project) in Yunnan in 2000, 4,298 women and 1,061 children have been rescued. In which 91 cases involvied Myanmar, Vietnam and Laos, in which case 129 victims were rescued, and 103 criminal suspects captured.

The police of Yunnan province reinforced the fulfilment of combat human trafficking responsibility, and strengthened collaboration with government administrations of railway, civil aviation and highway on inspection and interception. In Kunming a professional police force team has been formed to improve the efficiency in solving such cases.

People's government of Yunnan Province has recognized that certain relations exist between trafficking and poverty. Human trafficking not only violates the personal rights and interests of women and children, but also infringe upon the labour right for young women. Therefore employment plans are included in poverty alleviation programs in Yunnan。In the first half of 2005, 4,700 young women obtained employment through labour export in the two project sites of Honghe and Simao (Pu'er).

According to the introduction from Women's Union of Yunnan province, nearly 300,000 local people have been benefited from the agriculture training, micro-credit, education, labour export and trafficking prevention training and dissemination implemented by the Project.

The private enterprise association carried out trafficking prevention training to more than 800 employers. Two Women's House for rural women employees have been set up in Kunming to provide technical trainings and dissemination of how to prevent from trafficking and gender equality.

So far Chinese police have set up the communication office at the border between China and Laos and Myanmar. Meanwhile, Chinese police will strengthen the information exchange and sharing with the other countries in the GMS, build the database for combating women and children trafficking, and utilize information-based measures to promote the fight against human trafficking.

Furthermore, case cooperation will also be reinforced in the GMS region by joint working of the police force once the transnational trafficking crime clue is detected.

Such cooperation has been extended to the ASEAN regions. Public Security Ministry of China has signed a series of bilateral police cooperation agreements with Vietnam, Cambodia, Thailand, Laos, Filipine, Myanmar and Indonesia to prioritize combating to women and children trafficking. In 2005 and 2006, the specific actions were taken by the police from Yunnan and Guangxi targeting the trafficking at the border areas between China and Vietnam, and uncovered a series of crime cases of trafficking women from Vietnam for prostitution by force. A number of Vietnam women and children were rescued, and the criminal suspects arrested.

However, challenge exists to combating human trafficking in the GMS region and in Yunnan. I.e. inadequate funds, information system yet to be built, and the long term existence of poverty induced demand for trafficking. E.g. the price for a girl has been increase four times from 2001 to 2006. The huge profit, flowing population and logistic exchange with economic development have driven more trafficking cases and more difficulty for international anti-trafficking.

Relevant laws, policies, plans and institutional arrangements:

Regulation on Encouragement for Rural Households Singleton (Interim):

In order to establish a new mechanism to control population quantity and improve the quality, the policy was initiated in 2003 targeting rural households' family plan in Yunnan province. Specific encouragement measures were included in the policy, such as bounty to singleton parents, preferential enrollment to secondary and higher education for rural singleton students, free tuition for singleton students in the 9 years compulsory education, and subsidy to singleton parents after 60 years old. The interim policy is going to be legalized by Yunnan Provincial Government.

Institutional Arrangement in China on Combating Women and Children Trafficking:

Based on the Constitution, a relative complete national law framework of the People's Republic of China has been established to fight human trafficking and protect the rights and interests of the victims, particularly for women and children. The law framework including Criminal Law, Labour Law, Law on the Protection of Women's Rights and Interests, Law of the People's Republic of China on the Protection of Minors, Marriage Law, Adoption Law, Decision of the Standing Committee of the National People's Congress Regarding the Severe Punishment of Criminals Who Abduct and Traffic in or Kidnap Women or Children, and the Security Administration Punishment Act.

The government of P.R. China has taken priority of fight the trafficking of the vulnerable groups of women and children. In 2001, the Women Development Program of China (2001-2010) and the Children Development Program of China (2001-2010) were enacted, in which reduction of the crime of women and children trafficking were set as an important target to protect the victims. By end of 2007, Fight Trafficking of Women and Children Action Plan (2008-2012) was enacted by the government, indicating the establishment of a long term effectiveness mechanism of anti-trafficking, integrating prevention, combat, salvation and healing, and dominated by the government, participating by communities and 28 relevant government agencies. Thus the State Fight Trafficking Joint Conference by Ministries was formed to carry out integrated administration of women and children trafficking. Effective measures such as setup centres for transfer, training and healing the rescued victims in the key areas have been adopted so far by the joint conference.

P.R. China is a contracting party of United Nations Convention Against Transnational Organized Crimes, and an implementation party of the UN Institutional GMS Cooperation Fight Human Trafficking Programme. The Programme was joined by 6 nation's governments, 13 UN institutions and 8 international NGOs, which was officially initiated in 2001, and an office in each of the 6 countries has been set up.

In 2003 China and the other five GMS governments of Myanmar, Vietnam, Laos, Thailand and Cambodia initiated the coordination mechanism of fight trafficking in GMS (COMMTT), with the aim to found a sustainable and effective transnational cooperation system to fight human trafficking. In 2004 the first ministers' conference was held in Myanmar on COMMTT, and the Aide-memoire of GMS Cooperation Fight Human Trafficking was signed by the six member countries. At the end of 2007, the second ministers' conference of COMMTT was held in Beijing, a series of important guiding documents were approved by the conference, i.e. GMS Fight Trafficking Action Plan (2008-2010), and the Joint Declaration, which would have a profound impact to the fight human trafficking in the GMS.

Problems and issues encountered during data collection:

The data on population flow and human trafficking in the NSEC regions is not available so far. Only a few news reports from webpages could be found but the data is not very correlated to the issue. Presently complete statistic data from fight human trafficking is not available from public channels, only some estimation could be found from some international cooperation project and institutions, which could not give a full picture of the real situation.

Summary of main concerns for the NSEC:

- There is a target for Yunnan to maintain its population on 46 million by 2010. The population growth in 2007 was 6.86‰ to 45.14 million. However, population growth has decreased from 10.6‰ in 2003 due mainly to incentives for 'one child' households which have greatly reduced the birth rate.
- The population growth rates in the NSEC area are Honghe 7.99‰, Xishuangbanna 7.50‰, Kunming 6.47‰, Pu'er 6.01‰ and Yuxi 5.50‰.
- Although population growth has taken a descending tendency, the in-migrant and population flow due to economic potential of Yunnan in the context of GMS and ASEAN cooperation could resulted in an increase of population in near future, particularly in the NSEC main cities. It will be more important to relate population development and economic grow in Yunnan, and attract the increasing in-migrants to move to the secondary and remote areas of Yunnan to bring along new thinking, create material and spiritual wealth for those regions, and make a benign cycle of population growth and urbanization and economic development.
- Although the fight against human trafficking in the GMS countries has shown good progress and the institutional arrangement has been confirmed, it is still far to fulfill the target to eliminate human trafficking in GMS. Prevention and fight against human trafficking in the GMS countries faces huge challenge and difficulties owing to the new features and drivers of trafficking. Therefore it will be more sense for the GMS countries to work closely to promote a more effective fight against human trafficking.

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Annexes: (eg. maps, diagrams, tables) See the annex file

Table 10-1. Indicators of population in Yunnan province from 2000 to 2007

Year	Population by the end of the year (10,000 persons)	Growth Rate (%)	New Born Population (10,000 persons)	Birth Rate (‰)	Death Population (10,000 persons)	Death Rate (‰)	Natural Growth Population (10,000 persons)	Natural Growth Rate (‰)
2000	4240.80	1.15	80.30	19.05	31.90	7.57	48.40	11.48
2001	4287.40	1.10	78.90	18.51	32.30	7.57	46.60	10.94
2002	4333.10	1.07	77.30	17.90	31.50	7.30	45.70	10.60
2003	4375.60	0.98	74.00	17.00	31.40	7.20	42.60	9.80
2004	4415.20	0.91	68.60	15.60	29.00	6.60	39.60	9.00
2005	4450.40	0.80	65.30	14.72	29.90	6.75	35.40	7.97
2006	4483.00	0.73	59.00	13.20	28.10	6.30	30.90	6.90
2007	4514	0.69	58.64	13.08	27.88	6.22	30.75	6.86

Source: Report of the Population Development in Yunnan Province since the 16th National Congress of the Communist Party of China, from the Population and Employment Division of the Statistic Bureau of Yunnan Province, Jan.24, 2008,

http://220.163.9.6:8081/ynstjjwz/4688248311604314112/20080124/167903.html

Table 10- 2 Population and Its Composition in NSEC Regions (2006)

NSEC Regions	Total Population (10 000 persons)	By Gender (10 000 persons)		By Residence (10 000 persons)		By Agriculture and Non-agriculture (10 000 persons)		Population Density (person/km^2)
		Male	Female	Urban	Rural	Agriculture Population	Non-agriculture Population	
Kunming	615.2	318.3	296.9	363.0	252.2	362.6	252.7	285.1
Yuxi	224.6	115.2	109.4	76.3	148.2	186.5	38.1	146.9
Pu'er	257.3	134.4	122.9	64.3	193.0	223.6	33.7	56.7
Honghe	434.5	224.7	209.8	134.7	299.8	360.3	74.2	131.9
Xishuangbanna	105.7	53.4	52.3	35.0	70.7	74.0	31.7	53.7

Source: Yunnan Statistic Yearbook 2007

Table 10-3 Population Birth Rate, Death Rate and Natural Growth Rate in NSEC Regions (2006)

(10 000 persons, ‰)

NSEC Regions	Birth		Death		Natural Growth	
	Population	Birth Rate	Population	Death Rate	Population	Natural Growth Rate
Kunming	6.80	10.90	3.50	4.43	3.30	6.47
Yuxi	2.70	10.82	1.40	5.32	1.30	5.50
Pu'er	3.34	13.00	1.80	6.99	1.54	6.01
Honghe	6.06	13.99	2.60	6.00	3.46	7.99
Xishuangbanna	1.38	13.10	0.59	5.60	0.79	7.50

Source: Yunnan Statistic Yearbook 2007

Birth Rate = Number of Births/Annual Average Number of Population x1000‰;

Annual Average Number of Population is the average of population at the beginning and the end of the year. Sometimes it is substituted for with the mid year population.

Death Rate = Number of Deaths/ Annual Average Number of Population x 1000‰

Natural Growth Rate of Population = Birth Rate – Death Rate

Gender Ratio = male population/female population x 100%

Table 10-4 The traditional ethnic minority groups and populations in the NSEC (2006)

(10 000 persons)

	Minority Pop.	Total Pop.	Percentage	Traditional Groups of Minorities
Kunming	75.95	615.2	12.4%	9: Yi, Moslem, Bai, Miao, Lisu, Zhuang, Dai, Hani, Buyi
Yuxi	68.4	224.6	30.5%	8: Yi, Hani, Dai, Moslem, Menggu, Bai, Miao and Lahu
Honghe	245	434.5	56.4%	3:Yi, Hani and Zhuang
Pu'er	152.84	257.3	59.4%	14: Hani, Yi, Dai, Lahu, Wa, Bulang and Yao.
Xishuangbanna	80.0	105.7	75.7%	12: Dai, Hani, Yi, Lahu, Bulang, Jinuo, Yao, Miao, Moslem, Wa, Zhuang and Jingpo

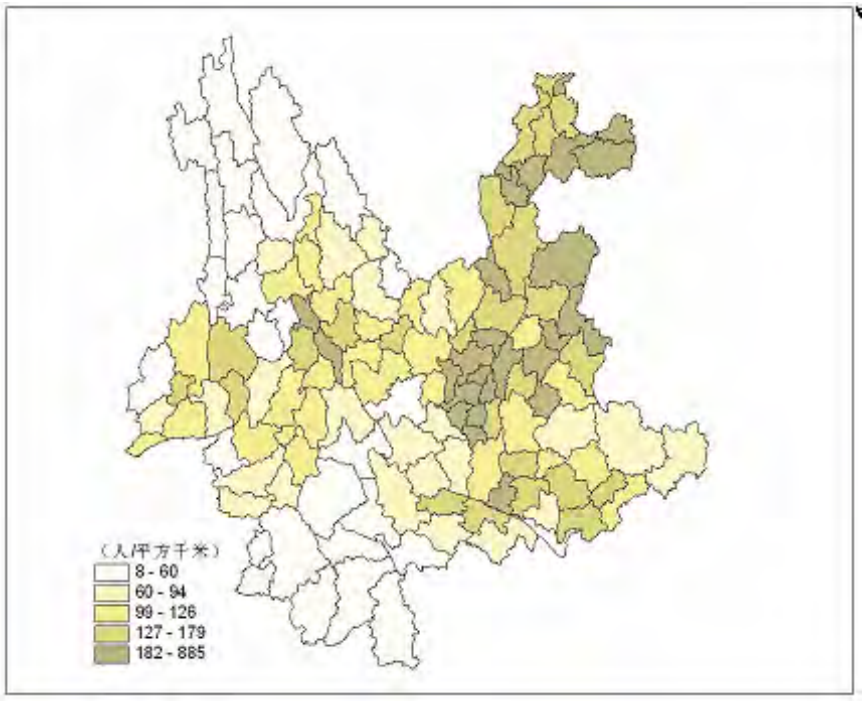
Source: Yunnan Statistic Yearbook 2007; National Economy and Social Development Statistic Statement 2006 for Kunming and Yuxi municipalities.

Table 10-5 The Urban Households Annual Disposable Income per Capita in the NSEC of 2006

	Urban Residents Annual Disposable Income per Capita (RMB Yuan)	Increased Ratio compared to 2005 (%)
Kunming	10,766	12.0
Yuxi	9,526	7.7
Honghe	N/A	N/A
Pu'er	8,200	10.2
Xishuangbanna	8,425	7.0

Source: National Economy and Social Development Statistic Statement 2006 for Kunming, Yuxi, Pu'er and Xishuangbanna.

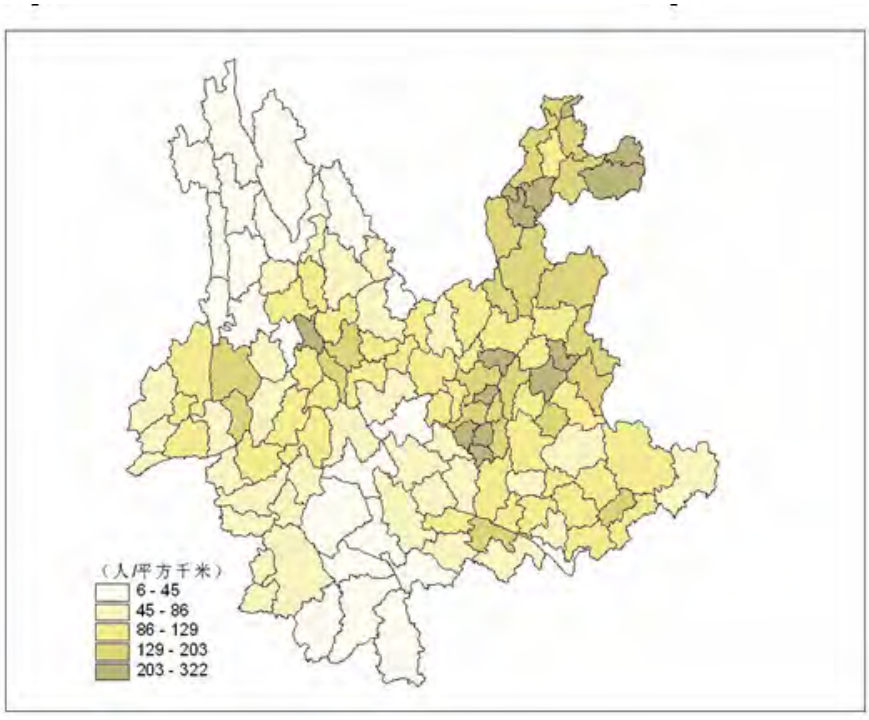
Fig. 10-1 Total Population Density Distribution in Yunnan in 2005



Legend: person/km^2

Source: Consulting Report on the Research to the Spatial Structure Adjustment and Spatial Development Order Coordination of Yunnan Province, by the Planning Division of Yunnan Development and Reform Commission, and Yunnan Provincial Land and Resource Laboratory, Oct. 2005

Fig. 2 Urbanization Distribution in Yunnan in 2005, Legend: Person/km^2



Check also this link in English:
http://www.ilo.org/public/english/region/asro/bangkok/child/trafficking/index.htm
And from UN:
http://www.humantrafficking.org/organizations/89

Social

Template 11: Natural disasters

Key issue S5: Natural disasters

Introduction:

Owing to special geological and natural conditions Yunnan is one of the provinces in China which suffered by the most severe natural disasters. Except tsunami, sand storm and typhoon the other kinds of natural disasters all take place in Yunnan province, including meteorological disasters (windstorm, hail, thunderbolt, frost & snow, flood, and draught) and geological calamity (earthquake, mud-rock flow and landslides).

Meteorological disasters, including the induced flood and drought, have become the biggest natural calamity in Yunnan, which may cause much bigger economic loss than earthquake or other geological disasters in this province. (see Annex Table 11-1 for details) The 6 types of meteorological disasters obtain very obvious spatial-temporal distribution feature. Drought is prone in the northeast, east, north and middle of Yunnan; flooding and waterlogging are mainly in the northeast, southeast, south and southwest of Yunnan; frost and snow (cold disaster) mostly occur in the northeast, northwest, east and middle of Yunnan; hail prevails in the northeast, east, south, northwest and part of the middle of Yunnan; windstorm mostly happens in the northeast and south of Yunnan; thunderbolt focuses in the south, southeast and part of north of Yunnan.

Serious drought happens in the spring and beginning of summer season, flood forms in the summer and autumn, cold disaster happens in the winter, spring and summer, hail in spring and summer, windstorm in spring and summer, and thunderbolt is in the summer and spring seasons.

The NESC runs through five municipality/prefecture of Kunming (northeast), Yuxi (middle and southeast), Pu'er (south), Honghe (southeast), and Xishuangbanna (south). The prevalence of meteorological disasters in the NSEC in Yunnan have been highlighted in yellow in Table11-2, which indicate that almost all types of meteorological disasters except thunderbolt happen in the northeast (Kunming); drought, cold and hail focus in the middle (Yuxi); flood and thunderbolt mainly in the southeast (Honghe) and hail, windstorm, thunderbolt and flood are mostly in the south (Pu'er and Xishuangbanna).

Table11-2 Distribution of Meteorological Disasters in Yunnan

	East	Southeast	South	Southwest	West	Northwest	North	Northeast	Middle
Spring		#	#				#		
Summer		≈ #	≈ #	≈			#	≈	
Autumn		≈	≈	≈				≈	
Winter									

drought , flood ≈, cold , hail , windstorm , thunderbolt #

Earth quakes

Owing to the special geological location of Yunnan and the impact of diastrophism from the earth's crusts of Indian and Qinghai-Tibetan, Yunnan is one of the acute earthquake-active areas on the globe. The earthquake in Yunnan is featured by high frequency and intensity, wide distribution and heavy destruction. 84% of the land of Yunnan is subject to above 7 seism intensity, doubled the average of

that of China. In the 1990s about 23.6% and 18.8% of all the acute earthquakes over 7 magnitude and 6 magnitude in the mainland of China, occurred in Yunnan province respectively. According to the state criterion assessment of earthquake loss from 1993 to 2000, death, grievous bodily harm (GBH) and direct economic loss caused by earthquake in Yunnan accounted to 71%, 85% and 52% to those of China in the same period. From 2001 to 2005, the earthquake induced direct economic loss in Yunnan arrived to 43.6% of all that in mainland of China.
(Source: Notice to Issue Yunnan Province 11th Five Year Plan for Earthquake Prevention and Disaster Relief, www.yn.gov.cn)

Fig.11-1, 11-2 and 11-3 in the Annex show the earthquake distribution and intensity maps for Yunnan province.
The Ailao mountain region in the middle of Yunnan, and the northeast, northwest, west and southwest are the regions of active and high density earthquake locations in Yunnan.
NSEC runs through from the northeast to the middle and south of Yunnan, where is subject to the impact of earthquake also. The latest destructive earthquake happened in the old town of Ning'er county of Pu'er municipality on Jun.3, 2007 at the magnitude of 6.4, which caused 3 deaths and 562 injured. Over 1 million populations impacted by the earthquake and direct economic loss reached 2.5billion Yuan.

According to the latest assessment for earthquake risk, expert judged that Kunming ranked NO.24 in all the 31 capital cities in China in terms of earthquake criticality, which was in a relative stable phase. (Source: Kunming Ranked No.24 of the earthquake criticality by experts, www.ynnan.cn.jul.23,2008)

Landslides and mud flows
The analysis to the annual environmental statement of Yunnan province from 2000 to 2007 indicates that landslides and mud-rock flows have become the main types of geological disasters in Yunnan. The high prevalence areas are the middle-down stream of Jinsha River, middle-upper stream of Nujiang River, middle-down stream of Yuanjiang River, middle stream of Lancang River and Dayingjiang basin. Northeast of Yunnan at Dongchuan and Qiaojia is the key place for mud-rock flow. (Source: http://politics.people.com.cn/GB/14562/5896487.html, Jun.21, 2007)

See Annex Fig. 11-4 and 11-5 for the map of geological disaster distribution in Yunnan province.
From the projection of the two maps that NSEC locates mostly in the secondary prevalence area of geological disasters, only part in the middle of Yunnan of Yuxi Prefecture projected to be the strong prevalence area.

Table 11-1 in the Annex consolidated the natural disasters and impact to Yunnan from 2000 to 2007. The meteorological and induced disasters led to RMB46billion Yuan in this period, nearly 81.2% of all the direct economic loss by the natural disasters in Yunnan; while geological disasters economic loss was RMB10.658billion Yuan and occupied 18.2% of the total. It shows that meteorological disasters and the induced disasters are the major natural calamity of Yunnan.

Being the high incidence natural disaster province of China, Yunnan has initiated the geological disaster forecast system, which discloses the possibility of landslide and mudflow incidence every day in Yunnan

at the webpage of www.yndlr.gov.cn of the Land and Resource Department of Yunnan. Meanwhile, the network for massive forecast and prevention of geological disasters has been established in Yunnan. Most of the counties, towns and villages are covered under the monitor and forecast network; all prefectures and municipalities have developed annual geological disaster prevention scheme and the countermeasures, the emergency response proposal of county above governments also prepared.

Source: http://politics.people.com.cn/GB/14562/5896487.html, Jun.21, 2007

Indicator: Natural Disaster Victims

Target: NA

Trends and Drivers:

The number of natural disaster victims in Yunnan fluctuated around 20-30millions every year from 1997 to 2006, and occupied from 40% to 80% of the population of Yunnan. Peak value of 34.66million appeared in 2000, accounted for 81.73% of the total population by then. The reason behind was that strong cold current impacted Yunnan province at the beginning of 2000 and resulted in the most grievous low temperature and frost ever met in 30 years. Heavy snow fallen in 38 prefectures and counties for 10-20 hours. Flood and landslide in the rainy season further enlarged the impact population. After 2001 the number of natural disaster victim has taken a descending trend.

Meteorological disaster is the NO.1 calamity to Yunnan, with various types, high density and frequency, and happens all year round. The direct economic loss induced by meteorological disaster has taken 3%-5% of the GDP of Yunnan annually. It's very important for Yunnan to build up effective and timely weather forecast service and improve the capacity for calamity prevention and disaster relief. In 2006 measures were adopted to set up the meteorological disaster monitoring system, weather forecast system, public weather service system, disaster emergency response system and the rural thunderbolt prevention system to cover and serve to urban and rural areas in Yunnan province.
(Source: http://www.yn.xinhua.org/newscenter/2007-01/14/content_9037330.htm)

Government has realized that it is important to integrate resources and strength on meteorological disaster preventions and forecast, thus required the Meteorological Administration to work closely with Land and Resource, Forestry, Agriculture, Water Conservancy and Flood and Drought Prevention Headquarters since 2002.
(Source: Annual Environmental Statement of Yunnan Province 2002, www.yepb.gov.cn)

In the past 40 years earthquake precaution and relief have been made great progress in Yunnan province, esp. in 2000-2005, three working systems infrastructure development were improved obviously by establishing the earthquake monitoring and forecast, prevention and emergency rescue network, which have been playing important roles in secure the community stability and promote socio-economic development in Yunnan.
(Source: Notice of Yunnan Province People's Government on Distribution of the 11th Five Year Plan of Earthquake Precaution and Relief in Yunnan, www.yn.gov.cn)

Yunnan Province 11th Five Year Plan for Earthquake Prevention and Disaster Relief was enacted in 2006. In 2007 the baseline survey for geological disasters was organized to stipulate the prevention and treatment plans.

Target:

The goal of earthquake precaution and relief in Yunnan is that by 2010, the Three Working System for quake precaution and relief will be preliminarily established in the key monitoring cities in the east of Yunnan, including Kunming and Yuxi, and the capacity improved to resist to magnitude 6 of earthquake; by 2020, cities above county level shall be able to resist magnitude 6 of earthquake, Kunming and the adjacent areas will meet the middle developed nations level for quake precaution and relief.

(Source: Notice of Yunnan Province People's Government on Distribution of the 11th Five Year Plan of Earthquake Precaution and Disaster Relief in Yunnan, www.yn.gov.cn)

Relevant laws, policies, plans and institutional arrangements:

1. Meteorological Disaster Forecast and Alarming Signal Release and Dissemination Measure, approved by State Meteorological Administration in Jun.2007, to make criterion for release and dissemination of the meteorological disaster forecast and alarming signals, prevent and reduce the disaster damage, and protect national and people's life and asset security.

(Source: www.yn.gov.cn)

2. Yunnan Provincial Geological Disaster Emergency Response Counterplan (Simplified version), issued in Oct.2007, applied to respond to the geological action related disasters, i.e. collapse, landslide, mud-rock flow and land subside, caused by natural factors or artificial movements within Yunnan. The aim is to make a effective and orderly response to emergent geological disasters, furthest avoid or mitigate the damage and secure people's life, asset and social stability.

(Source:, www.yn.gov.cn)

3. The 11th Five Year Plan of Earthquake Precaution and Disaster Relief in Yunnan, is to provide guidance to earthquake precaution and disaster relief development, review and approve key projects, and arrange government investment. The Plan was approved in 2006.

(Source: www.yn.gov.cn)

Problems and issues encountered during data collection:

Provincial wide data could be found from the open sources of internet page, newspaper and Yunnan Statistic Yearbook, such as the annual environmental statement from 2000 to 2007. It's very difficult to search for data from municipal level on natural disaster data.

Summary of main concerns for the NSEC:

- Geological environment, climate and human interventions are the main reasons forming meteorological disasters in Yunnan. The special highlands at low latitude, nearby to tropical ocean, complicated landform, high alpines and deep valley, few vegetation, concentrated rainfall, complex geological conformation and strong movement of fracture zones all contributed to the disaster as geological environmental factors. Intensity of monsoon and the difference of atmosphere circumfluence in winter and summer made the climate context to form the disasters in Yunnan. The artificial factors are rapid growing of population, excessive reclamation of land, deforestation and soil erosion, which deepened the damage from the meteorological disasters.
- Artificial factors could be treated and controlled by series of countermeasures; so far Yunnan government has implemented many environmental measures to protect the fragile environment from disaster damage, such as upland and grassland reversion program, reforestation, rehabilitation of soil erosion, river basin management and so on.
- Disaster monitoring and forecast capacity has been improved gradually in Yunnan by establishing omnidirectional and tridimensional monitoring system depend on radar detecting system, automatic weather station monitoring system, satellite and lightening position apparatus and automatic rainfall stations. Joint working mechanism has been set up between the related government agencies to share information and resource on disaster precaution and relief.

- In the 10th Five Year period of 2000 to 2005, Yunnan earthquake observation station network and Kunming earthquake intensity fast report station were built, laid a foundation for further establishment of the earthquake automatic treatment system for important infrastructures and lifeline engineering project.
- Due to a special geological location of Yunnan in terms of the global modern earth's crust movement and earthquake research, and the natural linkage of Yunnan to the neighboring nations in earthquake conformation and dynamical environment, it's urgent for Yunnan to improve the opening and international cooperation capacity on earthquake precaution and disaster relief.

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3. Notice to Issue Yunnan Province 11th Five Year Plan for Earthquake Prevention and Disaster Relief, www.yn.gov.cn
4. Kunming Ranked No.24 of the earthquake criticality by experts, www.ynnan.cn.jul.23,2008
5. http://politics.people.com.cn/GB/14562/5896487.html, Jun.21, 2007
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7. Yunnan Statistic Year Book 2007
8. http://www.yn.xinhua.org/newscenter/2007-01/14/content_9037330.htm
9. Annual Environmental Statement of Yunnan Province 2002, www.yepb.gov.cn
10. The Strong Shock and Earthquake Belt Location in China, May 12, 2008, www.xinhuanet.com
11. Yunnan Province Geological Disasters Prevention and Control Scheme of 2006, Department of Yunnan Land and Resources, http://www.yndlr.gov.cn

Annexes: (eg. maps, diagrams, tables)

Table 11-3 Natural Disaster Victim of Yunnan

Year	Natural Disaster Victims (10,000 persons)	Total Population of Yunnan Province (10,000 persons)	Percentage of the Victims to the Total Population (%)
1997	2913.00	4094.0	71.15
1998	2651.00	4143.8	63.98
1999	3165.21	4192.4	75.5
2000	3466.10	4240.8	81.73
2001	2566.48	4287.4	59.86
2002	2544.00	4333.1	58.71
2003	2341.20	4375.6	53.51
2004	1825.30	4415.2	41.34
2005	2756.50	4450.4	61.94
2006	2161.00	4483.0	48.2

Source: Yunnan Statistic Year Book 2007

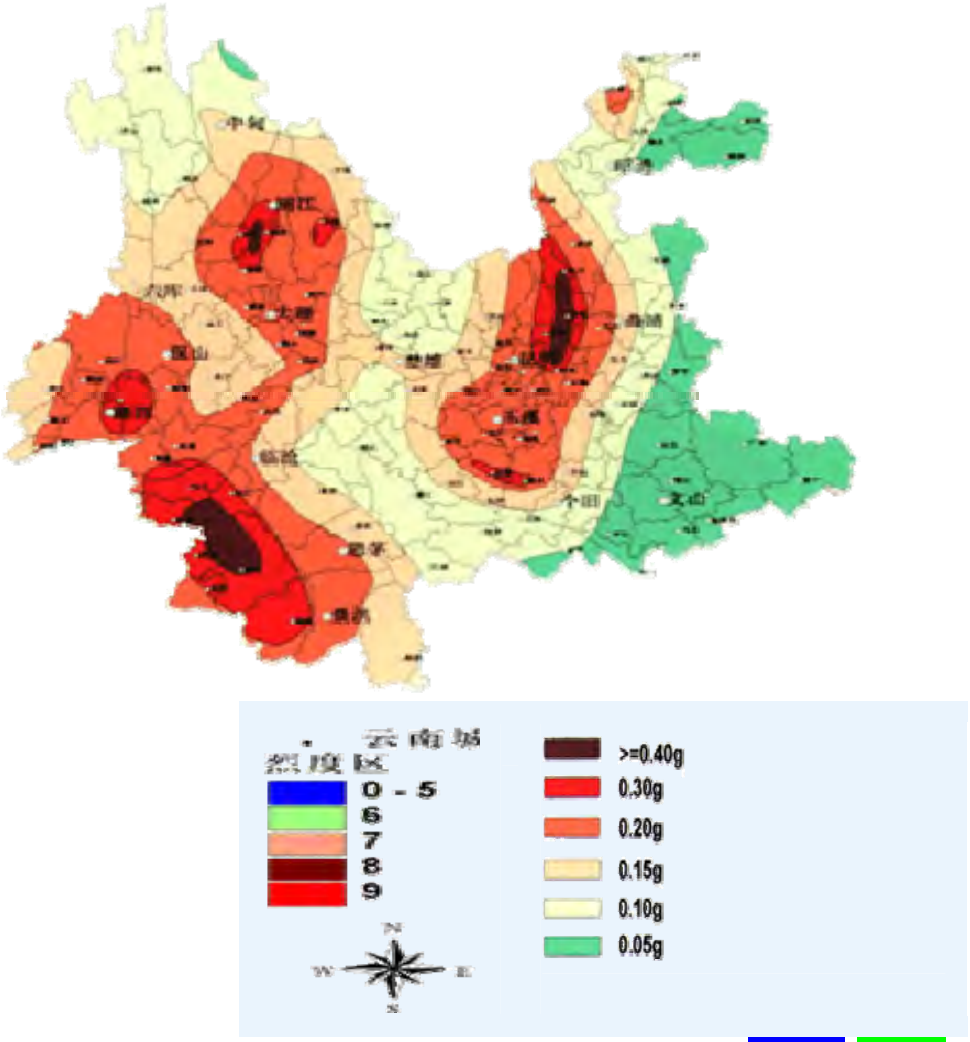
Fig. 11-1 Indication of the Earthquake Location in China

Source: The Strong Shock and Earthquake Belt Location in China, May 12, 2008, www.xinhuanet.com

Please translate legend

(since the map was taken from webpage, the resolution is not enough to read the legend, which is only an indication of the earthquake locations in China. The legend may be the main cities of China, epicenters in history, the earthquake belts, the line between different earth crusts, and the arrow is the direction of earth crust movement)

Fig. 11-2 Earthquake Parameter Map of Yunnan



The indicators reflect the earth quake intensity in the cities of Yunnan, Blue: 0-5, green 6, pink 7, wine 8, red 9

Source: www.eqyn.com

Fig. 11-3 Earthquake Intensity Map of Yunnan

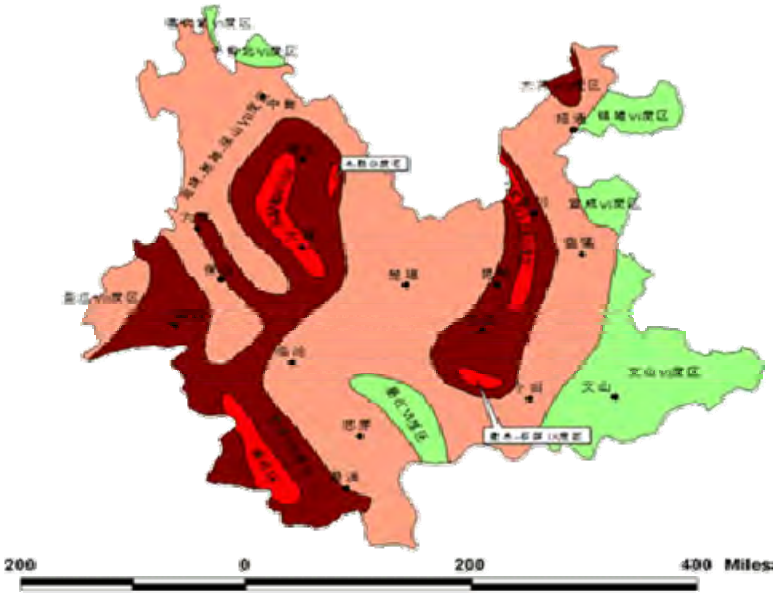


Fig.11-4 Projection of Landslide Trend in Yunnan of 2006

Grey: Strong Prevalence Area; Yellow: Secondary Prevalence Area; Green: General Prevalence Area

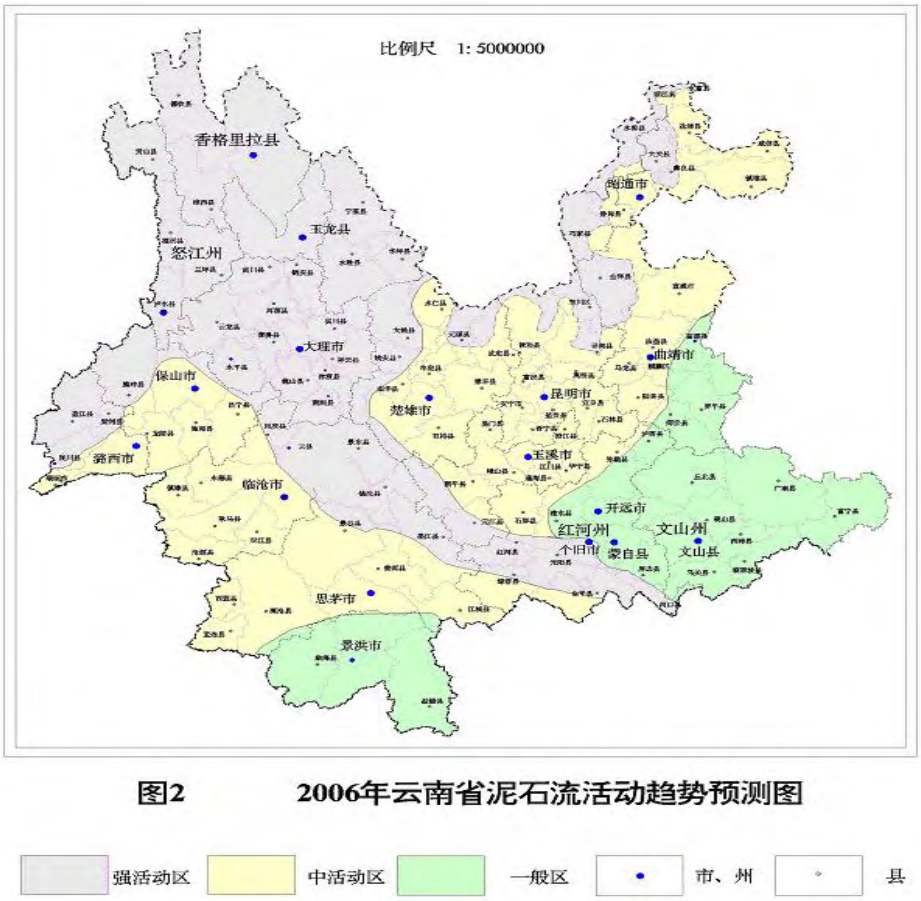


图2　　2006年云南省泥石流活动趋势预测图

Grey: Strong Prevalence Area; Yellow: Secondary Prevalence Area; Green: General Prevalence Area

Source: Yunnan Province Geological Disasters Prevention and Control Scheme of 2006, Department of Yunnan Land and Resources, http://www.yndlr.gov.cn

Table 11-1 2000—2007 Natural Disasters Impact in Yunnan Province

(Source: calculation based on the Annual Environmental Statement of Yunnan Province, www.ynepb.gov.cn)

		2000	2001	2002	2003	2004	2005	2006	2007	Sum
Meteorological	**Main types**	The most grievous low temperature and frost met in ever 30 years happened at the beginning of the year. Heavy snow in 38 prefectures and counties over 20mm.	54 county/cities suffered 98 times of windstorm and hailstone	Windstorm: 55 county-times; hailstone 138 county-times; and low temperature and less sunshine in summer	Low temperature and snow disaster in Jan., windstorm, hailstone and thunderbolt	Lower temperature and strong snow in Feb. in the middle and northeast of Yunnan. Windstorm: 147 county-times; Hailstone: 292 county-times; thunderbolt: 59 county-times	Cold current in Mar., hailstone and thunderbolt	Windstorm, hailstone and thunderbolt	Various Met. Disasters and the induced disasters happened continuously	
	Disaster victim: People injured or died		Died: 24	Died:48	Died:7; Injured: 47	Victim: 2.62million Died: 63 Injured: 38	Victim: 8.936 million Died: 123, Livestock 1417	Victim:4.893million Died: 118 and livestock 5000	Victim: 19.167 million Died: 374, Livestock 12,000	
	Stricken farming areas and Buildings		Buildings: 1,140 houses destroyed	Building:5,049 collapsed; stricken 91,500 ha rice paddy fields:, 55,800 ha yield reduce	Building: 72,844 destroyed Stricken:1.38million ha 564,900ha yield reduced over 30%	Building: 339,800 houses destroyed Stricken 164,400ha,	Building: 388,000 houses impacted and 48,000 house	Buildings: 74,000 impacted and 9000 houses collapsed Stricken 233,200ha,	Buildings: 285,000 houses impacted and 72,000 collapsed Stricken 1.357mi	

				d over 30%			s collapsed; Stricken 1.033 million ha and 196,200ha total crop failure.		llion ha and 200,700ha total crop failure.	
	Direct economic loss(RMB Yuan)		390million	1.35billion		762.68 million	3.81billion	1.19billion	7.56billion	15.063 billion
Flood	**Stricken/ flooded area; buildings collapsed**	Stricken area: 375,300ha, flooded area: 204,000ha	Flooded area: 508,000ha, 77 small dams destroyed, 53,200 buildings collapsed, 405 counties/cities suffered	Stricken 448,000ha and flooded area 259,000ha, 92,300 ha yield reduced over 30% 57700 buildings collapsed	Stricken 227,000ha, flooded 119,500ha, 30,700ha yield reduced over 30%; 9600 buildings collapsed	Stricken 194,900ha Building: 297,828 houses destroyed	Stricken 251,240ha and flooded 148,450ha, 42,000ha total crop failure 11,400 houses collapsed	Stricken 210,800ha and 56,900ha total crop failure; 56,000 buildings impacted and 33,000 collapsed.	127 counties and 1,190 towns were flooded, 30,500 houses collapsed	
	Flood victim	6.392 million	7.99million	8.74million	4.08million	3.82million	4.25million	5.284million	6.309million	
	Died	277	393	351	107	123, 119missing	86	160	173	
	Direct economic loss(RMB Yuan)	3.65billion	3.85billion	3.498billion, foodstuff reduced 495,800tons.	1.234billion, foodstuff reduced 208,200tons.	2.563billion	1.935 billion	2.044billion	4.09billion Loss from Lincang, Qujin, Baoshan, Pu'er, Zhaotong, Kunming and	22.864 billion

									Honghe accounted for 82%.	
Draught	**Stricken area**	206,700ha	154,000 ha	716,100ha	The most serious drought ever happened in 10 years, water reservoir quantity reduced 673million m^3 than the same period of 2002, agriculture impacted in a large area.	430,000ha 45,000 ha in the pasturing area.		731,600ha	Included in the meteorological disaster	
	Drought area/impact	113,300ha				32 water reservoir dry up, 1.25million people and 820,000 livestock no access to drinking water		7.828million people affected and 2.101million couldn't access to drinking water		
	Direct economic loss(RMB Yuan)	740million		1.639billion	2.398billion	Higher than last year.		3.3billion		8.077billion
Geological (landslide, mud-rock flow)	**Incidence**	750	962	4,150	1,691	3,056	1,888	1,203	1,154	
	Died	116	155 died, 38 missing, and 266 injured	234 died and missing, 418 injured	61 died, 1missing, and 96 injured	118 died, 73 missing,	52 died, 8 missing	46 died and 11 missing	114died, 11missing	
	Direct economi	410million	Nearly 1billion	1.223billion, a	360milliion	1.991billion	449million	283million	275million	5.991billion

	c loss(RMB Yuan)			heavy geological disaster year.						
Earthquake	**Incidence over 5 magnitude**				4	4	3	3	5 (Earthquake in Ning'er on Jun.3 2007 was 6.4magnitude, largest of 2007)	
	Earthquake victim				1.09million impacted, 23died, GBH113, flesh wound 649	839,000 impacted, 5 died, GBH196, flesh wound 459,	366,000 impacted, 2GBH, flesh wound 51	474,000 impacted, 24 died and GBH29, flesh wound 153	430,000 impacted, 3 died and GBH 28, flesh wound 392	
	Stricken area/buildings				Stricken 7,697 km^2; 148,100m^2 buildings demolished	Stricken 2,200 km^2, 91,100 m^2 buildings demolished	Stricken 2,347,44,200m^2 buildings demolished	Stricken 23 towns. 511,500m^2 buildings demolished	1.512million buildings collapsed and 6.434million destroyed	
	Direct economic loss(RMB Yuan)				1.292billion	626million	249million	550million	1.95billion	4.667billion
Direct Economic Loss Sum (RMB Yuan)		**4.8billion**	**5.24billion**	**7.71billion**	**5.284billion**	**5.943billion**	**6.443 billion**	**7.367billion**	**13.875 billon**	**56.662 billion**

Social: Lao

Social
Template 8: Education and capacity
Key issue S2 Education and capacity building HRD

Introduction:

Education is a crucial priority and one of the four pillars of the poverty reduction strategy. This includes building a workforce that is knowledgeable and competent in implementing development policies and programmes and has the capability to apply the results of modern science and technologies for the benefit of the Lao society.
One of the main goals of the education policy is to develop quality human resources to meet the needs of the socio-economic development of the nation and thus contribute to poverty reduction. In order to improve the education of the whole population, it is necessary to concentrate on equitable access, quality, relevance and management of the education system. Disparities in income/poverty, physical access, residence (rural/urban), gender and language all affect educational attainment. Increasing primary school attendance and literacy rates particularly for people in under-served areas, such as ethnic peoples, girls and children with special needs, is an important foundation step.

It is necessary for the Lao PDR to (i) strengthen the education system as the cornerstone of a human resource development strategy focussed on poverty alleviation and enhancing labour productivity, and (ii) implement the principle of compulsory primary education as an important means of poverty reduction, with the development of education facilities at all levels (at the centre and in the provinces, districts and villages), paying particular attention to the ethnic areas and the disadvantaged groups (Lao PDR, NSEDP, 2006).

Most villages (79%) have their own primary school and 8 % have a lower secondary school. Primary schools are well spread over the country, even in villages without access to road there is a school in the village in 76% of the villages. Enrolment rates are generally a bit higher among boys, especially in the age group 11-15.Compared with 1995 population census, the enrolment rate for girls, in particular, has improved. The percentage of people “never been to school” has dropped from 38 % 1995 to 23 %.

Indicator: education level
Official targets for Fifth Five-Year Socio Economic Development Plan (2001-2005)
Targets:

Primary school enrolment of 6-10 year olds (2005)	*86%*
Lower secondary school enrolment (2005)	*52%*
Upper secondary school enrolment (2005)	*24%*
Literacy among people 15 to 40 years old (2005)	*85%*
Provide vocational training and skill development	*350,000 workers*

Source: NSEDP, 2006

Official targets for the Sixth Five-Year Socio Economic Development Plan (2006-2010)

The main targets for 2010 in the education sector are to continue to increase the level of training to achieve the ratio of 1,140 students per 100,000 people; and increase the proportion of well-trained workers at different levels to 10 percent by 2010. Gradually popularize primary and secondary education; initially this should be done in urban areas. Attention should be given to ensuring by 2010 net enrolment rates of 16 percent for kindergarten, 90.6 percent primary, 68.4 percent for lower-secondary and 40 percent for upper-secondary schools; and 90 percent of the

those between 15-39 years old should be literate.

Primary education

The most important target is achieving universal quality primary education by 2015, with equitable access and completion as medium-term objectives. There are strong disparities between gender, ethnic minorities, poor and non-poor, and urban, rural and remote areas. Low enrolment and completion rates are concentrated amongst children in rural, remote and ethnic minority children in poor districts. The main targets are to (Lao PDR, NSEDP, 2006):

- Convert 80 percent of incomplete primary schools to complete schools by 2010;
- Provide access to a primary school to children from all under-served villages by 2010;
- Gross Enrolment Rate to reach 95.8 percent (girls), 97.8 percent (boys), and 96.8 percent (total) in 2010;
- Net Enrolment Rate to reach 89.7 percent (girls), 91.4 percent (boys), 90.6 percent (total) in 2010;
- Reduce Repetition Rates in Grade 1 to 5 percent for both girls and boys in 2010;
- Reduce Dropout Rate in Grade 1 to 5 percent for both girls and boys in 2010;
- Reduce Dropout Rates in Grade 5 to 1 percent for both girls and boys in 2010;
- Increase the Primary School completion Rate to 75.4 percent (girls), 79.5 percent (boys), and 77.4 percent (total) in 2010; and
- Pupil-Teacher Ratio to be kept constant and not to exceed 31:1.

Lower and higher Secondary education:

Secondary schools coverage is highest in urban areas and economically developed areas and lowest in rural, remote and ethnic minority areas and poor districts which contribute to a widening gap in learning opportunities. High enrolment rates, lack of classrooms and lack of teachers result in high pupil/teacher ratios in urban areas; whereas low enrolment rates and surplus classrooms, equate to low pupil/teacher ratios in rural areas. Gender disparity manifests itself more prominently in rural, remote and ethnic minority areas, while the gender disparity is reducing in urban areas. The main targets are to:

- Achieve parity between girls and boys in access to lower secondary education, particularly in ethnic minority and poor areas;
- Reach a national transition rate from Grade 5 to Grade 6 of 82.5 percent in 2010 and 85 percent in 2015;
- Achieve an attendance rate of 68.4 percent for lower secondary schools; and
- Achieve an attendance rate of 40 percent for higher secondary schools.

Non-formal education

Only 45.2 percent of the adult population are currently considered to be literate at a basic level. A significant challenge is to achieve over 98 percent reported adult literacy rate and 61 percent tested basic adult literacy rate by 2015. The purpose of the NFE programme is to increase learning opportunities for children not enrolled in school, school dropouts and young adults, thus increasing the adult literacy rate and reducing poverty.

The Ministry of Education's (MOE's) strategy is to concentrate its actions on three main disadvantaged target groups:

- Children and young adults aged 6-14 who did not have a chance to be admitted into primary school and are willing to follow literacy and continuing education courses;
- Adults aged 15-40 who are illiterate and are willing to participate in literacy and continuing education courses; and

- Young adults and adults aged 15-24 who do not have definite vocations and are willing to participate in basic vocational training.

The targets are to: Annually enrol 20 percent of the primary dropouts in non formal primary courses; and 2 percent of the illiterate adults in adult literacy programmes.

Tertiary education

In the Sixth Plan (2006-2010) period, a master plan for the development of universities, colleges, high schools and vocational training networks will be established. A university in Luang Prabang and a technical college in Luang Namtha will be constructed, where technical and managerial training such as mineral exploration and processing, agro-forestry processing and tourism will be provided. The capacities of the teachers and professors in the universities in Vientiane, Savannakhet and Luang Namtha have to be upgraded. The three national-level Universities have to be upgraded with better libraries and laboratories. The National University has to be improved so that it reaches regional and international standards. The bachelor's degree curriculum has to be improved and the master's degree curriculum has to be developed. High-level technical schools for each area of industry, middle-level technical schools for agriculture, and two or three teacher colleges should be established. Vocational schools need to be expanded and improved, by mobilising funds from all economic sectors, to enable them to receive the students who graduate from secondary schools. A policy will be established to encourage households to send their children to study abroad and then return and serve the country.

Investment in scientific research needs to be increased. The first task is to establish research centres and laboratories for the universities, with focus on research in key sectors such as electricity, minerals processing, agriculture and forestry, seeds, chemical fertilizer, organic fertilizers and animal feeds. In addition, the centres should coordinate with the ministries and projects to develop technical staff and focus on key sectors. The curriculum and teaching methods should be reformed to train high-quality workers, in particular workers to serve key economic sectors. The scientific and technological researchers should be trained in line with regional standards.

Promote vocational training for workers to increase their employability and encourage the domestic and foreign sector to take part in vocational training areas. Develop vocational high schools in Xiengkhouang, Huaphanh and Oudomxay. Curricula need to be developed for vocational and technical education that is relevant to the needs of the domestic and regional labour markets. These schools have to be supplied with proper textbooks, workbooks and other instructional materials. Additionally, businesses should be encouraged to upgrade the quality of the professional skills of business people, particularly in the fields of business administration and management, technical knowledge and foreign languages.

Trends:

Most villages (79%) have their own primary school and 8 % have a lower secondary school. Primary schools are well spread over the country, even in villages without access to road there is a school in the village in 76% of the villages. Enrolment rates are generally a bit higher among boys, especially in the age group 11-15.Compared with 1995 population census, the enrolment rate for girls, in particular, has improved. The percentage of people "never been to school" has dropped from 38 % 1995 to 23 %.

Table 4.10, below, presents the distribution of the population aged six years and above by school attendance and comparisons with data from the 1995 Population Census. The share of population "never been to school" has decreased from 38 to 23 percent. Although school attendance has increased both for female and male, the gap between them remains. More than 30 percent has never been to school among female compared to 15 percent among male. For the population in school ages (6-20), the difference between gender is less marked. In 1995, as estimated in the Population Census, 60 % of the Lao people 15 years and above

could read and write, 74 per cent among the male and 48 per cent among the female population. The summary table 4.12 below shows that at present, as estimated in LECS III, 79 % of the male and 57 per cent of the female population can write and read without difficulty. Including those who can read and write with some difficulty the literacy rates go up to 85 % for male and 64 per cent for female (LECS III, 2004).

Drivers of trends: NA

Indicator: Ethnic minority education

Target: See non-formal education?

Trends:

The Lao PDR has witnessed a distinct rise in the number children from smaller ethnic communities attending school. In the five years between 1999/00 and 2003/04 primary enrolment rose sharply for the Lao Soung (by more than 30,000 students) and the Lao Teung (by more than 50,000 students). This is tied to an increased number of schools and an increased focus on previously under-served ethnic communities.

There has also been a general increase in girl's attendance at school over recent years, and with this, a decreasing gap between the representation of boys and girls in schools in general (UN_CCA).

Drivers of trends: NA

Relevant laws, policies, plans and institutional arrangements:

NA

Problems and issues encountered during data collection:

NA

Summary of main concerns for the NSEC:

- The quality and relevance of primary education is a critical development concern. Legislation, regulations, standards, training, and education planning need to be improved to address this concern.
- Institutional capacity is not strong enough to deal with the problem (including the management, administration and coordination of programs) and resources in schools are also limited.
- For smaller ethnic communities, the content of primary education is often not related to their lifestyle and community away from school. Students and their families lack awareness and understanding to question these shortcomings. The Government and development partners often lack the resources and well-defined strategic vision to overcome such concerns.

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- Report on Coordinating the Greater Mekong Subregion North-South Economic Corridor Bridge Project, 2005 :

Annexes: (eg. maps, diagrams, tables)

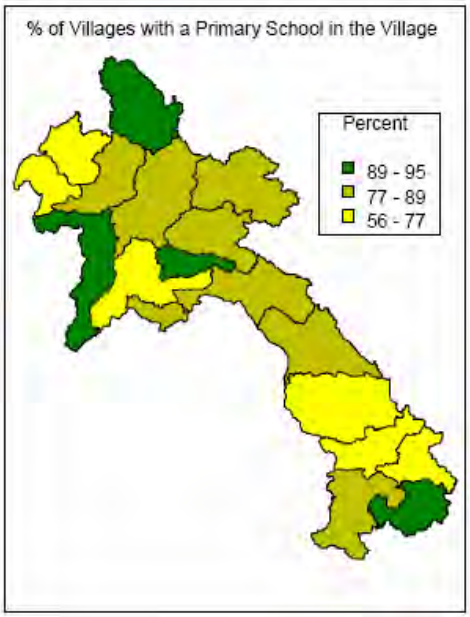
Table 4.8: Educational services and quality.

Region/ Province	Primary school in village	Lower secondary school in village	Pupils per teacher	Primary schools: Textbooks available	Primary schools: Regularly operating	Primary schools: Operating mixed classes	Primary schools: Operating half day classes
	%	%	Number	%	%	%	%
Lao PDR	***79***	***8***	***22***	***77***	***70***	***48***	***8***
Urban	80	19	24	81	79	16	12
Rural with road	81	11	21	78	72	48	8
Rural without	76	0	23	75	64	59	8
North	***81***	***7***	***19***	***81***	***70***	***47***	***9***
Phongsaly	95	0	15	95	95	60	8
Luangnamtha	75	4	18	75	71	63	12
Oudomxay	78	16	14	76	70	33	0
Bokeo	56	5	31	56	45	9	14
Luangprabang	78	4	29	78	61	52	9
Huaphanh	88	3	16	88	74	62	20
Xayaboury	94	10	15	94	79	39	5
Center	***81***	***11***	***23***	***80***	***75***	***49***	***9***
Vientiane C.	88	26	19	89	91	28	7
Xiengkhuang	88	9	18	88	71	59	44
Vientiane P.	73	14	23	73	71	21	2
Borikhamxay	88	6	37	88	81	67	1
Khammuane	84	7	25	84	72	68	6
Savannakhet	75	9	25	70	73	45	2
Xaysomboon SR	91	6	24	91	83	66	0
South	***71***	***7***	***27***	***66***	***61***	***50***	***6***
Saravane	63	7	27	58	52	42	11
Sekong	65	7	15	65	58	39	6
Champasack	77	5	32	69	65	59	2
Attapeu	89	22	22	87	89	44	7

Source: LECS III, 2004

Table 4.9: Net school enrolment (%) among children 6-15 years old by sex and by province and urban/rural areas.

Region/province	Age 6-10			Age 11-15		
	Girls	Boys	Total	Girls	Boys	Total
Lao PDR	**70**	**73**	**72**	**70**	**82**	**76**
Urban	91	88	89	87	90	88
Rural with access to road	72	75	74	71	82	76
Rural without access to road	50	56	53	49	71	60
North	***61***	***67***	***64***	***63***	***80***	***71***
Phongsaly	48	55	52	56	70	63
Luangnamtha	43	49	46	54	64	59
Oudomxay	53	56	54	59	81	69
Bokeo	59	58	59	64	82	72
Luangprabang	66	73	69	67	83	74
Huaphanh	57	68	62	65	83	74
Xayaboury	82	87	85	66	82	74
Center	***78***	***78***	***78***	***77***	***86***	***82***
Vientiane C.	96	92	94	85	95	90
Xiengkhuang	73	70	72	71	88	79
Vientiane P.	89	91	90	85	91	88
Borikhamxay	86	90	88	82	90	86
Khammuane	70	73	71	74	80	77
Savannakhet	69	67	68	70	77	74
Xaysomboon SR	83	80	81	78	96	88
South	***69***	***73***	***71***	***66***	***75***	***71***
Saravane	48	54	51	49	66	58
Sekong	60	63	62	69	86	77
Champasack	84	86	85	71	76	74
Attapeu	63	68	65	82	89	86



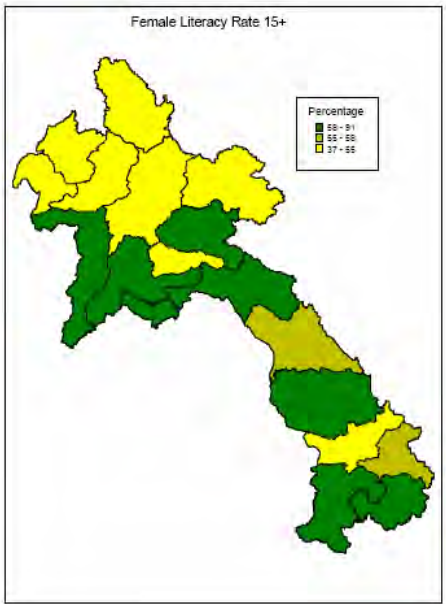


Table 4.10: Time for Education by Provinces and regions in 2002/03

	No. of schooling years				Time used for education hours/day				Literacy rate 15+	
	Female	Male	F 15-19	M 15-19	F -14	M -14	F 15-19	M 15-19	Female	Male
Lao PDR	***5***	***5***	***6***	***6***	***2.9***	***3.0***	***3.0***	***3.0***	***65***	***86***
Urban	7	7	8	8	3.1	3.1	3.1	3.1	86	96
Rural	7	7	8	8	2.9	2.9	2.9	2.9		
North	***4***	***5***	***5***	***6***	***2.9***	***2.9***	***2.8***	***2.9***	***55***	***80***
Phongsaly	4	4	4	4	3.3	3.3	3.1	3.3	38	57
Luangnamtha	4	5	6	6	3.4	3.7	3.6	3.7	37	60
Oudomxay	3	4	5	5	3.0	3.1	3.1	3.1	45	78
Bokeo	4	4	5	6	2.5	2.6	2.9	2.6	49	78
Luangprabang	4	5	5	6	2.4	2.4	2.6	2.4	54	84
Huaphanh	4	5	6	6	3.4	3.2	2.8	3.2	54	85
Xayaboury	5	6	6	7	2.7	2.7	2.4	2.7	81	91
Center	***6***	***6***	***7***	***7***	***2.9***	***3.0***	***3.0***	***3.0***	***71***	***89***
Vientiane C.	7	8	8	8	3.1	3.2	3.1	3.2	91	97
Xiengkhuang	4	5	6	6	3.0	3.2	3.1	3.2	60	85
Vientiane P.	5	6	7	7	2.4	2.5	2.6	2.5	77	93
Borikhamxay	5	5	6	7	3.3	3.3	3.5	3.3	82	90
Khammuane	4	5	6	6	3.3	3.2	3.2	3.2	57	85
Savannakhet	5	5	6	6	2.8	2.9	2.9	2.9	58	83
Xaysomboon SR	4	5	5	6	2.8	2.7	3.2	2.7	54	84
South	***4***	***5***	***5***	***6***	***3.0***	***3.0***	***2.9***	***3.0***	***65***	***88***
Saravane	4	4	5	5	3.2	3.3	3.5	3.3	47	79
Sekong	3	4	4	5	3.4	3.3	3.0	3.3	55	82
Champasack	5	5	6	6	2.8	2.8	2.7	2.8	74	93
Attapeu	4	5	5	6	3.5	3.6	3.4	3.6	71	91
1997/98										
Lao PDR	3	4	4	5	3.1	3.7	1.8	2.4	55	82
Urban	5	6	7	7	4.3	6.3	3.9	5.4	82	96
Rural	2	4	4	5	2.9	3.3	1.5	1.9	49	79

Table 4.11: School attendance, population 6+ years of age. Percentages

	Never been to school		At school		Left school	
	Census 95	LECS III	Census 95	LECS III	Census 95	LECS III
All	38	23	25	31	37	46
Female	47	31	21	28	32	41
Male	28	15	29	34	43	51
Age group, all						
06-20	32	17	56	63	12	19
20-	42	29	2	1	57	70
Age group, Female						
06-20	36	21	50	58	14	22
21-	55	40	1	1	44	59
Age group, Male						
06-20	28	14	62	69	11	17
21-	28	17	2	2	70	82

Table 4.12: LECS III estimation of literacy rate, population 15 +

Region	Read and write without or with some difficulty			Can not read and write			Can either write or read with some difficulty or with difficulty	
	Male	Female	Total	Male	Female	Total	Male	Female
Lao PDR	***85***	***64***	***74***	***14***	***34***	***24***	***1***	***2***
Urban area	95	85	90	4	14	9	1	1
Rural with road	86	63	74	13	35	25	1	2
Rural without road	69	39	54	29	60	45	2	1
North	79	54	66	20	44	32	2	2
Center	89	71	79	10	28	19	1	1
South	87	63	75	11	35	24	1	1

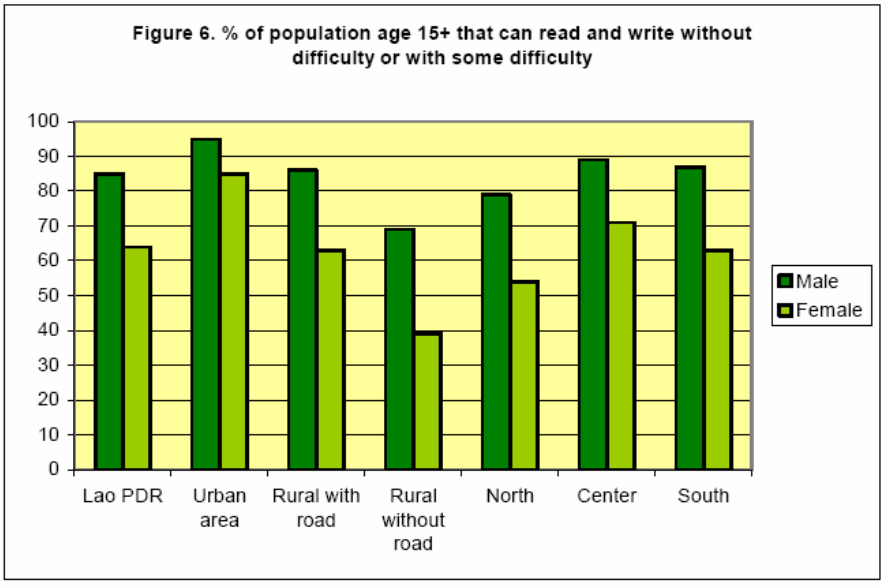


Table 4.13: Highest level of education completed by sex and region, population 6+

	None		Completed Primary school		Completed Lower secondary school		Completed Upper secondary school	
	Census 95	LECS 2002/03	Census 95	LECS 2002/03	Census 95	LECS 2002/03	Census 95	LECS 2002/03
Lao PDR	***43***	***23***	***11***	***15***	***4***	***7***	***2***	***6***
-Female	52	31	9	14	3	6	2	2
- Male	33	15	13	17	5	9	3	4

Table 4.14. Highest level of education completed by region and sex. Population aged 6 +. 2002/03

Region/		Primary school		Lower secondary school		Upper secondary school	
Province	None	Not completed	Completed	Not completed.	Completed	Not completed	Completed
			All people				
Lao PDR	**23.3**	**33.9**	**15.4**	**8.6**	**7.4**	**2.8**	**3.6**
Urban	*8.5*	*25.2*	*15.8*	*11.6*	*12.8*	*5.8*	*9.1*
Rural with road	*13.0*	*37.2*	*16.7*	*8.6*	*6.8*	*2.2*	*2.1*
Rural without road	*42.6*	*36.0*	*11.4*	*4.4*	*2.4*	*0.7*	*0.7*
North	30.3	34.7	15.8	7.0	5.9	2.0	1.6
Center	18.5	31.3	15.8	9.5	9.1	3.6	5.4
South	23.2	38.8	14.0	8.7	5.9	2.2	2.2
			Male				
Lao PDR	**15.4**	**35.3**	**16.5**	**10.0**	**8.8**	**3.3**	**4.4**
Urban	*4.7*	*24.9*	*14.6*	*12.1*	*13.4*	*6.4*	*10.1*
Rural with road	*14.8*	*38.2*	*18.0*	*10.4*	*8.6*	*2.8*	*2.9*
Rural without road	*30.6*	*41.3*	*14.7*	*5.9*	*3.3*	*0.9*	*1.1*
North	20.9	37.2	18.0	8.5	7.4	2.6	2.0
Center	12.0	32.3	16.0	10.7	10.2	3.9	6.7
South	14.7	40.0	15.4	10.5	7.6	3.0	2.6
			Female				
Lao PDR	**31.0**	**32.4**	**14.4**	**7.2**	**6.1**	**2.3**	**2.7**
Urban	*12.4*	*25.5*	*17.0*	*11.1*	*12.1*	*5.1*	*8.1*
Rural with road	*30.9*	*36.2*	*15.4*	*6.9*	*5.0*	*1.7*	*1.2*
Rural without road	*54.2*	*30.9*	*8.3*	*2.9*	*1.4*	*0.5*	*0.4*
North	39.5	32.3	13.7	7.2	4.4	1.4	1.2
Center	25.1	30.4	15.6	8.4	7.9	3.3	4.1
South	31.2	37.7	12.6	7.0	4.4	1.4	1.9

Social
Template 7: Poverty reduction
Key issue S1: Poverty reduction (improve the standard of living, local community development, ethnic minority well-being)
Key Issue S5: Retention of ethnic cultures and traditions (Impact to Mekong culture diversity)
Key Issue S6. Empowerment of disadvantaged groups (information, participation in decision making)

Introduction:
In June 25, the Prime Minister issued the instruction No. 010/PM on the development of poverty eradication programs. In particular, directives were given with regard to definition and indicators of poverty.

The definition of poverty:
Poverty is the lack of basic requirements in daily livelihood, such as the lack of food (less than 2,100 kilocalories per person and per day), clothing, permanent shelter, inability to afford necessary medical treatments, inability to afford one's own education and the education of other members of the family and the lack of easy access…primarily.

At the household level:

Households considered as poor are households with an income of less than KIP 85,000 equivalent in cash per person/month (Based on 2001 prices). This sum allows purchasing 16 kilograms of milled rice per person/month, but the balance is insufficient to cover other necessary expenses, such as clothing, shelter, children's schooling costs and medical treatment. Households living in such conditions are considered households who still live in poverty.

At village level
Villages considered as poor villages are:
- Villages where at least 51% of the total households are poor households
- Villages without school within the village or schools in nearby and accessible villages
- Villages without dispensaries, traditional medicinal practitioner or requiring over 6 hours of travel to reach a hospital
- Villages without safe water supply
- Villages without access road (at least trails accessible by car during the dry season)

At district level
- District where over 51% of the villages are poor
- District where over 40% of the villages do no have local or nearby schools
- District where over 40% of the villages do not have a dispensary or pharmacy
- District where over 60% of the villages without access road, which can be used by car
- District where over 40% of the villages do not have safe water

The measurement of poverty at provincial and national level is the compilation of poverty at district level and combined with poverty analysis based on the household consumption and expenditure survey performed by the National Statistic Centre.

Sources: PRF National Office at *Committee for Planning and Investment 2007*

The Lao PDR is one of the least-developed countries, with a GDP of 390 USD per capita in 2004 (1,420 USD per capita in average for East Asia and Pacific), the second poorest nations of ASEAN and ranked 133 in the UNDP index of human development, out of 177 States. More than 38% of the population live below the poverty line (2002), In 2003, 73% of the population earn less than 2 USD per day and per capita and 26% less than 1 USD.
Social indicators in the Lao PDR are among the lowest in the region.

Poverty in the Lao PDR is a complex issue and can be viewed from many perspectives. For the Lao multi-ethnic culture, poverty has a particular meaning, as it refers to those families that have been stricken by misfortune or are the least well-off in a given community. That is why household poverty is an important criterion for poverty

assessment at the district level. Villages provide a measure of welfare, a natural safety net to compensate for shortcomings in livelihood

According to the results of the Lao Economic and Consumption Survey 2003 (LECSIII), provinces have been ranked by Poverty Incidence.

Indicator: Poverty incidence
Official target:
Poor households (hh) graduating out of poverty (2005): Half of 2000 level of 304,100 hh or 150,050 hh. (or 20-25% of total hh).

The target for poverty reduction is to improve the quality and living standards of the people, particularly in poor and remote areas. Promote employment in rural areas, developing income generation activities while respecting the laws. Increase the access of the poor households to the services in education, health, credit, etc., so that they can improve their family situation. In addition, promote those households who have overcome poverty to help other poor families. The specific targets include the following:

- Implement the objective of poverty reduction to bring down the ratio of poor families to below 15 percent in 2010 compared with that in 2000;
- By 2010, abolish completely seasonal hunger (rice scarcity) at the household level;
- Reduce the ratio of malnourished children under five to below 30 percent;
- Accomplish the programme of Education for All;
- Provide clean water to 65 percent of the population in rural areas;
- Lower the population growth rate to 1.91 percent;
- Raise the ratio of green areas to above 50 percent of all natural areas.

Source: NSEDP, 2006.
Trends:

In 2000/01, about 38 percent of the population was below the national poverty line (or classified as poor). According to the reports from the provinces, there were 304,100 poor households in 2001 and the Plan target was to move some 150,050 households out of poverty. Over the five years from 2001 to 2005, some 137,500 families graduated from poverty, achieving about 90 percent of the Plan target (NSEDP, 2006).

Quantitative data on the incidence of expenditure, consumption or income poverty (henceforth referred to as income poverty) in the Lao PDR are compiled through the Lao Expenditure and Consumption Surveys (LECS) conducted in 1992/93, 1997/98 and 2002/03. The incidence of income poverty (headcount index) has declined from 46.0 percent in 1992/93 to 39.1 percent in 1997/98. Results from the Third Lao Expenditure and Consumption Survey (LECS III) show that the incidence of income poverty declined further to 33.5 percent in 2002/03.[2] This impressive declining trend in poverty incidence, if continued, would enable the country to achieve the MDG target of reducing the proportion of people below the poverty line by half by 2015 (as compared to that in 1990). (NSEDP, 2006).

The highest poverty incidence within the NSEC provinces is in Oudomxay with 42.5%, followed by Bokeo and Luang Namtha with 21.3 and 20.8% respectively (Table 1).
Other selected indicators are presented in table 2. These indicators show strong poverty-environment linkages, such as water, sanitation and health.
A Participatory Poverty Assessment (PPA) was conducted in 84 rural villages in 43 districts in North, Central and South regions of Lao PDR. About 90 percent of the PPA villages rely on swidden (shifting) agriculture to various extents.
Figure 1 presents the poorest districts according to four selections. These selections are: (i) the 46 priority

[1] The definition of poor families is based on the standards specified in the Prime Minister's Instruction No. 10, which includes income and access criteria. However, the number of poor households in 2004/05 will be much larger if the national (income) poverty line from the Second or Third Lao Expenditure and Consumption Surveys (LECS II or III) is used.

[2] Source: Lao PDR Committee for Planning and Investment, National Statistics Centre and World Bank, *Lao PDR Poverty Trends, 1992/3 – 2002/3, Draft Report,* prepared by Kaspar Richter, Roy van der Weide and Phonesaly Souksavth, March 2005.

districts for poverty alleviation identified by the Government of Lao PDR during the NPEP process; (ii) the 42 districts assessed in the PPA; (iii) the 46 districts with the highest number of poor; and (iv) the 46 districts with the highest poverty incidence.

Poverty incidence is highest in the North. The North has the lowest forest cover, but highest deforestation (1993-97). The region had the lowest agricultural land per capita, rice production and large animals per household. It had the highest reliance on river water, but higher sanitation coverage rates than Central and South. Literacy rates were the lowest of all regions (Tables 2-6)..

Drivers of trends:

Principal drivers of poverty in Lao PDR are rice sufficiency and livestock holdings. Illness and lack of health services were also raised as central issues. A main cause of poverty was considered to be the implementation of the land-forest allocation program by the Government following the land-forest allocation law in 1997. The villagers raised that the land-forest allocation program, intended among other objectives to protect forest resources and stabilize swidden agriculture, has caused fallow periods to decline to 3-4 years from previously 14-15 years, resulting in nutrient depletion and rice yield declines of often 50% or more. Programs to limit swidden cultivation have upset ecological balances and caused increased run-off, pests as well as soil depletion. Other causes of poverty included natural disasters, relocation and/or land allocation, and livestock diseases and lack of veterinary services.

Rice deficiencies forced people to get supplements from forest non-timber products (meat, fish, vegetables, herbs), renting out labour to other villages, sale of products and livestock, and making handicrafts. Declines in non-timber forest products (NTFPs), associated with overexploitation, are experienced by many villages. Declining wild life (especially predators) have increased wild pig populations that are destroying crops. Restricted forest access by Government to protect and restock resources is at least in the short term causing additional burden on the poor.

Relevant laws, policies, plans and institutional arrangements:
National Growth and Poverty Eradication Strategy (NGPES)

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- Principal drivers of poverty in Lao PDR are rice sufficiency and livestock holdings. Illness and lack of health services
- The Lao PDR is one of the least-developed countries, with a GDP of 390 USD per capita in 2004 (1,420 USD per capita in average for East Asia and Pacific), the second poorest nations of ASEAN and ranked 133 in the UNDP index of human development, out of 177 States.
- More than 38% of the population live below the poverty line (2002), In 2003, 73% of the population earn less than 2 USD per day and per capita and 26% less than 1 USD.

References/sources:

- LAO PDR POVERTY AND ENVIRONMENT Background Report Prepared For The Poverty Environmental Nexus (PEN) Project Group EASEN/DECRG/EASPR World Bank- MAY 1, 2004
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Annexes:

Table 1: Poverty incidence in Lao PDR (LECS 3 data)

Provinces	Poverty incidence LECS3	Rank on Poverty incidence
Oudomxay	**42.5**	**4**
Bokeo	**21.3**	**15**
Luang Namtha	**20.8**	**16**
Saravanh	49.1	1
Huaphanh	48.9	2
Phongsaly	46.6	3
Attapeu	41.5	5
Savannakhet	40.2	6
Xiengkhouang	39.7	7
Sekong	39.2	8
Luang Phrabang	36.4	9
Khammouanh	33.2	10
Xaysomboun	29.9	11
Bolikhamxay	27.8	12
Vientiane Province	26.2	13
Xayabury	24.8	14
Vientiane Capital	19.2	17
Champassack	18.0	18

Table 2: Lao PDR Select Indicators

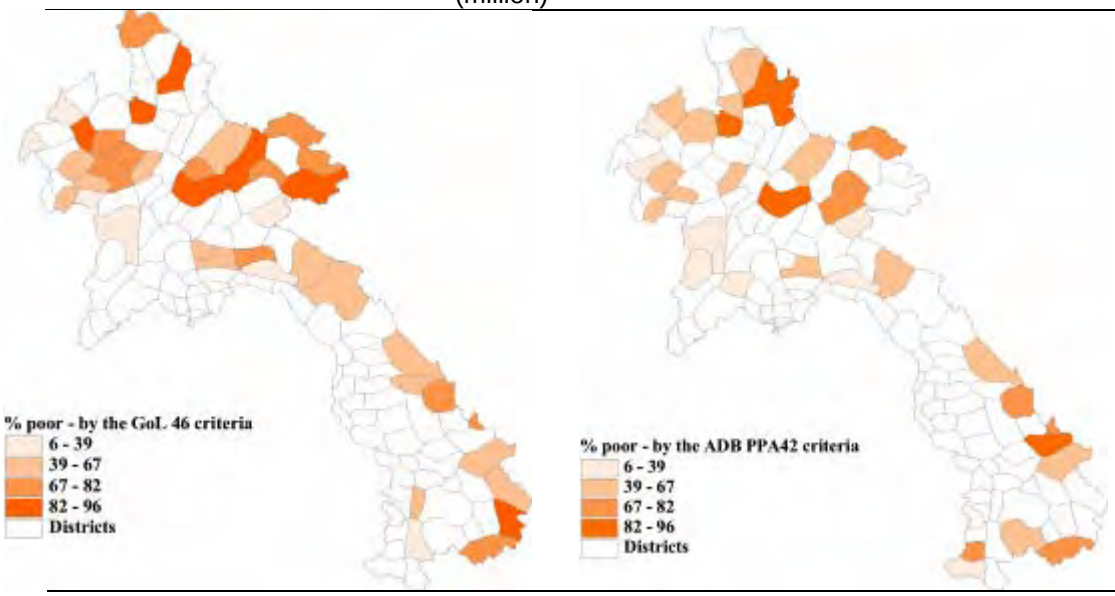
GNP per capita (US $) 2002	310
Annual GDP growth (1990-2002)	6.2%
Annual Population growth (1990-2002)	2.32%

Agriculture share of GDP (2001)	51%
Industry share of GDP (2001)	23%
Services share of GDP (2001)	26%
Under 5 child mortality rate (1990)	163
Under 5 child mortality rate (2001)	100
Poverty Incidence (1998)	39%
Poverty Incidence (1993)	46%
Total Population (2000) – millions	5.1
Population Density (2000) per km^2	23
Urban Population Share (2000)	20%
Access to safe water supply –Rural (2000)	29%
Access to safe water supply –Urban (2000)	61%
Access to Sanitation –Rural (2000)	19%
Access to Sanitation –Urban (2000)	67%
Traditional fuel use (% of population) – Wood and charcoal	95%
Forest cover (1997)	39%
Agricultural land (1997) -% cultivated of total land area	5.5%
Agricultural land (1997) -% fallow/regrowth of total land area	8.0%

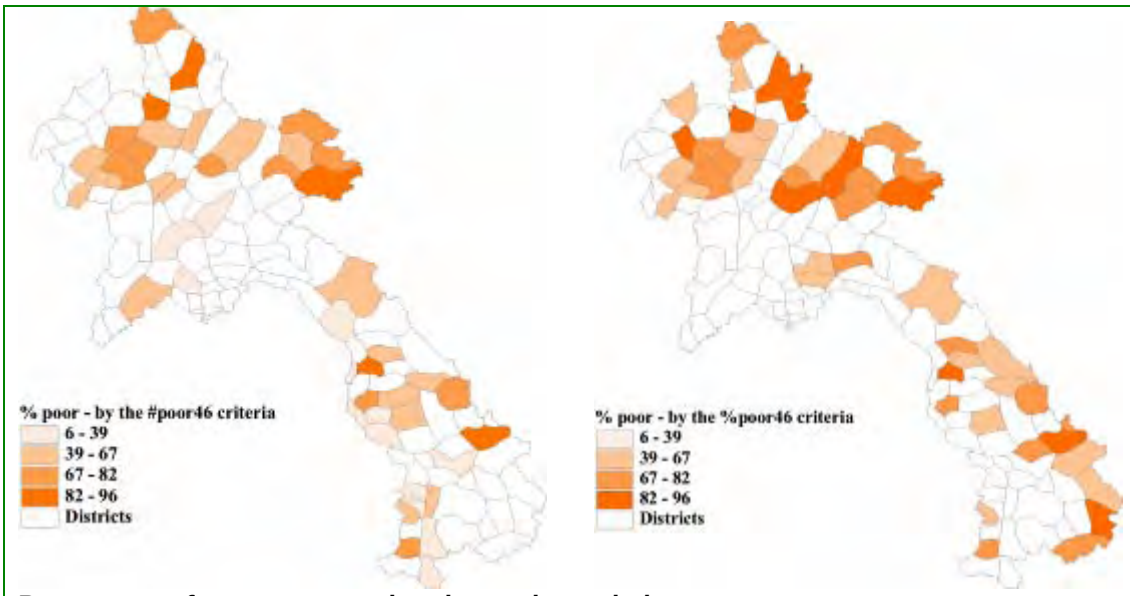
Source: Poverty incidence is from Kakawani et al (2002). Traditional fuel use, forest cover and agricultural land are from Lao PDR Censuses and satellite imagery data. The remaining data are from World Bank Development Indicators (2003).

Figure 1: District percentage of poor by each selection criteria

Gov't. of Lao 46		**ADB PPA 42**
63.4	Average % poor in selected areas	52.1
0.74	Total # poor in selected areas (million)	0.55



Number of poor 46		**Percentage of poor 46**
48.0	Average % poor in selected areas	71.7
1.24	Total # poor in selected areas (million)	0.94



Percentage of poor compared to the total population

Table 3: District-level poverty profile

ADB (2001) % poor	**0-25%**	**25-41%**	**41-64%**	**64-96%**	**All Lao PDR***
Number of districts	32	32	32	32	128
Population (million) 1995 Census	1.4	1.2	0.9	0.9	4.4
Population (million) 2000	1.7	1.4	1.0	0.9	5.1
Population in poverty 1997/98 (million)	0.27	0.47	0.52	0.70	1.96
Rural population share	65.7	90.5	87.0	94.8	82.6
Forests					
Forested land % of total land 1997	39.4	43.8	37.7	34.6	38.6
Change in forested land 1993-97 (km^2)	-406.6	-611.4	-627.9	-783.1	-2428.9
Deforestation rate of forested land 1993-97	2.9	2.4	2.7	3.2	2.8
Wood & charcoal use					
% of HH using wood for cooking	80.9	96.2	97.7	98.7	91.9
% of HH using coal for cooking	0.2	0.1	0.1	0.05	0.1
% of HH using charcoal for cooking	10.0	2.4	1.1	0.6	4.3
Agriculture (arable land, excluding mosaic)					
Agricultural land % of total land 1997	12.2	8.3	3.2	1.7	5.5
Change in agricultural land 1993-97 (km^2)	369.7	315.3	116.7	47.9	849.5
Change in agricultural land 1993 (m^2/capita)	260	260	130	55	200
% distribution of agricultural land 1997	35.8	38.9	15.9	9.4	100
Agricultural land per capita 1997 ('000 m^2)	3.0	3.8	2.1	1.3	2.7
Rice production per capita (kg/person)	280.4	264.5	229.4	188.1	247.3
Large animals per household	1.84	2.75	2.52	2.59	2.36
Steep slopes / fragile land					
% total area with 16 %< slope < = 30%	16.4	17.5	19.8	21.8	19.3
% total area with 30 %< slope < =60%	21.7	27.1	37.0	39.7	32.8
% total area with slope >16%	**41.9**	**50.5**	**66.0**	**70.3**	**59.5**
Water supply & sanitation					
% HH main water source: piped water	18.3	5.5	6.3	1.2	9.1

% HH main water source: protected well/ bore hole	10.0	5.5	5.7	3.8	6.7
% HH main water source: unprotected well/ bore hole	45.9	33.9	23.4	19.6	33.0
% HH main water source: river water	24.6	53.8	63.4	74.2	49.9
% HH ***without*** toilet facilities	**52.0**	**76.3**	**76.6**	**84.3**	**69.7**
Health & education					
Crude death rate	6.8	10.6	12.1	14.7	10.5
% population that is educated	72.9	58.3	49.7	40.3	57.7

Notes: * 14 districts did not have poverty numbers, and were dropped from the following analysis.
Sources : LAO PDR POVERTY AND ENVIRONMENT Background Report Prepared For The Poverty Environmental Nexus (PEN) Project Group EASEN/DECRG/EASPR World Bank- MAY 1, 2004

Table 4: Forest Cover, Deforestation and Agriculture

Parameter	Vient. Mun.	North	Center	South	All Lao PDR
No. of provinces	1	7	6	4	18
No. of districts	8	50	43	27	128
Population (millions) 1995	0.5	1.5	1.6	0.9	4.5
Population (millions) 2000	0.6	1.6	1.9	1.0	5.1
Population in poverty (million)	0.07	0.85	0.65	0.39	1.96
Population density (persons per km^2)	173.9	15.2	20.6	21.0	20.3
Poverty (% of population) 1997/98	12.2	**53.4**	34.4	38.4	38.6
Rural population share	35.2	90.4	86.5	89.7	82.6
Forests					
Forest % land area 1997	15.7	21.1	46.9	**65.0**	38.6
Deforestation % of forest cover 1993-97	**5.4**	**5.2**	1.6	2.5	2.8
Deforestation (km^2) 1993-97	26.4	**1118.3**	576.3	707.9	2428.9
Deforestation % of land area 1993-97	0.9	1.2	0.8	**1.6**	1.1
Deforestation per capita ('000 m^2/person) 1993-97	0.05	0.76	0.37	0.78	0.54
Agriculture (arable land, excluding mosaic)					
Change in Agricultural land (km^2) 1993-97	86.2	120.1	302.2	341.1	849.5
% change in agricultural land area	8.7	13.2	6.4	7.5	7.6
Change in Agricultural land ('000m^2/person)	0.17	0.08	0.19	0.38	0.19
Agricultural land per capita ('000m^2/person) 1997	2.12	0.70	3.22	5.39	2.70
Agricultural land per rural capita ('000m^2/person)	6.04	0.77	3.73	6.00	3.27
Rice production per capita (kg/person)	259.4	181.6	290.4	273.7	247.3
Large animals per household	0.75	1.91	3.23	2.69	2.36
Wood & charcoal use					
% of HH using wood for cooking	62.2	98.7	93.8	94.9	91.9
% of HH using coal for cooking	0.4	0.1	0.1	0.1	0.1
% of HH using charcoal for cooking	15.4	0.4	4.7	3.6	4.3
Steep slopes/ fragile land					
% total area with slope >16%	6.6	78.4	50.5	36.4	59.5

h (Phongsaly, Luang Namtha, Oudomxay, Bokeo, Luang Prabang, Houaphanh, Sayabouri); **Center** (Xiangkhu iane, Xaysomboon, Borikhamxay, Kammuane, Savannakhet); **South** (Saravane, Sekong, Champasack, Attapeu)
Sources : LAO PDR POVERTY AND ENVIRONMENT Background Report Prepared For The Poverty Environmental Nexus (PEN) Project Group EASEN/DECRG/EASPR World Bank- MAY 1, 2004

Table 5: Water Supply & Sanitation, Education, Health

Parameter	Vient. Mun.	North	Center	South	All Lao PDR
No. of provinces	1	–	6	4	18
No. of districts	9	North??	52	27	142
Poverty (% of population)	12.2	53.5	34.4	38.4	38.6
Total number of poor (millions)	0.07	0.85	0.65	0.39	1.96
Water supply & sanitation					
% HH main water source: piped water	37.2	4.7	4.7	6.2	8.9
% HH main water source: protected well/ bore hole	11.2	1.4	7.9	10.8	6.8
% HH main water source: unprotected well/ bore hole	46.6	19.2	51.1	13.9	32.8
% HH main water source: river water	3.7	73.8	34.7	68.0	50.3
% HH ***without*** toilet facilities	**30.1**	**66.6**	**76.7**	**88.7**	**70.3**
Health & education					
Crude death rate 1995	3.9	12.3	10.4	12.1	10.6
% population that is educated	83.1	47.0	58.2	56.7	57.1

Sources : LAO PDR POVERTY AND ENVIRONMENT Background Report Prepared For The Poverty Environmental Nexus (PEN) Project Group EASEN/DECRG/EASPR World Bank- MAY 1, 2004

Table 6: Poverty and Environment Nexus (PEN)

PEN areas:	Indicators:	Poverty and Geographic Analysis:
Poverty	Poverty incidence 1997/98	Highest in the NORTH
	Number of poor 1997/98	
Forest	Deforestation (%) 1993-97	Highest in the NORTH and POOREST GROUP
	Deforestation (km^2) 1993-97	
Land	Agricultural land per capita 1997	Lowest in the NORTH and POOREST GROUP
	Sloped land (% of total land)	Highest in the NORTH and POOREST GROUP
Indoor air pollution	Households using fuel wood (%)-potential indoor air pollution problem	High in all regions and poverty groups (medium in Vientiane Municipality and least poorest group)
Water supply	Piped water supply (1995 Census)	Low in all regions and poverty groups (medium in Vientiane Municipality and least poorest group)
	Reliance on river water (1995 Census)	Highest in NORTH, SOUTH and POOREST POVERTY GROUP
Sanitation	No toilet facilities (1995 Census)	Highest in SOUTH and all poverty groups (medium in lowest poverty group)
Malaria	Confirmed Cases per 10 000 people (2001 WHO)	Highest in SOUTH and the middle two poverty groups
Natural disasters	Areas affected by Flood	Highest in SOUTHERN/WESTERN districts/provinces
	Areas affected by Drought	More data and analysis needed.
Urban environnent	Air pollution	Medium in largest cities
	Solid waste, water and sanitation	

Sources : LAO PDR POVERTY AND ENVIRONMENT Background Report Prepared For The Poverty Environmental Nexus (PEN) Project Group EASEN/DECRG/EASPR World Bank- MAY 1, 2004

Table 7: Demographic Comparison of Selected Priority Districts

Parameter	ADB PPA 42		GoL 46		% poor 46		# poor 46	
	Selelcted?	Non-selected		Non-selected		Non-selected		Non-selected
No. of provinces	18	18	16	18	16	17	14	18
No. of districts	42	100	46	96	46	96	46	96
Total population (millions) 1995	1.2	3.4	1.1	3.4	1.3	3.3	2.0	2.5
Rural population share	83.4	82.8	95.1	78.8	93.1	79.0	86.3	80.1
Poverty (% of population)	52.1	35.1	63.4	31.3	71.7	27.1	48.0	28.8
Total number of poor (millions)	0.55	1.41	0.74	1.22	0.94	1.02	1.24	0.71
Water supply & sanitation								
% House-hold HH main water source: piped water	9.5	8.7	1.5	11.3	2.4	11.3	8.1	9.5
% HH main water source: protected well/ bore hole	3.8	7.7	1.7	8.4	5.8	7.1	7.9	5.9
% HH main water source: unprotected well/ bore hole	22.8	36.0	17.2	37.7	22.9	36.4	32.3	33.1
% HH main water source: river water	63.0	46.1	78.7	41.3	67.7	43.8	50.3	50.3
% HH ***without*** toilet facilities	70.5	70.2	82.5	66.4	83.7	65.3	77.2	64.8
Health & education								
Crude death rate	12.7	9.9	14.9	9.2	14.1	9.3	10.9	10.4
% population that is educated	47.3	60.4	39.8	62.9	42.0	63.0	56.1	57.9

Parameter	ADB PPA 42		GoL 46		% poor 46		# poor 46	
	Selelcted?	Non-selected		Non-selected		Non-selected		Non-selected
Agriculture (arable land, excluding mosaic)								
Change in Agricultural land (km^2)	134.0	733.7	123.6	744.1	115.9	751.8	237.3	630.4
% change in agricultural land area	11.6	7.1	9.4	7.3	5.9	7.9	4.4	10.5
Change in Agricultural land per capita (‘000m^2/person)	0.12	0.21	0.11	0.22	0.09	0.23	0.12	0.25
Agricultural land per capita (‘000m^2/person)	1.12	3.22	1.25	3.17	1.64	3.10	2.78	2.62
Agricultural land per rural capita (‘000m^2/person)	1.34	3.89	1.32	4.02	1.76	3.93	3.22	3.27
Rice production per capita (kg/person)	183.8	267.2	175.7	269.7	220.3	256.2	243.9	248.0
Large animals per household	2.23	2.49	2.50	2.39	2.72	2.31	2.62	2.28
Forests								
Forested land % of total land 1997	40.6	39.6	39.9	40.1	36.7	42.3	35.4	42.7
Deforestation (km^2) 1993-97	1151.4	1450.4	921.2	1680.6	1063.7	1538.1	860.9	1740.9
Deforestation % of forest cover 1993-97	3.2	2.5	2.3	3.1	2.9	2.6	2.7	2.8
Deforestation per capita (‘000m^2/ person)	1.0	0.4	0.8	0.5	0.8	0.5	0.4	0.7
Wood & charcoal use								
% of HH using wood for cooking	92.5	91.9	98.9	89.9	98.3	89.7	94.5	90.1
% of HH using coal for cooking	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1
% of HH using charcoal for cooking	2.5	4.8	0.3	5.5	1.0	5.5	4.1	4.4
Steep slopes/ fragile land								
% total area with slope >16%	67.2	53.1	69.5	49.8	69.1	50.7	57.0	59.2

Social
Template 9: Public health
Key issue S3: Quality of Life (including: public health, safety, noise, smell, communicable disease)

Introduction:

The strategic policy of the Lao Party and the Government in the Health sector is to strongly encourage health care by upholding prevention as a primary task and treatment as an important task to ensure the Lao people's health and participation in national socio-economic development. In line with this policy, the health care system has developed during the last five years under the Government's guidance with the participation of communities and international cooperation. The health system has improved and gradually expanded to form a complete network from the central level to the districts and villages. Thus, it became an important factor in extending improved health services including primary health care to the population.

In the areas of prevention, attention is given to primary health care with emphasis on high risk groups; child immunization; recommendations on the use of safe and sanitized water; management and the control of transmittable diseases, such as diarrhoea, malaria, dengue fever, tuberculosis, leprosy and HIV/AIDS; and the close monitoring of other diseases caused by drug addiction. Eight hygiene, disease prevention, and health care centres have been built nationwide. So far, there have been six central and provincial laboratories. These establishments have maintained coordination, and made regular or emergency reporting on examination and health care to the Ministry of Public Health. Laos and Vietnam have signed an agreement on the implementation of a border disease prevention system.

Initial coordination was made with different agencies, authorities and line Ministries in charge of promotion and communications to promote hygienic lifestyles and protection from diseases, combat superstitions, and encourage infected people to seek treatment at hospitals. Child polio was eradicated in 2000, but Lao PDR still remains in a vulnerable position, as polio free status is under threat because of the low polio routine coverage. Immunization was expanded to children less than one year old for various diseases such as whooping cough, measles, tetanus, tuberculosis and others. The safe injection plan has been introduced nationwide. Efforts made in the prevention of transmittable diseases such as malaria, dengue fever and HIV/AIDS have shown positive results.

Investments were made to upgrade treatment in the central and regional hospitals and expand access to medical services. At the same time, traditional treatment systems were improved and developed in cooperation with Vietnam. About 57 percent of the patient beds at central and provincial hospitals were in use.

The private health network has also developed since 2001. There are currently 254 private clinics, 108 of which are located in Vientiane, which in turn contribute to the diversification of health care services. In the last five years, the country has provided 5,226 drug kits to the villages in the 72 poor provinces identified in the NGPES. Thus, about 94 percent of villages have been provided with drug kits.

Indicator: Life expectancy & mortality
Official targetS:

Fifth Five-Year Socio Economic Development Plan (2001-2005): Targets & Achievements (LAO PDR NSEDP, 2006)

	Target	Achievement
Life expectancy at birth (2005)	61 years	61 years
Infant (children under one) mortality (2005)	60 per 1,000 live births	70
Child (children under five) mortality (2005)	98 per 1,000	98 per 1,000

Maternal mortality (2005)	350 per 100,000	405 per 100,000

The Health sector targets by the end of the Sixth Plan (2006- 2010) include the following LAO PDR NSEDP, 2006):

- Life expectancy at birth will rise to 63.5 years;
- Infant mortality to reduce to 55 per 1,000 live births;
- Mortality of children under five years (child mortality) to reduce to 75/1,000;
- Maternal mortality to reduce to 3300 per 100,000 live births;
- Number of people catching tuberculosis to reduce to 72 cases per 100,000 people;
- Child vaccination coverage to reach 85 percent;
- Vaccination programme to eliminate dangerous epidemics to reach 100 percent;
- Ratio of malnourished children under five to reduce to below 30 percent;
- Access to basic health care services to reach 100 percent;
- Access to safe water to increase to 75 percent of the people overall;
- Access to safe water in rural areas to increase to 70 percent of the people;
- Coverage of toilet facilities meeting sanitary standards to rise to 60 percent;
- Proportion of schools having segregated sanitary facilities to rise to 35 percent;
- For the 72 poor districts, the Ministry of Health has set the following targets for 2010:
  - 100 percent of the population in all the 72 poor districts will have access to PHC; and
  - 75 percent will have access to clean water; and
  - 55 percent to will have access safe sanitation.

General Health Trends:
Thanks to the health system's development, the population's health has improved significantly in the past five years. By 2005, the infant mortality rate has been reduced to 70 per 1,000 live births (viable infants), while that of children under five also reduced to 98 per 1,000 (viable children). The maternal mortality was also reduced to 405 per 100,000 live births (viable babies). The country has been able to meet 48 percent of the local population's demand for medicines from local production; and provided drug kits to 95 percent of the villages. In addition, the life expectancy has increased to 61 years.

Drivers of trends:

Indicator: HIV/AIDS

Target:

(include sources of indicator and target)

Trends:

The Lao PDR is in a relatively fortunate situation of low prevalence of HIV/AIDS as compared to that in the neighbouring countries. At the end of 2004, the estimate of the cumulative number of people identified with HIV was 1,470, of which 835 were known to be living with AIDS.[3] Around 556 of the infected have died. About 62 percent of the reported HIV cases were male and 38 percent female. The HIV prevalence rate for persons between 15 and 49 years is less than 0.05 percent (estimate of UNAIDS). More than 50 percent of those infected are between the ages of 20 and 39 years. Awareness of HIV/AIDS is limited as is the access to the means of gaining information. More than 83 percent of HIV infections result from unprotected heterosexual intercourse.

Drivers of trends

Low levels of awareness and limited access to prevention and protection (including condoms) heighten the risk of rising prevalence of HIV/AIDS in the country. Other factors such as the low socio-economic status of women, high levels of poverty and a widening generation gap compound the risk of the spread of the disease. Increased population mobility, internal and external labour migration and changes in lifestyles and sexual behaviour are all important ingredients for an accelerated spread of the epidemic. In recent years, the use of recreational drugs has rapidly expanded in the Lao PDR. An alarming number of sex workers are thought to be injecting drugs. International evidence shows that intravenous drug use may substantially accelerate the spread of the HIV epidemic. This means that the country could face either a small or large epidemic unless action is taken to contain and reverse the trend soon.

Indicator: Water supply & Sanitation

Target: NA

Trends:

Safe water is defined as piped water in/outside, protected well/borehole and purified water. Sometimes water from streams can be clean. Water and sanitation is still a big problem in Lao PDR. However, access to piped water or water from protected wells/boreholes has doubled since 1995. 50% of the Lao population has access to safe water in the village according to village heads. In the rural areas without access to road only 24% of the population has access to safe water in the village. The population in the north has less access to safe water than the population in the center and south.

Half the population do not have any toilet, still a large improvement since 1995 (population census) when 71 per cent of the population did not have toilet. Almost all of the Lao population has now been covered by the immunization programs. Anti-malaria programs have been carried out in villages covering 72 % of the population (LECS III, 2004)

Drivers of trends: NA

Indicators: Health services

Target: NA

Trends:

5% of the total population has 8 hours or more to the nearest hospital. In rural areas without access to road 20 per cent of the population have 8 hours or more to come to nearest hospital, and 20 per cent the same time to nearest health center. (table 4.3) 30% of the population has access to a pharmacy in the village.

Of the people with temporary health problems during the last 4 weeks 15 per cent sought treatment at health facilities or provider, with variation from 20 per cent in urban areas to 10 per cent in rural areas without access to road.

The overwhelming reason for not seeking help was that the illness was minor. Difficulty to get to the facility or provider was also an important reason in some provinces. The cost of treatment was a reason only among 4 per cent of those having temporary health problems (LECS III, 2004).

Drivers of trends: NA

Indicators: Health assessments and health seeking behaviour

Target: NA

Trends:

Sickness and death limits the welfare, and it also restricts the resources to create welfare. Approximately 14 per cent of the people stated that they had temporary health problems in the past 4 weeks. There was no difference between male and female. Health problems were significantly more in the south than in other regions both among male and female. These temporary problems caused disruption in work, schooling and other activities in 56 % of the cases, i.e. about 8 per cent of the population had temporary health problems that disrupt work. Of these 14 per cent with temporary health problems, only 2 per cent sought treatment at a health facility or health provider (table 3.5 combined with table 3.6). 5% of the population has a long-term illness or disability, slightly more in rural than in urban areas. The South has a somewhat higher prevalence than North and Center (LECS III, 2004).

Relevant laws, policies, plans and institutional arrangements:

To address the challenges, the Government has formulated the National Strategy and Action Plan on HIV/AIDS/STI for 2006-2010, with the overall goal of maintaining the present low level of HIV/AIDS in the general population, ensuring that HIV seroprevalence among vulnerable groups is lower than five percent, and scaling up the national response in order to prevent in a timely manner and minimize the impact of the HIV/AIDS pandemic on social and economic development in the country. The National Strategy and Action Plan (2006-2010) defines a reach of 90 percent as full coverage, with the creation of an enabling environment for an expanded response at all levels, an increased availability of data, capacity building and effective management as the necessary means to prevent an epidemic (Lao PDR, NSEDP, 2006)

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- Access to medical care is limited in the NSEC Project Area. In each of the three towns, there is a hospital. But each hospital has to cover lots of villages and some villages are very remote, having very difficult access to health facilities. Most villages have a village health volunteer and some have a nurse.
- Hospitals are reputed to be understaffed, and without many essential resources.
- Impoverished villagers are sometimes unable to afford to buy medicines, even when they are available in local clinics.
- Public health and sanitation information campaigns are carried out by the provincial Public Health Departments, the Red Cross, the Lao Women's Union, and various area NGOs. Health indicator (staff) use translator in the ethnic villages where most people do not speak Lao.
- Campaigns to make affordable chemically-impregnated mosquito nets available to people have had a significant impact in reducing malaria and dengue fever, but these diseases are still common.
- The prominent diseases occurring in the NSEC area would be highlighted as ; malaria, diarrhea, dang fever, dysentery etc. The key concern in relation to potential impact of NSEC (R3) is AIDS prevention and STDs.
- Malaria has no relevance to free trade, only STDs/AIDS have relevance. The Lao Red Cross has HIV/AIDS prevention educational programme in both provinces (BoKeo and Oudomsay) supported by Australia Red Cross. These programmes are able to cover two or three villages per months in each province, and since March 2002 had carried out HIV/AIDS workshops in about a third of villages along R3. CARE delivers AIDS education to workers/ labors in entertainment venues in Houei Sai and LuangNamtha. Norwegian Church Aid provide HIV'AIDS education in the villages in works in some districts of both provinces (which are not directly in the road corridor; but within the area of Project influence.

HIV/AIDS

The main challenges that remain include the following (Lao PDR, NSEDP, 2006):

- Most of the prevention, care and treatment programmes are pilot initiatives and reach only a small portion of target populations;
- Comprehensive interventions reach only a fraction of the population in need;
- There are limited interventions for certain vulnerable groups, such as migrant labour, drug users and men who have sex with men;

- Implementation capacity remains low at all levels;
- Research information is not effectively shared and applied by different partners;
- Involvement of the civil society and private sector is still very limited;
- Coordination of HIV/AIDS/STI programmes and activities is insufficient;
- High-level, multi-sectoral political commitment needs to be strengthened;
- Lack of skilled personnel, frequent turnover and heavy workload prevent many people who have been trained from implementing and utilizing what they have learned;
- Follow-up of benefits of trainings is weak;
- There is no functioning M&E system for the National Response; and
- Both human and financial resources are inadequate to tackle the epidemic.

References/sources:

- HIV/AIDS/STI/Drugs and Trafficking Awareness and Prevention Education Programme Package 4 Lao Red Cross August 04 to March 05.
- Bokeo Results from the Population and Housing Census 2005
- More information about public health in Lao, case study and research journals, papers please goes to this website:

http://www.undplao.org/whatwedo/bgresource/poverty/Final%20report%20LECS%203.pdf and http://www.health.gov.la/forums/ all the activities that they had done in each province also provided and www.directoryofngos.org

- United Nations Common Country Assessment Lao PDR, June 2006
- Committee for Planning and Cooperation National Statistical Centre. 2004. The household of Lao PDR. Social and Economic indicators Lao Expenditure and Consumption Survey 2002/3, LECS 3.
- Lao PDR-Committee for Planning and Investment. 2006. National Socio-Economic Development Plan (NSEDP) (2006-2010).

Annexes: (eg. maps, diagrams, tables)

Next figures and tables are all from LECS III, 2004.

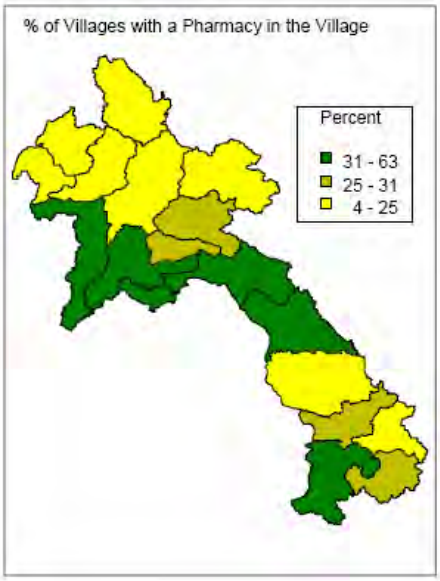
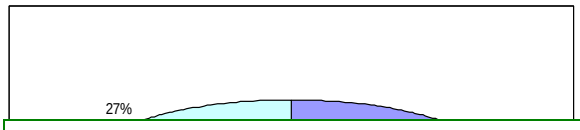


Table 4.2: Access to health services by province and region in 2002/03.

Province/ region	Per cent of population with access in village to:						
	Pharmacy	Licensed pharmacy	Medical kit	Midwife	Traditional practician	Health volunteer	Medical staff as caretaker
Lao PDR	**30**	**26**	**37**	**54**	**44**	**59**	**36**
Urban	*62*	*60*	*21*	*41*	*40*	*40*	*81*
Rural with road	*26*	*20*	*43*	*64*	*48*	*67*	*28*
Rural without road	*10*	*6*	*36*	*37*	*37*	*54*	*12*
North	***24***	***19***	***39***	***52***	***42***	***58***	***30***
Phongsaly	24	20	44	15	30	41	14
Luangnamtha	16	16	43	63	54	59	20
Oudomxay	4	4	19	22	19	44	39
Bokeo	24	16	35	47	33	46	23
Luangprabang	24	17	31	49	45	68	41
Huaphanh	20	15	35	45	56	35	15
Xayaboury	47	37	64	98	51	84	35
Center	***33***	***30***	***37***	***50***	***45***	***56***	***44***
Vientiane C.	63	60	19	30	34	34	77
Xiengkhuang	27	19	54	21	52	68	24
Vientiane P.	49	42	29	42	47	32	51
Borikhamxay	31	31	81	51	38	85	46
Khammuane	33	28	33	62	33	53	32
Savannakhet	8	8	37	70	55	74	28
Xaysomboon SR	27	27	44	67	48	25	30
South	***32***	***26***	***37***	***66***	***44***	***66***	***26***
Saravane	25	22	47	55	43	72	20
Sekong	15	8	43	48	27	44	19
Champasack	37	29	25	69	44	65	29
Attapeu	27	37	63	97	65	74	33



Open Well/Underground water

Water supply in house/out side

Close well/Underground water

Other

Table 4.3: Access to health services in villages

	Per cent of people by distance to nearest hospital			Per cent of people by distance to nearest health center				
	-10 KM	11-30 KM	31 KM-	-10 KM	11-30 KM	31 KM-	Nearest hospital	Nearest health center
Lao PDR	***54***	***31***	***15***	***78***	***17***	***5***	***5***	***3***
Urban	*94*	*6*	*0*	*100*	*0*	*0*	*0*	*0*
Rural with road	*47*	*39*	*14*	*76*	*21*	*3*	*1*	*1*
Rural without road	*28*	*37*	*35*	*56*	*27*	*16*	*20*	*11*
North	***47***	***26***	***27***	***66***	***24***	***10***	***9***	***6***
Phongsaly	37	23	40	37	30	33	17	9
Luangnamtha	48	27	25	63	28	9	14	8
Oudomxay	51	13	36	53	36	11	16	9
Bokeo	39	34	28	80	13	7	2	7
Luangprabang	43	35	22	63	33	4	0	0
Huaphanh	51	21	29	62	17	21	19	16
Xayaboury	55	24	22	90	10	0	5	0
Center	***58***	***32***	***10***	***84***	***12***	***4***	***2***	***1***
Vientiane C.	86	12	2	100	0	0	0	0
Xiengkhuang	35	33	32	77	13	10	12	5
Vientiane P.	61	33	6	80	16	4	2	0
Borikhamxay	61	26	14	77	19	3	6	6
Khammuane	46	43	11	73	27	0	2	2
Savannakhet	47	43	9	83	12	6	0	0
Xaysomboon SR	83	7	10	83	7	10	0	0
South	***54***	***39***	***7***	***81***	***18***	***1***	***4***	***0***
Saravane	40	58	2	72	28	0	3	0
Sekong	47	32	21	85	12	4	33	8
Champasack	62	31	8	86	14	0	0	0
Attapeu	63	29	8	79	16	5	6	3

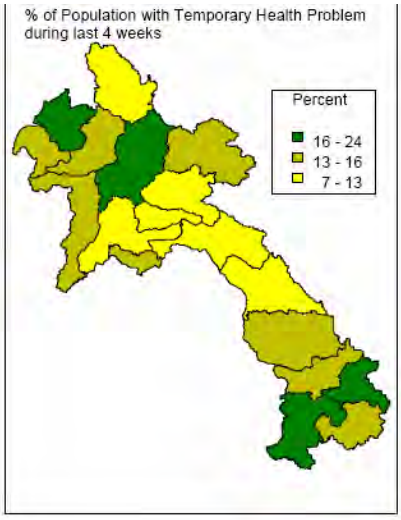


Table 4.4 : Temporary health problems in the past 4 weeks by Provinces and regions in 2002

	Per cent of population with temporary health problems			Per cent of people with temp. health problems disrupting work, etc.		
	Male	Female	Total	Male	Female	Total
Lao PDR	***14***	***15***	***14***	***56***	***57***	***56***
Urban	12	14	13	43	42	43
Rural w road	14	15	15	58	59	59
Rural wo road	13	13	13	62	65	63
North	***14***	***15***	***14***	***56***	***54***	***55***
Phongsaly	7	8	7	75	70	72
Luangnamtha	17	19	18	60	64	62
Oudomxay	15	15	15	62	69	65
Bokeo	14	16	15	8	4	6
Luangprabang	16	17	16	70	67	69
Huaphanh	13	13	13	47	44	45
Xayaboury	15	16	15	52	42	47
Center	***12***	***12***	***12***	***51***	***51***	***51***
Vientiane C.	13	14	14	33	34	34
Xiengkhuang	8	9	9	59	66	63
Vientiane P.	8	9	8	56	60	58
Borikhamxay	9	10	9	45	55	50
Khammuane	11	11	11	57	55	56
Savannakhet	14	13	13	57	57	57
Xaysomboon SR	10	10	10	82	64	73
South	***19***	***20***	***20***	***62***	***67***	***65***
Saravane	14	15	14	63	64	64
Sekong	18	19	19	78	85	82
Champasack	23	25	24	64	69	66
Attapeu	14	14	14	34	41	38

Table 4.5: Per cent of people with long term illness or disability

	Men	Women	Total
Lao PDR	***5.2***	***5.0***	***5.1***
Urban	4.5	4.7	4.6
Rural with access to road	5.7	5.4	5.5
Rural without access to road	4.7	4.2	4.4
North	***4.7***	***3.8***	***4.2***
Phongsaly	4.9	4.2	4.5
Luangnamtha	6.5	4.1	5.1
Oudomxay	6.1	3.8	4.9
Bokeo	1.0	0.7	0.9
Luangprabang	6.2	5.5	6.0
Huaphanh	4.3	3.6	3.9
Xayaboury	2.9	2.7	2.8
Center	***4.7***	***4.6***	***4.6***
Vientiane C.	3.8	4.5	4.3
Xiengkhuang	5.0	3.8	4.3
Vientiane P.	3.6	2.7	3.0
Borikhamxay	2.8	3.2	3.2
Khammuane	7.2	6.9	7.1
Savannakhet	5.3	4.9	5.1
Xaysombone	5.8	6.4	5.7
South	***7.3***	***7.9***	***7.5***
Saravane	7.3	7.0	7.1
Sekong	6.2	6.6	6.5
Champasack	8.2	9.4	8.6
Attapeu	2.6	3.3	3.0

Figure 4. % of population having longterm illness or disability

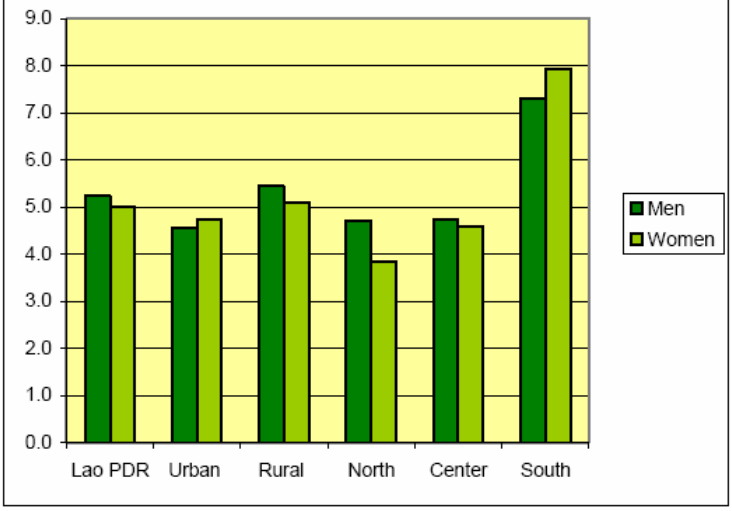


Table 4.6: Visits to health care facilities to obtain health care in the past 4 weeks

Type of health facility or provider	Visits per 1000 inhabitants: North	Center	South	Urban	Rural with road	Rural without road	Total country
Health care facilities	195	263	257	296	261	116	240
Private doctor, commune health volunteer or trained midwife	94	135	160	138	144	64	126
Traditional health practitioner or birth attendant	44	58	71	46	65	41	57

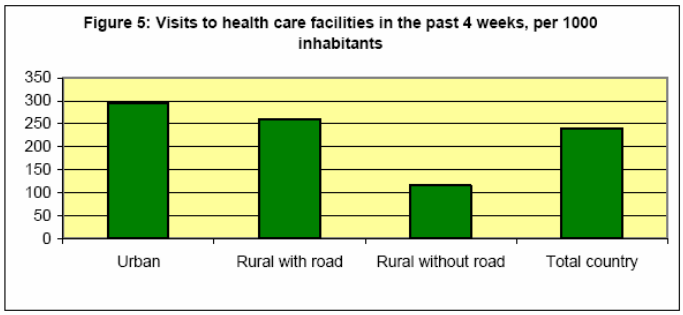


Table 4.7: Health seeking behavior

Region/province	Per cent of people with health problems seeking treatment	Per cent distribution of people with health problems in the past 4 weeks not seeking treatment at health facilities or providers by reason: Not serious enough	Difficult to get there	Too expensive	Not good quality	No cure possible
Lao PDR	***15***	***76***	***14***	***4***	***1***	***6***
Urban	*20*	*88*	*4*	*3*	*1*	*4*
Rural with road	*15*	*75*	*15*	*4*	*1*	*7*
Rural without road	*10*	*69*	*21*	*5*	*0*	*5*
North	***12***	***76***	***15***	***3***	***0***	***6***
Phongsaly	10	64	33	1	.	1
Luangnamtha	17	73	20	1	.	5
Oudomxay	9	68	28	3	.	1
Bokeo	5	97	3	0	.	0
Luangprabang	10	67	13	7	.	14
Huaphanh	7	78	15	1	0	6
Xayaboury	23	90	7	1	1	3
Center	***20***	***76***	***12***	***4***	***1***	***6***
Vientiane C.	21	90	4	0	.	6
Xiengkhuang	25	68	18	7	2	6
Vientiane P.	21	72	17	4	4	4
Borikhamxay	14	65	16	2	.	17
Khammuane	18	69	15	5	0	11
Savannakhet	21	75	16	7	0	2
Xaysomboon SR	20	72	1	1	.	26
South	***12***	***76***	***15***	***4***	***1***	***4***
Saravane	11	74	15	9	0	2
Sekong	18	59	30	5	.	7
Champasack	12	77	14	3	1	5
Attapeu	10	89	7	1	.	4

The information below was collected by Phaknakhone

Loungnamtha Province

Water supply for drinking and cooking in town and urban at Loungnamtha Province

Sources: Loungnamtha Results from the Population and Housing Census 2005

Water supply in house/out side	41.5%
Open Well/Underground water	19.5%
Close well/Underground water	11.6%
Other	27.4%

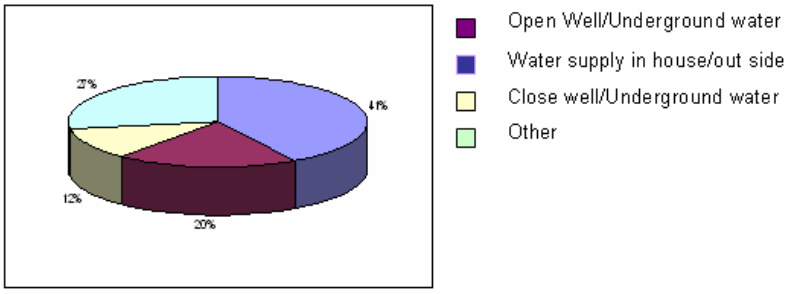
(Water supply in house/out side is percentage of population)

Clean water supply	**1995**	**2005**
	5.1%	18.6%

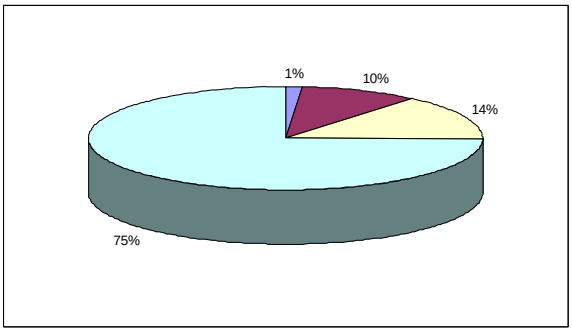
If compare within town and urban are differences Long district has a very low clean water supply 1.5% but in Loungnamtha district is very high 42.5%. In Loungnamtha town clean water supply is 53%. In urban areas with access roads this is 11% and in urban areas without access roads clean water supply is 3.4%. See figure below.

Figure clean water supply in town, urban with access and urban with no access

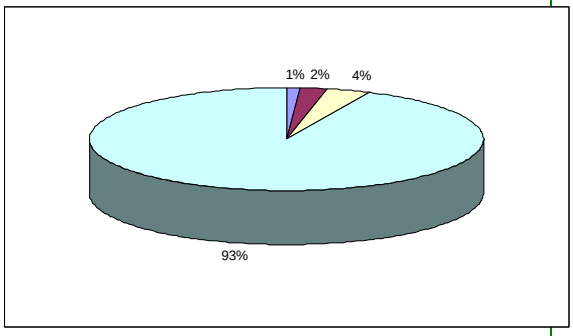
In town



Urban with access



Urban with no access



Sanitation

Sanitation for local people in the project area is very important for human health. Households are using septic tank increase from 4.8% in 1995 to 42.6% in 2005. Moreover, in 1995 people no septic tank use decrease from 71% to 50.4% in 2005. More detail in table below.
Table of Number of household using septic tank and site in each area

No. of Household	**Type of sanitation**					
Districts	**Site/ LuangNamtha**	**septic tank**	**other**	**nothing**	**No answer**	**Total %**

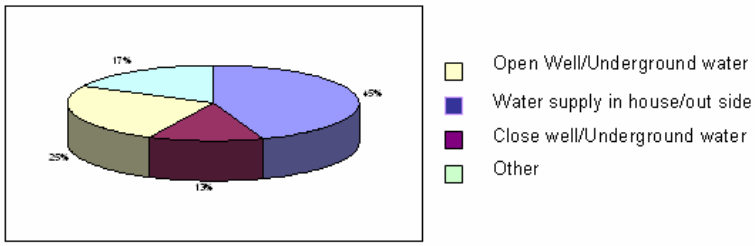
	district					
Loungnamtha	0.2	42.6	5.6	50.4	1.1	100
Town	1	80	10	8	1	100
Urban with access	0	40	5	54	1	100
Urban no access	0	12	2	84	1	100
General	2	39	9	49	2	100

Sources: Loungnamtha Results from the Population and Housing Census 2005

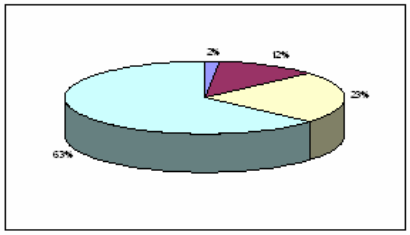
Bokeo Province

Clean water supply in Bokeo province increased from 2% in year 1995 to 16% in 2005, a slow increase. Moreover, each district in Bokeo province shows differences, for example Paktha district has no clean water supply. Houyxay District is the highest 28.1%. Town has 57.3% and in urban with access road is 13.4% but urban with no access is 1.2%. More detail in figure below.

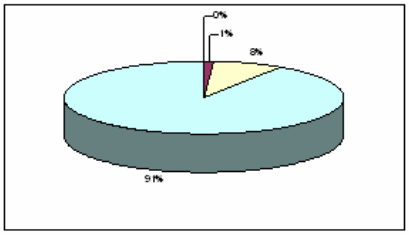
Town



Urban with access



Urban no access



Sanitation

Sanitation for local people in the project area is very important for human health. Households are using septic tank increase from 11% in 1995 to 51% in 2005. Moreover, in 1995 people no septic tank use decrease from 82% to 41% in 2005. More detail in table below.

No. of Household	Type of sanitation					
Districts	Site	septic tank	other	nothing	No answer	Total %
Bokeo	1	50.7	3.2	41	4.2	100
Town	3.4	75.4	2.4	9.3	9.5	100
Urban with access	0.9	57.2	4	34.4	3.6	100
Urban no access	0.2	27.7	2.3	67.1	2.9	100
General	1.8	38.5	9	49	1.7	100

Social

Template 10: Population, Migration and Trafficking

Key issue S4: Migration and trafficking (including: Demographics)

Introduction:

In line with the Programme of Action adopted by the International Conference on Population and Development (Cairo, 1994), the Government has formulated a National Population and Development Policy (NPDP), adopted in 1999. The main policy goals of the NPDP are to:

- Support measures to achieve a rate of population growth compatible with socioeconomic development and employment opportunities available within the country;
- Ensure safe motherhood and enable couples to responsibly decide the number and spacing of their children;
- Improve the status of women and the multi-ethnic populations by improving access to education, health, social welfare and socio-economic development;
- Promote a balanced distribution of population between rural and urban areas and between different parts of the country; and
- Incorporate population factors and concerns into all social and economic policies, plans and programmes.

Two main programmes have been at the forefront of the Government's population policy: Reproductive Health and Population and Development.

The purposes of the Reproductive Health Programme include: (i) increasing the use of reproductive health services and information leading to responsible and safe sexual behaviour, and (ii) creating an enabling environment for the provision of quality, integrated services and counselling on reproductive health. Activities under this programme include special focus on ethnic groups and institutional strengthening and training.

The 'Population and Development' Programme focuses on the following inter-related outputs: (i) strengthened advocacy capacity of key organisations (e.g., the National Coordinating Committee for Population and Development or NCCPD) for the implementation of the NPDP and its Action Plan, and support to key population/gender issues; (ii) strengthened capacity of CPI and other agencies for data collection, analysis, training, research and dissemination of information on gender and population issues; and (iii) strengthened capacity of NCCPD, CPI and other organisations for the coordination and implementation of the national population programme.

The objectives are to improve the quality of the population, balancing population growth with socio-economic growth and the capacity to meet the labour force and employment needs; and ensure equal population distribution between urban and rural areas, while ensuring that the population movement is well planned (Lao PDR, NSEDP, 2006)..

Indicator: Population growth rate

The population of the Lao PDR is estimated at 5. 62 million (2005), according to the National Statistics Centre (NSC). It consists of 49 officially recognized ethnic groups, which have their own customs and languages. There are growing gaps in wealth, economic opportunities and access to basic social services among the people living in different geographic regions, topographic conditions (lowland-upland), rural and urban areas as well as among different ethnic groups. In all situations, however, girls and women have less opportunities and access to resources and services than boys and men. People are scattered in 10,552 villages across the country, with an average village size of approximately 500 inhabitants. A typical village has some 80 households and the average household size is 5.9 (2005). Some 62 percent of the population is under the age of 24, 44 percent of the population under the age of 15, and 3.8

percent over the age of 64 (resulting in the high dependency ratio of 76 percent). Life expectancy is 59 years: male 59 years and female 63 years.

Official target: (Lao PDR, NSEDP, 2006)

Target for period 2000-:2005 (Fifth five year development plan)

	Target	Achievement
Total population (2005)	5.9 million	5.61 million
Population growth rate		2%

The target for 2010 is that the population growth will reduce to 1.85%, with the average growth in the five-year period at 1.91% (as compared to 2.12% during 2001-2005). Reduce the fertility rate from 4.5 in 2005 to 3.9 per woman in reproductive age in 2010. Reduce maternal mortality from 405 to 300 per 100,000 live births. Reduce infant mortality below one year (IMR1) from 70 to 55 per 1,000 live births; reduce IMR5 from 98 to 75 per 1,000 live births; and increase average life expectancy from 61 years to 63.5 years during the five-year period.

Trends:

With the annual population growth rate of 2.1 percent (2005), the Lao population is expected to reach 11.4 million, double the present size, by 2040. The high population growth is a result of high fertility and declining mortality. Based on a total fertility rate of 4.9 (2000) and a crude death rate of 9.8 per 1000 people (2005), Lao grows by approximately 153,000 people each year. Limited access to family planning, early marriages, early births and early sexual activity all contribute directly to population growth. Although fertility rates are falling across the population as a whole, there was no evidence of declining adolescent fertility at the time of the last LRHS in 2000. The large cohort of youth entering reproductive age will ensure the absolute number of people added each year will continue to rise.

Table 10-3 shows population projections of Lao PDR in 2006-2020. In 2020. the population of Lao PDR increased with 1,639,600 persons.

Since there is no population projections at provincial level reported in the population and housing census 2005 in Lao PDR, the consultant assumes the population of each province in Lao PDR will have the same growth rate as the national projections. Therefore, population of Bokeo and Luangnamtha province can be projected as shown in Table 10-.4 and figure 2.1.4-15.

There are no data on Oudomxay.

Drivers of trends:

The rapid population increase has serious implications for food consumption, land use, natural resources, housing needs, employment creation and the supply of utilities. Similarly, national budgeting to provide basic services (schools and staff, health facilities and staff) and ensure acceptable living standards for Lao people is of pressing concern. At the household level, a large family puts pressures on household expenditures and assets, often leading to poverty or making it difficult to escape from poverty. As more adolescents reach working age, the competition for scarce employment opportunities will substantially increase in the coming decades. The young population also poses a major challenge for policy-makers and planners in providing accessible education of adequate quality. Population pressures impact on hunger, education, health, environment and gender disparities. In turn, such pressures impact on the Lao PDR's capacity to achieve most if not all of the MDGs.

About 80 percent of the population live in rural areas in the Lao PDR. The distribution of resources, infrastructure, social services and job opportunities strongly favours urban areas. Increasing numbers of young people are moving from rural to urban areas, leading to high rates of urbanization and creating urban poor. The urban growth rate of 4.6 percent in the Lao PDR is the second highest in Southeast Asia, next to 5.5 percent in Cambodia. Both international and internal migration is increasing through major construction works and improved road networks

connecting the Lao PDR to neighbouring countries (China, Thailand and Viet Nam). Consequently, there is an increasing risk of STI/HIV prevalence, human trafficking (discussed in the *Cross Cutting Issues* chapter) and the illegal migration of workers. Illegal migrants are subjected to abuse economically and physically and their rights are often violated. Data on population movement is limited due to the poor civil registration system.

Indicator: Average household size

Target: NA

Trends:

The estimated number of households in Lao PDR is 867 000 and the average household size is 6.1 with a margin of error of + 0.1. The household size is significantly lower in LECS 3 as compared to LECS 2. There is no good explanation to this. However, the LECS 3 estimates seem to be better in line with estimates from the 1995 Census and the population headcounts that have been conducted in 2000 and 2003.

The households are generally larger in the rural areas, the average household size is 6.2 persons in the rural areas whereas urban areas have an average household size of 5.8 persons. Xiengkhuan and Huaphanh provinces have the largest average household size (table 2.1). Within rural areas there is a significantly higher average household size in villages without access to road. (table 2.2).

72 % of the households are located in rural areas. In most provinces the proportion is above 80 %, only in Vientiane Capital just 19% of the households are in rural areas (table 2.3).

Drivers of trends: NA

Indicator: Migration (NA)

Target: NA

(include sources of indicator and target)

Trends: NA

Drivers of trends

Indicators: Trafficking (NA)

Target:

(include sources of indicator and target)

Trends:

Drivers of trends

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- Table 10-2 shows number of population, population density, number and household size by Province in 2005.
- Within the NSEC area, Bokeo Province had 145,263 residents or 2.6% of the total population in Lao PDR. About 13.7% of population lived in urban area and 86.3% lived in rural area. Bokeo Province had 25,470 private households with an average household size of 5.6 persons/household.
- Luangnumtha Province had 145,310 residents or 2.6% of the total population in Lao PDR. Approximately 21.8% live in urban area, and most of the people, 78.2%, live in rural areas. There were 25,943 private households with an average household size of 5.5 persons/household in Luangnamtha in 2005.
- Of the 3 Provinces in the NSEC area, Oudomxay has the highest population, 265,179 residents or 4.7%. of the total population in Lao PDR. Approximately 15.2% live in urban area, and most of the people, 84.8%, live in rural areas. There were 42,546 private households with an average household size of 6.1 persons/household in Oudomxay in 2005.
- Of the 3 Provinces, the population density of Bokeo Province is the highest, with 23.4

persons/km^2, followed by OUdomxay with 17.3 persons/km^2.and Luangnumtha Province's with 15.6 persons/km.

- The Social-economy of Bokeo and Luangnamtha Provinces has been developing at a reasonable pace as indicated by Table 2.5, which shows GDP and GDP per capita growing at an average annual rate of 6.13 percent and 3.63 percent respectively in current prices.

- It trends regarding growth in tourism and industry, it is expected that this trend will continue into the near to mid-term. Note that GDP data for Houay Xai was not available.

- On the other hand, as Table 2.6 indicates, there are still development issues that have to be addressed. For example, the standard of living between the urban and rural areas of Houay Xai District is quite large. In the case of rural villages, only 27 percent of them have electricity while about 95 percent of the villages in the urban area are connected to a power grid. As for piped water, none of the rural villages are yet equipped with this while all of the urban villages are connected to a town water system.

- Regarding medical facilities, there is a provincial hospital in Houay Xai, which might help explain the low number of clinics in the villages. On the other hand, many people from all over Bokeo Province go to this hospital, as there are no district hospitals. Given this, an increase in the overall number of clinics may be needed, as this one hospital is responsible for serving a population much larger than that of just Houay Xai District.

- As for primary schools, about 45 percent of rural villages do not have their own, meaning that small children would have to walk some distance to get to school. For urban villages, this number is slightly higher but is probably due to villages sharing the same school as a result of higher population densities. Concerning access, it does not seem to be a problem for either rural or urban villages, although there are a small number of rural villages (nine) that do not yet have a road.

References/sources:

No references via Phaknakhone, only the ones I got via internet:

- United Nations Common Country Assessment Lao PDR, June 2006
- Committee for Planning and Cooperation National Statistical Centre. 2004. The household of Lao PDR. Social and Economic indicators Lao Expenditure and Consumption Survey 2002/3, LECS 3.
- Lao PDR-Committee for Planning and Investment. 2006. National Socio-Economic Development Plan (NSEDP) (2006-2010).

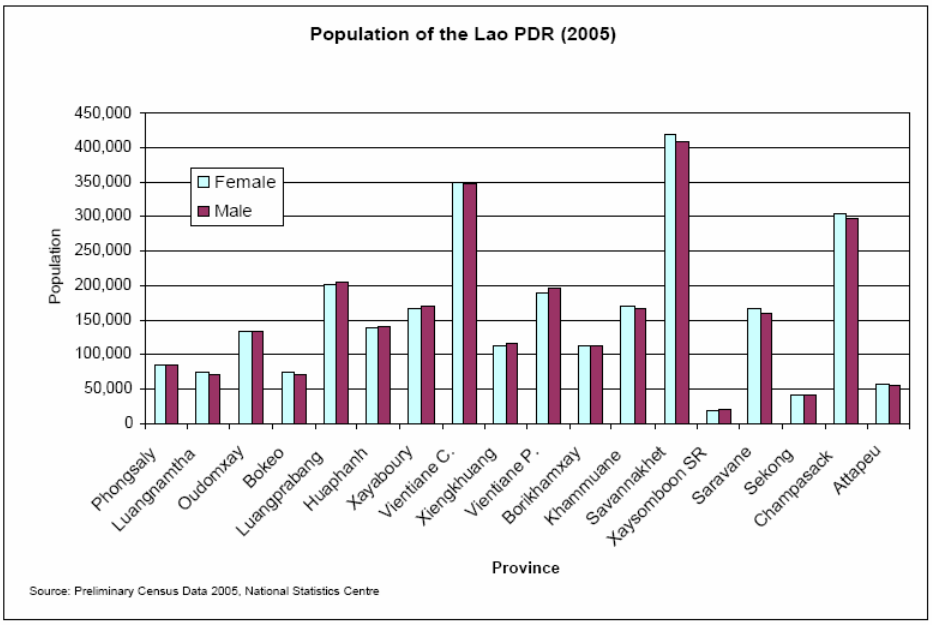
Annexes: (eg. maps, diagrams, tables)

Population distribution by gender, sex ratio, and growth rate by province[11] 2005

	Female	Male	**Total**	% of population in each province	Sex ratio female/male	Population growth rate
North						
Phongsaly	82,838	83,109	**165,947**	3.0	100.33	
Luangnamtha	73,599	71.711	**145,310**	2.6	97.43	
Oudomxay	133,126	132,053	**265,179**	4.7	99.19	
Bokeo	73,162	72,101	**145,263**	2.6	98.55	
Luangprabang	203,429	203,610	**407,039**	7.2	100.09	
Huaphanh	139,372	141,611	**280,938**	5.0	101.64	
Xayaboury	167,633	171,036	**338,669**	6.0	102.03	
Center						
Vientiane C.	349,624	348,694	**698,318**	12.4	99.73	
Xiengkhuang	113,944	115,652	**229,596**	6.0	101.50	
Vientiane P.	191,433	197,462	**388,895**	6.9	103.15	
Borikhamxay	111,293	114,008	**225,301**	4.0	102.44	
Khammuane	171,825	165,565	**337,390**	6.0	96.36	
Savannakhet	419,101	406,801	**825,902**	14.7	97.07	
Xaysomboon SR	18,686	20,737	**39,423**	0.7	110.98	
South						
Saravane	165,508	158,819	**324,327**	5.8	95.96	
Sekong	43,041	41,954	**84,995**	1.5	97.47	
Champasack	306,524	300,846	**607,370**	10.8	98.15	
Attapeu	57,338	54,782	**112,120**	2.0	95.54	
Total	**2,821,431**	**2,800,551**	**5,621,982**	**100.0**	**99.26**	**2.1**
Urban	759,904	763,043	1,522137	27.1	100.5	
Rural with road	1,452,837	1,442,342	2,895,179	51.5	99.3	
Rural without road	607,122	590,947	1,198,069	21.3	97.3	
NS	2,378	4,219	6,597	0.1	177.4	

[11] *Source: Population and Housing Census 2005*

Source: UN CCA



Source: UN CCA

Table 2.1. Household size and number of households by provinces and regions in 2002/03

	Number of households 2002/03 1000	Number of households 1997/98 1000	House-hold size LECS 2002/03	Confidence interval (margin of error)	Household size LECS 1997/98
Lao PDR	***867***	***783***	***6.1***	***± 0.1***	***6.5***
Urban	240	135	5.8	± 0.2	6.3
Rural	627	649	6.2	± 0.1	6.5
North	***266***	***252***	***6.2***	***± 0.2***	***6.4***
Phongsaly	25	26	6.5	± 0.4	6.0
Luangnamtha	23	20	6.0	± 0.3	6.0
Oudomxay	38	34	6.5	± 0.5	6.6
Bokeo	25	21	5.4	± 0.4	5.8
Luangprabang	61	63	6.3	± 0.4	6.3
Huaphanh	37	38	7.3	± 0.3	7.3
Xayaboury	58	50	5.6	± 0.3	6.3
Center	***423***	***374***	***6.0***	***± 0.1***	***6.6***
Vientiane C.	111	92	5.7	± 0.2	6.3
Xiengkhuang	30	32	7.4	± 0.4	7.4
Vientiane P.	62	50	5.9	± 0.3	6.7
Borikhamxay	38	28	5.6	± 0.4	6.2
Khammuane	55	51	5.8	± 0.3	6.5
Savannakhet	122	112	6.3	± 0.2	6.7
Xaysomboon SR	6	9	5.8	± 0.6	6.7
South	***178***	***159***	***5.9***	***± 0.2***	***6.4***
Saravane	51	43	6.0	± 0.3	6.7
Sekong	12	11	6.4	± 0.5	6.7
Champasack	97	89	5.9	± 0.2	6.2
Attapeu	17	16	5.9	± 0.4	6.5

Note: For explanation of confidence interval see page 8

Source: LECS III, 2004

Table 2.2: Average household size by type of area in 2002/03

	Urban	Rural with access to road	Rural with-out access to road	Total
Lao PDR	5.8	6.0	6.6	6.1
North	5.8	6.0	7.0	6.2
Center	5.8	6.1	6.4	6.0
South	5.6	6.0	6.1	5.9

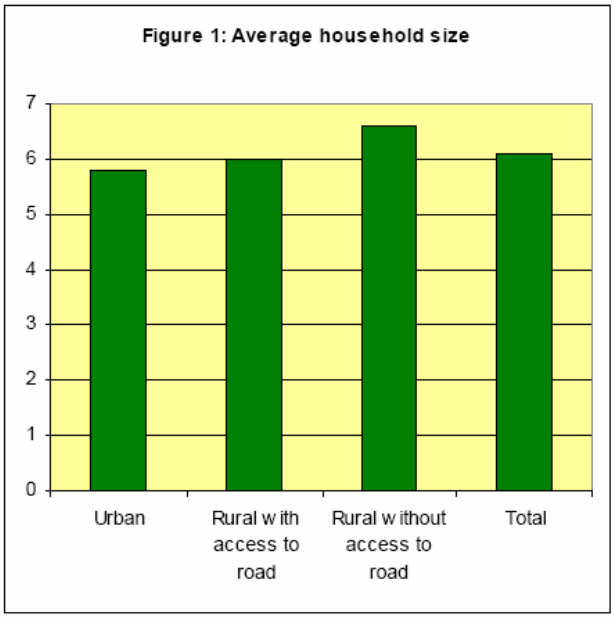


Table 2.3: Number of households by province and type of area in 2002/03, 1000 households

	Urban areas	Rural areas with access to road	Rural areas without access to road	Total	% Rural areas
Lao PDR	***240***	***470***	***157***	***867***	***72***
North	***47***	***152***	***67***	***266***	***82***
Phongsaly	4	8	13	25	85
Luangnamtha	5	11	7	23	80
Oudomxay	7	18	13	38	81
Bokeo	2	21	2	25	92
Luangprabang	12	34	14	61	80
Huaphanh	6	18	13	37	84
Xayaboury	12	42	4	58	79
Center	***162***	***212***	***48***	***423***	***62***
Vientiane C.	90	21	-	111	19
Xiengkhuang	6	11	13	30	80
Vientiane P.	12	47	3	62	80
Borikhamxay	10	19	10	38	74
Khammuane	10	41	4	55	81
Savannakhet	33	70	19	122	73
Xaysomboon SR	1	5	-	6	82
South	***31***	***105***	***42***	***178***	***83***
Saravane	4	19	28	51	93
Sekong	2	7	3	12	83
Champasack	23	68	6	97	77
Attapeu	2	11	4	17	87

Table 10.2: Number of population, population density, number of Household and Household size by Province in 2005

Province	Population	Population In Urban area	Population In Rulal area	Area (Km^2)	Population Density (persons/km^2)	Private Household	Private Household Size
Vientiane Capital	698,318	82.4%	17.6%	3,920	178.1	125,625	5.2
Phongsaly	165,947	12.6%	87.4%	16,270	10.2	28,340	5.8
Luangnamtha	145,310	21.8%	78.2%	9,325	15.6	25,943	5.5
Oudomxay	265,179	15.2%	84.8%	15,370	17.3	42,546	6.1
Borkeo	145,263	13.7%	86.3%	6,196	23.4	25,470	5.6
Luangprabang	407,039	18.8%	81.2%	16.875	24.1	69.592	5.7
Huaphanh	280,938	11.8%	88.2%	16.500	17.0	43.182	6.5
Xayabury	338,669	22.7%	77.3%	16.389	20.7	62.092	5.4
Xiengkhuang	229,596	21.1%	78.9%	15,880	14.5	35,942	6.3
Vientiane	388,895	23.6%	76.4%	18.526	21.0	68.584	5.5
borikhamxay	225,301	26.3%	73.7%	14.863	15.2	38.182	5.8
Khammuane	337,390	21.3%	78.7%	16,315	20.7	61.081	5.5
Savannakhet	825,902	22.4%	77.6%	21,774	37.9	130.399	6.3
Saravane	324,327	8.6%	91.4%	10,691	30.3	52,676	6.1
Sekong	84,995	21.3%	78.7%	7665	11.1	12,533	6.7
champasack	607,370	20.5%	79.5%	15,415	39.4	104,249	5.7
Attapeu	112,120	17.0%	83.0%	10,320	10.9	19,708	5.6
Xaysomboon	39,423	17.5%	82.5%	4,506	8.7	6,242	5.9

SR							
Total	5,621,982	27.1%	72.9%	236,800	23.7	952,386	5.8

Source: results from the population and housing Census 2005 in Lao people Democratic republic, steering committee for Census of population and housing

Table 10-3: Population Projection in 2006-2020

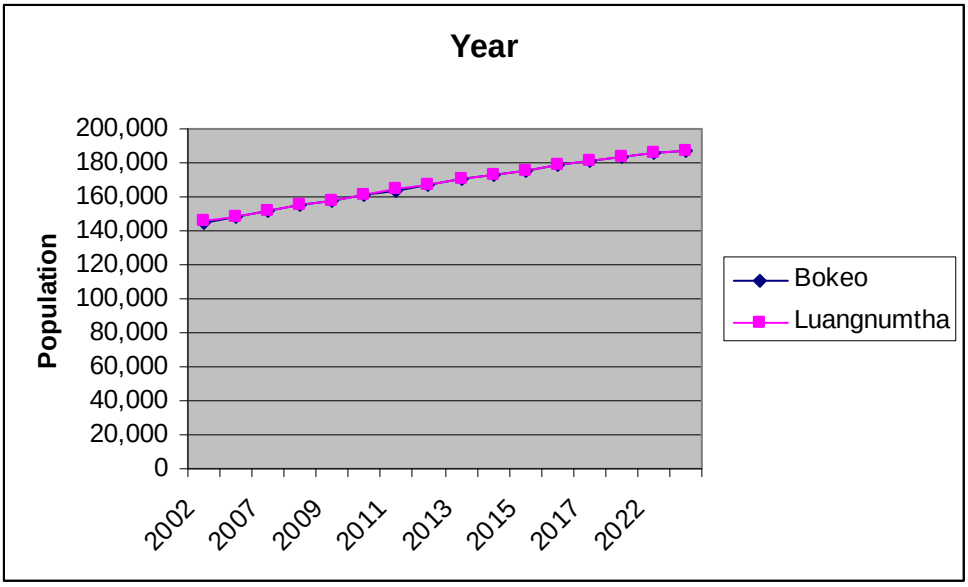
Year	Population	Growth Rate
2005	5,622,000	
2006	5,746,200	2.2%
2007	5,868,800	2.1%
2008	5,990,100	2.1%
2009	6,110,600	2.0%
2010	6,230,200	2.0%
2011	6,348,800	1.9%
2012	6,465,800	1.8%
2013	6,580,800	1.8%
2014	6,693,300	1.7%
2015	6,802,00	1.6%
2016	6,906,200	1.5%
2017	7,005,200	1.4%
2018	7,097,900	1.3%
2019	7,183,500	1.2%
2020	7,261,600	1.1%

Source: results from the population and housing Census 2005 in Lao people Democratic republic,
steering committee for Census of population and housing

Table 10-4: Population Projection of Bokeo and Luangnumtha Province

Year	Bokeo	Luangnumtha
2005	145,263	145,310
2006	148,459	148,507
2007	151,576	151,625
2008	154,760	154,810
2009	157,855	157,906
2010	161,012	161,064
2011	164,071	164,124
2012	167,024	167,078
2013	170,031	170,086
2014	172,921	172,977
2015	175,688	175,745
2016	178,323	178,381
2017	180,820	180,878
2018	183,171	183,230
2019	185,369	185,429
2020	187,408	187,468

Population Projection of Bokeo and Luangnumtha Province



Source: the consultant

Table 10-5. Growth in GDP for Bokeo Province from 1998 to 2004

Year	GDP in Current Prices (billion kip)	Annual Growth in GDP	GDP/Capita in Current Prices (million kip)	Annual Growth in GDP/Capita
2000	388.8	-	3.13	-
2001	410.7	5.63%	3.28	4.79%
2002	435.1	5.94%	3.35	2.13%
2003	462.1	6.21%	3.43	2.39%
2004	493.2	6.73%	3.61	5.25%
Av. Annual Growth Rate (2000-2004)		6.13%		3.63%

Source: Committee of Planning & Cooperation, Houay Xai District.

Table 10-6. Development Indicators for Houay Xai (as of March 2005)

Type of Village	Total No. of Villages	Villages Without Roads	Villages Without Electricity	Villages Without Piped Water	Villages Without Clinic	Villages Without Primary School
Villages in Urban Area	21	0 0.00%	1 4.76%	12 57.14%	20 95.24%	10 47.62%
Villages in Rural Area	100	9 9.00%	73 73.00%	100 100.00%	92 92.00%	45 45.00%

Source: Committee of Planning & Cooperation, Houay Xai District

Social
Template 11: Natural disasters
Key issue S5: Natural disasters

Introduction:

During 2006 localised flash floods in Luang Namtha and Attapeu provinces were the only noteworthy flood incidents that occurred in Lao PDR (Figure 27). Events in Luang Namtha during the second week of August were in response to orographically (no idea what this is) induced monsoonal storms which produced 230 mm to 270 mm of rainfall over the first 10 days of the month. The flooding in Attapeu province during the first week of October was attributable to the Severe Tropical Storm Xangsane. Elsewhere the only meteorological episodes of any significance were local storms over Vientiane which caused brief urban flooding in March, May and October and a highly localised 'whirlwind' which moved at high speed through the Chanthabouly district of the capital at 7:25 pm on the 5th May, with wind speeds of over 100 kph (30 m/sec) causing severe structural damage to numerous buildings.

Descriptor: Flash floods
Official target: NA
Description:

The rainfall from the local monsoonal storms during early August 2006 reached maximum intensities on the 6th and 7th of the month, with over 100 mm rainfall for the two days. In response the Luang Namtha River rose over 5 metres in 12 hours and inundated its natural floodplain to a depth of more than 1.2 metres. At Hongleuai hydrometric station the maximum water level of 13.25 m was more than 3 metres higher than the danger level. The resulting flash flood inundated 132 villages, and affected 1,916 households in the NamTha, Long, Sing, Viengphoukha and Nale districts. (Plates 1 and 2).

This local flash flooding in the far north and far south of Lao PDR during May and October affected over 400 villages and 13,500 households, according to Ministry of Agriculture and Forestry and National Disaster and Management Organisation figures. Five people were killed and almost seven million hectares of rice and other crops were damaged. There were some livestock losses and some damage to national infrastructure was recorded. Direct economic losses are estimated to have been US$3 million, which is a comparatively small figure and less than 20% of the economic losses incurred in 2005, which was not in itself a year of particularly severe or extensive flooding.

Plates 1 and 2. Army and police supervise the evacuation of residents of Dounamphanh village and locals begin to clear rubbish trapped in the Luang Namtha weir (August 2006).

Drivers of trends: NA

Indicator/Descriptor: Earthquakes
Target: NA

Trends/description:

Eleven aftershocks of the magnitude between 4.2-4.9 on the Richter scale were felt in Laos, Burma, and Thailand throughout the night of April 16th, 2007 following two earthquakes of larger magnitudes that occurred on the night of April 15th and the afternoon of the 16th in the Golden Triangle area between the three neighboring countries, which experts say resulted from the earthquake under the Andaman Sea that created a disastrous tsumani in December 2004.

Experts add that the region faces more earthquake risks as more cracks under the earth crust, caused by the December 2004 earthquake, have been discovered in the Golden Triangle area. They say an earthquake of a 7.0 magnitude in that area would be catastrophic because it could cause serious structural damage to many dams in the region, evantually leading to dam collapses and flooding

The high earthquake-risk area in Laos are said to be the provinces of Bokeo, Oudomxay, and Luang Namtha.
Sources : http://www.voanews.com/lao/archive/2007-05/2007-05-18-voa3.cf

Drivers of trends: NA

Indicator/Descriptor: Landslides and erosion

Target: NA

Trends/description:
Erosion and Instability of earthworks, steep slopes made by cutting soils for construction of road, earthworks in some sections along the road3, are subjects to erosion during the rainy season. In some cases it could become so larges to create land slips or even larger landslides. A certain amount of accelerated erosion is inevitable during heavy rains, causing heavy large landslides.

Erosion from Disposal of Cut Spoil
Spoil disposal can cause severe sediment impacts, particularly where the spoil is disposed of in steep areas, or where the spoil is not properly stabilized. Since much of the project road alignment follows rivers and streams, careless disposal of cut spoil would have severe effects on adjacent watercourses.

Erosion of lands below the roadbed receiving concentrated outflow carried by drainage structures in some sections, where drainage is diverted by road works, increased flows in the discharge area can cause severe erosion at the point where the water is released from the drainage structure. Or it is probable that further downstream where a number of drainage discharges come together to produce high flow volumes.

Sources: ESD-TAT, field survey on July, 2008

Relevant laws, policies, plans and institutional arrangements:
NA

Problems and issues encountered during data collection:
NA

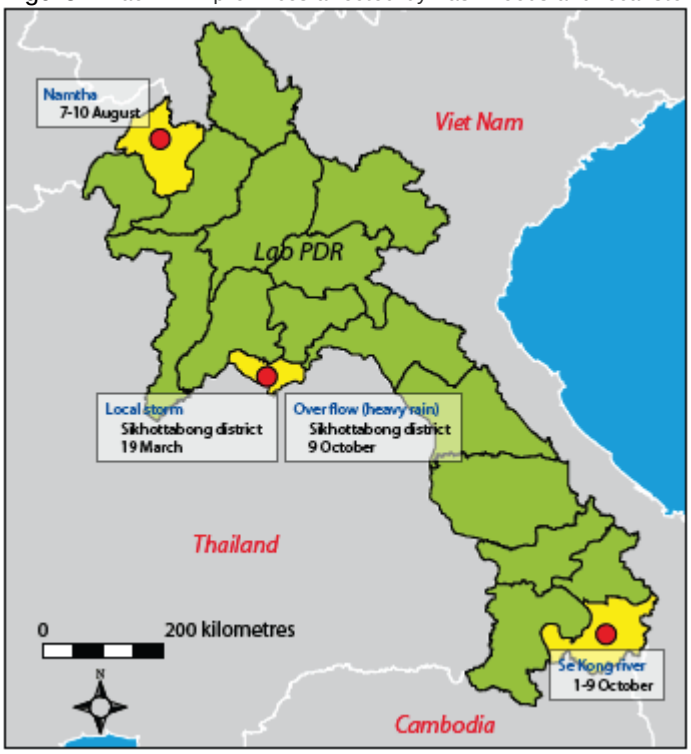
Summary of main concerns for the NSEC:

- Flash flooding caused by monsoon induced rainfall, landslides and earthquakes are the most significant natural disasters in the area.

References/sources:

Annexes: (eg. maps, diagrams, tables)

Figure 1 Lao PDR—provinces affected by flash floods and local storms during 2006.



Lessons Learnt from flash floods

- The Department of Meteorology and Hydrology operational staff concerned with extreme weather events, typhoons, floods, flood monitoring and forecasting successfully consolidated their experience and expertise during the events of 2006.
- A meeting one month before the start of the monsoon season of the National Disaster Management Committee, with representatives drawn from 13 ministries, and with the aim of clarifying responsibilities and coordination was found to be most useful. A second annual post flood season meeting to assess the performance of the relevant agencies and ministries would have significant additional benefit.
- Effective medium and long-term flood forecasts are required to prepare the agricultural sector, the national flood management programme and the relevant national agencies for the management and mitigation of flood impacts.
- The weather, typhoon and flood forecasting skills as well as the procedures for issuing and disseminating flood warnings from the Department of Meteorology and Hydrology must continue to be improved from year to year. Official procedures to ensure even closer coordination between the Department, the mass media, relevant ministries and line agencies should be prepared.
- Knowledge and experience of flash floods and the ability to forecast them needs to be improved and the facility to communicate and disseminate warnings to high risk areas requires more consideration. A start lies in identifying, zoning and mapping these high

risk areas.

- Close coordination with the Regional Flood Management and Mitigation Centre in Phnom Penh is essential and should be further reinforced.

Social: Thailand

Social

Template 8: Education and capacity

Key issue S2 Education and capacity building HRD

Introduction:

Table 1 shows the number and percentage of population with different highest education levels of the provinces along the corridor, in 2004. On average the percentage of population with secondary school as highest level of education was 6.27 in 2004. Tak, Kamphaeng Phet and Chiang Rai were the provinces with low percentage at 3.23, 4.15 and 5.13, respectively. The average percentage of population with vocational training as highest level was 3.05. Tak, Kamphaeng Phet and Sukhothai were the provinces with low percentage at 1.24, 1.37 and 1.99, accordingly. The average percentage of population with bachelor and graduate level was 2.12 and 0.20.

Tak, Kamphaean Phet, Chiang Rai and Sukhothai had the lowest percentage of population with at least secondary education. The percentage was less than 10 percent in 2004.

The main weakness considered in the curriculum in Thailand, especially in the secondary level, is lack of practice and application to every day life. Curriculum revision has been made at all levels of education to include application and hand-on practice so new workforce can be productive within a brief period of transition.

Table 1 Educational level in 2004 (thousand persons)

Province	Population		Secondary		Vocational training		Bachelor		Graduate	
	Total	%	Total	%	Total	%	Total	%	Total	%
Chiang Rai	945.0	100	48.5	5.13	21.1	2.24	16.5	1.74	1.3	0.13
Phayao	376.9	100	28.9	7.65	12.3	3.26	8.2	2.18	0.5	0.12
Chiang Mai	1,112.1	100	71.3	6.41	39.6	3.56	31.6	2.84	3.4	0.30
Lamphun	296.9	100	25.9	8.74	13.5	4.55	8.2	2.75	0.6	0.20
Lampang	563.4	100	37.4	6.63	19.5	3.45	11.2	2.00	0.6	0.11
Tak	337.1	100	10.9	3.23	4.2	1.24	3.7	1.11	0.3	0.09
Sukhothai	409.5	100	21.7	5.29	8.2	1.99	8.3	2.02	1.2	0.28
Phitsanulok	558.5	100	39.7	7.11	19.9	3.57	10.8	1.94	1.3	0.24
Kamphaeng Phet	504.4	100	20.9	4.15	6.9	1.37	6.3	1.26	0.9	0.19
Nakhon Sawan	741.5	100	43.4	5.85	19.5	2.63	12.6	1.70	1.2	0.16
Chai Nat	285.7	100	18.4	6.43	9.0	3.13	5.5	1.91	0.4	0.15
Sing Buri	143.0	100	12.2	8.55	6.4	4.49	4.4	3.07	0.5	0.37
Lop Buri	Data not available									
Saraburi	340.0	100	28.4	8.35	14.1	4.16	8.1	2.38	0.5	0.14
Ayutthaya	485.9	100	40.0	8.23	21.8	4.50	13.2	2.71	1.0	0.20
Pathum Thani	379.2	100	21.6	5.71	12.1	3.18	10.1	2.66	1.0	0.27
Bangkok	Data not available									
Average of 15 provinces	7,479	100	469.2	6.27	228.1	3.05	158.7	2.12	14.7	0.20

Source: National Statistical Office, year?

Seems a bit weird to me that there are no data available on education in Bangkok????

Population with at least secondary school education

In table 2 the population with at least secondary school education is presented. Chiang Rai, Tak, Sukhothai, Kamphaeng Phet, and Nakhon Sawan are below the average of 11.64% of the 15 provinces.

Table 2 Population with at least secondary school education in 2004
(thousand persons)

Province	Population		Population with at least second school education	
	Total	%	Total	%
Chiang Rai	945.0	100	87.4	9.24
Phayao	376.9	100	49.9	13.21
Chiang Mai	1,112.1	100	145.9	13.11
Lamphun	296.9	100	48.2	16.24
Lampang	563.4	100	68.7	12.19
Tak	337.1	100	19.1	5.67
Sukhothai	409.5	100	39.4	9.58
Phitsanulok	558.5	100	71.7	12.86
Kamphaeng Phet	504.4	100	35.0	6.97
Nakhon Sawan	741.5	100	76.7	10.34
Chai Nat	285.7	100	33.3	11.62
Sing Buri	143.0	100	23.5	16.48
Lop Buri	Data not available			
Saraburi	340.0	100	51.1	15.03
Ayutthaya	485.9	100	76.0	15.64
Pathum Thani	379.2	100	44.8	11.82
Bangkok	Data not available			
Average of 15 provinces	7,479.1	100	870.7	11.64

Source: National Statistical Office, yesr?

Gender

Table 3 shows the gender differences in education in 2004

Conclusion(s) regarding gender????

- For secondary and vocational training rather equal, some provinces % of male is slightly higher than female
- Bachelor: % of female higher than male
- Graduate: differs per province.

(thousand persons)

Province	Secondary			Vocational training			Bachelor			Graduate		
	Total	M	F	Total	M	F	Total	M	F	Total	M	F
Chiang Rai	48.5	24.7	23.8	21.1	10.5	10.6	16.5	7.8	8.6	1.3	0.7	0.5
Phayao	28.9	15.1	13.8	12.3	6.1	6.2	8.2	3.8	4.4	0.5	0.3	0.2
Chiang Mai	71.3	35.9	35.4	39.6	19.7	19.9	31.6	15.3	16.3	3.4	1.6	1.7
Lamphun	25.9	13.1	12.9	13.5	6.8	6.7	8.2	3.8	4.4	0.6	0.3	0.3
Lampang	37.4	18.8	18.6	19.5	9.6	9.9	11.2	5.2	6.0	0.6	0.3	0.3
Tak	10.9	5.8	5.0	4.2	2.2	2.0	3.7	1.7	2.0	0.3	0.1	0.2
Sukhothai	21.7	10.9	10.7	8.2	4.0	4.1	8.3	3.8	4.5	1.2	0.6	0.6
Phitsanulok	39.7	19.7	20.0	19.9	9.7	10.3	10.8	4.9	5.9	1.3	0.6	0.7
Kamphaeng Phet	20.9	10.6	10.3	6.9	3.4	3.5	6.3	2.9	3.4	0.9	0.4	0.5
Nakhon Sawan	43.4	21.7	21.7	19.5	9.8	9.7	12.6	5.7	6.9	1.2	0.6	0.6
Chai Nat	18.4	9.4	9.0	9.0	4.5	4.5	5.5	2.5	2.9	0.4	0.2	0.2
Sing Buri	12.2	6.2	6.0	6.4	3.1	3.3	4.4	1.9	2.5	0.5	0.3	0.3
Lop Buri	Data not available											
Saraburi	28.4	14.2	14.2	14.1	7.2	7.0	8.1	3.5	4.6	0.5	0.3	0.2
Ayutthaya	40.0	19.4	20.6	21.8	10.6	11.3	13.2	5.9	7.3	1.0	0.4	0.6
Pathum Thani	21.6	10.7	11.0	12.1	6.1	6.0	10.1	4.4	5.7	1.0	0.5	0.5
Bangkok	Data not available											

Source: National Statistical Office, year?

Labour force in manufacturing and hotel sector

The labour force in the manufacturing and hotel sector is shown in Table 4. Concerning the manufacturing sector, it can be said that this sector of the provinces in the central region demanded higher percentage of work force than the provinces in the northern region. There was, however, no marked difference in the percentage of employment in the hotel sector among the provinces along the corridor. The percentage was less than 10 percent in 2006.

Table 4 Employment in manufacturing and hotel sector in 2006

Provinces/Sector	Total	Manufacturing	Percent	Hotel	Percent
Chiang Rai	702,879	68,528	9.75	39,122	5.57
Phayao	274,750	25,567	9.31	11,356	4.13
Chiang Mai	904,233	141,925	15.70	63,965	7.07
Lamphun	219,828	57,039	25.95	9,246	4.21
Lampang	420,410	68,009	16.18	20,933	4.98
Tak	243,316	23,432	9.63	12,584	5.17
Sukhothai	319,984	26,532	8.29	15,341	4.79
Phitsanulok	428,822	36,007	8.40	27,936	6.51
Kamphaeng Phet	451,178	23,041	5.11	19,428	4.31
Nakhon Sawan	576,493	58,450	10.14	29,500	5.12

Chai Nat	213,770	26,278	12.29	12,345	5.77
Sing Buri	126,705	27,679	21.85	7,315	5.77
Lop Buri	422,512	80,166	18.97	28,003	6.63
Saraburi	387,021	142,526	36.83	28,422	7.34
Ayutthaya	398,507	166,889	41.88	32,176	8.07
Pathum Thani	440,947	171,248	38.84	35,249	7.99

Source: National Statistical Office

Indicator: Level of education

Official target: N/A

Trends: N/A

Summary of main concerns for the NSEC:

- The percentage of the population that has reached secondary education as the highest level of education is fairly low in all the provinces along the NSEC (average 6%). The percentage of the population that has received vocational training averages at 3%.
- Percentages of graduates and bachelors are also in the range of 1 to 2%. There are no great differences in educational achievement by gender.

Social

Template 7: Poverty reduction

Key issue S1: Poverty reduction (improve the standard of living, local community development, ethnic minority well-being)

Key Issue S5: Retention of ethnic cultures and traditions (Impact to Mekong culture diversity)

Key Issue S6. Empowerment of disadvantaged groups (information, participation in decision making)

Introduction:

The poverty line is defined as money required per person per month in order to acquire goods and services for basic needs. A person who earns less than the poverty line is considered poor. It was found in 2007 that the poverty line for the corridor provinces ranged from 1,300 to 1,500 baht per person per month. Bangkok, with its high cost of living, is an exception, with a poverty line of 2,065 baht. The percentage of population with an income below the poverty line indicates a poverty incidence in the province.

Indicator: poverty incidence

Target: N/A

Trends:

The percentage of population below the poverty line has decreased since the year 2000, but showed an increase in 2007 in about half of the provinces along the corridor, namely Chiang Mai, Lampang, Sukhothai, Pitsanulok, Kamphaeng Phet, Nakhon Sawan, Chai Nat, Saraburi and Bangkok (Table 3).

In 2007 8.5 percent of the population was below the poverty line for the whole country. Chiang Rai, Chiang Mai, Lampang, Tak, Sukhothai, Pitsanulok and Nakhon Sawan were thus considered worse off than the country average in terms of percentage of poor people.

Table 1 Average income

	Income (baht/person/month)				
	2000	2002	2004	2006	2007
Whole country	3,372	3,867	4,331	5,221	5,532

Source: National Economic and Social Development Board, year?

Table 2 Exchange rate (baht/us$)

Year	2002	2003	2004	2005	2006	2007
Baht per US$	43.0041	41.5303	40.2699	40.2697	37.9286	34.5637

Source: Bank of Thailand, year?

Table 3 Poverty line and percentage of population below poverty line

Province	Poverty line (baht/person/month)					Percentage of population below poverty line				
	2000	2002	2004	2006	2007	2000	2002	2004	2006	2007
Chiang Rai	995	1,062	1,135	1,268	1,333	34.46	12.39	13.12	15.63	14.44

Phayao	1,039	1,094	1,159	1,303	1,375	19.57	18.34	16.89	7.99	4.45
Chiang Mai	1,067	1,132	1,156	1,320	1,394	17.86	23.28	20.76	8.80	9.00
Lamphun	1,048	1,107	1,170	1,320	1,378	10.02	11.17	8.95	4.66	4.05
Lampang	1,038	1,091	1,152	1,282	1,365	23.69	32.74	14.06	9.44	14.56
Tak	989	1,054	1,113	1,263	1,310	34.70	44.17	36.93	20.94	17.86
Sukhothai	1,008	1,078	1,140	1,254	1,313	18.49	15.45	9.81	12.10	19.27
Phitsanulok	1,013	1,084	1,134	1,273	1,324	32.83	16.57	10.33	8.59	8.90
Kamphaeng Phet	992	1,035	1,075	1,226	1,278	5.83	2.53	8.05	3.32	5.36
Nakhon Sawan	1,024	1,079	1,151	1,267	1,318	15.63	13.66	12.16	9.13	12.32
Chai Nat	1,234	1,263	1,321	1,448	1,485	5.65	13.43	7.23	6.30	6.70
Sing Buri	1,186	1,266	1,344	1,431	1,452	6.75	6.51	5.25	4.78	1.48
Lop Buri	1,181	1,255	1,278	1,441	1,465	10.78	18.97	5.25	4.22	2.97
Saraburi	1,223	1,309	1,321	1,485	1,538	7.68	9.86	4.41	3.20	3.53
Ayutthaya	1,215	1,280	1,362	1,505	1,485	1.80	5.54	4.97	0.50	0.06
Pathum Thani	1,259	1,298	1,308	1,409	1,458	3.28	1.88	0	0.56	0.20
Bangkok	1,736	1,801	1,853	2,020	2,065	1.71	2.24	0.78	0.51	1.14
Whole country	1,135	1,190	1,242	1,386	1,443	20.98	14.93	11.16	9.55	8.48

Source: National Economic and Social Development Board, year?

Description: Minority groups

The minority group concerned within the provinces along the corridor are people who live in the highlands. They are Karen, Meo, Yao, Lahu, Lisu, Akha, Lua and others. According to the survey done in 2002 by the Community Development Department, there were 923,257 minorities with 186,413 families in 164,637 households in 3,422 villages located in Chiang Rai, Chiang Mai, Lamphun, Payao, Lampang, Tak, Sukhothai, Pitsanulok, Mae Hong Son, Nan, Phrae, Kamphaeng Phet, Phetchabun, Kanchanaburi, Uthai Thani, Phetchaburi, Suphan Buri, Ratchaburi, Prachuap Khiri Khan, Nakhon Sawan and Loei. Karen was

accounted for 47 percent of the minority group.

The minority group resides in 10 provinces along the corridor. There were 312,447 minorities with 70,820 families in Chiang Mai. The number of minorities in other provinces along the corridor are not available.

The concerns on the minority group are
1. Administration. The minority groups settle in prohibited areas which makes it difficult to legalize the settlement. Surveillance is hampered as migration takes place along the entire mountainous border.
2. Drugs Some minorities are still involve in drug related activities.
3. AIDS With increasing interaction with the rest of the population, AIDS has spread among minorities.
4. Low quality of life. Although their quality of life has been improved, it can still be considered below standard.
5. Loss of cultural identity. Due to limited land for agriculture, some move to work in the urban area leaving behind their dependents. They are subject to be taken advantage and the adaptation to an new environment causes them to deviate from their unique culture.
The Thai government has formulated an integration policy. The minority group is treated as Thai citizen. Basic services are provided and permanent settlement is encouraged in order for them to be self-sufficient without involvement in forest encroachment and drug abuse.

Summary of main concerns for the NSEC:

- The percentage of population below the poverty line has decreased since the year 2000, but showed an increase in 2007 in about half of the provinces along the corridor, namely Chiang Mai, Lampang, Sukhothai, Pitsanulok, Kamphaeng Phet, Nakhon Sawan, Chai Nat, Saraburi and Bangkok (Table 3).
- In 2007 8.5 percent of the population were below the poverty line for the whole country. Chiang Rai, Chiang Mai, Lampang, Tak, Sukhothai, Pitsanulok and Nakhon Sawan were thus considered worse off than the country average in terms of percentage of poor people.
- Minority groups reside in 10 provinces along the corridor. There were 312,447 ethnic minority members with 70,820 families in Chiang Mai. Figures for other provinces along the corridor are not available.
- Some issues of concern with respect to ethnic minorities are highlighted:

1. Administration. The minority groups settle in prohibited areas which makes it difficult to legalize the settlement. Surveillance is hampered as migration takes place along the entire mountainous border.
2. Drugs Some minorities are still involve in drug related activities.
3. AIDS With increasing interaction with the rest of the population, AIDS has spread among minorities.
4. Low quality of life. Although their quality of life has been improved, it can still be considered below standard.
5. Loss of cultural identity. Due to limited land for agriculture, some move to work in the urban area leaving behind their dependents. They are subject to be taken advantage and the adaptation to an new environment causes them to deviate from their unique culture.
The Thai government has formulated an integration policy. The minority group is treated as Thai citizen. Basic services are provided and permanent settlement is encouraged in order for them to be self-sufficient without involvement in forest encroachment and drug abuse.

Social

Template 9: Public health

Key issue S3: Quality of Life (including: public health, safety, noise, smell, communicable disease)

Introduction:

The Department of Disease Control monitors the following communicable diseases closely: African hemorrhagic fever, hand, foot and mouth, influenza virus, tuberculosis, bird flu, meningococcal meningitis, severe acute respiratory syndrome (SARS), poliomyelitis, rabies, and AIDS. Some of these had been considered no threat until recently.

Descriptor: Communicable diseases

Target: NA

Trends

Almost one-to two-third of the provinces along the corridor were found having higher cases per million persons than the whole country for African hemorrhagic fever and AIDS in 2006, respectively (Table 1).

The number of AIDS cases is clearly down from 2002 to 2007, with the exception of Sukhothai, Nakhon Sawan and Ayutthaya, which show an increase in the number of cases in 2007 compared with 2006 (Table 2).

The number of bird flue cases is showing a declining trend since 2004, with no cases in 2007 (Table 4)

Table 1 African hemorrhagic fever in 2006

Province	Population	Case	Death	Case per million persons	Death per million persons
Chiang Rai	1,225,386	113	0	9.22	0.00
Phayao	486,554	80	0	16.44	0.00
Chiang Mai	1,654,154	895	1	54.11	0.06
Lamphun	405,146	287	0	70.84	0.00
Lampang	775,259	207	0	26.70	0.00
Tak	524,938	754	0	143.64	0.00
Sukhothai	609,591	234	0	38.39	0.00
Phitsanulok	842,739	485	0	57.55	0.00
Kamphaeng Phet	728,293	613	0	84.17	0.00
Nakhon Sawan	1,076,911	1,145	2	106.32	0.19
Chai Nat	339,568	163	0	48.00	0.00
Sing Buri	217,357	102	0	46.93	0.00
Lop Buri	752,364	809	0	107.53	0.00
Saraburi	605,897	298	1	49.18	0.17
Ayutthaya	750,757	381	0	50.75	0.00
Pathum Thani	838,371	658	1	78.49	0.12

Bangkok	5,677,455	7,632	13	134.43	0.23
Whole country	62,623,416	46,829	59	74.78	0.09

Source: Department of Disease Control, year?

Table 2 AIDS cases

Province	2002	2003	2004	2005	2006	2007
Chiang Rai	1,195	1,377	1,985	1,251	946	647
Phayao	817	783	667	566	429	382
Chiang Mai	1,010	1,157	1,016	941	826	584
Lamphun	354	277	244	163	120	79
Lampang	730	686	488	260	138	79
Tak	108	212	233	73	47	16
Sukhothai	229	233	192	163	95	106
Phitsanulok	266	245	325	232	237	125
Kamphaeng Phet	288	281	427	222	265	198
Nakhon Sawan	321	325	395	294	226	286
Chai Nat	76	55	92	47	46	25
Sing Buri	54	95	95	95	60	61
Lop Buri	222	209	293	212	208	204
Saraburi	141	99	101	68	67	54
Ayutthaya	388	373	369	297	213	233
Pathum Thani	541	497	581	394	431	224
Bangkok	2,970	2,902	2,968	2,658	2,568	2,162
Whole country	25,329	26,366	28,361	21,328	17,333	11,903

Source: Department of Disease Control

Table 3 AIDS in 2006

Province	Population	Case	Case per million persons
Chiang Rai	1,225,386	946	77.20
Phayao	486,554	429	88.17
Chiang Mai	1,654,154	826	49.93
Lamphun	405,146	120	29.62
Lampang	775,259	138	17.80
Tak	524,938	47	8.95
Sukhothai	609,591	95	15.58
Phitsanulok	842,739	237	28.12
Kamphaeng Phet	728,293	265	36.39
Nakhon Sawan	1,076,911	226	20.99
Chai Nat	339,568	46	13.55
Sing Buri	217,357	60	27.60

Lop Buri	752,364	208	27.65
Saraburi	605,897	67	11.06
Ayutthaya	750,757	213	28.37
Pathum Thani	838,371	431	51.41
Bangkok	5,677,455	2,568	45.23
Whole country	62,623,416	17,333	27.68

Source: Department of Disease Control

Table 4 Bird flu case

2004		2005		2006		2007	
Case	Death	Case	Death	Case	Death	Case	Death
17	12	5	2	3	3	0	0

Source: Department of Disease Control

Table 5 Exchange rate (baht/us$)

Year	2002	2003	2004	2005	2006	2007
Baht per US$	43.0041	41.5303	40.2699	40.2697	37.9286	34.5637

Source: Bank of Thailand

Descriptor: Accidents

Target: NA

Trends

Accidents are the major cause of death in Thailand with considerable loss in property and medical expenses. The reported accident statistics are shown in the tables 6-16, per province.

In 2003 all provinces show an increase in accidents, particularly the number of casualties. Chiang Mai, Lampang, Sukhothai, Phitsanulok, Kamphaeng Phet, Nakhon Sawan, Chai Nat, Sing Buri, Lop Buri and Ayutthaya show an increase accidents in 2005-2006. Kamphaeng Phet shows a high number of injured and death people in 2005, Saraburi in 2004 and 2005. .

In Bangkok the number of people killed by accidents decreased since 2002, but the number of injured people increased in 2003 and stayed at around 22,000 until 2006.

The Road Safety Center, Department of Disaster Prevention and Mitigation continuously launches campaigns and introduces measure to minimize accidents.

Table 6 Reported accident in Chiang Rai

Year	Number of	Number of casualties	Property damaged

	accidents			
2002	2,388	70	1,988	-
2003	1,205	281	1,331	34,710,100
2004	1,453	282	1,505	20,221,300
2005	850	196	1,138	22,117,300
2006	614	190	846	21,400,300

Table 7 Reported accident in Phayao

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	397	103	437	7,475,800
2003	500	111	513	5,618,070
2004	646	102	509	8,957,470
2005	424	103	507	7,594,170
2006	340	96	433	5,217,800

Table 8 Reported accident in Chiang Mai

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	4,934	397	4,537	44,380,340
2003	5,109	500	4,609	55,566,085
2004	6,809	436	6,373	54,608,809
2005	12,335	1,146	11,189	52,846,567
2006	5,970	689	5,281	32,510,391

Table 9 Reported accident in Lamphun

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	

2002	653	151	347	4,736,750
2003	226	160	216	3,938,100
2004	431	189	398	3,533,900
2005	407	159	366	3,348,050
2006	221	108	219	2,452,100

Table 10 Reported accident in Lampang

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	335	149	447	14,423,357
2003	389	202	610	16,723,910
2004	509	164	820	18,872,162
2005	627	146	690	20,653,590
2006	426	165	577	25,793,150

Table 11 Reported accident in Tak

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	-	-	-	-
2003	-	-	-	-
2004	517	104	634	8,443,286.00
2005	518	128	562	4,650,293.00
2006	486	114	450	7,627,000.00

Table 12 Reported accident in Sukhothai

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	360	124	369	2,673,220
2003	472	159	535	4,112,400

2004	421	127	437	3,235,120
2005	411	156	511	6,516,760
2006	292	129	369	4,365,243

Table 13 Reported accident in Phitsanulok

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	398	177	384	8,897,500
2003	544	195	500	10,787,800
2004	792	225	638	11,398,950
2005	604	200	674	9,445,030
2006	692	226	224	9,416,550

Table 14 Reported accident in Kamphaeng Phet

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	224	106	304	20,812,195
2003	254	97	239	6,063,900
2004	266	50	121	5,403,181
2005	2,215	221	12,440	-
2006	448	83	668	6,605,025

Table 15 Reported accident in Nakhon Sawan

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	1,470	383	1,116	26,824,990
2003	1,470	383	1,116	26,824,990
2004	1,130	293	1,311	31,671,450

2005	934	223	1,087	30,597,598
2006	830	232	1,039	29,554,175

Table 16 Reported accident in Chai Nat

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	174	97	226	26,653,132
2003	205	143	318	8,028,742
2004	275	119	386	30,486,626
2005	228	119	330	7,108,920
2006	341	105	394	8,275,782

Table 17 Reported accident in Sing Buri

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	109	67	143	5,828,000
2003	158	95	235	4,644,500
2004	223	94	295	15,133,090
2005	211	67	271	118,951,240
2006	209	88	256	141,969,900

Table 18 Reported accident in Lop Buri

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	620	226	582	16,889,050
2003	1,407	312	1,404	29,847,692
2004	1,272	270	1,213	32,576,394
2005	1,300	215	1,335	28,825,293
2006	1,090	208	1,242	21,095,783

Table 19 Reported accident in Saraburi

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	633	226	583	16,101,846
2003	904	259	629	20,510,589
2004	1,018	287	833	22,234,483
2005	1,114	276	800	17,557,836
2006	-	-	-	-

Table 20 Reported accident in Ayutthaya

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	1,225	269	1,000	42,648,585
2003	1,446	287	1,273	42,002,200
2004	1,521	258	1,390	32,284,400
2005	2,668	348	1,999	11,069,600
2006	-	-	-	-

Table 21 Reported accident in Pathum Thani

Year	Number of reported accidents	Number of casualties		Property damaged (baht)
		Killed	Injured	
2002	1,333	208	566	8,325,300
2003	1,837	247	950	23,577,000
2004	2,490	320	1,925	37,345,000
2005	2,069	269	1,247	13,580,000
2006	-	-	-	-

Table 22 Reported accident in Bangkok

Year	Number of	Number of casualties	Property damaged

	reported accidents	Killed	Injured	(baht)
2002	45,388	843	20,483	474,620,598
2003	52,400	840	22,439	488,425,797
2004	54,389	806	23,015	466,029,181
2005	50,126	697	22,957	402,550,675
2006	49,320	632	22,107	394,811,424

Source: Provincial Police Headquarter

Summary of main concerns for the NSEC:

- Almost one-to two-third of the provinces along the corridor were found having higher cases per million persons than the whole country for African hemorrhagic fever and AIDS in 2006, respectively (Table 1).
- The number of AIDS cases is clearly down from 2002 to 2007, with the exception of Sukhothai, Nakhon Sawan and Ayutthaya, which show an increase in the number of cases in 2007 compared with 2006 (Table 2).
- Road accidents are a major cause of death in Thailand with considerable loss in property and medical expenses.

Social

Template 10: Population, Migration and Trafficking

Key issue S4: Migration and trafficking (including: Demographics)

Description: Population

Target: NA

Trends

The population in the corridor provinces accounted for roughly one-fourth of Thai population in 2007 with average annual growth rate 0.14 percent from 2001 to 2007 which was lower than the country average. The average annual population growth rate for most provinces ranged from negative growth to less than one percent except for Tak and Pathum Thani which experienced 1.15 and 4.59 percent growth rate, respectively (Tables 1 & 2).

Description: Population density and gender

Target: NA

Trends: NA

The density of Bangkok and Pathum Thani at 3,644 and 588 persons per square kilometer were marked different from the rest. Pathum Thani as a province adjacent to Bangkok has become a residential area for people working in Bangkok (Table 3).

Most provinces have a slightly higher number of females than men, except for Tak and Lop Buri

Description: Number of people and proportion of female/male living in municipalities and rural areas

Target: NA

Table 4 and 5 shows the population in each province living in municipalities and rural areas, and proportion of females and male. With the exception of Saraburi, Ayutthaya, Pathum Thani and Bangkok, the rest of provinces along corridor had more than 70 percent of population living in non-municipality. Only in Tak more male are living in rural areas, in all other provinces more female than male are living in both rural areas and municipalities (Table 4).

Trends

In nine provinces the percentage of people living in municipalities increased from 2005 to 2007, while the number of people living in rural areas decreased. Seven provinces show a reverse trend, the percentage of people living in municipalities decreased from 2005 to 2007, while the number of people living in rural areas increased, indicated in blue (Table 5).

Description: Average income per household

Target: NA

Trends

The average income per household per month increased in all provinces from 2002-2006 and was clearly higher for the corridor provinces in the central region than those in the northern region. Payao, Chiang Rai and Tak are the three lowest income provinces in 2006 while Bangkok, Pathum Thani and Saraburi are the

three provinces with the highest income (Table 7).

Description: Birth and mortality
Target: NA
Trends
In most (11) provinces (indicated in blue) the percentage of birth was higher than that of death, which can be explained because of advancing medical science and availability of medical services in most areas. In two provinces, Lamphun and Lampang (red colour) the percentage of death is more than the percentage of birth. One possible explanation may be dependents which comprises of children and old that are left behind. In the other four provinces the ratio between birth and death is equal.

Description: Migration
Target: NA
Trends

Concerning migration, the percentage of immigration and emigration is quite balanced within the whole NSEC over the years. Bangkok, Tak and Sukhothai have a higher percentage of emigrants than immigrants, while Chiang Mai, Lamphun, Lampang, Phitsanulok, Kamphaeng Phet, Nakhon Sawan, Chai Nat and Pathum Thani.have a higher percentage of immigrants than emigrants. In Saraburi, Ayutthaya the percentage of emigrants was higher than that of immigrants in 2005 and 2006, but in 2007 the reverse took place.

Migration requires social, cultural and mental adaptation. The area with a high emigration loses human resources while population, economic, social and production structure of the destination area changes as well. In general, the economic structure without opportunity to improve the economic status is an influencing factor.

Drivers of trends
Population dependency on natural resources, age (20 to 29 years old), single, high education, high density of population per area, and mortality are the factors driving migration. Other factors are type of jobs, degree of independence, experience and social network at destination. The common causes of migration from rural areas are primitive conditions in poor rural area, unemployment, low productivity, inadequate food, large family size, solution to solve family problem, low standard of living, and lack of basic services.

Description: Human trafficking
Target: NA

Thailand serves in terms of human trafficking as country of origin, transit country and destination area. Figure 1 and table 10 show the major trafficking routes.

Drivers
The reasons for human trafficking in Thailand are the common ones, namely poverty and lack of education. The curriculum in school provides only knowledge without enhancing practical skills. In addition, relatively better Thai economy compared to neighbored countries coupled with demand for unskilled labour make

Thailand an easy target for trafficking. The misconception on wealth is another cause.

The memorandum on cooperation to prevent, suppress and solve human trafficking in the northern region was agreed in 2007 by 17 provinces including Chiang Rai, Payao, Chiang Mai, Lamphun, Lampang, Tak, Sukhothai, Pisanulok and Nakhon Swan in order to strengthen the network, and efficiently assist, protect and prevent victims according to fundamental human right.

Any government policies regarding:

- Migration?
- Trafficking?

And related to the NSEC developments

References

Annexes

Table 1 Population

(thousand persons)

Provinces/Year	2000	2001	2002	2003	2004	2005	2006	2007
Chiang Rai	1,260	1,263	1,274	1,215	1,214	1,225	1,226	1,225
Phayao	512	509	509	501	488	487	486	487
Chiang Mai	1,590	1,601	1,596	1,603	1,631	1,650	1,658	1,664
Lamphun	406	406	407	409	405	405	406	405
Lampang	803	801	801	797	779	777	774	771
Tak	490	499	507	499	516	522	528	531
Sukhothai	625	624	625	622	611	610	609	605
Phitsanulok	866	870	868	867	841	841	844	842
Kamphaeng Phet	766	766	768	774	726	728	728	726
Nakhon Sawan	1,125	1,129	1,131	1,127	1,077	1078	1076	1,074
Chai Nat	351	351	350	349	341	340	339	337
Sing Buri	224	223	223	223	220	218	217	216
Lop Buri	761	765	768	768	749	752	753	750
Saraburi	608	614	622	626	596	602	610	616
Ayutthaya	734	742	748	751	740	747	755	761
Pathum Thani	655	679	709	739	770	815	861	897
Bangkok	5,680	5,726	5,782	5,845	5,634	5,659	5,696	5,716
Corridor provinces	17,456	17,568	17,688	17,715	17,338	17,456	17,566	17,623
Whole country	61,879	62,309	62,800	63,080	61,974	62,418	62,829	63,038

Source: Department of Provincial Administration,

Table 2 Population growth rate (percentage)

Provinces/Year	2001	2002	2003	2004	2005	2006	2007	Average

Chiang Rai	0.24	0.87	-4.63	-0.08	0.91	0.08	-0.08	-0.40
Phayao	-0.59	0.00	-1.57	-2.59	-0.20	-0.21	0.21	-0.71
Chiang Mai	0.69	-0.31	0.44	1.75	1.16	0.48	0.36	0.65
Lamphun	0.00	0.25	0.49	-0.98	0.00	0.25	-0.25	-0.04
Lampang	-0.25	0.00	-0.50	-2.26	-0.26	-0.39	-0.39	-0.58
Tak	1.84	1.60	-1.58	3.41	1.16	1.15	0.57	1.15
Sukhothai	-0.16	0.16	-0.48	-1.77	-0.16	-0.16	-0.66	-0.46
Phitsanulok	0.46	-0.23	-0.12	-3.00	0.00	0.36	-0.24	-0.40
Kamphaeng Phet	0.00	0.26	0.78	-6.20	0.28	0.00	-0.27	-0.76
Nakhon Sawan	0.36	0.18	-0.35	-4.44	0.09	-0.19	-0.19	-0.66
Chai Nat	0.00	-0.28	-0.29	-2.29	-0.29	-0.29	-0.59	-0.58
Sing Buri	-0.45	0.00	0.00	-1.35	-0.91	-0.46	-0.46	-0.52
Lop Buri	0.53	0.39	0.00	-2.47	0.40	0.13	-0.40	-0.21
Saraburi	0.99	1.30	0.64	-4.79	1.01	1.33	0.98	0.19
Ayutthaya	1.09	0.81	0.40	-1.46	0.95	1.07	0.79	0.52
Pathum Thani	3.66	4.42	4.23	4.19	5.84	5.64	4.18	4.59
Bangkok	0.81	0.98	1.09	-3.61	0.44	0.65	0.35	0.09
Corridor provinces	0.64	0.68	0.15	-2.13	0.68	0.63	0.32	0.14
Whole country	0.69	0.79	0.45	-1.75	0.72	0.66	0.33	0.27

Source: Department of Provincial Administration.

Table 3 Gender and population density in 2007

(thousand persons)

Provinces	Male	Female	Total population	Area (km^2)	Density (person/km^2)
Chiang Rai	606	619	1,225	11,678.4	105
Phayao	239	247	487	6,335.1	77
Chiang Mai	817	847	1,664	20,107.0	83
Lamphun	198	207	405	4,505.9	90
Lampang	380	390	771	12,534.0	62
Tak	271	260	531	16,406.6	32
Sukhothai	305	311	605	6,596.1	92
Phitsanulok	414	427	842	10,815.8	78
Kamphaeng Phet	361	364	726	8,607.5	84
Nakhon Sawan	526	547	1,074	9,597.7	112
Chai Nat	163	174	337	2,469.7	136
Sing Buri	103	112	216	822.5	263
Lop Buri	376	374	750	6,199.8	121
Saraburi	305	311	616	3,576.5	172
Ayutthaya	368	393	761	2,556.6	298
Pathum Thani	429	468	897	1,525.9	588
Bangkok	2,728	2,989	5,716	1,568.7	3,644
Whole country	31,096	31,942	63,038	513,117.5	123

Source: Department of Provincial Administration

Table 4 Population living in municipalities and rural areas

Province	Year	Municipality			Non-municipality			Total
		Male	Female	Total	Male	Female	Total	
Chiang Rai	2005	109,075	117,401	226,476	497,614	500,995	998,090	1,225085
	2006	106,801	117,715	224,516	499,589	501,608	1,001,197	1,225713
	2007	106,660	114,996	221,656	499,303	504,054	1,003,357	1,225,013
Payao	2005	53,051	56,430	109,481	187,152	190,256	377,408	486,889
	2006	52,672	56,160	108,832	186,897	190,490	377,387	486,219
	2007	59,444	62,673	122,117	179,949	184,513	364,462	486,579
Chiang Mai	2005	184,334	205,688	390,022	627,656	632,331	1,259,987	1,650,009
	2006	187,162	209,406	396,568	628,367	633,363	1,261,730	1,658,298
	2007	186,748	209,521	396,269	630,776	637,354	1,268,130	1,664,399
Lamphun	2005	51,757	56,520	108,277	145,789	150,661	296,450	404,727
	2006	51,442	56,173	107,615	146,510	151,439	297,949	405,564
	2007	51,166	55,868	107,034	146,553	151,570	298,123	405,157
Lampang	2005	102,742	112,019	214,761	281,210	280,755	561,965	776,726
	2006	106,036	115,721	221,757	276,069	275,964	552,033	773,790
	2007	111,528	115,486	227,014	268,833	274,766	543,599	770,613
Tak	2005	55,185	55,558	110,743	211,077	200,377	411,454	522,197
	2006	55,130	55,515	110,281	213,795	203,601	417,396	527,677
	2007	60,214	60,407	120,621	210,443	199,864	410,307	530,928
Sukhothai	2005	53,082	58,541	111,623	244,552	254,186	498,738	610,361
	2006	52,619	57,979	110,598	244,350	253,872	498,222	608,820
	2007	51,585	58,557	110,142	243,732	251,427	495,159	605,301
Pitsanulok	2005	69,008	76,135	145,143	346,297	349,530	695,827	840,970
	2006	68,132	75,595	143,727	347,901	352,880	700,781	844,508
	2007	78,837	86,503	165,340	335,474	340,869	676,343	841,683
Kamphaeng Phet	2005	47,631	50,609	98,240	314,602	315,423	630,025	728,265
	2006	47,608	50,710	98,318	314,838	315,164	630,002	728,320
	2007	66,795	72,488	139,283	294,728	291,983	586,711	725,994
Nakhon Sawan	2005	105,167	114,605	219,772	423,516	434,520	858,036	1,077,808
	2006	103,954	113,858	217,812	423,632	434,571	858,203	1,076,015
	2007	103,250	113,343	216,593	423,226	433,864	857,090	1,073,683
Chai Nat	2005	19,517	21,325	40,842	145,186	154,101	299,287	340,129
	2006	26,385	21,393	47,778	137,639	153,589	291,228	339,006
	2007	19,782	21,467	41,249	143,165	152,733	295,898	337,147
Sing Buri	2005	28,363	31,372	59,735	76,044	81,965	158,009	217,744
	2006	28,159	31,148	59,307	75,743	81,919	157,662	216,969
	2007	27,867	30,776	58,643	75,299	81,711	157,010	215,653
Lob Buri	2005	71,702	66,741	138,443	305,734	307,774	613,508	751,951
	2006	71,539	66,607	138,146	306,024	308,605	614,629	752,775

	2007	95,415	89,431	184,846	280,262	284,713	564,975	749,821
Saraburi	2005	146,633	108,797	255,430	151,790	194,718	346,508	601,938
	2006	107,956	110,197	218,153	194,271	197,431	391,702	609,855
	2007	109,068	111,200	220,268	195,988	199,500	395,488	615,756
Ayutthaya	2005	122,790	130,526	253,316	239,157	254,446	493,603	746,919
	2006	122,401	131,342	253,743	242,772	258,080	500,852	754,595
	2007	143,541	154,001	297,542	224,132	239,038	463,170	760,712
Pathum Thani	2005	161,465	175,886	337,351	230,444	247,607	478,051	815,402
	2006	169,440	185,388	354,828	243,442	263,068	506,510	861,338
	2007	174,668	192,231	366,899	254,123	275,821	529,944	896,843
Bangkok	2005	2,705,954	2,952,999	5,658,953				5,658,953
	2006	2,721,273	2,974,683	5,695,956				5,695,956
	2007	2,727,574	2,988,674	5,716,248				5,716,248

Source: Department of Provincial Administration, year of publication?

Table 5 Proportion of population in municipality and non-municipality

Province	Percentage in municipality			Percentage in non-municipality		
	2005	2006	2007	2005	2006	2007
Chiang Rai	18.49	18.32	18.09	81.47	81.68	81.91
Phayao	22.49	22.38	25.10	77.51	77.62	74.90
Chiang Mai	23.64	23.91	23.81	76.36	76.09	76.19
Lamphun	26.75	26.53	26.42	73.25	73.47	73.58
Lampang	27.65	28.66	29.46	72.35	71.34	70.54
Tak	21.21	20.90	22.72	78.79	79.10	77.28
Sukhothai	18.29	18.17	18.20	81.71	81.83	81.80
Phitsanulok	17.26	17.02	19.64	82.74	82.98	80.36
Kamphaeng Phet	13.49	13.50	19.19	86.51	86.50	80.81
Nakhon Sawan	20.39	20.24	20.17	79.61	79.76	79.83
Chai Nat	12.01	14.09	12.23	87.99	85.91	87.77
Sing Buri	27.43	27.33	27.19	72.57	72.67	72.81
Lob Buri	18.41	18.35	24.65	81.59	81.65	75.35
Saraburi	42.43	35.77	35.77	57.57	64.23	64.23
Ayutthaya	33.91	33.63	39.11	66.09	66.37	60.89
Pathum Thani	41.37	41.19	40.91	58.63	58.81	59.09
Bangkok	100.00	100.00	100.00			

Table 6 Exchange rate (baht/us$)

Year	2002	2003	2004	2005	2006	2007
Baht per US$	43.0041	41.5303	40.2699	40.2697	37.9286	34.5637

Source: Bank of Thailand, year of publication?

Table 7 Income (per household per month)

Province	In baht			In US$		
	2002	2004	2006	2002	2004	2006
Chiang Rai	8,369	8,920	10,495	195	222	277
Phayao	9,520	9,643	10,352	221	239	273
Chiang Mai	9,582	12,586	14,904	223	313	393
Lamphun	11,328	11,843	14,361	263	294	379
Lampang	9,759	10,576	15,551	227	263	410
Tak	7,763	9,549	10,963	181	237	289
Sukhothai	8,299	11,427	13,843	193	284	365
Phitsanulok	10,637	12,751	14,117	247	317	372
Kamphaeng Phet	12,583	12,776	15,337	293	317	404
Nakhon Sawan	9,660	10,200	14,947	225	253	394
Chai Nat	11,119	13,383	13,058	259	332	344
Sing Buri	14,434	14,788	18,510	341	465	540
Lob Buri	11,010	15,003	19,935	336	367	488
Saraburi	14,677	18,742	20,468	256	373	526
Ayutthaya	13,319	14,980	19,676	310	372	519
Pathum Thani	22,838	21,530	25,143	531	535	663
Bangkok	29,589	29,843	36,658	688	741	967

Source: 2006 economic and social survey on household

National Statistical Office (This survey is carried out every two years.)

Table 8 Birth, death and migration

(thousand persons)

Provinces	Birth			Death			Imigration			Emigration		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Chiang Rai	12	11	11	10	9	9	58	61	60	58	61	60
Phayao	4	4	4	4	4	4	22	25	27	23	25	25
Chiang Mai	20	20	19	13	13	13	94	91	89	88	86	85
Lamphun	3	3	3	4	4	4	19	18	19	17	16	18
Lampang	6	5	5	7	7	7	35	34	35	34	34	34
Tak	10	9	8	3	3	3	29	29	27	29	27	28
Sukhothai	5	5	5	5	5	5	26	26	26	26	27	27
Phitsanulok	9	9	9	6	6	6	48	50	50	47	46	50
Kamphaeng Phet	7	7	7	5	5	5	38	37	39	38	37	38
Nakhon Sawan	11	11	11	8	8	8	58	58	62	57	59	61
Chai Nat	3	3	3	3	3	3	15	14	20	14	15	19
Sing Buri	2	2	2	2	2	2	10	9	12	10	10	12
Lop Buri	8	8	8	5	5	6	48	43	50	47	43	50
Saraburi	9	9	9	4	4	4	41	39	43	36	36	38
Ayutthaya	10	10	10	6	6	6	46	46	52	39	39	43
Pathum Thani	12	15	13	4	4	5	99	98	94	59	60	62
Bangkok	112	110	110	30	29	29	453	437	421	473	449	439
Whole country	809	803	811	399	392	398	3,751	3,674	3,810	3,540	3,479	3,580

Source: Department of Provincial Administration, year of publication?

Table 9 Birth, death and migration as percentage of population (percentage)

Provinces	Birth			Death			Imigration			Emigration		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Chiang Rai	0.98	0.90	0.90	0.82	0.73	0.73	4.73	4.98	4.90	4.73	4.98	4.90
Phayao	0.82	0.82	0.82	0.82	0.82	0.82	4.52	5.14	5.54	4.72	5.14	5.13
Chiang Mai	1.21	1.21	1.14	0.79	0.78	0.78	5.70	5.49	5.35	5.33	5.19	5.11
Lamphun	0.74	0.74	0.74	0.99	0.99	0.99	4.69	4.43	4.69	4.20	3.94	4.44
Lampang	0.77	0.65	0.65	0.90	0.90	0.91	4.50	4.39	4.54	4.38	4.39	4.41
Tak	1.92	1.70	1.51	0.57	0.57	0.56	5.56	5.49	5.08	5.56	5.11	5.27
Sukhothai	0.82	0.82	0.83	0.82	0.82	0.83	4.26	4.27	4.30	4.26	4.43	4.46
Phitsanulok	1.07	1.07	1.07	0.71	0.71	0.71	5.71	5.92	5.94	5.59	5.45	5.94
Kamphaeng Phet	0.96	0.96	0.96	0.69	0.69	0.69	5.22	5.08	5.37	5.22	5.08	5.23
Nakhon Sawan	1.02	1.02	1.02	0.74	0.74	0.74	5.38	5.39	5.77	5.29	5.48	5.68
Chai Nat	0.88	0.88	0.89	0.88	0.88	0.89	4.41	4.13	5.93	4.12	4.42	5.64
Sing Buri	0.92	0.92	0.93	0.92	0.92	0.93	4.59	4.15	5.56	4.59	4.61	5.56
Lop Buri	1.06	1.06	1.07	0.66	0.66	0.80	6.38	5.71	6.67	6.25	5.71	6.67
Saraburi	1.50	1.48	1.46	0.66	0.66	0.65	6.81	6.39	6.98	5.98	5.90	6.17
Ayutthaya	1.34	1.32	1.31	0.80	0.79	0.79	6.16	6.09	6.83	5.22	5.17	5.65
Pathum Thani	1.47	1.74	1.45	0.49	0.46	0.56	12.15	11.38	10.48	7.24	6.97	6.91
Bangkok	1.98	1.93	1.92	0.53	0.51	0.51	8.00	7.67	7.37	8.36	7.88	7.68
Whole country	1.39	1.37	1.34	0.68	0.67	0.68	6.52	6.35	6.39	6.27	6.09	6.18

Source: Department of Provincial Administration, year of publication?

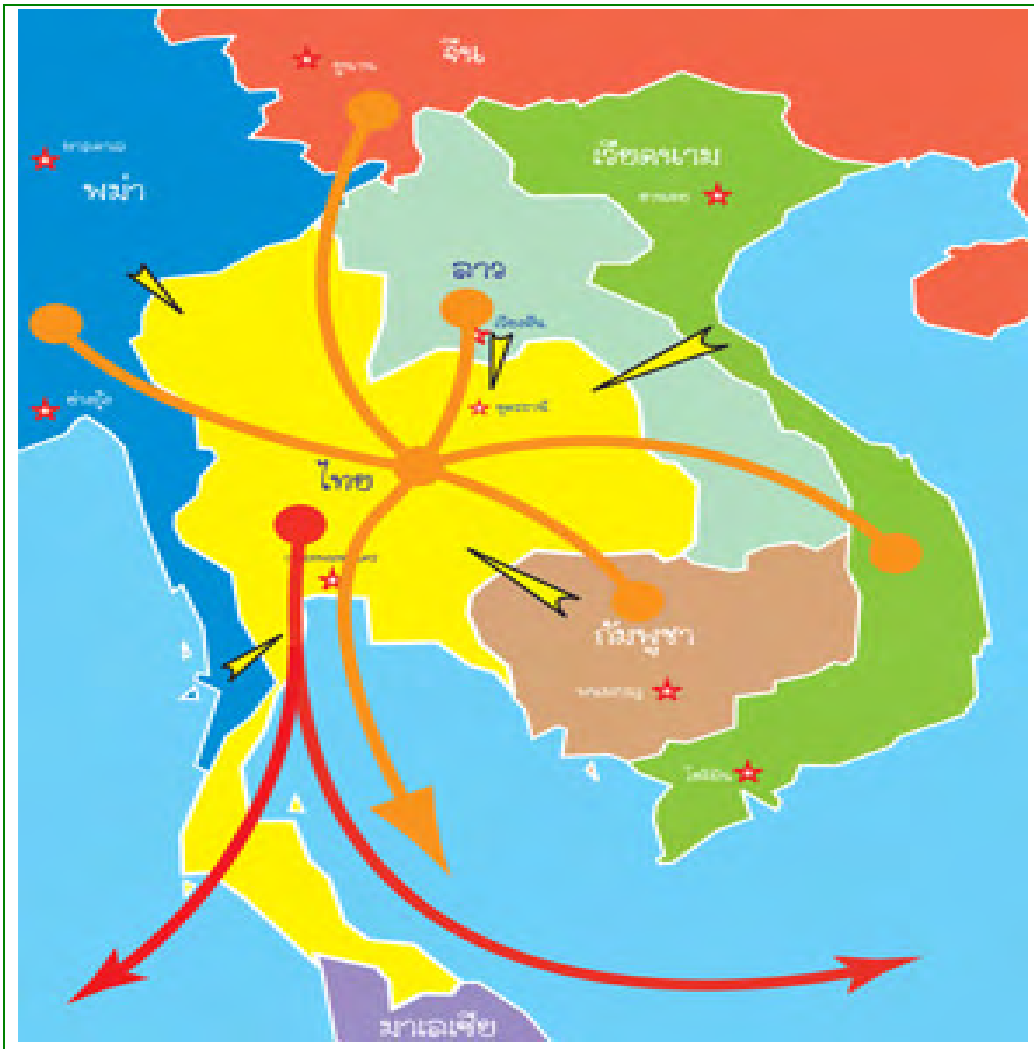


Figure 1 Trafficking pattern

Table 10 Major trafficked route

Province	through District
Chiang Rai	Maesai, Maefalueang, Chiangkhong, Chiangsan, Viangpapao and Teang
Payao	Chiangkam and along mountainous area
Chiang Mai	Maeaye and Chiangdao
Tak	Maesod, Poobphra and along Moei river

Summary of main concerns for the NSEC:

- Population numbers have been relative stable in the area with an average annual growth of 0.14% (2001-2007) which is lower than the country averages.
- Population density of Bangkok and Pathum Thani at 3,644 and 588 persons per square kilometer are markedly different from the rest of the provinces. Pathum Thani as a province adjacent to Bangkok has become a residential area for people working in Bangkok.
- With the exception of Saraburi, Ayutthaya, Pathum Thani and Bangkok, the rest of provinces along corridor had more than 70 percent of population living in rural areas. In nine provinces the percentage of people living in municipalities increased from 2005 to 2007, while the number of people living in rural areas decreased. Seven provinces show a reverse trend, the percentage of people living in municipalities decreased from 2005 to 2007, while the number of people living in rural areas increased.
- The average income per household per month increased in all provinces from 2002-2006 and was clearly higher for the corridor provinces in the central region than those in the northern region. Payao, Chiang Rai and Tak are the three lowest income provinces in 2006 while Bangkok, Pathum Thani and Saraburi are the three provinces with the highest income.
- Concerning migration, the percentage of immigration and emigration is quite balanced within the whole NSEC over the years. Bangkok, Tak and Sukhothai have a higher percentage of emigrants than immigrants, while Chiang Mai, Lamphun, Lampang, Phitsanulok, Kamphaeng Phet, Nakhon Sawan, Chai Nat and Pathum Thani.have a higher percentage of immigrants than emigrants. In Saraburi, Ayutthaya the percentage of emigrants was higher than that of immigrants in 2005 and 2006, but in 2007 the reverse took place.
- Migration requires social, cultural and mental adaptation. The area with a high emigration loses human resources while population, economic, social and production structure of the destination area changes as well. In general, the economic structure without opportunity to improve the economic status is an influencing factor.
- Population dependency on natural resources, age (20 to 29 years old), single, high education, high density of population per area, and mortality are the factors driving migration. Other factors are type of jobs, degree of independence, experience and social network at destination. The common causes of migration from rural areas are primitive conditions in poor rural area, unemployment, low productivity, inadequate food, large family size, family problem, low standard of living, and lack of basic services.
- Thailand serves in terms of human trafficking as country of origin, transit country and destination area. The reasons for human trafficking in Thailand namely poverty and lack of education. In addition, Thailand’s economy is more prosperous than that of neighboring countries and there is also a demand for unskilled workers which make Thailand an obvious destination for trafficking.

Social Thailand

Template 11: Natural disasters

Key issue S5: Natural disasters

Introduction:

The NSEC of Thailand section of 17 provinces covers a diverse topography from mountainous areas in the North to the floodplain area of the Central Plain. Bangkok, the capital of Thailand, is situated in the downstream flat delta of the Chao Phraya river. The city is located at an average of 1.0-1.5 m above MSL. The main mountainous regions are in the North and West of the country. The highest point in the country is the summit of Doi Inthanon in Chiang Mai at 2,565 m AMSL.

Owing to lack of good and efficient management, Thailand has faced droughts in the dry season and floods in the wet season. Damage from drought in the last 15 years has been estimated to be around 200 million baht per year and from floods 4,000 million baht per year. (Office of Natural Resources and Environmental Policy and Planning, 2007)

The four important natural disasters are: earthquakes, landslides, floods and droughts. Table 11.1 shows the natural disasters occurred in Thailand.

Earthquakes

From the 13 active fault zones in Thailand (Dharmasaroja, 2008), 6 occur within the NSEC of Thailand section covering 8 provinces (Table 11.1). As a whole, Thailand has faced low (1-4.9 richter scale) to moderate (5-6 richter scale) level of earthquakes. From the 3 earthquakes with more than 5 at the richter scale recorded in Thailand, 2 major earthquakes of 5.6 at the richter scale occured in Tak (1975) and one of 5.1 at the richter scale in Chiang Rai (1994).

Kwan Phayao (Phayao Lake) was formed as the result of the first major earthquakes in 560.

Although Bangkok is not on the active faults, it is about 130 km from two active fault zones, i.e., Jedi Sam Ong (connecting to Sagiang Fault Zone in Myanmar) and Sri Sawat in Kanchanaburi. An earthquake with a magnitudes of more than 7.6 at the richter scale has been reported in Kanchanaburi in 1837.

The biggest concern related to earthquakes is the collapse of the Srinakarin Dam in Kanchanaburi, in which case it is predicted that severe floods will spread to Ratchaburi, Nakhon Pathom and Bangkok.

In 2006, there are 9 records of earthquakes ranging from 2.7 to 5.7 at the richter scale in Chiang Mai and Chiang Rai (Dharmasaroja, 2008). Impacts and losses were mild, the most severe one was at Pai District, Chiang Rai that caused moderate impact on the building structure of Pai Hospital.

Landslides

The North and West of Thailand are most prone to landslide hazards due to the topography and rather high precipitation. In 2004 the Department of Mineral Resources identified 51 provinces, 250 districts and 2,355 villages as landslide hazard prone areas, of which there are 11 provinces, 70 districts and 448 villages located within the NSEC (Table 11.3) (Promsuwan, et.al. 2007). Table 11.4 shows the incidents of landslides between 2001 and 2006 in the NSEC. Landslides in the North can occur at the start of the rainy season in Thailand (in May) but the most frequent and severe ones

occur between August and October. There is not much information on the cost of losses except for the ones shown in Table 11.4.

Floods

Table 11.5 shows floods incidents between 1994 and 2000.

Urban floods

The incidents of urban floods in big cities in Thailand increased. In 2005 Chiang Mai faced 5 floods from August to November. Heavy rains in the Ping watershed (northern part of Chiang Mai) and urban expansion and development (reducing drainage area and blockage of runoff drastically) are the main causes of urban floods in this area (Office of Natural Resources and Environmental Policy and Planning, 2007).

In the past, Bangkok has faced several severe floods because Bangkok is situated on the Chao Phraya river mouth receiving runoff from the Chao Phraya watershed which is about 160,000 km^2 or 1/3 of the total country area. Flooding is aggravated by ditch constructions, small canals and rivers, loss of discharge areas and wetlands, land sink, and tidal influence. Floods in Bangkok are caused by precipitation, runoff and seawater (tidal influence). There are many flood protection schemes to prevail the problems and as a consequence the occurrence of floods in Bangkok is controlled. Deforestation and expansion of urbanized areas (causing blockage of runoff) also increase flood hazards..

Droughts

A drought is the consequence of rainfall dropping below long-term average levels. Table 11.6 shows the drought incidents in 2008.

Relevant laws, policies, plans and institutional arrangements:

National institutional arrangement.

1) Ministry of Natural Resources and Environment

-Strategic plan of the Ministry

-Environmental quality management 2007-2011 (implemented by Office of Natural Resources and Environmental Policy and Planning)

-Department of Water Resources

2) Ministry of Transportation

-Department of Mineral Resources The establishment of Networks of Early warning systems for landslides in 18 provinces 18,000 volunteers

-Meteorological Department

3) Ministry of Interior Affairs

-Department of Constructions and Town and Country Planning

Earthquake Preparedness and Study Centre was established in 2008.

Construction and Building Act (revision)

4) Earthquakes: National Disaster Warning Centre established in 2005

Local institutional arrangement

1) Bangkok: Action Plan for Bangkok Metropolitan Flood Control

Bangkok Metropolitan Flood Control Center under Department of Drainage and Sewerage, Bangkok Metropolitan Administration

Problems and issues encountered during data collection:

Summary of main concerns for the NSEC:

- Thailand suffers droughts in the dry season and floods in the wet season
- Six of the 13 active fault zones in Thailand occur within the NSEC. One of the biggest concerns with regards to earthquakes is the potential collapse of Srinakarin Dam which would cause severe floods.
- Within the NSEC, there are 11 provinces, 70 districts and 448 villages in areas prone to landslides during the rainy season.

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Annexes: (eg. maps, diagrams, tables)

Table 11.1 Natural disaster occurrence in Thailand

Month/ Region	**North**	North-east	**Central**	East	South	
					West	East
January						Floods Drought
February	**Forest fire**	Forest fire Drought	**Drought**			Drought
March	**Tropical storm** **Forest fire** **Drought**	Tropical storm Forest fire Drought	**Tropical storm** **Drought**	Drought	Drought	Drought
April	**Tropical storm** **Forest fire** **Drought**	Tropical storm Forest fire Drought	**Tropical storm** **Drought**	Drought		Drought
May	**Floods** **Tropical storm**	Floods Tropical storm	**Floods** **Tropical storm**	Floods	Floods Tropical storm	Floods Drought
June	**Floods** **Drought**	Floods Drought	**Floods** **Drought**	Floods Drought	Floods	Floods
July	**Tropical storm** **Floods** **Thunder storm** **Drought**	Tropical storm Floods Thunder storm Drought	**Floods** **Thunder storm** **Drought**	Floods Drought	Floods	Floods
August	**Tropical storm** **Floods** **Thunder storm**	Tropical storm Floods Thunder storm	**Tropical storm** **Floods** **Thunder storm**	Tropical storm Floods Thunder storm	Floods	Floods
September	**Tropical storm** **Floods** **Thunder**	Tropical storm Floods Thunder	**Tropical storm** **Floods** **Thunder**	Tropical storm Floods Thunder		

	storm	storm	**storm**	storm		
October			**Tropical storm Floods Thunder storm**	Tropical storm Floods Thunder storm	Floods	Tropical storm Floods High wave Landslides
November					Floods	Tropical storm Floods High wave Landslides
December						Floods

Source: Adapted from Meteorological Department (2001)

Table 11.2 Active fault zones in the NSEC of Thailand section

Name	Provinces on the faults
1. Mae Chan and Mae Ing	**Chiang Rai** and **Chiang Mai**
2. Mae Hong Son	Mae Hong Son and **Tak**
3. Moei	**Tak** and **Kamphaeng Phet**
4. Mae Tha	**Chiang Rai**, **Lamphun** and **Chiang Mai**
5.Thoen	**Lamphun** and Phrae
6. Phayao	**Chiang Rai**, **Lamphun** and **Phayao**

Source: Dharmasaroja 2008

Remarks: Province in bold is the province in NSEC

Table 11.3 List of province and village (mooban-in Thai) at risk to landslides in the NSEC of Thailand section

Province	No of District at risk of landslides	No of village at risk of landslides
1. Chiang Rai	14	119
2. Chiang Mai	17	39
3. Kamphaeng Phet	4	33
4. Tak	6	61
5. Nakhon Sawan	1	6
6. Phayao	9	35
7. Phitsanulok	4	62
8. Lampang	3	8
9. Lamphun	5	34
10. Sukhothai	5	30
11 Lop Buri	2	21

Source: Adapted from Promsuwan, et.al. (2007)

Table 11.4 Landslides incidents and losses between 2001 and 2006

Location		Losses
Man Mae Rak, Mae Cham District, Chiang Mai	September 15, 2001	Migration of 108 households, Local road between Mae Cham and Hod damaged
Ban Kong Bod, Mae Cham District, Chiang Mai	May 6, 2003	1 dead, 3 houses damaged, 1 motorcycle damaged
Mae Taen, Mon Chong and Yang Baen Subdistricts, Umkoi District, Chiang Mai	May 20, 2003	1 dead, all together 14 villages destroyed, 100 people in 120 households in trouble
Mae Ramad, Mae Taen, Ka Najael Jaroa Subdistricts, Mae Ramad District, Tak	May 20, 2003	5 dead, 391 injure, 16 villages destroyed, 8,846 people in 2,135 households in trouble
Ban Pamee, Mae Sai District, Chiang Rai Ban Nong Or, Mae Sai District, Chiang Rai	August 2, 2005	1 house damaged No report of damage
Ban Ekor Pakloy, Mae Fah Luang, Chiang Rai	August 7, 2005	Damage of highway no 1149
Ban Song Pi Nong, Chiang Kong, Chiang Rai	August 15, 2005	Damage of Ban Song Pi Nong School buildings (mild)
Pang Makad, Vien Papau District, Chiang Rai	August 28, 2005	Collapse of Pang Makad School building (some parts)
Ban Hua Muang Narm, Mae Ary District, Chiang Mai	September 9, 2005	No report of damage
Ban Yang Sen and Ban Yang Luang, Mae Cham District, Chiang Mai	September 19, 2005	House damaged (little)
Uttaradit, **Suknothai**, Phrae, Nan and **Lampang**	May 21-23, 2006	Severe landslides caused losses of lives and properties with preliminary cost of 308.6 million baht
Ban Yang, Fang District, Chiang Mai	October 5, 2006	8 dead, 29 houses damaged

Source: Adapted from 1) Promsuwan, et.al. (2007) 2) Office of Environmental policy and Planning (2007)

Table 11.5 Floods

Year	Total floods recorded in Thailand	Total floods recorded in the NSEC	Duration of floods occurring in the NSEC	Number of Tropical storms passing Northern Thailand
1994	34	19	March-September	2
1995	31	19	March-October	1
1996	43	21	April-November	2

1997	21	9	May-October	1
1998	25	9	May-October	-
1999	31	11	May-November	-
2000	28	5	June-October	2

Source: Adapted from Meteorological Department (2001)

Table 11.6 Droughts in 2008

	Affected area						People affected	
	Region	No of Province	No of District	No of Sub-district	No of Village	Province	No of household	No of people
1	North	16	144	786	5,647	Phrae, Nan, **Chiang Rai, Lampang, Kamphaeng Phet,** Uttaradit, **Tak, Chiang Mai, Phitsanulok, Lamphun, Phayao, Nakhon Sawan,** Hae Hong Son, Uthai Thani, Phichit	548,964	1,717,099
2	North-east	19	250	1,921	17,161	Si Sa Ket, Khon Kaen, Loei, Buri Ram, Nakhon Phanom, Udon Thani, Naha Sarakham, Yasothon, Mukdahan, Nong Bua Lam Phu, Ubon Ratchathani, Kalasin, Surin, Chaiyaphum, Sakon Nakhon, Roi Et, Nong Khai, Nakhon Ratchasima, Amnat Charoen	1,773,284	7,739,410
3	Central	10	56	261	2,004	**Saraburi**, Phetchaburi, Ang Thong, Suphan Buri, Prachup Khiri Khan, Ratchaburi, Kanchanaburi, **Chai Nat, Ayutthaya, Lop Buri**	154,950	632,871
4	East	7	44	232	1,394	Rayong, Trat, Nakhon Nayok, Sa Kaeo, Prachin Buri, Chachoengsao, Chanthaburi	142,197	420,555
5	South	3	13	49	253	Ranong, Chumphon, Satun	38,503	108,550
The Whole Country		55	507	3,249	26,459		2,657,898	10,618,485

Remarks: Province in bold is the province in NSEC.

Economic Templates

Economic: China

Economy

Template 1: National & local GDP

(Key issue EC1: National and Local Economic GDP Growth)

(Key issue EC5: More employment (equity dealt with under social theme)

Introduction:

Advice to local consultants – this template needs to cover for example:

(i) National GDP and per capita GDP
(ii) Provincial GDP and per capita
(iii) Levels of unemployment
(iv) Employment by sector
(v) Informal and formal sector employment

Please consider current state & recent & future trends (including government targets)

Indicator: National GDP and per capita GDP, Yunnan Provincial GDP and per capita GDP

Official target: In the "National Eleventh Five-year Plan (2006-2010) for Economic and Social Development for China" the official target by 2010 for the national GDP is set at 26.1 trillion RMB, with targeted average annual growth rate 7.5%. Regarding national per capita GDP the targeted value for 2010 is set at 19,570 RMB and the targeted average annual growth rate at 6.6%.

Under the "National Eleventh Five-year Plan" the official target by 2010 for the Yunnan Province is set at 0.522 trillion RMB with targeted average annual growth rate greater than 8.5%. The per capita GDP for the Yunnan Province is set at 11,400 RMB with targeted average annual growth rate 7.8%.

Trends: During the "Tenth Five-year Plan" period (2001-2005), China's national GDP grew from 9.92 trillion RMB in 2000 to 18.23 trillion RMB in 2005 with average annual growth rate of 9.5%.

Over the same period Yunnan Provincial GPD grew from 0.201 trillion RMB in 2000 to 0.347 trillion RMB in 2005 at an average annual rate of 8.9%. (Are these figures in real or in current prices?)

Drivers of trends: The main driving forces for the national GDP growth during the period 2001-2005 were: the rapid industrial development (the 2005 figure was increased by 67.5% as compared with that of 2000); the increase of investment in fixed assets (20%annual average growth); the increased import & export value (24.6% annual average growth); the FDI increase (8.2% annual average growth) and the increase of total retail sales of consumer goods (11.4%. annual average growth).

For the YN provincial GDP growth during the period 2001-2006, the main driving forces were: the industrial restructuring (the ratio of primary: secondary: tertiary industries of 22.3:43:34.7 in 2000 changed to 18.7:42.7:38.6 in 2006, with 3.6 percentage decrease in primary industry and 3.9 increase in tertiary industry); the five (5) supportive industrial sectors of tobacco & cigarette, phosphorus chemical industry & non-ferrous metallurgical industry, power industry dominated by hydro-power, tourist industry, and cultural industry were fostered; the increased investment in fixed asset (19.9%

average annual growth); the improved infrastructure (especially bottleneck of transport and energy mitigation).

Source of information: "The National Eleventh Five-year Plan for Economic and Social Development" for China and for Yunnan, www.gov.cn and www.govzx.com.cn. China National Statistic Administration, www.gov.cn.

Indicator: Registered unemployment rate in urban areas

Target: By 2010 the registered unemployment rate in urban areas to be controlled within 5% (China national target is 5%, the Yunnan provincial target is also set at 5% and the targets for each of the municipalities are set as follows: 4.5%, Yuxi 4%, Pu're 4.7%, Honghe 5% and Xishuangbanna **?**%). For the period 2006-2010 the target is to provide more than 1 million additional employment opportunities. (What is the source of these figures? "The Eleventh Five-year Plan"?)

Trends: For the period 2002-2006 the registered unemployment for urban in China areas increased from 7.7 million to 8.27 million, leading to a change of the unemployment rate from 2% to 4.1%

In Yunnan province, registered unemployment in urban areas increased from 62,000 in 1999 to 137,900 in 2006, leading to a change of the unemployment rate from 2.5% to 4.28%.

Drivers of trends: The YPG has taken active policy to promote stable employment development. A labour market system has been established and the modern public employment service framework has now taken its initial shape with the establishment of labour security institutes/stations in townships/towns and the publication of labour supply and demand.

The main reasons for the increase of unemployment include: the accelerated transferring of surplus rural labour workers (there are about 7.5 million rural surplus workers in YN, accounting for 60% of rural population; in 2003, roughly, 40% of them flow inside townships), the rapid development in vocational education and training (there are more than 480 secondary and 30 higher vocational education schools/colleges); the stable progress of endowment insurance; the improved and standardized unemployment insurance system (enlarged coverage of unemployment insurance to 76% in 2004, 5% higher than in 2003)

Sources: www.gov.cn and Yunnan Statistic Yearbook in 2007

Indicator: Employment by primary, secondary, tertiary industry sectors in the Yunnan Province and for the local government administration areas in 2005

Target: N/A

Trends: In the Yunnan Province, with the economic restructuring the share of people employed in the tertiary industry is increasing. In the relatively developed areas, like Kunming and Yuxi and in the tourist destination areas, like Xishuangbanna, employment in secondary and tertiary industries has higher percentage than the average of Yunnan Province. The number of employment in the sectors of mining, common administration and social organization, construction, health care, and education accounts for over 50% of the total.

Drivers of trends: These are same as for the unemployment plus the economic restructuring of the area

Relevant laws, policies, plans and institutional arrangements:
National Economic Policy for the future: President Hu Jingtao Report on Economic Policy at 17 CPC Congress: Promoting Sound and Rapid Development of the National Economy

“To attain the objectives for the economic development, it is essential to accelerate the transformation of the development pattern and improve the socialist market economy. We need to vigorously push forward for strategic economic restructuring and make greater efforts to improve China's capacity for independent innovation as well as energy and environmental conservation, and to enhance the overall quality of the economy and its international competitiveness. We need to deepen our understanding of the laws governing the socialist market economy, introduce institutions to give better play to the basic role of market forces in allocating resources, and form a system of macroeconomic regulation conducive to scientific development...”

Employment Policies of Yunnan: Yunnan Government has given priority to the employment strategy and it has defined 5 working targets: (1) increase employment opportunities; (2) carry out re-employment policy; (3) increase input on re-employment; (4) strengthen re-employment services; (5) provide help to people suffering from hardship. To achieve these targets, the Government grants re-employment preferential certificates and provides guarantee for micro credit to re-employed persons, it also provides reduced or exemption taxes to enterprises absorbing laid-off workers, etc.
Main relevant laws and regulations include:
Labour Law of PR.China
Contract Law of PR.China
Economic Contract Law of PR.China
Foreign Economic Contract Law of PR.China
Individual-Owned Enterprise Law of PR.China
Small & Medium Sized Enterprises Promotion Law of PR.China
Commercial Bank Law of PR.China
Company Registration Management Regulation of PR.China
China People’s Bank Law of PR.China
Company Law of PR.China
Products Quality Law of PR.China
Acounting Law of PR.China
Budgetary Law of PR.China

Problems and issues encountered during data collection:
Summary of main concerns and challenges for the NSEC: Although Yunnan Province experienced rapid socio-economic development during the "Tenth Five-Year" period, the Provincial GDP growth rate is lower than that of China (1.9% of China). Yunnan provincial per capita GDP is also much lower than that of China (65%). Economic development in Yunnan province is unbalanced among the different regions. There is a big gap between the relatively developed areas and the remote poor areas. Of the 5 Municipalities/prefectures in NSEC, Kunming and Yuxi are the strongest with per capita GDP much higher than the provincial average, while Xishuangbanna and Honghe are weaker, with per-capita GDP much lower than the provincial average; Pu're is much more weaker. The corridor links the complex of the cities of Kunming, Qujing, Yuxi and Chuxiong, which are the economic growth pole and urban economic sphere of Yunnan Province. It is expected that the NSEC will bring more economic opportunities to this area.
References/sources: "The National Eleventh Five-year Plan for Economic and Social Development" for China and for Yunnan, www.gov.cn and www.govzx.com.cn. China National Statistic Administration, www.gov.cn. Yunnan Statistic Yearbook 2006 and Yunnan Statistic Yearbook 2007
Annexes: Table 1, Table 2, Figure 1, Figure 2

Table 1 China's National and Yunnan Province targeted total and per-capita GDP figures for the "Eleventh Five-year Plan" (2006-2010)

	Total GDP				Per-capita GDP			
	China's National		YN Province		China's National		YN Province	
	Value	Average annual growth rate	Value	Average annual growth rate	Value	Average annual growth rate	Value	Average annual growth rate
Unit	Trillion RMB	%	Trillion RMB	%	RMB	%	RMB	%
2010target	26.1	7.5	0.522	>8.5%	19,570	6.6	11,400	7.80%

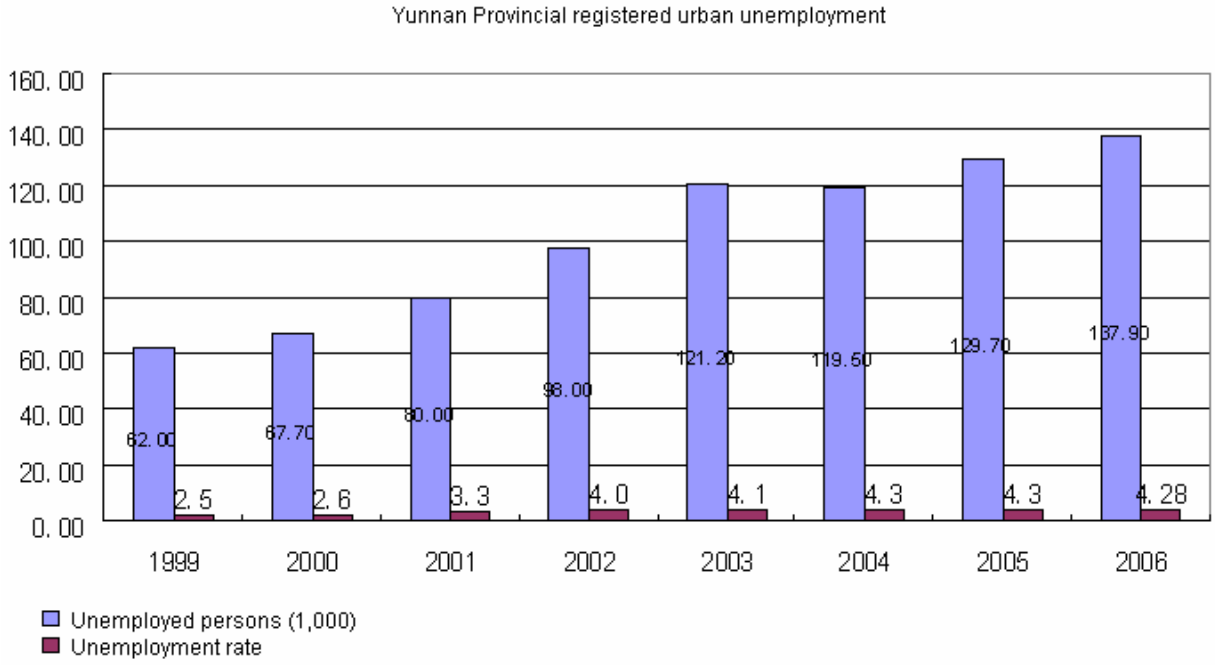
Source of information: "The National Eleventh Five-year Plan for Economic and Social Development" for China and for Yunnan, www.gov.cn and www.govzx.com.cn.

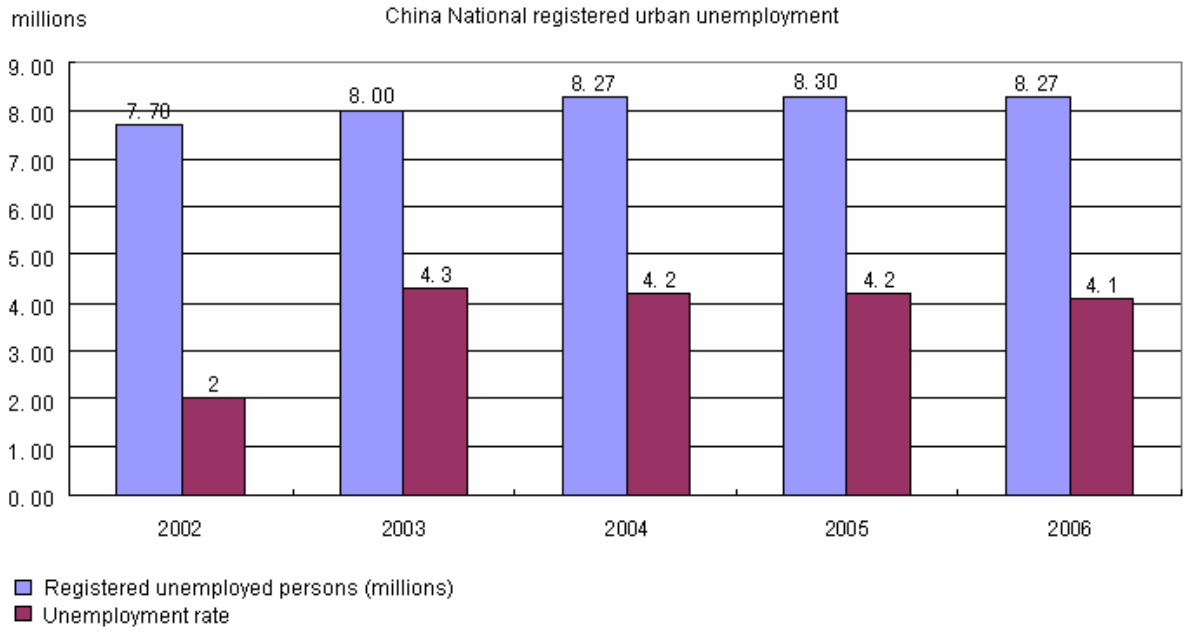
Table 2 Baseline of total and pre-capita GDP of the municipalities in the Yunnan Province (these are figures in real or in current prices?)

	Kunming		Yuxi GDP		Pu're GDP		XSBN GDP		Honghe GDP	
	Total GDP	Per-Capita GDP	Total GDP	Per capita GDP	Total GDP	Per capita GDP	Total GDP	Per capita GDP	Total GDP	Per capita GDP
	Billion RMB	RMB	Billion RMB	RMB	Billion RMB	RMB	Billion RMB	RMB	Billion RMB	RMB
2005	106.234	17,573	36.84	17,630	10.63	4,157	7.882	7,543	30.85	7,185
2006	120.728	19,730	41.487	18,606	12.468	4,853	9.1497	8,687	36.032	8,325

Source: Yunnan Statistic Yearbook, 2007, Yunnan yearbook 2006

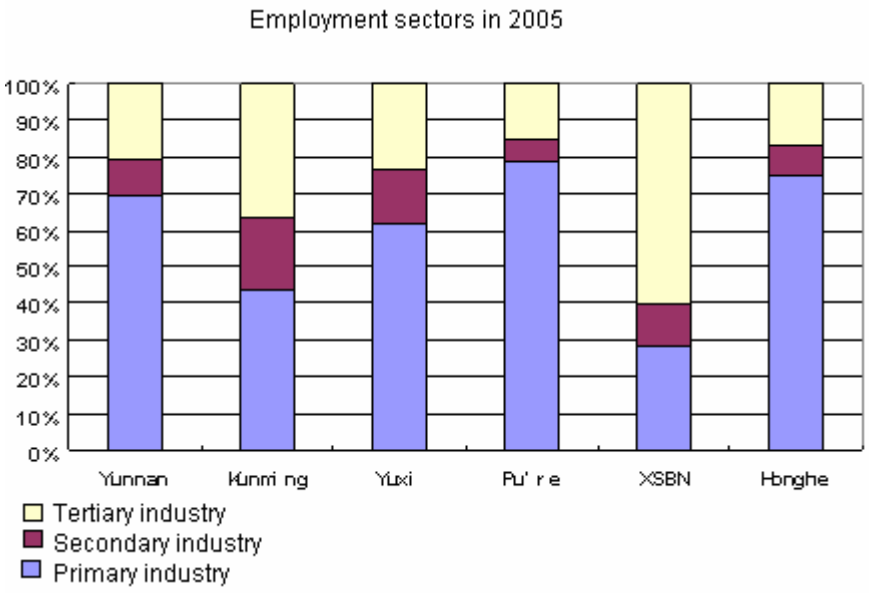
Figure1 Registered unemployment in the urban areas of China and the Yunnan Province

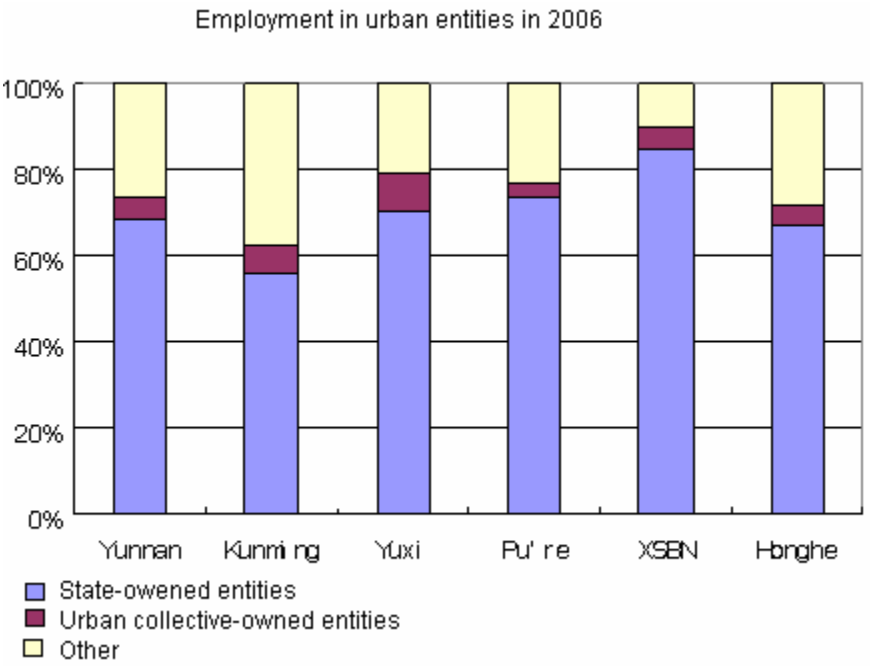




Source: Yunnan Statistic Yearbook, 2007, Yunnan yearbook 2006

Figure 2 Employment by sector in Yunnan Province municipalities





Source: Yunnan Statistic Yearbook, 2007 and Yunnan Statistic Yearbook 2006

Economy

Template 5: Agriculture

Key issue EC2: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development)

Introduction:

Advice to local consultants – this template needs to cover for example:

(i) Provide details of the agricultural sector in the NSEC, including types and production figures of crops
(ii) Describe (or show on maps) the location of the agricultural activities in the NSEC
(iii) Provide details of commercial and subsistence agricultural activities
(iv) The number of people engaged in different categories of agriculture
(v) Provide details on processing of agricultural produce within the NSEC
(vi) Data of export of agricultural produce and destination
(vii) Describe the main government policies/plans driving agricultural development in the NSEC

Please consider current state & recent & future trends (including government targets)

Indicator:

Output Value of Agriculture in Yunnan (grouped by sectors) (2000-2006),

Unit: million RMB

Year	total agriculture output value	farming	forestry	animal husbandry	fishery
2000	68,086	41,636	4,975	20,149	1,326
2001	70,353	43,131	4,721	21,063	1,438
2002	74,375	41,489	5,927	22,349	1,519
2003	79,933	43,391	7,317	24,253	1,656
2004	96,522	51,692	8,640	30,542	1,914
2005	106,858	55,932	10,553	33,968	2,297
2006	120,976	63,019	14,259	36,289	2,630

Added Value of Farming, Forestry, Animal Husbandry and Fishery in NSEC Corridor in 2006

Unit: million RMB

	total gross output value	farming	forestry	animal husbandry	fishery
total of YN	74,980.95	40,762.64	10,551.30	19,924.79	1,850.30
Kunming	7,624.00	4,532.06	298.28	2,363.06	179.71
Yuxi	4,133.09	2,736.05	146.11	1,066.35	104.25
Pu're	3,855.91	1,930.18	1,007.76	724.12	72.64
Xishuangbanna	3,116.91	740.17	2,029.86	194.28	58.30
Honghe	5,967.54	3,284.36	509.74	1,858.55	192.15

source: Yunnan Statistic Yearbook, 2007

Official target:

During the eleventh-five year (2006-2010): the added value of agriculture in Yunnan Province will increase at annual growth rate of 5%; the advantaged agriculture sector will be developed significantly, such as tobacco, sugar, tea, rubber, animal husbandry, forestry, flowers, traditional Chinese medical herbs, vegetables, potato, fruit, edible mushroom.

Farming: increase the sown areas of grain crops to 62 million mu (4.13 million ha), with total grain output of 16 million ton/yr by 2010.

Forestry: actively develop the following 8 forestry sectors: a) integration of forest and pulp & paper; b) timber processing & artificial fibreboard, c) forestry chemical industry, d) special characteristic economic forestry, e) non-timber produce in forest resources, f) bamboo & rattan sector, g) domestication and breeding of wild-animals, h) eco-tourism in forestry. The gross output value of forestry will reach over 50 billion RMB by 2010.

Animal Husbandry*:* greatly develop herbivorous & grain-saving livestock, beef cattle, goat meat and milk as the dominant sectors, to develop Yunnan province as an important livestock production and processing base. By 2010, the total meat output will reach 4.4 million tons, milk output will reach 500,000 tons and the gross output value of animal husbandry will reach 57 billion RBM, accounting for 35% or more of the gross output value of agriculture.

Source: Programme for Eleventh-Five Year Plan of Yunnan's National Socio-Economic Development

Trends:

The average annual growth rate in total agriculture output value during the tenth-five year plan was 8.73%. The average annual growth rate of farming, forestry, animal husbandry, and fishery section during the tenth-five year plan was 5.34%, 17.45,% 10.03%, and 9.82% respectively.

Drivers of trends: In Yunnan Province as a whole:

- Development of modern agricultural from traditional agricultural production patterns through integrated agriculture development;
- Accelerated restructuring of the agriculture sectors (the ratio of farming: forestry: animal husbandry: fishery were optimized from 61:7:30:2 respectively in 2000, to 54:12:32:2 in 2004). The enhanced comprehensive agriculture economic strengthening, with stable growth of agriculture produce, comprehensive development of all the agriculture sectors including farming, forestry, animal husbandry and fishery, and rapid development of high-quality agriculture produce;
- Increased input on agriculture and improvement of agriculture infrastructure and eco-environment; the financial budget for agriculture expenditure during the tenth-five year plan period increased at an annual growth rate of 13.1%;
- The rapid development of township & village enterprises (TVEs) and the increase in the level of urbanization; in 2004, the total added value of TVEs was 50.57 billion RMB, and the level of urbanization in the province increased from 23% in 2000, to 28% in 2004.
- In-depth rural reform and significant alleviation of farmers' burden. On March 5, 2004 Premier Wen Jiabo gravely reported in his Government Working Report that China will example agriculture Taxes within 5 years. The farmers burden alleviation rate in 2004 was 64.4%.

Source: thoughts and countermeasures for accelerated addressing agriculture, farmers and rural issues in the eleventh-five year period, (book of "Study on Strategy for the Development of Eleventh-Five Year Plan of Yunnan

Province”

Indicator:

Agricultural Commercial Rate in Yunnan (see table in annex EC5-2) (*Source: Yunnan Statistic Yearbook, 1998)*

Targets:

unknown

Trends: During the period from 1978 to 1997, the agricultural commercial rate had been increasing at average annual growth rate of nearly 24% (excluding trade between farmers).

Drives of Trends:

- Increased agricultural output value; increased input on the establishment of agricultural commercial base (as of mid 2001, there were over 600 agricultural commercial bases established in Yunnan Province, these included tobacco, sugarcane, rubber, forest, fruit, vegetable, silkworm, flowers, coffee, pigs, cattle, aquatic produces, eggs, and medicinal materials). The following geographic distribution situation is being developed:
  - The agricultural bases within flat areas: dominated by foodstuff, tobacco, vegetable, flowers, fruits and pork and birds/egg;
  - The agricultural bases within semi-mountainous areas: dominated by commercial cattle, medicinal materials, tea, sugarcane, rubber;
  - The agricultural bases within mountainous areas: dominated by dried fruits, timber, livestock.

  (source: *Yunnan Daily, June 28, 2001)*
- Yunnan hosted "Shanghai High Quality Ecological Agricultural Produce Talks", Kunming Agricultural Exposition", actively participated in "China Agricultural Fairs", opening the "green passages" for the transportation of fresh, live agriculture produce to develop and enlarge market *Source: Yunnan Yearbook, 2006*
- The strengthening of township & village enterprises (TVEs): in 2005, there were 68 thousand of out of 129 thousand total TVEs (52.5%) in Yunnan engaged in agricultural produce processing with total number of employees of 0.307 million. Main agricultural processing sectors are: tea processing, rubber plantation and procession, foodstuff, edible vegetable oils, sugar, beverage, vintage, fodder, silk, herb processing, tropic & sub-tropic fruits (coffee, longan, banana, lichee) processin; flavour and edible mushroom processing, knojak plantation and processing, timber, bamboo, rattan processing, aquatic produce & livestock processing. TVEs in Pu're are mainly engaged in tea processing; TVEs in Xishuangbanna are main engaged in rubber procession.

Indicator:

Yields of Main Farm Crops in NSEC Corridor in 2006 (see Annex EC5-1)

source: Yunnan Statistic Yearbook

Target:

Yunnan Province: The yield of grain crops reaches 16 million ton/yr by 2010. The traditional advantaged agriculture sectors of tobacco, sugar, tea, rubber, animal husbandry and forestry will be consolidated. The sectors of flowers, Chinese medical herbs, vegetables, potatoes, fruit, dried fruit, and edible mushrooms will also be greatly developed.

Promote supportive or special characteristic agriculture sector development in the NSEC:

Kunming: plantation and processing of grain crops, tobacco, vegetables, flowers, fruit, raising and processing of livestock.

Yuxi: plantations of vegetables, flowers, sugarcane, oil plants, fruit, processing of grain crops, vegetable, livestock, fruits and forest seed/nuts.

Honghe: supportive agriculture sector: tobacco, sugar cane, forestry, tea, rubber, livestock; industrialized agriculture production area: tobacco, high quality rice, vegetable, grape, pear, high quality guava, orange, banana, flower, flax, rubber and tea.

Pu're: agriculture supportive sector: tea, forestry, tobacco, processing of cane sugar, biological medication, rubber, coffee, fruit, lac, mulberry and flax.

Xishuangbanna: maintain the traditional supportive sectors of grain crop, rubber, sugar can, tea and their processing; develop new biological resource, including Dai national traditional medical herbs, tropic flowers, tropical fruit, natural flavours, coffee and their procession, as well as livestock and its processing, macadamia nut plantation and its processing, natural healthcare food processing.

Source: Programmes for Eleventh-Five Year Plan on National Socio-Economic Development of Yunnan, and localities

Trends:

Through development over the last decade, the yield of grain crops increased from 14 million tons/yr in 2005 to 15.149 million/yr in 2005. The special characteristic production of tobacco, sugar, tea, rubber, vegetable, fruit, flowers, animal husbandry became the advantaged agriculture sector.

Drivers of trends

The same as the drivers for Output Value of Agriculture in Yunnan.

The most important task of integrated agriculture development is the promotion of agricultural industrialisation. Increased investment input to support the development of advanced and special characteristic agriculture sectors. The approach of "company+ base+ farmer" and "company + cooperative organization + base is being taken on the key and special characteristic sectors to enlarge production capacity.

Indicator:

Rural Population and rural Employees in Yunnan Province (Grouped by Sector)

	1990	1995	2000	2005
Total of rural households (million household)	5.9	7.69	8.3	8.77
total rural population (million person)	32.26	33.35	34.5	35.68
rural employed persons (million person)	16.47	18.35	19.49	20.51
rural population engaged in farming, forestry, animal husbandry and fishery (million person)	15.03	16.32	16.74	16.9
rural population engaged in industry (million person)	0.36	0.48	0.52	0.59
rural population engaged in construction (million person)	0.28	0.39	0.53	0.63
rural population engaged in transport, storage and post service (million person)	0.16	0.27	0.36	0.39
rural population engaged in wholesale and retail trade (million person)	0.12	0.22	0.37	0.38
rural population engaged in other sectors (million person)		0.67	0.97	1.62

Source: Yunnan Statistic Yearbook, 2007

Target

During the eleventh-five year plan, around 6 million rural labourers are targeted to be transferred to the other sectors.

Trends:

Increasing rural residents' income.

Drivers of trends

Direct and powerful measures have been taken to open channels for rural people to increase their income, including income from the non-farming sector. The institutional, technological, and managerial innovation has been promoted to drive the acceleration and enhancement of TVEs development to absorb rural labour forces and income. Rural able-bodied labours are, and will continue to be encouraged, and guided to work in other sectors. A number of programs/initiatives, like "million rural worker training initiative" , the "Sunshine program", "green certificate" and "new farming skill training to farmers" are being arranged to enhance rural labourers employment capacity.

Indicator:

Agriculture Products Export Value of Yunnan

(unit: million USD)

	2002	2003	2004	2004 Jan.~May	2005 Jan.~May
Thailand	5.55	9.65	5.49	1.04	1.79
Vietnam	30.85	41.48	33.17	11.39	12.27
Myanmar	43.89	41.77	44.45	14.26	14.50
Lao	0.34	1.01	0.85	0.34	0.25

Cambodia	1.30	0.52	1.22	0.20	0.64

Source: Website of Kunming Customs District, People's Republic of China, Aug. 2005

Target:

Agricultural products are one of the most important products with special Yunnan characteristics exported to GMS countries, which will be greatly promoted to increase exports.

Trends:

In recent years, agriculture product exports from Yunnan to GMS countries have been slightly and steadily increasing. However the overall proportion of all Yunnan products exported from Yunnan to GMS countries is decreasing.

Of the exported agriculture products, the proportion of very preliminarily processed product with low added value is rather large, which did not fully reflect the complementary effect among GMS countries. In 2004, the export value of tobacco and cigarette products to GMS countries, the advantaged exporting product of Yunnan, was 30.27 million USD, accounting for 35.5% of the total agricultural product export value of Yunnan. The export value of vegetable to GMS countries was 21.50 million RMB, nearly half of the products (e.g. apples, oranges, other fruits) were exported by Yunnan enterprises as agent, but produced in other provinces of China, only a small proportion are vegetables produced from Yunnan, most of the vegetables from Yunnan were virtually non-processed. There is a tendency for the increased export of higher added value of agriculture products (e.g. beer and mild powders products, decreased export of tobacco and cigarette).

Drivers of trends:

The decrease in agricultural product consumption markets in GMS countries, the declining position of Yunnan's agricultural products in GMS countries, the changes in product exports from Yunnan to GMS countries: the increasing demand for chemical fertilizers, iron & steel and machinery products. Agriculture is becoming an important supportive sector in GMS countries, and there are limitations in GMS countries on the import of agricultural products from Yunnan. The GMS countries, except for Thailand, have weak economies with limited capacity to absorb agricultural products from Yunnan. The unstable export market in GMS has resulted in the impact on price, demand in GMS countries on Yunnan's agricultural products.

Relevant laws, policies, plans and institutional arrangements:

National Policy: China will actively promote the implementation of "GMS Agricultural Cooperation Framework and Agriculture Supporting Core Programme (The Framework)" deliberated and approved at GMS Agricultural Ministerial Conference. China will strengthen the follow up and coordination among parties, concerned according to the strategy, key sectors and key projects defined in the Framework to improve the quality and efficiency of GMS agriculture cooperation. China will further strengthen its communication with ADB and GMS countries to enlarge the cooperation sectors, to promote the foodstuff security, poverty alleviation, cross-boundary agricultural trade and investment, and to realized the sustainable utilization of natural resources.

(*source: China National Report on China's Participation in GMS Cooperation)*

Favorable policy for agricultural products trading with GMS:

- duty-free for import & export of vegetables and fruits between China and Thailand;
- Unilateral special favourable tariff rate granted by China to Myanmar, Laos and Cambodia for part of commodities.

Five Year Plan for Yunnan to promote GMS economic cooperation:

Farming sector: Yunnan will carry out jointly with other GMS countries research on agricultural production conditions, development status, products characteristics to develop agricultural cooperation plan, and to standardize agricultural products grade activities. Yunnan will strengthen its technical cooperation with other GMS countries in the fields of plantation, livestock raising and agricultural products processing (focusing on cooperation with Myanmar, Laos and Cambodia on plantation livestock raising by rending or purchasing suitable farmland). Yunnan will carry out cooperation with other GMS countries on the processing of agricultural products and the links sectors; Yunnan will promote the exchange of germ plasm of crops; Yunnan will promote the trade of agricultural products and instrument for agricultural production; Yunnan will cooperate with other GMS country to carry out temperate zone farming in Yunnan to meet the demand on agricultural products in temperate zone. Yunnan will continue to consult actively with GMS countries to establish monitoring, forecasting and prevention/control system of epidemic disease and exchange information on propagation epidemic disease to strengthen the cooperation on comprehensive development of epidemic disease control technologies. Yunnan will take the advantage of its agricultural practical technology and equipment to provide training and technical services.

Forestry sector: invest to buy or to leasehold forestry centre or mountain forest for development and management, the principle of attaching equal importance on felling and planting will be followed to greatly afforest, foster new forest species to increase forest quality and the quantity of costly timbers to infuse forestry with new vitality; Yunnan will cooperate to establish timber processing enterprise to reduce the export of raw products and logs and to process forest product significantly to increase added value; Enterprises and individuals will be encouraged to participate in the cooperative development of forest resources in any manner to turn the advantage of forest resources into advantaged industry.

(*Source*: *Fiver Year Plan for Yunnan to Promote Lancang—Mekong Sub-region Economic Cooperation*)

Yunnan Agricultural Policies: The rural population of Yunnan Province accounts for 77% of the total population. Agriculture, farming, rural are the top issues of the province. In order to implement the Central government's guideline of "offering more to, demand less from, revitalizing" for agriculture, farming and rural, Yunnan Province promulgated "Yunnan Rural Working Rules". The stable increase of grain crops output and sustained increase of farmers' income are the planned objectives to increase agricultural output, deepen rural reform and promote continued agriculture and rural economic strategic structural adjustment. This is to occur under the guidelines of "adjusting structure for increasing income, developing market by highlighting special characteristic, increasing efficiency by relying on science and technology" and adopting the concept of industrialization for designing agriculture.
In 2005, 110 counties in Yunnan province were designated as being national or provincial key poverty alleviation assisted counties, or located at border areas which were exempted from agricultural tax. Agricultural tax to the rest of counties in Yunnan has been reduced to 2%. Subsidies were made to farmers engaged in the plantation of grain crops in the key grain production counties, and counties for high quality grain crops seeds.

Relevant Plans

- Programme of the Eleventh-Five Year Plan for National Socio-Economic Development of Yunnan Province
- Five Year Plan for Yunnan to Promote Lancang—Mekong Sub-region Economic Cooperation

Problems and issues encountered during data collection:

There is no map on the distribution of agriculture activities.

There is no statistic data on the agriculture commercial rate after 1998.

Summary of main concerns and challenges for the NSEC:

- Through many years of development, a group of special characteristic agricultural products will start to make an income. However, when the structure of agriculture production in different locations is identical and spread around, the benefit of agricultural products will be low, impacting the income of local villagers. In order to improve the current situation, Yunnan will take integrated agriculture development path to promote industrialized agriculture operations.
- The proportions of Yunnan agricultural product exports to GMS countries in that of the Nation and that of total export value of Yunnan's is decreasing (in 2002 the agricultural export value to GMS countries from Yunnan accounted for 17.2% of Nation exports, and this decreased in 2003, 2004 and 2005).
- The gap in the Kunming—Bangkok road corridor may increase the cost of agricultural cooperation among GMS countries, restricting the cooperation between investors with producers and their competitiveness in GMS.
- Language differences create communication barrier to agricultural cooperation among GMS countries.

References/sources:

Challenges and Opportunities of GMS Agricultural Joint Venture and Cooperation, Anthony Zola, March 2005

A clairvoyance on the Challenges and Prospect of Agricultural Production Cooperation between GMS Countries and China, Website of China Planting Information, June 2004 www.c-seed.cn

Eleventh-Five Year Plan for Integrated Agriculture Development of Yunnan (website of Institute of tropic and sub-tropic economic crops of Yunnan Agriculture Academy)

Annexes: (eg. maps, diagrams, tables)

Annex EC5-1 Yields of Main Agriculture Products in NSEC Corridor in 2006

Unit: ton

	YN total	Kunming	Yuxi	Pu're	Xishuang banna	Honghe
Farming:						
Grain Crops	15,422,100	1,313,691	471,431	831,518	344,689	1,292,328
Cereals	12,689,000	895,665	427,076	771,151	339,150	1,161,050
rice	6,511,700	372,231	203,667	425,435	266,563	613,575
wheat	1,101,300	93,121	60,309	40,331	291	81,757
maize	4,520,600	348,043	150,344	289,261	71,775	400,046
Beans and Peas	684,000	108,237	24,256	38,778	2,454	66,078
broad beans	543,200	67,947	11,442	7,431	167	23,136
Tubers	2,049,100	127,789	20,099	21,589	3,085	65,200
Oil-bearing Crops	390,078	14,513	32,344	12,420	1,673	34,574
peanuts	5,800	1,113	1,057	9,052	1,661	11,687
rapeseeds	315,662	11,712	30,534	3,207	2	21,794
sugarcane	16,787,261	3,451	1,262,488	2,022,008	967,155	1,287,157
flue-cured tobacco	757,773	88,291	99,345	15,502	0	80,294
forestry						
rubber	264,238.4	0	0	16,435	204,886	19,044.7
pine resin	110,527.9	86.0	3,866.8	96,332.7	987.0	42.1
Tung-oil seeds	18,392.1	42.5	0.0	90.3	0.0	37.1
rapeseeds	4,834.4	16.0	0.0	2.0	0.0	0.3
walnuts	106,499.0	1,616.0	1,458.1	3,507.5	0.0	1,375.2
chestnuts	24,629.1	8,446.9	1,679.3	344.2	207.5	657.5
shellac	2,099.8	0.0	15.9	569.6	5.7	884.1
vegetables	10,337,815	1,742,470	1,119,922	1,295,952	551,126	298,366.0
fresh cut flowers (million branches)	3,986.36	334,910.00	40,749.00	1.61	2.40	20.9
potted ornamental plants (pot)	67,796,540	13,896,200	3,899,500	5,919,300	0	3,370,200.0
medicinal materials	39,873.8	1,905.8	383.6	664.0	1,322.4	4,280.5
edible mushrooms	21,555.6	1,345.2	497.2	398.1	859.2	729.6
tea and fruits						
tea	138,176					
black tea	10,498					
green tea	124,999					
fruits	1,625,584					
bananas	338,112					
apples	201,962					
citrus	243,628					
pears	216,936					
grapes	90,117					

	YN total	Kunming	Yuxi	Pu're	Xishuang banna	Honghe
pineapples	19,542					
Tropical and subtropical crops						
rubber	264,238					
coffee	25,399					
perfume plants (converted to perfume oil)	949					
pepper	341					
fructus amomis	1,395					

source: Yunnan Statistic Yearbook

Annex EC5-2 Agricultural Commercial Rate in Yunnan

Year	Gross Agriculture Output Value	Value of Agricultural Produce(exclude trade between farmers) Million RMB	Commercial rate (%)	Value of Agricultural Produce(Include trade between farmers) Million RMB	Commercial rate (%)
1978	4002.25	1140.22	28.5	1374.59	34.3
1980	4820.29	1465.96	30.4	1868.04	38.8
1985	8888.26	3908.22	44.0	4977.43	56.0
1986	9601.49	4040.62	42.1	5064.57	52.8
1987	11124.97	4959.09	44.6	6092.91	54.8
1988	13539.00	6694.12	49.4	8201.36	60.6
1989	15268.00	6828.28	44.7	8433.49	55.2
1990	16848.00	7178.52	42.6	8870.38	52.7
1991	22293.00	7989.46	35.8	9897.22	44.4
1992	25035.35	10223.74	40.8	1220.901	48.8
1993	28121.00	11850.00	42.1	14380.00	51.1
1994	35678.00	14850.00	41.6	18450.00	51.7
1995	47446.41	19846.78	41.8	24999.41	52.7
1996	56751.49	25098.95	44.2	30524.06	53.8
1997	61201.00	28647.61	46.8	34595.16	

Source: Yunnan Statistic Yearbook, 1998

Economy

Template 4: Industry (including energy, mining etc)

Key issue EC4: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development)

Introduction:

Advice to local consultants – this template needs to cover for example:

(i) Provide details of industry sectors active in the corridor

(a) Analyse the breakdown of industry according to primary, secondary and tertiary categories?

(b) Where possible, provide examples and details of industries depending on natural resources from the NSEC?

(ii) What is the location of different industrial sectors in the NSEC?

(iii) What are the main energy types and sources used by NSEC industries?

(iv) What and where are the main mining activities?

(v) Describe the main national and local government policies and plans driving industrial development in the NSEC area.

Please consider current state & recent & future trends (including government targets)

Indicator:

Gross Output Value of Primary, Secondary, Tertiary Industries, and added value of industry in the Corridor in 2005

(details are shown in annex EC4-1)

Official target:

In Yunnan Province as a whole, the target is to pursue the path of industrialization with high-tech industry, sound economic benefit, low resource consumption and low environmental pollution. Implement the strategy of developing industry to regenerate Yunnan Province, by developing new industries and industries with concentrated labour forces.

The economic value of the industrial sector will increase at anural growth rate of about 12%, hitting 210 billion RMB by 2010. The percentage of GDP that is attributed to the industrial sector increases from 34.2% in 2005 to over 40% in 2010. The structure of the three categories of industry will be optimized, targeting 15：43：42.

Source: Programme of the Eleventh-Five Year Plan for New Industrialization in Yunnan

Indicator:

Number of Industrial Enterprises of Major Sector Depending on Natural Resources in NSEC in Yunnan and Their Gross Output Value in 2006

(figures are shown in annex EC4-2)

Target:

Provincial Target: Industry will account for over 40% of GDP in the majority of prefectures/municipalities, about one third of the counties/districts in the Province will achieve

preliminarily industrialization.

Kunming: Promote the metallurgical industry, taking advantage of the abundant natural resources in the area, which include phosphorus, salt, titanium, iron and copper. Establish copper and aluminium industrial bases to supply the nation. Establish iron & steel industrial bases to supply the province. Promote the processing of ferrous & non-ferrous metals. Promote the chemical industry and the establishment of a chemical base producing high concentration phosphorus compound fertilizer and refined phosphorus to supply the nation. Keep the existing traditional cigarette industry, and develop the bio-medicine industry. Develop the tourism industry significantly.

Yuxi: Take the advantage of the abundant iron, nickel, copper and phosphors resources and the existing tourism industry. Consolidate the existing superiority of the tobacco and cigarette industry and auxiliary sectors. Strengthen the metallurgical industry to increase its competitiveness, and enable Yuxi to be one of the most important mining and metallurgical industrial bases. Greatly promote tourism and cultural industry.

Pu're:

Take the advantage of the areas forestry, mineral resources (gold, copper, iron, aluminium, lead, zinc, coal) biological resources, water power resource and tourism resources. Enlarge and strengthen the famous brand tea industry, forestry industry (integrating forest, pulp and paper), hydropower industry, biological resources innovation and development industry (tea, rubber, sugar, fruit, coffee processing and bio-medical products). Develop the tourism industry.

Xishuangbanna: Take advantage of the tourism, mineral (manganese, iron), water power and biological resources. Enlarge and strengthen the tea, forestry, hydropower and mining industries as supportive industries. Further enlarge and improve the quality of the tourism sector, and combine this with eco-environment protection. Support the biological resources innovation and development industry (e.g. grain, rubber, sugar, tea, tropic flower, fruit, natural spices, coffee, macadamia nut, ethic traditional medical herbs, healthy and green food, etc.)

***Honghe*:** Take advantage of mineral, biological and tourism resources. Develop the mining and metallurgical industry (deep processing of tin, lead, zinc aluminium product, and become a new iron & steel industrial base). Develop the power industry (both thermal and hydropower) and become an important energy base in Yunnan and the largest thermal power base. Develop the phosphorus and coal chemical industry and building material industry. Develop the biological resource innovation and development industry significantly (maintaining the traditional tobacco and cigarette, forestry, pasturage, sugar, rubber, team supportive sector industry, emphasise the development of grape wine, pollution-free vegetables and fruit, biological medicine and bio-pesticide). Shape the tourism industry.

Source: local Eleventh-Five Year Plan

Indicator:

Total Production and Consumption of Energy and Their Composition in Yunnan Province (see annex, the table EC4-3)

In 2004 the percentage of energy consumption by primary industry, secondary industry, tertiary

industry and domestic sectors in Yunnan Province was: 2%, 73.5%, 13.4%, and 11.1% respectively. The secondary industry sector was responsible for the majority of the energy consumption. The sectors with intensive energy consumption are: the metallurgical sector, heavy chemical industry, and power supply. Detailed figures are shown in annex EC4-3. Energy consumption in Yunnan is dominated by coal, together with hydropower, and an increase in petroleum products.

Source: (1) Yunnan Statistic Yearbook, 2007;

Target:

***Yunnan provincial target*:**

Province target:

- to achieve the coordinated development of the economy, resources, and the environment. To decrease energy consumption per 10,000 worth of added value of industry to 2.66 tons of SCE (25% decrease) by 2010; decrease water consumption per 10,000 worth of added value of industry to 152 m3 (22% reduction); to increase the industrial water recycling rate to 60%, to increase the reuse rate of industrial solid wastes to over 50%, to promote clean production in most industrial enterprises. (source: Programme of the Eleventh-Five Year Plan for New Industrialization in Yunnan)
- to build a well-off society in a sustainable way in relation to energy, the development of energy will drive the development of energy-related sectors to make great progress in energy saving, and increased energy efficiency;

(*source: the Eleventh-Five Year Plan on National Socio-Economic Development of Yunnan Province*)

Local government targets during the eleventh-five year (2006-2010) plan:

***Kunming Target*:** to install more power generators, to undertake the technical reform of thermal power equipment to increase capacity; to establish Kunming as the provincial centre for electricity transmission and transformation, and the electricity dispatching centre responsible for transferring power from west China to east China.

Yuxi Target: to further improve the power supply network, to give priority to the development of the small hydropower projects with larger dispatching capacity.

Pu're Target: the hydropower industry will be developed as one of the four supportive industries in Pu're, and a number of hydropower stations (large, medium and small in size) will be constructed. Power grid development will be accelerated. The economic value of the power industry will reach 3.4 billion RMB by 2010.

Xishangbanna target: The hydropower industry will be developed as a new and one of the six supportive industries of Xishuangbanna prefecture. A number of hydro-power stations, urban power grid and rural grid projects will be constructed or initiated to target the installed power generation capacity of 3.1 megawatt by 2010. The economic value of the power industry will hit 1.5 billion RMB by 2010.

Honghe Target: Energy development will follow the principle of "running thermal power and hydro power simultaneously". From 2006-2010, the capacity of three thermal power stations will be increased, a number of cascade hydropower stations and a group of small sized hydropower stations will be constructed. Power grid network will be extended and improved to increase the power supply reliability. A coal mining extension project in Kaiyuan existing coal mine and the

exploitation of coal resources in Mengzi and Mile counties are considered in the eleventh-five year plan.

Source: Programme of the Eleventh-Five Year Plan for Socio-Economic Development of Yunnan Province

Indicators:

Number of mining and dressing industrial sectors and their output value in the corridor in 2006

Kunming		Yuxi		Pu'er		XSBA		Honghe	
number of enterprise	gross output value	number of enterprise	gross output value	number of enterprise	gross output value	number of enterprise	gross output value	number of enterprise	gross output value
No.	Million RMB	No.	Million RMB	No.	Million RMB	No.	Million RMB	No.	Million RMB
37	5028.65	13	2124.145	10	281.68	5	559.56	17	1525.3

The main mining activities in the Province:

Kunming: non-metal mineral resources of phosphorus, quartz sand, salt; ferrous metal of iron; non-ferrous metal of titanium and aluminum and coal mining.

Yuxi: coal mining; non-metal mineral resources of phosphorus; ferrous metal of iron; non-ferrous metals of copper and nickel.

Pu're: non-metal mineral resources of potassium salt; ferrous metals of gold, silver, tin, copper, lead; and ferrous metal of iron.

Xishuangbanna: non-ferrous metal of cupper, tin, gold, lead, zinc; ferrous metal of manganese; non-metal mineral resources of halite; coal mining and geothermic resources.

Honghe: non-metal mineral resources of phosphorus; non-ferrous metal of tin, zinc, aluminum, lead; ferrous metal of iron and coal mining

Source: Yunnan Statistic Yearbook, 2007

Target:

The total gross output value of mining industrial sector in Yunnan Province will reach 100 billion RMB with revenue of 10 billion RMB by 2010. To develop Yunnan Province as the largest phosphorus chemical industrial base in China and an important non-ferrous metal industrial base. To consolidate the supportive industry role of mining sector in the economy of Yunnan Province.

In order to rationally exploit and effectively protect mineral resources, the total mining volume have been regulated and controlled. Based on the national and provincial laws & regulation, policies, taking into account of resources, market and environment, the mineral resources in Yunnan were divided into 7 zones, including 65 sub-zones, which have been categorized as: encouraged mining sub-zone; restricted mining zone, or forbidden mining zone. Of the 7 zones, three are located in the NSEC corridor:

- ***The Kun-Yu Zone*** (covering Kunming, Yuxi, eastern part of Chuxiong), this area is rich in phosphorus, copper, iron and titanium resources, and is the core of the planned mining industry in Yunnan. Focus will be placed on mining phosphorus in middle Yunnan, mining copper and iron

resources, and the opening mining of coal in Xundian for pilot of liquefaction of lignite. Titanium ore and salt distribution will be encouraged and exploited in Wuding, Luquan, An’ning.

- ***The Ge-Wen Zone***: (covering Honghe and Wenshan Prefectures), this area is rich not only tin, but also zinc, silver and indium resources. The total volume of tin mining (in Gejiu), two noble metal mining in Maguan and Mengzi will be driven to develop southeast Yunnan as the important non-ferrous metal and noble metal development base of Yunnan. The extension of gold, copper, nickel and manganese mining along Jingping-Yuanyang belt will be encourage; coal mining along Kaiyuan-Mile belt will also encouraged.
- ***The Si-Lin zone*****:** (covering Pu’re municipality and Lincang Prefecture): here is rich in copper, silver, lead and zinc. The extension of gold mining in Zhenyuan, Mojiang, solid potassium salt mining will be encouraged. Prospecting and exploitation of copper and other metal mine distributed in Simao—Jinggu will be accelerated. The total volume of asbestine mining in Mojing—Yuanjing will be controlled. An important mining centre of GMS economic zone is planned to be established.

Source: Yunnan Provincial Mineral Resources Master Plan (2000-2010)

Relevant laws, policies, plans and institutional arrangements:

Institutionally arrangement for GMS cooperation in Yunnan: since the GMS summit conference and under the leadership of Central Government of China, Yunnan has established following bilateral working groups and forums:

- Yunnan—Taibei Working Group
- Yunnan vs Five provinces in Northern Vietnam Economic Consultation Chamber
- Yunnan—North Laos Working Group
- Yunnan vs Myanmar Business Cooperation Forum

Key Sectors that China cooperates on a national basis with GMS: Transportation, energy, telecom, environment, agriculture, human resources, tourism, trade facilitation, investment, plus health and narcotics control.

Energy sector cooperation. In accordance with the conceived “four phases” of power trade development and action plans defined in GMS Power Trade & Operation Agreement (RPTOA), China is willing to work with other GMS countries to promote prioritized works and develop a masterplan for GMS electric power development. China will also establish an electric power database and website, electric power operation standards and rules for electricity transmission, etc. This will be achieved in full consultation to bring advantages into play, to develop bilateral, multi-lateral power cooperative trade in order to establish a unified GMS power market, to realize interlinks of power grid and free power trade in the sub-region, to realize optimized configuration of resources, to increase the benefit of the grid and complementary advantages, to achieve mutual benefits and equal win-wins. China is willing to work with other GMS countries to extend energy cooperation, including increasing energy efficiency, developing alternative energy resources to ensure energy safety in GMS.

In the telecom sector cooperation, China will attach its great importance and continuous to promote telecom cooperation in GMS. Based on phase I of GMS IS project, China will actively promote the launch and implementation of its phase II project, including wider cooperation on the network operation and maintenance. China will actively probe into and promote

information-based application projects on the basis of GMS IS. China will strengthen exchange and communication of experience in rural communication polities, rural communication development to promote the construction of pilot project of rural communication, and to jointly promote rural communication development in GMS. China will strengthen communication exchange and cooperation with information and communication authorities in GMS and will continue to organize training on telecoms to senior officials in GMS to increase the technical and management capacity of staff working in this sector.

(Source: China National Report on China's Participation in GMS Cooperation)

Key sectors that Yunnan will cooperate with GMS Countries in the coming 5 years or longer include: transportation, agriculture and forestry, water power resources, biological resource, cross-boundary tourism, mineral resource, human resource, science & technology, information service

(*Source: Five Year Plan for Yunnan to Promote Lancang—Mekong Sub-region Economic Cooperation)*

Industrial Development Plan for the corridor: The following industrial sectors will be distributed along the sections of Kunming—Jinggong—Mohan of the Kunming—Bangkkok highway, a) tobacco & cigarette and associated sectors; b) forestry & paper; c) processing of agriculture products; d) processing of rubber

(source: Programme of the Eleventh-Five Year Plan for New Industrialization in Yunnan)

Some policy on industrial development of Yunnan: To accelerate the development of key industrial sectors of tobacco & cigarette and associate sub-sectors, energy, iron & steel, and non-ferrous metals, chemical industry, machine manufacturing, building material, electronic information manufacturing, paper and processing of special characteristic agriculture products. To establish the energy base, non-ferrous metals base, high concentration phosphorus compound fertilizers base, photoelectron base, equipment manufacturing base, coal-chemical industrial base, Yunnan medicinal herb base, agricultural products' processing base, forest & bamboo pulp & paper base, hemp textile base, etc.; To optimize and adjust the structure of heavy and light industries and to extend industrial chains of raw materials and mining products; to accelerate the development of advanced manufacture; to greatly develop special characteristic industries and cycling economy ……

(*Source: Programme of the Eleventh-Five Year Plan for New Industrialization in Yunnan)*

Relevant plans:

- Programme of the Eleventh-Five Year Plan for National Socio-Economic Development of Yunnan Province
- Programme of the Eleventh-Five Year Plan for New Industrialization in Yunnan
- Five Year Plan for Yunnan to Promote Lancang—Mekong Sub-region Economic Cooperation (output of a UNDP TA project)

Problems and issues encountered during data collection:

Summary of main concerns and challenges for the NSEC:

1. The industrial economic development of Yunnan Province is facing problems and difficulties including: the uncertainties in world economic development, the strong competition at the later stage after China's accession to WTO, the more complicated issues as the results of accelerated development pace may impose adverse impact to the industrial economic development of Yunnan Province which has long been lagged behind. The total output value of the industrial sector in Yunnan is low: the growth rate of added value of industry during 2001-2005 was 8% lower than that of the Nation; The industrial structure is still irrational because it is too heavily dependent on tobacco & cigarette and resources processing is still the dominate industrial sector, while the new high-tech industrial development is very limited with little technology and few name brands and innovative products. State-owned enterprise accounts for the largest proportion of the sector, while private, small & medium sized enterprise and TVEs are less developed and less competitive; Industrial development was unbalanced between the different regions: the added value of larger sized industries in 7 prefectures/municipalities (including Kunming, Yuxi, plus Honghe in the NSEC) accounted for 90%, while the other 9 prefectures/municipalities only accounted for the remaining 10%; The growth pattern of industry in Yunnan was extensive: the technical process of traditional industrial sector of metallurgy, chemical industry, building materials, machinery are subject to further improvement, except for the tobacco and cigarette sector, some of mineral resources do not have alternatives, the issue of "high input, high consumption, high emission, low efficiency is still outstanding, the task of reform and upgrading of such a lagging industrial sector will be arduous.

2. Countries in GMS are relatively poor, with the exception of Thailand, so the GMS economic cooperation has started at lower point, with weak foundations and fund shortages. .

References/sources:

Annexes: (eg. maps, diagrams, tables)

Annex EC4-1 Gross Output Value of Industry in the Corridor

	Kunming	Yuxi	Pu'er	XSBA	Honghe	Yunnan
	Value (million RMB)	Value (million RMB)	Value (million RMB)	Value (million RMB)	Value (million RMB)	Value (million RMB)
primary industry (2005)	7731	4300	3364	2683	5740	65618
secondary industry (2005)	48324	21500	3366	2055	16670	144971
tertiary industry (2005)	50179	1102000	3901	3144	8443	136645
ratio of the three category industries (2005)	7.3：45.5：47.2	9.8：64.1：26.1	31.6:31.7:36.7	34:26.1:39.9	18.6:54:27.4	19：42：39
Added value of industry (2005)	38714	20170	1900	805	14414	120007

Source: Yunnan Yearbook, 2006

Annex EC4-2 Number of Industrial Enterprises of Major Sectors depending on natural resource in NSEC in Yunnan and Their Gross Output Value in 2006

	Kunming		Yuxi		Pu'er		XSBA		Honghe	
	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)
Light and heavy industrial sectors										
light industry	279	31820.4	94	23186.1	32	1269.4	23	1111.56	45	9548.95
heavy industry	610	101315.37	198	22914.16	64	3039.27	22	1120.88	134	29321.3
Sub-total	**889**	**133135.77**	**292**	**46100.26**	**96**	**4308.67**	**45**	**2232.44**	**179**	**38870.25**
Industrial sectors depending on natural resources										
coal mining and dressing	4	337.7	3	99.44	4	21.63			6	974.25
mining and dressing of ferrous metals	2	722.68	6	94.245			3	523.04	2	143.78
mining and dressing of nonferrous metals	11	1019.19	2	1917.98	5	250.71	1	31.52	8	405.01

	Kunming		Yuxi		Pu'er		XSBA		Honghe	
	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)	number of enterprise	gross output value (million RMB)
mining and dressing of non-metals mineral resource	20	2949.08	2	12.48	1	9.34	1	5.00	1	2.26
agricultural by-products processing	54	3493.88	18	1089.55	10	690.33	6	510.74	10	563.14
tobacco production	4	17132.74	4	19165.61					2	7846.47
timber processing, bamboo, cane, palm fiber and straw product	10	318.7	3	81.31	15	707.8	1	7.75	1	8.74
paper-making and paper products	19	396.3	20	1003.36	1	204.48			8	531.85
raw chemical materials and chemical products	123	12319.19	39	3797.95	9	491.01	1	14.05	19	3339.64
nonmetal mineral products	81	3316.74	46	1271.17	10	566.1	5	101.46	14	823
smelting and processing of ferrous metals	31	14662.01	43	8037.67	3	21.89	3	46.99	7	1440.48
smelting and processing of nonferrous metals	53	39852.31	11	2094.84	3	439.22			27	16774.78
metal products	38	1259.9	6	102.7			1	2.24	2	33.63
power production and supply of electric power and heat	25	9582.63	14	3139.8	13	522.32	6	346.82	36	4515.47
water production and supply	12	660.97	7	39.68	9	28.46	3	22.43	11	61

Source: Yunnan Statistic Yearbook, 2007

Annex EC4-3 Total Production and Consumption of Energy and Their Composition in Yunnan

year	total production of energy (10,000 tons of SCE	Percentage to Total Production (%)		Elasticity Ratio of Energy Production	Total Consumption of Energy (10,000 tons of SCE	Percentage to Toal consumption (%)				Elasticity Ratio of Energy Consumption
		Coal	Hydropower			coal	Petroleum	natural gas	hydro power	
2001	2611.54	65.48	30.53	0.49	3741.03	62.33	10.62	1.72	25.57	0.6
2002	3259.95	67.19	29.41	0.58	4131.31	61.04	11.12	1.51	23.7	0.63
2003	3608.45	64.24	30.78	0.60	4449.97	60.85	11.64	1.53	22.01	0.64
2004	4455.68	68.13	27.04	0.67	5209.81	63.3	11.13	1.34	20.16	0.68
2005	5353.36	68.92	26.61	0.72	6023.97	62.58	11.14	1.35	21.01	0.71
2006	6095.1	75.03	22.34	0.78	6640.58	67.82	11.48	1.09	17.57	0.71

Note: 1. SCE: Standard Coal Equivalent

2. Elasticity Ratio of Energy Production =Average annual growth rate of energy production/average annual growth rate of national economy

3. Elasticity Ratio of Energy consumption =Average annual growth rate of energy consumption/average annual growth rate of national economy

Source: Yunnan Statistic Yearbook, 2007

Economy

Template 6: Special economic zone

Key issue EC3: Special economic zones; free trade zone, concession areas - investment (spatial development)

Introduction:

Advice to local consultants – this template needs to cover for example:

(i) Describe the types of economic and land use zones in the NSEC
(ii) Where available provide maps showing spatial zoning affecting the NSEC (with legends)
(iii) Describe the government policies and plans promoting special economic zones
(iv) Describe the allocation of authority between levels of government for special economic zones
(v) Provide details of special economic zones and concession areas located on international borders
(vi) Describe some of the challenges relating to special zones and concessions (eg in Laos there is a government moratorium on concessions)

Please consider current state & recent & future trends (including government targets)

Indicator:

Main Economic Zones (at National & Provincial levels) in NSEC in Yunnan Province

location	Sum of economic zones	number of industrial zones/parks	number of special characteristic sector zones	Number of Tourist Resort	number of port (border trade areas)
Kunming	13	6	2	5	
Yuxi	8	2	1	5	
Honghe	10	2		7	1
Pu're	8	1	1	6	
Xishuangbanna	5	1	2	1	1
sub-total in NSEC	44	12	6	24	2
whole Yunnan	108	30	8	70	3

Source: 1.Programs for the Eleventh-Five Year Plan on New Industrialization Development

2 Yunnan Land & Resource Department Website (For tourist Resorts)

Details of the industrial zones/parks, special characteristic sector zones, and some key tourist resort are shown in the table of Annex EC6-1.

Official target:

There have been two national-level economic zones in Kunming since 1992. According to

Programs for the Eleventh-Five Year Plan on New Industrialization Development, about 70 industrial zones/parks are planned to be established, of which 30 (10 are in the NSEC) have been designated to be the provincial-level key industrial development zones/parks, 8 (6 are in the NSEC) be designated to be the provincial-level special characteristic industrial zone in 2004.

Trends:

In 2005, to meet the requirement of YPG of the *Resolution on Taking the Path of New Industrialization, Implementing Strategy of Rejuvenating the Province by Industry*, and *Programs for the Eleventh-Five Year Plan on New Industrialization Development,* a substantial progress have been made in the preparation, infrastructure development and business invitation and investment attraction. The gross output value, added industrial value, sales income, revenue and profit in 2005 reached: 41.371 billion RMB, 10.639 billion RMB, 24.674 billion RMB, 2.217 billion RMB, 2.86 billion, respectively, increased by 44.5%, 32.9%, 49.1%,24.3% and 22.3% respectively, as compared with that of the preceding year By 2010, three "50%s is targeted: e.g.

- Sales income of the key industrial zones/parks increase at annual growth rate of about 50%;
- Added value of key industrial zones/parks increase at annual growth rate of about 50%,
- Added value of key industrial zones/parks account for about 50% of that of the whole province

(source: *Programs for the Eleventh-Five Year Plan on New Industrialization Development, 2005)*

Drivers of trends:

1. Development of plans: A "Evaluation and Review Method for the Master Plans and Feasibility Studies of Key Industrial Zones and Special Characteristic Industrial Zones (Trial)" were framed as the guidelines for industrial zones development. By the end of 2005, 28 of the key industrial zones have prepared Feasibility studies, 30 of them have completed their master plan, a number of them have prepared EIAs, some of them are preparing the second or third phase of development.
2. Improvement of investment environment: each industrial zone/park has issues or is issuing favourable policies, improving quality of services to invite business and attract investment. in 2005, new a total of 2.232 billion RMB of investment, 1.028 billion loan were obtained by 29 key industrial zones for 30 infrastructure projects.
3. Key construction projects in industrial zones: in 2005, 167 enterprises flow into the industrial zones, with total investment of 4.92 billion RMB.
4. Special characteristic industrial clusters: the key industrial zones made efforts in develop special characteristic industrial clusters by taking the advantages of local resources and geographic locations.

Establishment of ecological industrial park: "cycle economy" is being accepted as the important industrial development pattern by the key industrial zones. Some key industrial zone selectively attract investment on sectors to make the gap in their cycling rings. Clean production technology are being introduced in some of the industrial zones in the technical reform and upgrading. Etc.

Indicators:

Target:

(include sources of indicator and target)

Trends:

Drivers of trends

Relevant laws, policies, plans and institutional arrangements:

***Strategy for taking the new path of industrialization in Yunnan*:**

Based on the principles of "attracting industrial clusters be rationally distributed under the guidance of scientific plans, gradually and harmoniously developed", the pace of industrial zones/parks development will be accelerated by taking the advantages of local resources, industrial foundations, traffic conditions and environmental capacity, and by making the driving effect of special fund into play and attracting more investment. The economy in the industrial zones/parks will be developed in harmonious with the urban construction, land use, environment resources. Effort will be made to improve management, to enhance service, and to improve mechanisms on business invitation & investment attraction to create a sound development environment. Industrial zones/parks will be established as the important platform for the swift input, effective convergence of industries, pilot drives of cycle economy and great-leap-forward development. It is to give priority to the key industrial zones/parks, promote their development level by level and manage industrial zones/parks dynamically. The whole Yunnan Province plans to establish about 70 industrial zones, of which, about 30 are designated to be the provincial-level key ones. In principle, counties with stronger industrial foundation the other conditions, can consider one special characteristic industrial zone by each.

A grout of key industrial zones/parks will be rationally distributed and encouraged to be concentrated in areas with best industrial development conditions, in the economic corridor supported by the transportation arteries, and in the centre cities or towns. For instance, in the Kunming-Bangkok economic corridor, which involves Kunming, Yuxi, Pu're and Xishuangbanna, the advantage of the highway corridor, special characteristic industrial sector and biological resources, the pace of industrial sector restructuring and innovation will be accelerated, the biological resources development, such as: tobacco & cigarette, forest based pulp and paper, tea, biological produces, foods, will be the prevailing development industry, plus tourism industry with special characteristic, such as Pu're tea cultural tourism, Tropic landscape tourism in Xishuangbanna, etc. Simao city and Jinggong City will be developed as the important city complex in south Yunnan, and the grow pole of the regional economic growth.

List of Relevant Policies at Provincial Level:

1. Opinions of National Development & Reform Commission on Promoting Cluster Development of Industries, Dec. 2007
2. The Resolution of Yunnan Committee of Communist Party of China, and YGP on Taking the Path of New Industrialization, Implementing Strategy of Rejuvenating the Province by Industry, December 30, 2003
3. Circular of YPG on vigorously Promote the Works of Cycle Economy of Yunnan

Province, July 2005

4. Provisions of Yunnan Province on Encouraging external Investors for Development in Yunnan, Dec. 2007
5. Opinions of Yunnan Committee of Communist Party of China and YGP on the Acceleration the Development of Non-Public Ownership Economy, 2003
6. Programs for the Eleventh-Five Year Plan on New Industrialization Development, July 2003
7. Resolution of YPG on Further Enlargement of nongovernmental Investment, 2003;
8. Circular of Yunnan Economic Commission on Printing and Distributing "Implementation Method for Key Industrial Zones in Yunnan (Trial)" 2003
9. Circular of Yunnan Economic Commission on Further Doing Well of the Works of Industrial Zones, 2005
10. Catalogue of Industrial Sectors, Products and Technologies Encouraged By Currently China National Authorities (amended in 2000)
11. Directive Catalogue of Yunnan Province on Industrial Sectors Restructuring (2006 version)
12. Preferential Policies of Yunnan Province for Inviting Business and Attracting Investment (including 32 articles covering following 6 aspects:
    a) Guiding principles for further improvement of investment environment
    b) Maximizing the concessions to outside investment
    c) Providing high-quality and high-efficient services to outside investors
    d) Creating sound investment opportunities and conditions, and reducing the investment cost of outside investors
    e) Implementing preferential land policies to outside investing enterprises
    f) Improving auxiliary service to make good social environment
    g) Establishing objective responsibility system for the enhancement of leadership on improved investment environment

Institutional Arrangements:

Yunnan Economic Commission is the Government Authority in charge of industrial economic development. In addition of the other industrial economic dynamitic monitoring, industrial sustainable development research, study out industrial sector policies, implementation the national policies, study the multiple economic ownership condition, etc., it is responsible for providing guidance on the planning and construction of industrial zones, and carry out management over the key industrial zones.

Yunnan Industrial Zones Association, is a government institution, established on Oct. 2005 subordinated to Yunnan Economic Commission. It is engaged in the planning, design of industrial zones and service for the business invitation & investment attraction.

Each industrial zone is locally managed by its management commission, comprised of members of local government agencies.

Problems and issues encountered during data collection:

It is difficult to collect land use pattern in the industrial zones. Only some maps of planned land use in the zone are collected and attached as annex.

Summary of main concerns for the NSEC:

Taking the new path of industrialization, is the important approach for Yunnan to change its economic development and growth pattern. It is to take a new path of industrialization with high-tech implication, better economic benefit, low resources consumption, low environmental pollution and to bring the superior role of human resources into fully play. The development of rational distributed industrial zones is one of the important measures for the optimization of the configuration of various resources and for the realization of the cluster industrial development. However, during the development of industrial zones, In addition to the same main concerns of Yunnan Industrial Economy (see Industrial template), followings are main concerns of industrial zones in Yunnan:

1. Of the designated key provincial-level industrial zones or special characteristic industrial zones, although they were designated to be the key provincial-level key zones by "*Programs for the Eleventh-Five Year Plan on New Industrialization Development*", there were a lack of officially approval document from YPG, the industrial zone management committees find themselves in difficulties in the approval of plans, land use, financing and attracting investment.
2. land acquisition difficulties: due to the very slow procedures for permitting land acquisition, worries of farmers and unwillingness of farmers for their land being acquired, limitation of available piece of land for being acquired;
3. Financing difficulties: due to difficulties in borrowing loan from local commercial banks, decentralized use of special funds for supporting industrial development, lack of sufficient funds channels, etc.
4. Difficulties in inviting business and attracting investment: due to less extent of well-know of some industrial zones, smaller area of the locality of the industrial zones, insufficient necessary infrastructure, etc.
5. Lag behind of infrastructure: due to the lack of sufficient funds input for the development of necessary infrastructure to access to or in the industrial zones.

References/sources:

Annexes: (eg. maps, diagrams, tables)

Annex EC6-1 Details of Economic Development Zones in NSEC

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
Kunming Development Zones								
1	Kunming Hihg-Tech Industrial Development Zone	National/one of 53 national High-Tech industrial zones	May-92	national level, high-tech industry	Kunming City, capital city of Province with the most convenient transportation conditions	9 km2	Industrial sectors orientation: focusing on the introduction of biological technology (BT), IT, Integrated optics/mechanics/electronics technology, new material technology, environmental protection industrial sector, energy sector, high-tech agricultural sector and their auxiliary services. moving towards "high-tech development, and industrialization"	
2	China Kunming Economic & Technological Development Zone	National/one of the 30 provincial designated key industrial zones/parks	1992	Economic & Technology Development	eastern of Kunming City, Capital city of Province with the most convenient transportation conditions	planned area: 9.8 km^2, plan control area: 55.7 km^2, developed area 6.58 km^2,	● Sector orientation: tobacco and its auxiliaries, modern manufacture, bio-medicine & bio-food production, electronic information sector. ● establishment of 8 sub-bases: service centre for creating career; Yunnan software park; Yunnan universities/colleges technology and returned overseas scholars park, Kunming modern bio-pharmacy park; public protective tariff warehouse;	investment policy: 1. for domestic and FDI production enterprises: levy 15% of enterprise tax to enterprises operating over 10 years. for FDI enterprises, enterprise tax will be exempt at the first and second years of making profit, levy only half of enterprise tax at third ~ fifth years of making profit; for domestically invested enterprises, enterprise tax are exempt in the first year years since its

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
							high-tech products exporting sub-base; eco-environment technology sub-base, electronic & automobile market	production, half enterprise tax will be exempt in the following two years. 2. other favorable policies granted by Central and local government will be fully implemented.
3	Chenggong Industrial Park	designated to be one of the 30 provincial key industrial development zones	2004	industrial development	5 km away from Chonggong County Town, 10 km southeast to Kunming, east Dianchi Lakeside	planned area: 50.88 km2, including two sub-zones: ● Dacong industrial sub-zone, ● Luoyang logistics sub-zone	sector orientation: automobile accessories, high-tech industries, e-information sector, building materials sector, bio-pharmacy sector	local government promulgated a support policy for attracting investment on green industrial development (provisional)
4	Haikou Industrial Park	designated to be one of the 31 provincial key industrial development zones	2004	industrial development	Xishan District of Kunming, western of Dianchi lakeside	Planned area: 30 km2, phase one developing 6 km2	sector orientation: OME (optical mechanical electrical) manufacturing, fine optical instrument, high-concentration phosphorus compound fertilizers, phosphorus chemical industrial sector	not available

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
5	An'ning Industrial Park	designated to be one of the 30 provincial key industrial development zones	2004	industrial development	32 km away, western to Kunming city, at thoroughfare connecting Kunming to western Yunnan.	planned area: 110.48 km2, including 3 sub-zones and one centre: ● Caopu industrial sub-zone, ● Taiping industrial Sub-zone, ● industrial sub-zone along Kunming--Jinning highway, and ● logistic center	sector orientation: ● prevalence sector in Taiping sub-zone: OME integrative technology, new environment technological sector, new materials sector, computer and software; ● Caopu sub-zone mew building material and fine chemical industrial sector, plus existing building material adn phosphorus chemical industrial sector ● sub-zone along Anning--Jinning highway: existing iron & steel base supported plate], galvanized colorful plates, alloys steel and iron products, logistic services	not available
6	Yangling Industrial Park	designated to be one of the 30 provincial key industrial development zones	1992	industrial development	Songming County, accessible by Kunming--Qujing expressway, 8 km away from the county town, 34 km away from Kunming	Planned area: 24.7 km2.	sector orientation: metallurgical non-ferrous metals processing, fine phosphorus chemical industry, food processing, machine manufacture, tourism service	favorable enterprise tax policy (quoted from Opinions of Kunming Gov. on the Acceleration of Socio-economic Development in North Counties of Kunming Municipality): during June 1, 2005 to may 31, 2010, levy enterprise tax, income tax, consumption tax, urban

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
								construction tax, housing tax, land use tax, while return reserves proportion by city and county to the enterprises; from June 1, 2010 to may 31, 2015, levy full taxes and return half to enterprise.
7	Dongchuan Re-employment Special Zone	designated to be one of the 8 provincial key special characteristic industrial development zones	2004	special characteristic industrial development	Dongchuan city, at thoroughfare connecting Kunming with northeast areas of Yunnan; a key hub city lining Yunnan with the Yangtze economic corridor and linking Sihuan proivnce and Chongqing Municipality	Planned area: 13.1 km2, including two sub-zones: ● Taoyuan sub-zone and ● Longquan sub-zone	sector orientation: metallurgical sector, chemical industrial sector, mechanical processing sector, building materials sector now a heavy chemical industrial group, a mechanical industrial group, a food & medicine group, a fine phosphorus chemical industrial group have been shaped.	A favorable policy implementation method for Dongchuan special zone re-employment have been granted, including favorable policy on taxation, employment, land use approval, and industrial support.
8	Xundian Special Characteristic Industrial Park	designated to be one of the 8 provincial key special characteristic industrial development	2004	special characteristic industrial development	Xundian County, north and next to Kunming city	planned area: 23.21 km2 with 4 sub-zones	Jingshuo sub-zone (planned area 11.21 km2) prevailing sector is coal & phosphorus chemical industrial sector Tangzi sub-zone (planned area 2.8 km2): biological resources processing and metallurgical & chemical industrial sector;	

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
		zones					Xianfeng sub-zone (planned area 9.2 km2) is mineral resources base, providing raw materials for stable industrial economic development	
9	Kunming Dianchi National Tourist Resort	National	1992	tourism development	Kunming, Dianchi Lakeside, established in 1992	18.6 km2	the zone includes: a integrated service sub zone, a holiday resort, a golf course, a modern recreation garden, a freshwater swimming beach, an ethnic culture village, a whiff base, a water recreation centre, a rare & endangered flora and fauna appreciation sub-zone	
10	Yunnan Yangzhonghai Tourism & Holiday Zone	Provincial	unknown	tourism development	border between Kunming and Yuxi	the Yongzhohai lake	the zone includes golf course, sports, water recreation area, surface water sports, ball firing, etc.	not available
Yuxi Development Zones								

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
11	Hongta Industrial Zone	designated to be one of the 30 provincial key industrial development zones in 2004	1992	industrial development	Yuxi city, At thoroughfare in south Yunnan, 100 km away from Kunming, accessible by Kunming-Bangkok highway, state road No.213, as well as Kunming--Hekou--Hanoi railway	planned area: 25.44 km2, including 5 sub-zone: ● a high-tech sub-zone, ● a Hongta Group sub-zone, ● Gaocang sub-zone, ● Dayin Street, and ● Jiulong sub-zone.	sector orientation: tobacco and its auxiliaries sector, bio-pharmacy, special agricultural produce processing, high-tech industry	any research institute, industrial production project (invested locally, nationally, internationally) to be located in the zone will enjoy favorable policies granted by national, Yunnan Province and Yuxi Municipality, including taxes, financing support, fund support, environmental service. If the research program/project is assessed by the Zone to be the key needed high-tech or with industrial incubation function, further special favorable policy, including subsidy to the interests of loan, subsidy to the project preparation cost, subsidy to technology innovation will be granted.

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
12	Yanhe Industrial Zone	designated to be one of the 30 provincial key industrial development zones in 2004	2004	industrial development	Yanhe Town, 8 km away from Yuxi City. Kuming--Bangkok highway and Yuxi--Tonghai expressway pass through the town. Kunming--Yuxi railway (one section of Trans-Asia Railway) terminal is located in the town. The town is a important thoroughfare to southeast and south part of Yunnan.	Planned area 22.3989 km2, including 3 sub-zones: ● subzone No.1: Yange iron, non-ferrous metal processing and logistics area 13.6154 km2 ● sub zone No.2: Luohe silica iron & silicic series processing and foundry area 2.416 km2 ● sub zone No.3: a non-ferrous metallurgy & foundry area at eastern suburbs of E'shan County Town: 6.3675 km2	sector orientation: iron & steel; non-ferrous metallurgy, processing & foundry base; one of the logistic centre serving the whole Yunnan province and southeast Asia; establishing a modern & ecological industrial park integrating science & technology, industry and trade in the R&D, deep-processing of metallurgical series new materials	any research institute, industrial production project (invested locally, nationally, internationally) to be located in the zone will enjoy favorable policies granted by national, Yunnan Province and Yuxi Municipality, including taxes, financing support, fund support, environmental service. If the research program/project is assessed by the Zone to be the key needed high-tech or with industrial incubation function, further special favorable policy, including subsidy to the interests of loan, subsidy to the project preparation cost, subsidy to technology innovation will be granted.

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
13	Tonghai ironware industrial zone	designated to be one of the 8 provincial key special characteristic industrial development zones	2004	special characteristic industrial development	Tonghai County, 125 km away from Kunming city and 47 km away from Yuxi city. The Trans-Asia Railway will pass through the county. 4 expressways lining the county with neighbor areas.	planned area: 6.2688 km2, including a number of small clusters for ironware and mechanical & electrical equipment development and its auxiliary sector, as well as project management	sector orientation: ironware, foundry, electrical appliance, cold working machine processing, logistic, trade, etc.	
14	Fuxian Lake Tourist Resort	Provincial	1993	tourism development	in Yuxi Municipality, covering Chengjiang county, Jiangchuan county and Huaning county. 60 km away from Kunming ciyt at south	the lake (212 km2) and lakeside	N	
Honghe Development Zones								

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
15	Mile Industrial Zone	designated to be one of the 30 provincial key industrial development zones in 2004	2004	industrial development	Mile County, 143 km away from Kunming, accessible by Kunming-Hekou-Hanoi highway	planned area: 18 km2, including 3 sub zones: ● the core sub zone: 8 km2, at south suburbs of the county town ● north sub zone: 5 km2, at Xishan Town, nearby highway ● south sub zone: 5 km2, at Zhuyuan town between two highways	a new industrial zone being established. Key sectors: high-tech industry; biological products; deep processing of cane sugar, agricultural and livestock produces into green food production: linen yarn sector; fine chemical industrial sector; building materials; presswork; cigarette addictive materials; environmental-friendly coke & metallurgical industry; storage and commodities wholesale	Mile industrial zone is an provincial non-public ownership economic zone. It takes "rational planning, market operation, policy driven" development approach to absorb, foster and support non-public ownership economy. All the enterprises located in the zone enjoy all favorable policies granted by national and provincial governments, as well as favorable policies granted by Mile County for local economic development. in addition, enterprises enjoy policy for non-public ownership economic zone.
16	Honghe Industrial Zone	designated to be one of the 30 provincial key industrial development zones in 2004	1992	industrial development	joint among state road No. 323 and 326. Kunming-Hekou-Hanoi highway, Kunming-Vietnam railway (now being constructed) pass through here, covering Gejiu city, Datun town, part of Mengzi city	planned area: 65 km2, in which the main area is 35 km2 located between Gejiu and Mengzi	sector orientation: metallurgical sector, high-tech industrial sector, biological resources processing, coal chemical industrial sector, import & export processing	Honghe Prefectural Government issued "Provisions on Favorable Policy for Honghe Industrial Zone to invite business and attract investment on August 19, 2003, including favorable policies of taxation (VAT, income tax), land use, fee charges (for registration, license, permits, etc.) ,others (putting a premium on investment, kids education, etc.)

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
17	Yunnan Luxi County Industrial zone	Honghe Prefecture		industrial development	in Luxi County, covering Baishui and Zhongshu towns, accessible by Class II highway, and railway	Planned area: 12.08 km2, including 3 sub zones: ● Wulang heavy chemical industrial zone 4.5 km2 ● Baishui bio-food processing sub-zone 6.88 km2; ● eastern county town 0.7 km2 for enterprises land use	sector orientation: ● in Wulang Heavy Chemical Industrial Sub zone: develop coal chemical industry, metallurgical industry, calcium carbide, building materials ● in Baishui Bio-Food Processing Sub zone: foster bio-resources processing and special characteristic agricultural produce processing ● in Eastern County Town Sub zone: maintain existing industrial condition without developing new industrial project and gradually relocate enterprises when condition is mature.	N
18	Hekou Border Economic & Cooperation Zone	Provincial	1992	border economic trade	border between Yunnan and Vietnam, accessible by Kunming-Hekao-Hanoi highway and railway	designated area: 4.02 km2	based on the previous border economic cooperation to develop into a border economic & trade Zone	Enjoy economic management at provincial level, a series of favorable policies of taxes, land use, project approval are granted. Enjoy streamlined service. More positive, investment, trade, financing, tax, entry and leave management policies will be

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
								implemented to provide sound service and investment environment to investors
XSBN Development Zones								
19	Jinghong Industrial Zone	designated to be one of the 30 provincial key industrial development zones in 2004	2004	industrial development	Jinggong city is a transportation hub in terms of waterway (the Lancang-Mekong navigation course), highway (the Kunming-Bangkok highway), railway (the middle route of planned TAR),airway (there is an airport in Jinggong) connecting China with South and Southeast Asia.	Planned area 30.12 km2, including 2 sub-zones: ● Gadong sub-zone 11.8 km2, 3 km west to Jinghong City; ● Jingha sub-zone 18.32 km2, at Lancang riverbank, 30 km away from Jinghong City	it is a industrial zone to be jointly developed by China and Thailand Sectors orientation: high-tech and Biological technological industry, pharmacy, rubber processing, green food processing, packaging & color printing sector, tourist products & textile costume processing, import & export products processing, modern service, etc. It aims to be developed as a international, modern, ecological, sustainable industrial zone, a plateform for industrial development in Jinggong, Xishuangbanna, a new city full of special characteristics of "trophic, Thai, water, border" cultures	favorable policies are referred to in following document, 1. National, Provincial document on taking the new path of industrialization and strengthening cycling economy, 2003 2. Xishuangbanna Prefecture 11-5 Year Plan for New Industrial Development Plan 2003, 3. XSBA Prefecture Gov. Opinions on the Promotion of Foreign Economic & Trade, 2003 4. .Jinggong Gov. Opinion on Further Improving and Optimizing Investment 5. XSBA Prefecture Gov Stipulations on Encouraging Outside Investors, 2005. 6. .Jinggong City Economic and Social Development Plan (2004-2020) 7. Relevant Prefecturel and City

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
								Governments Meeting Minutes
20	Menghai Hemp Industrial Zone	designated to be one of the 8 provincial key special characteristic industrial development zones in 2004	2004	special characteristic industrial development	Menghai County is in the western part of Xishuangbanna Prefecture, 580 km away from Kunming, 45 km away from Jinggong, the capital city of Xishuangbanna. The industrial zone is located at northeast part of the county town, by state road No. 210, 37 km away from Jinggong city	Planned area: 4.68 km2	sector orientation: hemp processing, tea processing, forest produce processing, etc.	favorable taxes on VAT, enterprise income tax, engineering vehicles, land use, urban maintenance tax, education surcharges, etc. are granted for enterprises engaged in the designated or oriented sectors

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
21	Mohan Frontier Trade Area	National-level port, since 1992, Mohan Frontier Trade Area was set up on May 2001	May-01	border economic trade	Border between Yunnan and Laos. Kunming-Bangkok highway pass through here. 181 km away from Jinghong, 701 km away from Kunming, 258 km away from Luang Prabang of Laos, 1186 km away from Bangkok	Planned area: 26.914 km2. Phase one 6.5 km2, including: a tourist section, a commercial & trade section, a processing section, a warehousing stockyard and passageway service section	It aims at transforming itself into a small-sized modernized port city up to international standards with nationality characteristics and alien styles, headed by commerce, trade and tourism, converging processing, warehousing and passageway services, with perfect functional facilities, and sound investment and financing environments	According to YGP, Mohan Frontier Trade Area enjoys favourable policies in terms of investment, trade, industry, commerce, tax, land, finance, foreign exchange, and emigration and immigration management. In Sep 2004, the State Council approved that Mohan Port develop port visa work, as a result, Mohan Port enjoys the rights for issuing immigration and emigration licenses, travel licenses and labour export licenses.
22	Xishuangbanna Tourist Resort	Provincial	1993	tourism development		Planned area: 22.03 km2, including phase one 1 km2, and phase 2: 21.03 km2.	the tourist resort has been developed as a important tourist base, economic growth point and window for opening up, a group of hotels , villas, recreation centers and business service with local ethnic & Europe architecture styles have been build and in operation	n/a
PU'ER Development Zones								

no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
23	Simao Industrial Zone	designated to be one of the 8 provincial key special characteristic industrial development zones in 2004	2004	industrial development	Cuiyun District of Simao City, southeast part of Yunnan, bordered with Laos, Myanmar, Vietnam. The zone is backed up by highways at state and provincial levels, Simao national port, the Trans-Asia Railway (proposed to be constructed).	Planned area: 21 km2, including 3 sub zones: ● the Manxie Commercial & trade centre dominated by storage, shipping, trade ● the Munaihe industrial sub zone, dominated by processing of tea, bio-pharmacy, food ● the Lianhua industrial sub zone, dominated by forest produce processing	sectors orientation: deep processing of forest produce; new building materials, Pu're tea processing; food processing; bio-pharmacy; storage and commercial trade	A Simao Industrial Management Method (provisional) has been worked out, including favorable policies on land use, taxes, issuance for pension, unemployment, etc. enterprises enjoy infrastructure and good services
24	Jinggu Forest Industrial Zone	designated to be one of the 30 provincial key industrial development zones in 2004	2004	special characteristic industrial development	Jinggu County is at southwest part of Yunnan, north to Simao City, neighbored with Lincang Municipality. The Zone is located at sides of Weiyuan River,	Planned area: 12 km2	Sectors orientation: focus on forest pulp & paper, wood plate to enhance forest production sector. Meanwhile, streanthen prospecting of mineral resources (salt, copper, iron, coal, oil, gas, etc.) and exploitation	lists of investment policies 1. Resolution of Jinggu County on the Acceleration of Private & Non-public Ownership Economic Development (2005), including payment of loan interest by special fund established by government

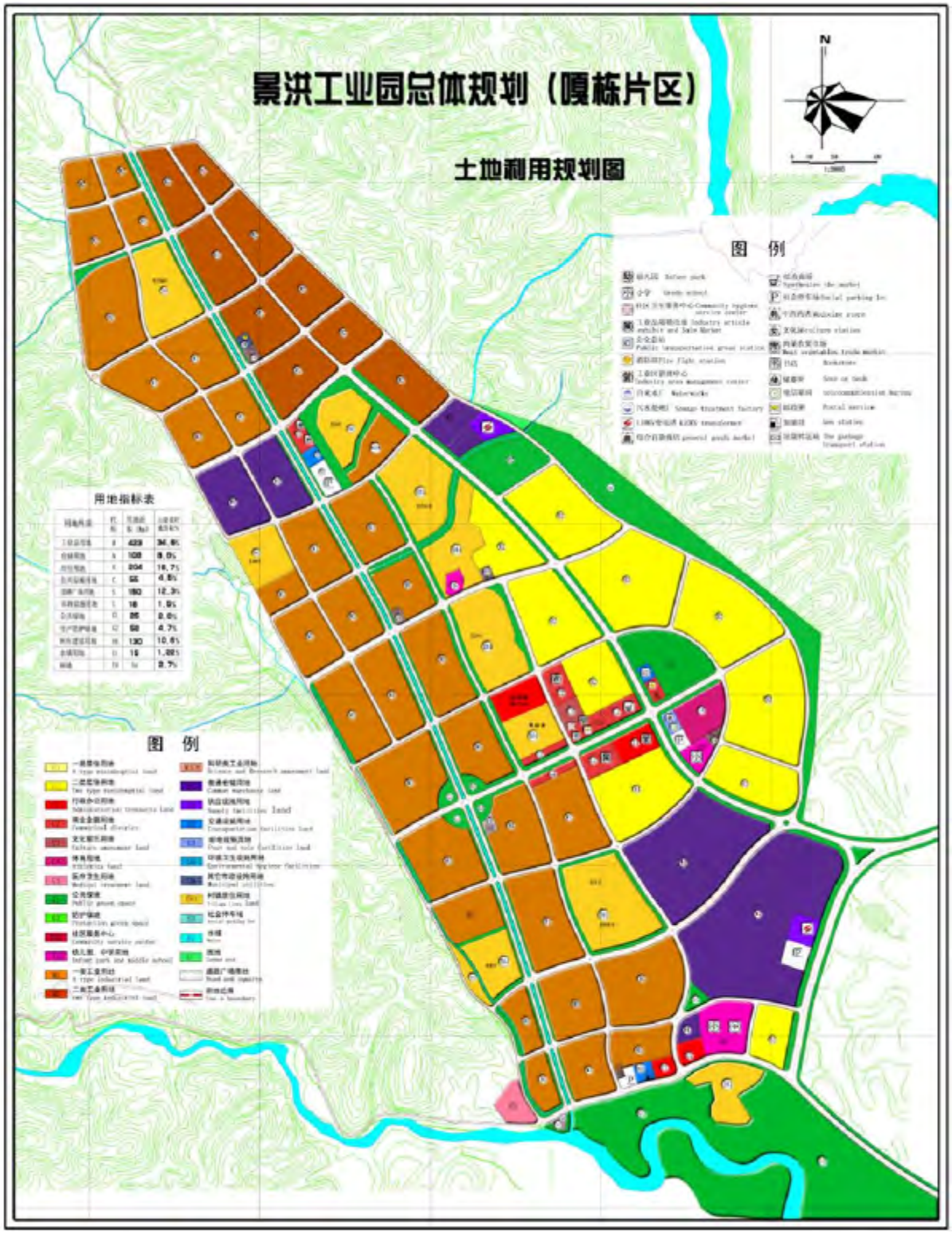
no.	name	Designated Level	Approval year/ initiating year	type	Geographic location and advantages	Planned area	brief	lists of confessional policies
					2 km away from the county town			2. Provisional Method for Water Resources Development in Jinggu County (2005), By county Gov. 3. Provisional Method Encouraging Investment in Agriculture Production in Jinggu(2005), by county Gov. 4. Provisional Method Striving After and Implementing Projects (2005) by county Gov. 5. Provisional method Inviting Business and Attracting Investment (2005), including favorable policies on land use, sales tax if enterprise recruiting certain proportion of laid-off persons, putting a premium on successful investment introducers, etc.

Source:

1. industrial & real estate website: www.gydcw.com
2. Yunnan industrial zone invite business and attract investment website: www.ynyo.org.cn

Annex EC6-2　Examples Land use Plan of Typical Development Zones

Chenggong Industrial Zone—Qidian Sub-zone



Jinggong Industrial Zone—Gadong Sub-zone

Economy
Template 3 Tourism
(Key issue EC2: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development))

Introduction:
Advice to local consultants – this template needs to cover for example:

(i) Figures on tourism (total numbers, duration of stay, money spent etc) including flows between the corridor counties (and from other regions)
(ii) Type of tourism (e.g. backpacker, eco tourism, self drive, gambling etc)
(iii) Policies plans and incentives for increasing tourism
(iv) Project future growth
(v) Tourism attractions and visitation rates

Please consider current state & recent & future trends (including government targets)

Indicator: Principal Economic Indicators of Yunnan Tourism

Official target: Short-term target by 2010 as set in the "Eleventh Five-Year Plan for Yunnan Provincial Tourism Development": The target is to double provincial revenue from tourism as compared to 2005 to hit 80 trillion RMB, including domestic tourism revenue of 70 trillion RMB, and tourism earnings in foreign exchange of 1.2 trillion USD. Overseas tourists to reach 3 million person-times and domestic to reach 100 million persons-times. Total tourism revenue of Yunnan to account for 17.8% of Yunnan Provincial GDP and tourism added value to contribute to 8% of the Yunnan Provincial GDP.

The long-term target to be achieved by 2020. Tourist revenue of the Province to be 160 trillion RMB**,** including domestic tourism revenue of 136 trillion RMB, and tourism earnings in foreign exchange of 3.0 trillion USD. Increase the number of overseas tourist to 5.5 million person-times and domestic tourists to 150 million person-times. Total tourism revenue of Yunnan to account for 20% of Yunnan Provincial GDP and tourism added value to contribute to 12% of the Yunnan Provincial GDP.

Trends: During the Tenth-five year period (2001-2005), Yunnan's tourism experienced rapid development with sustained growth of tourism economic indicators:

Overseas tourists increased from 1.001 million person-times in 2000 to 1.5028 million person-times in 2005 at average annual growth rate of 8.47%. Tourism earnings in foreign exchange increased from 339 million USD in 2000 to 528 million USD in 2005 at average annual growth rate of 9.27%. Both the total number of overseas tourists and earnings in foreign exchange rank ninth in China, and first in western China.

Domestic tourists increased from 38.41 million in 2000 to 68.6074 million in 2005 at average annual growth rate of 12.6%. Domestic tourism revenue increased from 18.3 trillion RMB in 2000 to 38.6 trillion RMB in 2005 at average annual growth rate of 16.1%.

Total Provincial tourism revenue increased from 21.1 trillion RMB in 2000 to 43.0 trillion RMB in 2005 at average annual growth rate of 15.3%, which is 7.7 percent higher than the average annual growth rate of the Provincial GDP. In 2005, total Yunnan Provincial Tourism Revenue contributed 12.4% of the Provincial GDP.

Drivers of trends: Government took the lead to promote tourism as one of the four supportive industries in Yunnan Province. Significant efforts were made to foster high quality and elaborated scenic sports by relying on the abundant tourism resources in Yunnan Province. These include the improved tourist related infrastructure (including transportation, communication, electricity, urbanization and scenic spots infrastructure construction), the marketing efforts (creating new tourist hotspots) and the accelerated promotion of the international regional tourism cooperation

(especially the development of the golden tourist routes of GMS).

Detailed number figures in tables 1 and 2 in the annex

Sources: Eleventh-Five Year Plan for Yunnan Provincial Tourism Development

Indicator: Number of Tourists and Tourism Revenues in the corridor related areas in Yunnan (tourists flows among the corridor counties)

Target: To achieve full tourism cooperation among GMS countries, through the development of the Lancang-Mekong golden tourist route to enable Yunnan as the most convenient tourism corridor in GMS and the most important tourism destination under the framework of GMS Tourist Sector Strategy and Action Plan.

Trends: In 2005, tourists who travelled from Yunnan to Vietnam were 398,815 person-times. Tourists from Vietnam to Yunnan during the same year were 680,686 person-times, 10 times higher than in 1995.

In 2005, tourists who travelled from Yunnan to Thailand were about 200,000 person-times. Tourists from Thailand to Yunnan during the same year were 81,172 person-times, signifying an increase of 82% from the previous year.

At the entrance of Mohan port between Yunnan and Laos, registered number of visitors to Yunnan increased to 340,000 person-times from 280,000 in 2005.

During the period 2001-2005 tourism revenues in Yunnan Province increased from 25.7 trillion RMB in 2001 to 43 trillion RMB in 2005 at an annual growth rate of 15.30%. During the same period there was a significant increase in tourist flows from the Corridor countries, especially for the border municipalities/prefectures of Pu're, Xishuangbanna and Honghe which are expected to become a tourism hotspot within 5 to 10 years.

Drivers of trends: The main drivers for the increased tourism figures in the Yunnan Province and especially regarding tourist flows from the Corridor countries are: the increased connectivity among GMS countries, the development of tourism marketing, the improved tourism infrastructure and services and the simplification of travelling.

Detailed number figures are provided in table 3 in the annex

Sources: Yunnan Tourism Statistic Wall Bulletin, Dec.2007, by Yunnan Tourism Administration.

Indicator: Types of tourism in the Yunnan Province

Target: Moving towards more diversified tourism products

Trends: The majority of tourism sites in the Yunnan Province (72.2%) are sightsee spots including historical and cultural sites, natural sites and ethnic minority culture sites. There are also sites for leisure and recreation (12.4%) including hot springs and health and sport sites. Finally there are a number of tourist towns, theme parks and museums to visit (15.4%)

Tourism products with Yunnan special characteristics like eco-tourism, ethnic cultural tourism, village tourism, healthy and sports tourism and border tourism, are now being encouraged for further development.

According the Yunnan Tourism Administration observation, tourists for sightseeing stay 2-3 days, tourist for characteristic tourism stay 1-4 days and tourists for eco-tourism stay about half a month.

Drivers of trends: N/A

Source: Yunnan Tourism Administration

Relevant laws, policies, plans and institutional arrangements: The Central Government of China has confirmed that tourism development is a key element in meeting the commitment for the realization of the goals of UN's millenary sustainable development and poverty alleviation, especially for those ethnic minorities in remote and border areas. The nation has also recognised the importance of conserving China's natural and cultural heritage through tourism development programmes such as like eco-tourism, community-based tourism, village tourism, and wild-life tourism. China clearly determined to foster tourism as a new sector of economic growth and Yunnan also decided to foster tourism as one of the important supporting industries of the Province.

Yunnan Province Government has decided to protect and conserve its rare and precious natural and cultural resources and provide support to the ethnic minorities. Tourism is defined as an important sector to contribute to the realisation of this objective. Local governments of Yunnan have also decided to give priority to sustainable development and increase tourism's contribution to poverty reduction efforts under the guidelines of the GMS co-operation.

In order to achieve the goal of GMS Tourism Development defined in GMS Tourism Sector Strategy that are endorsed at GMS summits on July, 2005, 13 tourism development areas (including 29 projects) have been selected and prioritized by Yunnan, Guangxi of China and 5 other GMS countries. Out of the 13 areas, 4 are located in or related to Yunnan Province: e.g. the Golden Quadrangle, Tengchong—Shangri-la—Myitkyina, the Red River Valley, and Heritage Necklace Ring (the Plans for tourist routs of the first two areas were drafted in early 2008).

To simplify the travelling procedures, with the approval of China's State Council, cross-border check points in some ports in Yunnan can issue tourist visa on arrival. Entry are allowed to tourists from the third counties holding valid certificate at 7 ports in Yunnan, including Kunming, Xishuangbanna, Mohan, Jinggong Ports in the corridor and Hekou port (bordering Lao Cai in Vietnam). On March 2008, Yunnan Tourism Administration made a proposal to China Tourism Bureau requesting support for the implementation of "GMS single visa".

National Laws and Regulations:

- Passport Law of PR.China
- Management Method for the Citizen of PR.China for Leaving & Entering the County
- Implementations Details For Managing the Citizen of PR.China for Leaving & Entering the County
- Regulation on Checking for Leaving and Entry the County of PR.China
- Provisions on Custom Clearance of Passenger Leaving & Entry the County of PR.China
- Sanitation Quarantine Law of PR.China
- Provisional Management Method of Tourism Safety
- Provisional Management Method of Border Tourism

Yunnan Provincial Regulations and Policies

- Yunnan Tourism Regulation
- Opinions of Yunnan Committee of CPC and YPG on Further Acceleration of Tourism Industry Development

Relevant Plans in Yunnan:

- Master Plan of Yunnan Provincial Tourism
- Eleventh-Five Year Plan for Yunnan Tourism
- Shangri-la Eco-Tourism Development Plan in Western Yunnan
- Thermal & Volcano Border Tourism Development Plan in Western Yunnan
- Lancang-Mekong International Tourism Development Plan in Southwest of Yunnan
- Grater Kunming International Tourism Development Plan
- Laterite Plateau Tourism Development Plan in Northeast Yunnan
- Karst Landscape Cultural Tourism Development Plan in Southeast of Yunnan
- Draft Tourist Routs Plan in the Golden Quadrangle

▪ Draft Tourist Routs Plan along Tengchong—Shangri-la—Myitkyina
Problems and issues encountered during data collection: There is no published statistic data on tourists flow between Yunnan and NSEC countries, there are only some reports from the Yunnan Tourism Administration, which are stated in the template and marked in red. There is no statistic data on the types of tourism from the viewpoint of the tourist. There are only data on the types of tourism from the viewpoint of the scenic spots available from the Yunnan Tourism Administration.
Summary of main concerns and challenges for the NSEC:
References/sources: Yunnan Tourism Administration, Yunnan Tourism Statistic Wall Bulletin, Dec.2007, by Yunnan Tourism Administration, Eleventh-Five Year Plan for Yunnan Provincial Tourism Development
Annexes: Table 1, Table 2, Table 3, Table 4, Figure 1, Map 1, Map 2, Map 3, Map 4

Table 1 Principal Economic Indicators of Yunnan Tourism during 2001-2005

	Overseas Tourists	Earnings in Foreign Exchange	Domestic Tourists	Domestic Tourism Revenue	Total Tourism Revenue
Year	million person-times	million USD	million person-times	trillion RMB	trillion RMB
2001	1.1313	367	45.7	22.6	25.7
2002	1.30355	419.3	51.1	25.5	28.993
2003	1.0001	304.1	51.69	27.831	30.664
2004	1.10099	422.4	60.11	33.408	36.927
2005	1.5028	528	68.6074	38.6	43
Annual growth rate	8.47%	9.27%	12.30%	16.10%	15.30%

Source: the Eleven-Five Year Plan for Tourism Development of Yunnan Province

Table 2 Projection on the Tourism Future Growth in Yunnan Province

year / Indicator		2005	2010	2005~2010	2015	2010~2015	2020	2015~2020
				Average annual growth rate		Average annual growth rate		Average annual growth rate
Overseas tourist (million person-time)		1.5028	3.0	14.80%	4.3	7.50%	5.5	5.00%
Domestic tourist (million person-time)		68.6074	100	7.80%	130	5.40%	150	2.90%
Tourism earnings in foreign exchange (million USD)		528	12	17.80%	2,000	10.80%	3,000	8.40%
Domestic tourism revenue (million RMB)		38,615	70,000	12.60%	100,000	7.40%	136,000	6.30%
Total Tourism Revenue		43010	80,000	13.20%	120,000	8.40%	160,000	5.90%
	% of GDP	-	17.80%	-	19.30%	-	20.00%	-
	Added value of tourism in GDP	-	8%	-	10%	-	12%	-

Source: the Eleven-Five Year Plan for Tourism Development of Yunnan Province

Table 3 Number of Tourists and Tourism Revenues in NSEC Areas in 2007

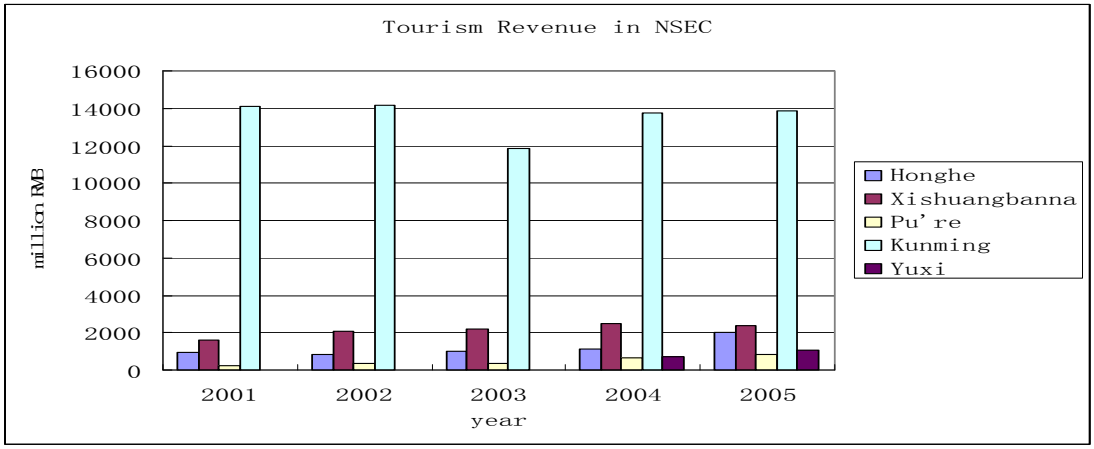
	International tourism figures		One-day entry tourists in border areas		Domestic tourism figures		Total Tourism Revenue
	International tourists	Earnings in foreign exchange	One-day entry tourists	Earnings in foreign exchange	Number of domestic tourists	Domestic tourism revenue	
	person-times	million USD	person-time	million USD	million person-times	million RMB	million RMB
Kunming	712,448	207.8400	n/a	n/a	24.4011	15,441.2013	17,000.0341
Yuxi	1,526	0.3956			7.1279	2,254.7494	2,257.7165
Pu're	19,687	4.1701	91,500	4.199	2.1795	838.0878	900.8622
Xishuangbanna	68,212	18.9000	173,500	7.9637	4.9311	3,117.2843	3,318.7620
Honghe	69,312	27.8622	202,600	36.6198	7.516	3,012.2964	3,495.9120

Source: Yunnan Tourism Statistic Wall Bulletin, by Yunnan Tourism Administration

Table 4 Types of Tourism sites in Yunnan Province

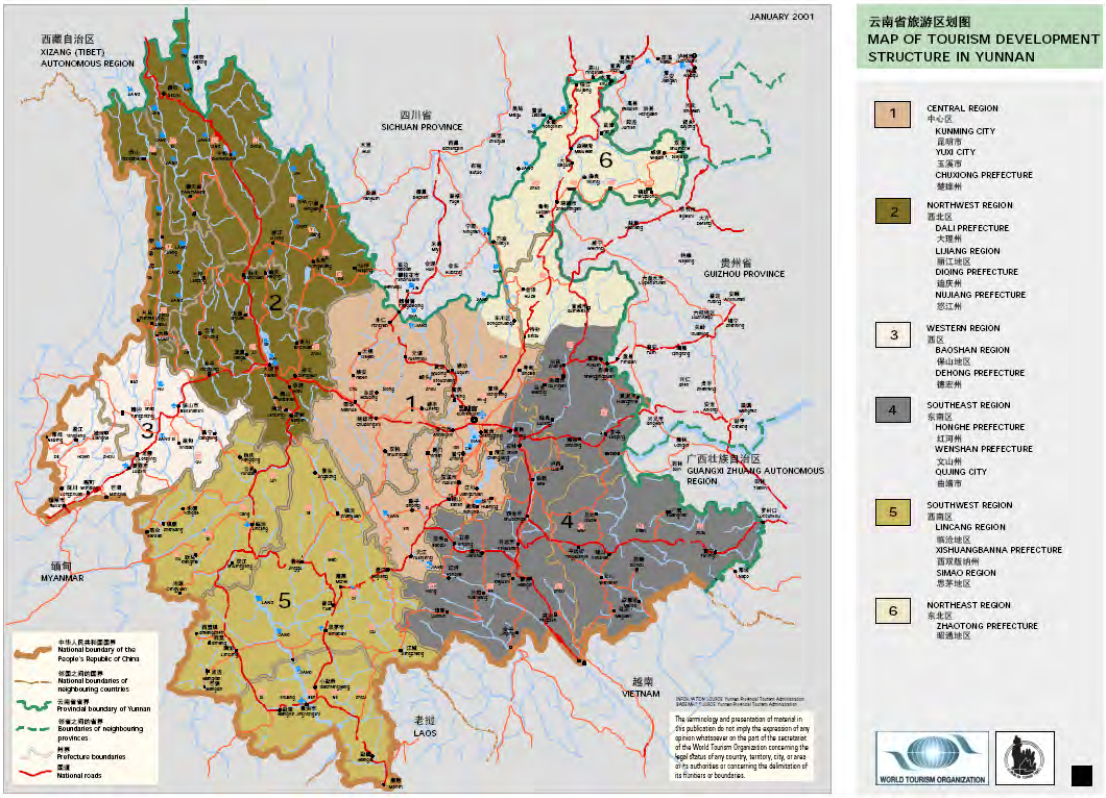
Category	Sub-category	Number of sub-category	Number of category	%
Sightsee spots	Historical & Cultural sites	71	207	72.2%
	Natural sites	205		
	Ethnic minorities culture sites	31		
Leisure and recreation	Hot spring healthy sites	15	53	12.4%
	Leisure and sport sites	38		
Integrated and special	Tourist towns	11	65	15.4%
	Theme parks	5		
	Urban parks	38		
	Museums	8		
	Other	3		
Total		425		

Figure 1 Tourism Revenues of Municipalities/Prefectures in Yunnan in NSEC

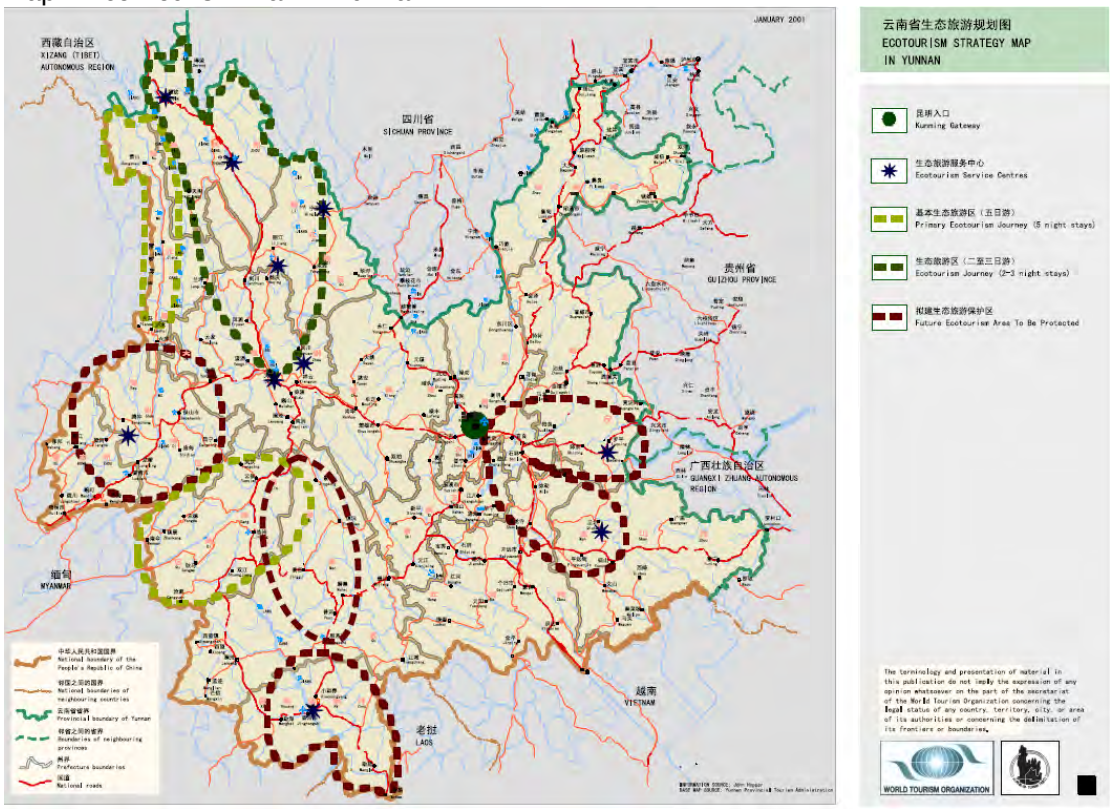


Source: Yunnan Tourism Administration

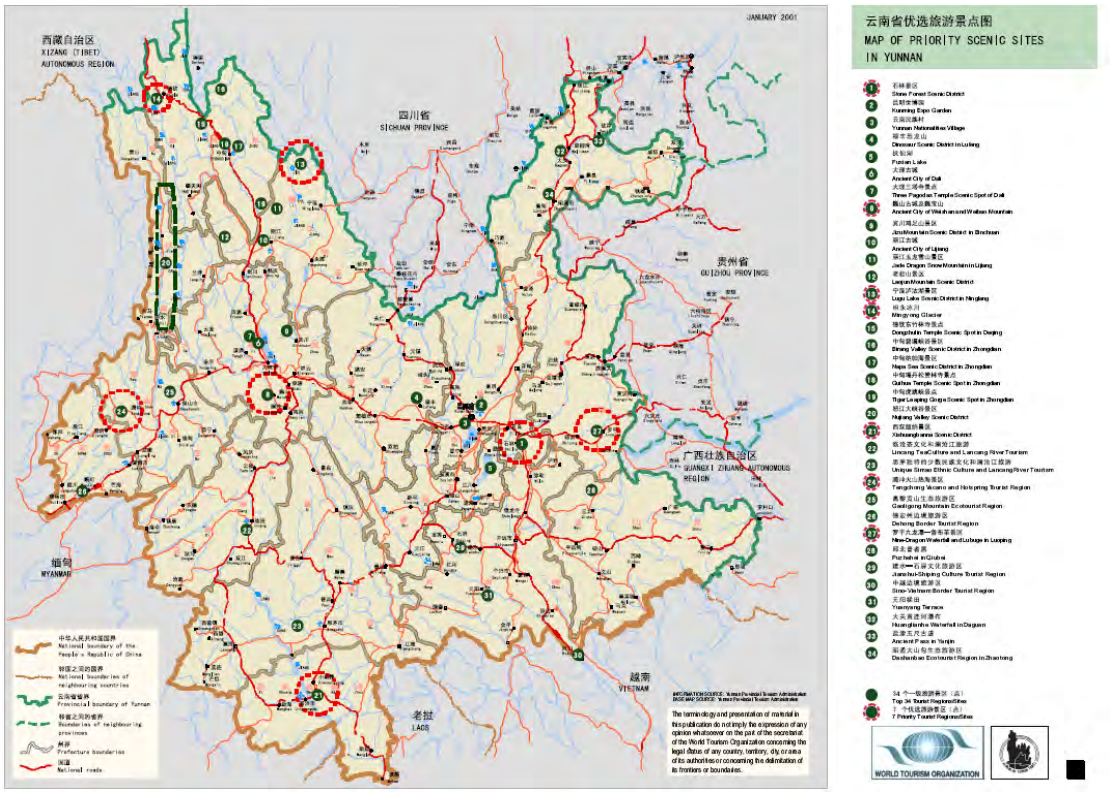
Map 1 Tourism Development Structure in Yunnan



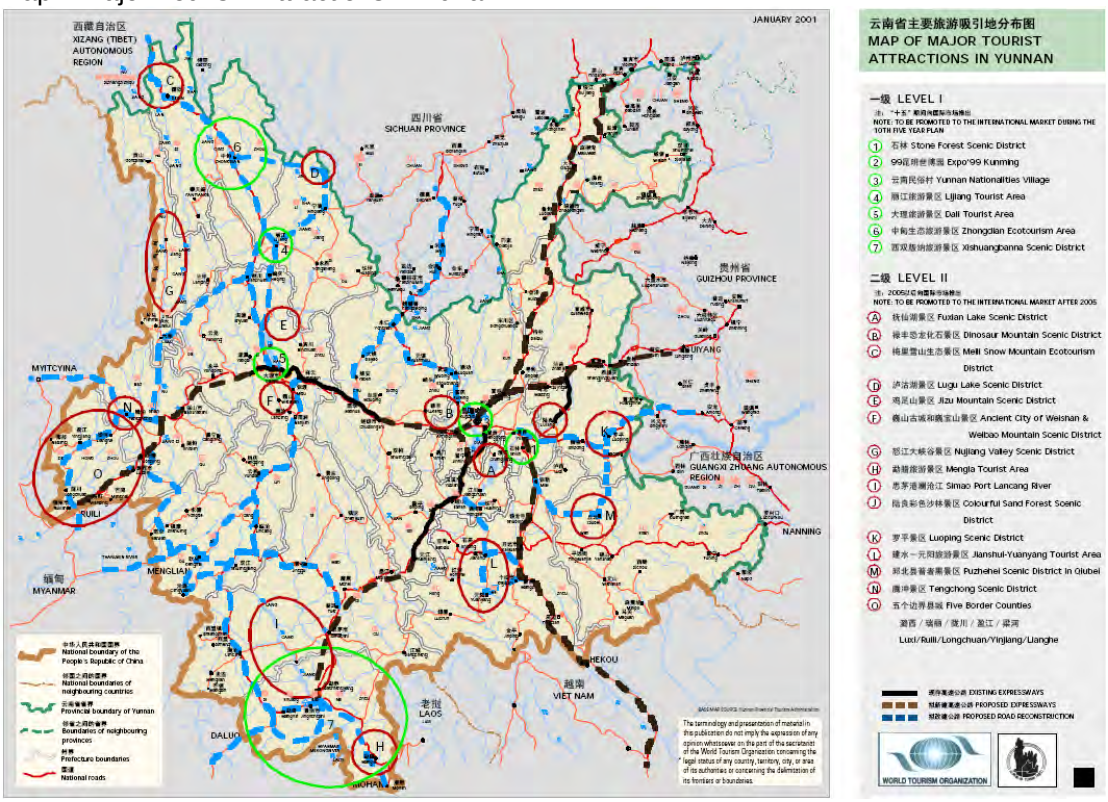
Map 2 Eco-Tourism Plan in Yunnan



Map 3 Priority Scenic Sites in Yunnan



Map 4 Major Tourism Attractions in Yunan



Economy
Template 2: Transport and Trade

(Key Issue EC2: Complementary economic development among countries: Agriculture, tourism, trade &

industry (sector development))

Key issue EC4: Limited and inequitable trade in goods, services, FDI and movement of people (information division, health, education, logistics, culture))

Introduction:

Advice to local consultants – this template needs to cover for example:

Transportation:

(i) Status of the corridor - are all roads built? What is the specification of the roads
(ii) Future plans to upgrade roads (medium and long), eg by passes
(iii) Status of the railway and future plans
(iv) Status river transport and future plans
(v) Status air transport and future plans
(vi) Computer models of future traffic flows / trade flows
(vii) Interchanges road, rail, water and air

Trade

(i) Existing and projected trade flows and routes between the corridor countries (Excluding Vietnam)
(ii) What are main commodities and products
(iii) Policies and incentives to increase and control trade

Please consider current state & recent & future trends (including government targets)

Indicator: Length and specifications of the Kunming-Bangkok Highway in the Yunnan Province

Official target: Short term target: to upgrade most sections of the highway to expressway. Long term target: to upgrade all sections of the highway to expressway

Trends: Presently 68% of the highway has been upgraded to expressway. The fourth section (Mohei-Pu'er) is currently being upgraded to expressway and it is expected to be completed by the end of 2009. By that time almost 80% of the highway will have been upgraded to expressway. There is also a long-term plan to further upgrade the remaining Class II subsection (from Xiaomengyang-Shangyong) to expressway. A subsection, connecting Xiaomengyong to Jinghong, the capital of Xishuangbanna, 17 km long has already being built. Xiaomengyang-Mohan is designed to be a typical China's national demonstration project in terms of integration of ecology, environmental protection, landscape and economy. Finally with the operation of the Kunming-Bangkok highway, township and village roads are going to be added to the network, especially to provide access to villages and important tourist spots.

The following table gives the exact specifications and the length of the road network as it has been developed until now:

NO.	Subsection	Length* (km)		Class	Specification	Status
1	Kunming-Yuxi	91	85.7	Expressway	6 lanes, bidirectional. Designed driving speed 100 km/hr	In operation: May 1999
2	Yuxi-Yuanjiang	112	113.9	Expressway	Closed bidirectional 4 lanes	In operation: Oct. 2006
3	Yuanjiang-Mehei	147	147.3	Expressway	4 lanes, bidirectional	In operation: Dec 2003
4	Mohei-Pu'er	65	64.5	Class II	**Will** be 4 lanes, bidirectional. Designed speed 60 km/hr (after upgrade)	Being upgraded to expressway. Commence: Dec.2006. Completion by the end of 2009
5	Pu're-Xiaomengyang	98	97.7	Expressway	4 lanes, bidirectional	In operation: Apr.2006
6	Xiaomengyang-Mohan	171	167.2	Class II	Sub-section from Xiaomengyang to Shangyong (149.6 km) is Class II. Designed driving speed 80 km/hr	Completed March 2008
				Class I	Sub-section from Shangyong to Mohan Town (17.6 km) is Class I. Designed driving speed 80 km/hr	

* Data on the left column is from "Meeting Minute with Yunnan Department of Communication" dated o n April 16, 2008; data in the right column are from the Government website.

Drivers of trends: To develop the road corridor into an "economic corridor"

Indicator: Length of railway, highway, navigable inland waterway and civil aviation route in the Yunnan Province

Target: Establishment of an integrated and sustainable market-oriented communication & transportation system, with fast speed passenger transportation and intelligent logistic cargo services, to make Yunnan the gateway and the main international corridor linking China with East, South and Southeast Asia, the Pacific and the Indian Ocean.

***Highway*:** Short term target: by 2010 8000 km of high Class highway, 3200 km of expressway and more than 15000 km of rural highways to be reconstructed. Long term target: by 2020 the road network will serve 90% of the population in Yunnan Province and it will be composed of a skeleton network, with 9 radial roads, 2 ring roads and 10 connecting roads, and of trunk networks with 7 vertical roads, 7 horizontal roads and 19 connecting roads.

***Railway*:** By 2010, the total length of railway to be extended from 1925 km (2005) to 3000 km in order to establish a complex railway corridor (centered in Kunming as hub) linking Yunnan with China's inland railway network, and South & Southeast Asia railway network with the "four entrances to China"(Nanning – Kunming, Guiyang – Kunming, Chengdu – Kunming, Neijiang – Kunming), the "three exits from Yunnan to its neighbour Countries and the three sections of the "Trans-Asia Railway" (TAR) (from China to Vietnam, Laos, and Myanmar).

The construction project of the three sections of the TAR routes from China has been included in China's "Mid-term and Long-term Railway Network Plan" and in the "Eleventh-Five year Plan for Railway. The preparation for the middle route of TAR, section from Yuxi to Mohan is on-going (about 599 km of this route are in parallel with Kunming- Bangkok Highway). The eastern route of TAR, the section from Yuxi to Mengzi, 142 km long is now being constructed, and the section from Mengzi to Hekou (border between China and Vietnam), 168 km is now on preparation stage.

Waterway: By 2010, total length of navigable inland waterway to be extended from 2764 km (2005) to 3100 km, including 450 km of class IV navigation route and 150 km of Class V navigation route and to promote the construction of the navigation route in Hong he River from China to Vietnam and to Yangon in Myanmar.

Aviation: Kunming International Airport will be relocated and constructed as a gateway airport. Four new airports will be built during the period 2006-2010, and 7 additional will be built by 2020. By 2010 there will be 15 airports in Yunnan Province and by 2020 there will be 22. At present there are two airports in the NSEC corridor, the Jinggong airport which is designated to be arterial by 2010 and the Simao airport that is a lateral

airport. There are planned two more airports at Mengna and Daluo (both in Xishuangbanna Prefecture) and they are expected to be constructed during 2011-2020.

Trends: During the "Tenth Five-year period" (2001-2005), Yunnan's transportation experienced some breakthroughs:

- Breakthrough in expressway construction: 9 expressways, including Yuanjiang-Mohei section of Kunming—Bangkok highway were constructed. The total length of expressway increased from 517 km in end 2000 to 1421 km in 2005. Another 15 expressways are currently being built.
- Breakthrough in the rural road construction. Village roads surface increased from 5.44% at the end of 2000 to 14.47% at the end of 2005. Over the same period, county-level roads surface increased from 14.25% to and 36.75.
- Breakthrough in the investment of transportation infrastructure: a total of 79.075 billion RMB were invested during the "tenth five-year period" in transportation infrastructure, which is 2.1 times of that of the ninth-five year period.
- Breakthrough in the formulation of strategy and plan for communication: such strategic, foresighted and comprehensive plans as "Yunnan Trunk Road Network Plan", "Yunnan Water Transport Development Plan", "Yunnan Motorcar Passenger and Cargo Service Station Construction Plan" Yunnan Science & Technology Development Plan for Road and Water Transportation", etc.
- Breakthrough in transport: total length of navigable inland waterway at the end of 2000 was 2764 km, an increase of 1184 km as compared with the end of 2000, annual average increase rate of cargo turnover from 2001-2005 was 24.5%.

Drivers of trends: The need for mitigating the transportation "bottleneck" and its impacts on the socio-economic development and the need for developing Yunnan as the transportation hub connecting China with South, Southeast and East Asia, and with the Pacific and Indian Oceans. These needs have increased the investment on transportation infrastructure and especially in the western Yunnan which is critical for the establishment of corridors linking Yunnan to its neighbor provinces and countries.

Source: Yunnan Statistic Yearbook, 2007; Strategic Research on Development of Eleventh-Five Year Plan of Yunnan.

Indicator: Passenger-Kilometres, Freight Ton-Kilometres

Target: Establishment of an integrated transportation system to enable Yunnan become a "bridge" connecting China with South and Southeast Asia. All the means of transportation to be co-developed and the advantages of the different means of transportation to be complemented.

Railway network: will be extended and upgraded to increase its freight delivery capacity up to 100 million tons per year and its passenger traffic capacity to 30 million person-rides per year.

Highway: while the main host transportation hinges are being constructed, the construction of regional transportation hinges and ports will be enhanced. Express and modern means of passenger transportation will be promoted to improve the efficiency and the safety of highway transportation.

Civil aviation: further improvement of the aviation network with more flights to Southeast Asia to be opened and direct flights from Yunnan to other Chinese Provinces.

Trends: Restricted by the routes, the limited network and the traffic capacity of railways, Yunnan's passenger transportation relied too much on highways. Regarding freight transportation, highways experienced rapid growth, railways remained stable, and waterways and aviation account for less than 1% of total freight transportation. The structure and the distribution among railway, highway, aviation and navigation in Yunnan province are unreasonable while transportation capacity is insufficient.
Drivers of trends: Deepening reform on integrated communication and transportation management system, Establishment of a safe, nimble, convenient, comfortable, economic and high-quality service integrated communication and transportation system. Developing Yunnan as transportation hub connecting China with Southeast Asia and East Asia.

Detailed figures are available in figure 3 in the annex.

Source: Yunnan Statistic Yearbook, 2007; Strategic Research on Development of Eleventh-Five Year Plan of Yunnan, the Eleventh-Five Year Plan for Socio-Economic Development in Yunnan

Indicators: Value of Import and Export Trade in Yunnan

Target: In the Eleventh-Five year plan for Yunnan Provincial Socio-Economic Development the target for cargo import & export by 2010 is set at 8.28 trillion USD with an average annual growth rate of 12%. To push forward China-ASEAN free trade and GMS cooperations (two pilot free trade zones in Yunnan, outside Kunming-Bangkok NSEC corridor, will be established) and to establish border economic cooperation zones and border open zones at national-level ports and surroundings.

Trends: During the tenth five-year period (2001-2005), the total value of import & export of Yunnan Province increased from 1812.83 million USD in 2000 to 4738.22 million USD in 2005 at an annual average rate of 21.2% from. The subtotal value of import & export trade of Kunming, Yuxi, Pu're, Xishuangbanna and Honghe in 2006 accounted for 86.86% of that of the Province. The Kunming municipality contributed the largest proportion (75.48%) on the total value of Yunnan Provincial imports & exports. In 2006, total import & export trade between China and the five GMS countries was 40.088 billion USD, while the trade between Yunnan and the five GMS countries accounted for only 3.5% of that of China's. The main commodities and products traded between China and GMS Countries are:

	Exports	Imports
China-Laos	motorcycle, iron & steel, accessories of motorcycle and bicycle, motorcar and automobile chassis, cable and wire	log, sawn timber, non-wrought iron & steel, iron ore sand and concentrate, agricultural product
China-Myanmar	yarn, fabric, iron & steel, motorcycle, agriculture products, finished oil products	log, sawn timber, gem & gemstone, natural rubber
China-Thailand	iron & steel, automatic data processing equipment and parts, yarn, fabric, telephone set	automatic data processing equipment and parts, integrate circuit, agricultural product, preliminary shaped plastic, natural rubber

Drivers of trends:

(1) Improved structure of imports & exports reflected in the increase of industrial products and the decrease of primary.
(2) Construction of corridors and ports including: the construction of Kunming—Mohan—Bangkok, Kunming—Ruili—Yangon, Kunming—Hekao—Hanoi, and the opening and the construction of Trans-Asia Railway (the eastern route is ongoing); the rehabilitation of the navigation route along Lancang River; the operation of 10 civil airports and the opening of more international flights from Yunnan to GMS countries; the opening of 12 category I, national-level ports and the provision of check-point buildings and facilities, as well as the opening 90 (2004) border corridors for border residents for accessing markets/fairs.
(3) Enhanced regional economic coalition, especially through the vigorous promotion of the China-ASEAN Free Trade Zone establishment. There has been a rapid increase of bilateral trade between Yunnan and ASEAN countries in the recent years.
(4) The boosting of regional complex cities in import & export trade: Kunming, Qujing, Yuxi, Chuxiong complex city in the middle of Yunnan; Gejiu, Kaiyuan, Mengzi complex city at the south of Yunnan; Jinggong, Simao, Dali, Luxi, Baoshan, Ruili, Wanding, which are the active cities in border trade.
(5) Increased imports & exports of industrial products, agricultural products and small-value border trade.
(6) Active promotion of trade and investment among GMS countries

Detailed figures available in the annex, figure 4 and table 1

Source: National Report on China's Involvement in GMS Cooperation, March 2008 by NDRC, Ministry of Foreign Affairs, Ministry of Finance

Relevant laws, policies, plans and institutional arrangements:
Since 2008, China has signed the CBTA and its Annexes and Protocols, and has completed internal acceptance of all the 17 CBTA Annexes and 3 Protocols. According the signed CBTA, China established its

national CBTA transportation Committee, who will take the responsibility of coordinating and dealing with issues related to the implementation of CBTA. China has prepared its “National Action Plan” and “Implementation Manual” for the implementation of CBTA.

Main Transportation law

Highway Law of PR.China
Highway and Transportation Safety Law of PR.China
Regulation on the Management of Highways of PR.China
Regulation on the Management of Road and Transportation of PR.China
Expressway and Transportation Management Method
Provisions on International Roadway Management and Transportation
Port Law of PR.China
Regulation on Waterway and Transportation Management of PR.China
Regulation on the management of Navigation Courses
Regulation on the Management of Inland River Transportation Safety
Yunnan Provisions on the Management of Navigation Courses
Regulation on International shipping of China
Civil Aviation Law of PR.China
Management Rules on China’s Civil Aviation Air Transportation
Railway Law of PR.China

Main foreign trade laws

Foreign trade Law of PR.China
Custom Law of PR.China
Regulation of Managing Foreign Exchange and its Revision
Foreign Investment Enterprises and Foreign Enterprises Income Tax Law of PR.China

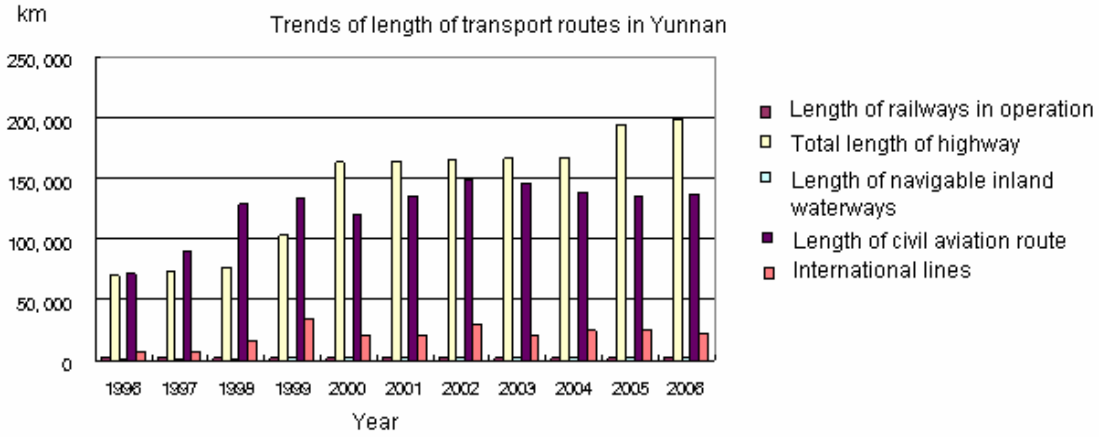
Problems and issues encountered during data collection:

Summary of main concerns and challenges for the NSEC: Although transportation network has taken its initial shape, transport development in Yunnan remains unbalanced. The value of import & export trade as a percentage in the Yunnan provincial GDP is low; this was 8.23% in 2003 which is much lower than China’s total (50.1% in 2003). Yunnan’s border trade is also decreasing from 19.65% in 2000 to 12.8% in 2003 (est). Although Kunming-Bangkok highway has been opened, the traffic flow still remains low due to the different considerations on political, economic and safety issues among the different GMS countries; the pace of implementing the CBTA is also slow.

References/sources:
Strategic Research on Yunnan’s Eleventh-Five Year Plan,
National Report on China’s Involvement in GMS Cooperation, March 2008 by NDRC, Ministry of Foreign Affairs, Ministry of Finance,
Yunnan Statistic Yearbook, 2007.

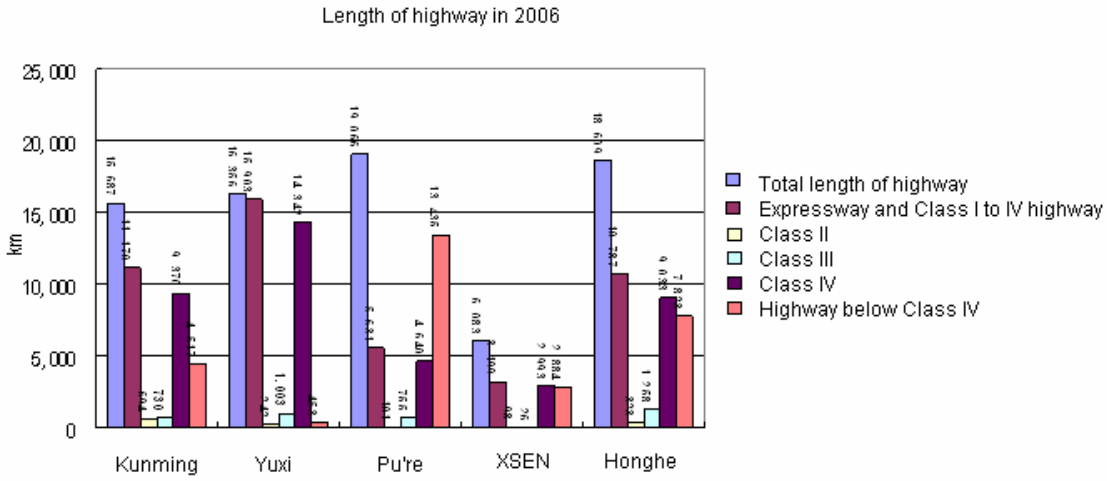
Annexes: Figure 1, Figure 2, Figure 3, Figure 4, Map 1, Map 2, Table 1

Figure 1 Trends of Length of Transport Routes in Yunnan



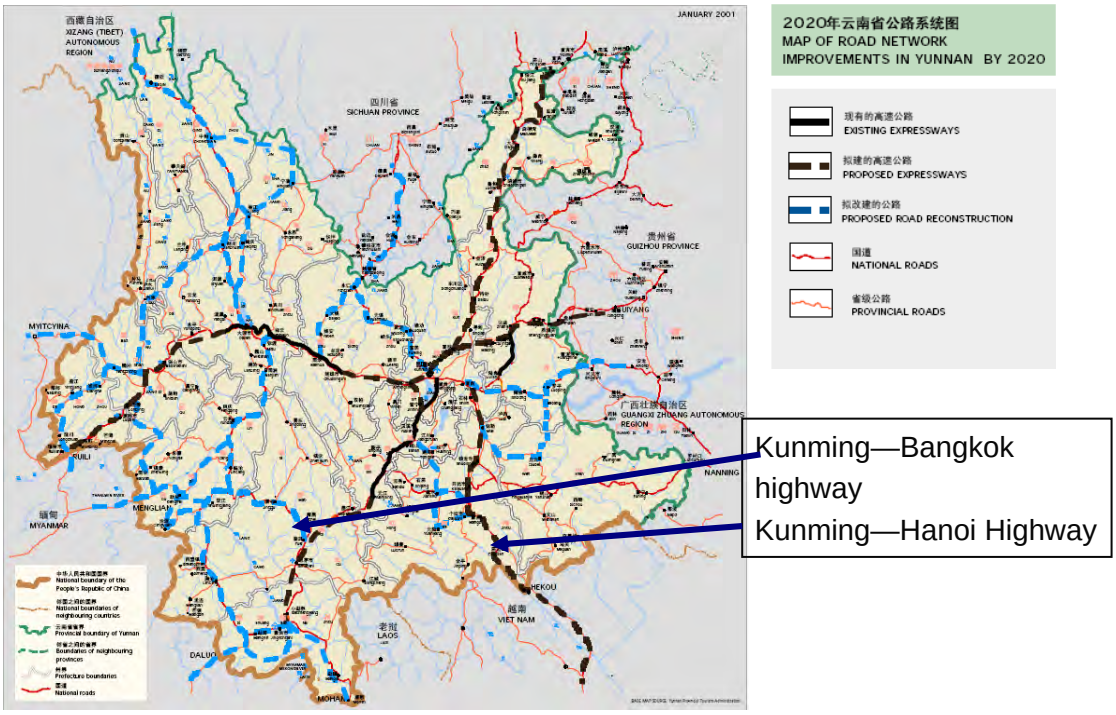
Source: Yunnan Statistic Yearbook, 2007

Figure 2 Length of the Highway in Yunnan



Source: Yunnan Statistic Yearbook, 2007

Map 1 Highway Network Development in Yunnan by 2010



Map 2 Railway Systems in Yunnan by 2020

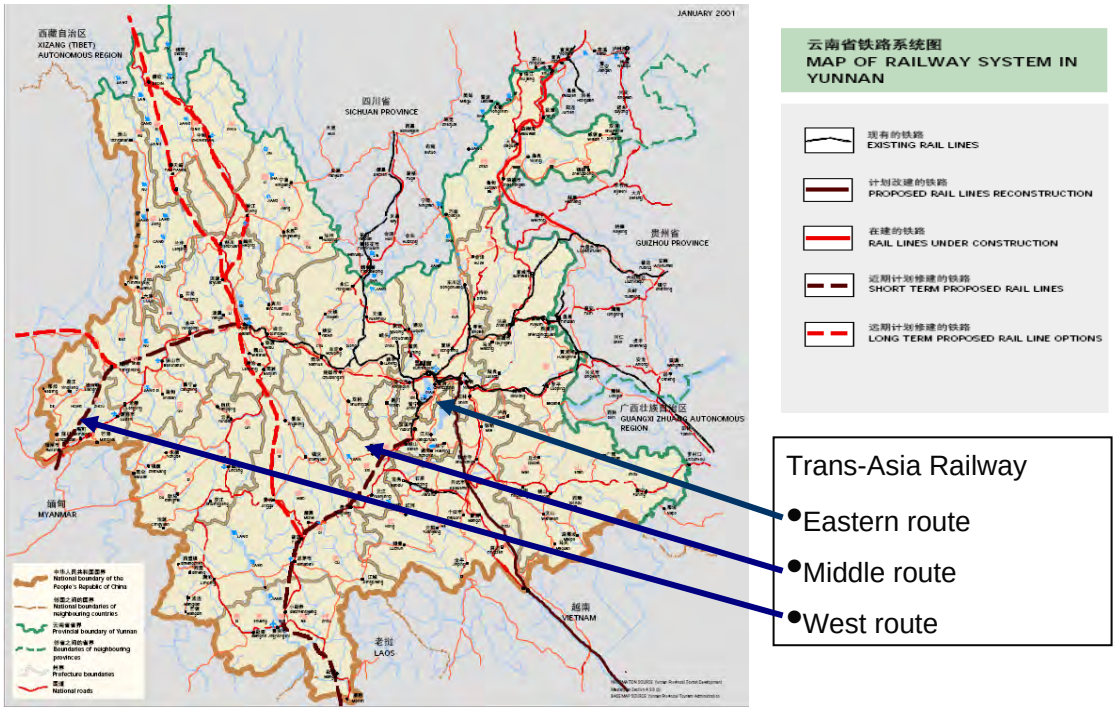
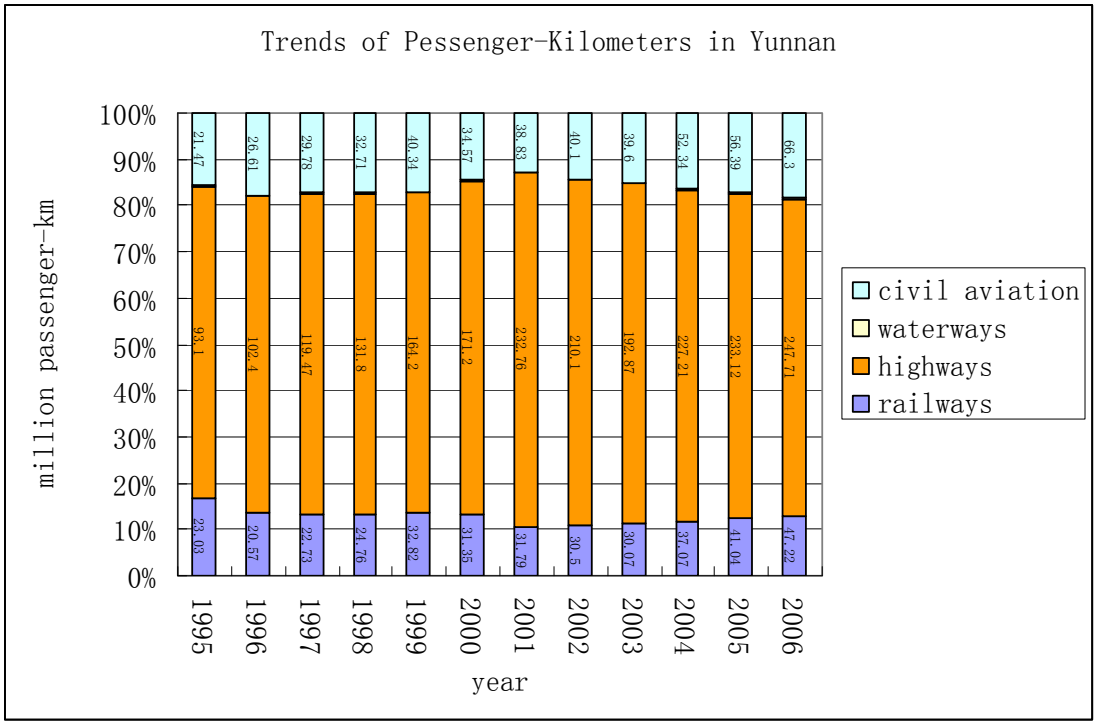


Figure 3 Trends of Passenger-Kilometres, Freight Ton-Kilometres in Yunnan


Trends of Pessenger-Kilometers in Yunnan
million passenger-km
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
year
civil aviation
waterways
highways
railways
21.47
26.61
29.78
32.71
40.34
34.57
38.83
40.1
39.6
52.34
56.39
66.3
93.1
102.4
119.47
131.8
164.2
171.2
232.76
210.1
192.87
227.21
233.12
247.71
23.03
20.57
22.73
24.76
32.82
31.35
31.79
30.5
30.07
37.07
41.04
47.22

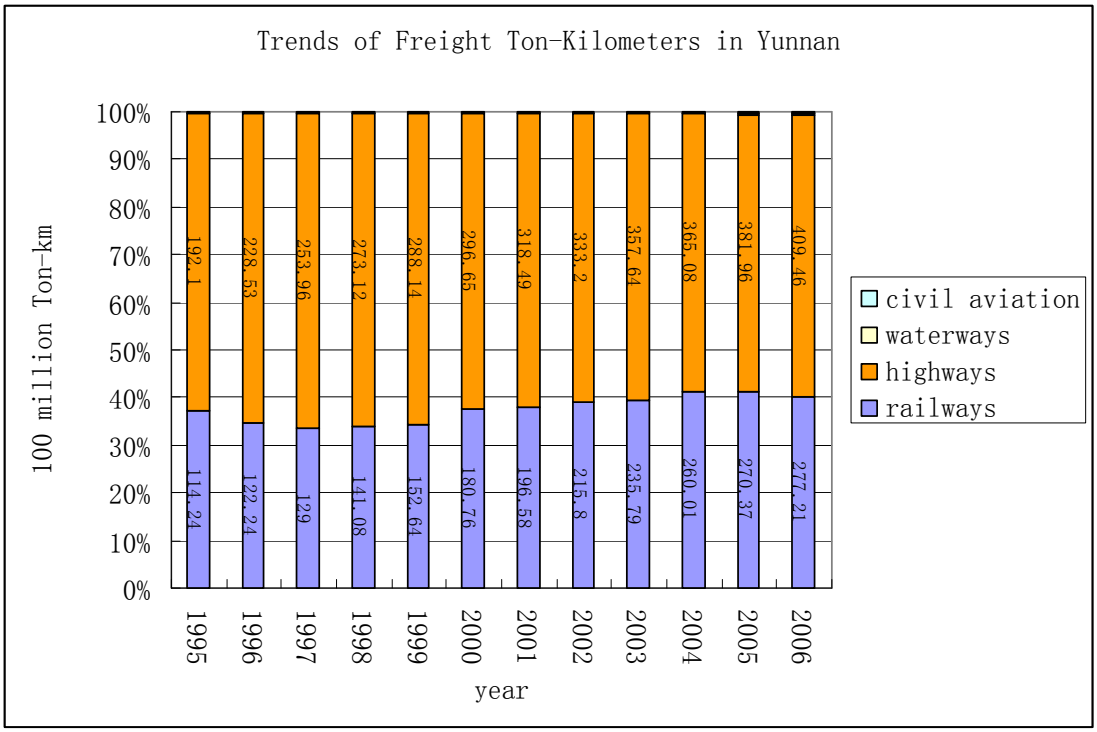
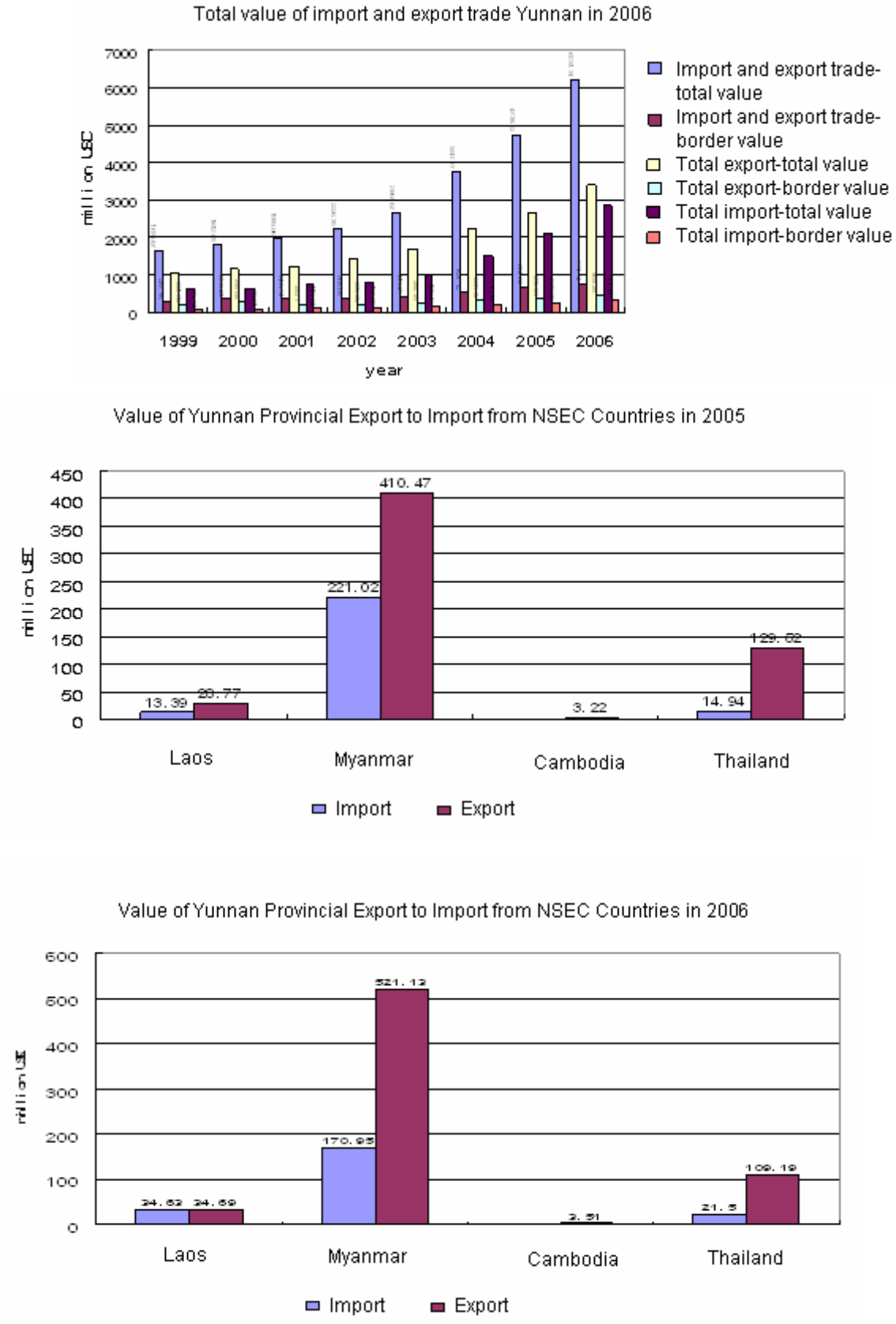

Trends of Freight Ton-Kilometers in Yunnan
100 million Ton-km
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
year
civil aviation
waterways
highways
railways
192.1
228.53
253.96
273.12
288.14
296.65
318.49
333.2
357.64
365.08
381.96
409.46
114.24
122.24
129
141.08
152.64
180.76
196.58
215.8
235.79
260.01
270.37
277.21

Figure 4 Yunnan's Foreign Trade



Source: YN Statistic Yearbook, 2007

Table 1 Comparison of Import & Export Trade Value between China and Yunnan in NSEC Countries in 2007

	China in 2007*					Yunnan in 2007**		
Country	Total	Import	Export	Inward investment	Outward investment	Total	Import	Export
Laos	249	85	164	76	146	83.39	47.48	35.91
Myanmar	2057	371	1686	76	134	873	233	640
Thailand	34638	22665	11974	2965	302	220	63.41	156
Cambodia	933	51	882	17	146			

*Source: * National Report on China's Involvement in GMS Cooperation, March 2008*

*** Meeting Minute between SEA Team and Yunnan MOFCOM, dated on April 14, 2008*

Economic: Lao

Economy

Template 1: National & local GDP

(Key issue EC1: National and Local Economic GDP Growth)

(Key issue EC5: More employment (equity dealt with under social theme)

Indicator: Lao's PDR national GDP and per capita GDP and provincial GDP and per capita

Official target: N/A

Trends: For the sixteen year period 1990-2005, Lao's PDR national total GDP grew at average annual rate of 9.3% from 612,681 million Kip in 1990 to 1.53 trillions Kip in 2005, measured in 1990 constant prices. For the eleven year period (1995-2005) Lao's PDR national per capita GDP overall growth was 33%, growing from 0.18 million Kip in 1995 to 0.27 million Kip in 2005, measured in 1990 constant prices.

For the six year period 2000-2005, the Bokeo Provincial GDP grew at average annual rate of 6.13% and the per capita GDP for the same province grew at average annual rate of 3.63%. The Bokeo Provincial GDP, in 2004 current prices, was 493.2 billion Kip compared to the National GDP that is was 26.6 trillion Kip. For the same year, in current prices, the Bokeo Provincial per capita GDP in current prices was 3.61 million Kip, while the National per capita GDP in current prices was 4.79 million Kip.

Drivers of trends: GDP has quadrupled over the sixteen year period 1990-2005. The main driver has been industry. Import duties and services have also had a significant overall growth. Lao PDR imports mostly commodities from Thailand, followed by Vietnam and China. The import growth from Thailand has increased continuously since 1998. In 2005, the import value from Thailand to Lao PDR accounted for about 66% of the total import value. Agriculture remains the dominant economic sector with more than 50 percent of total value added and an even higher share of total employment. Agriculture had the lowest growth rate with an average annual change of 5.22%.

The economy of Bokeo Province has been developing at a reasonable pace with average annual growth of 6.13% and the main driving forces of this growth have been tourism and industry. It is expected that this trend will continue into the near to mid-term future.

In Lao PDR the majority of enterprises are small establishments of less than 10 people. Small establishments in 2004 accounted for 96.5% of the total establishments, followed by medium (2.8%) and large establishments (0.8%). The national figures for the Bokeo and Luang Namtha Provinces were similar to the national ones. The. Bokeo Province just had 4 large establishments settled up in 2004.

(Source of information: Lao PDR statistical yearbook 1975-2005, National Statistics Centre, Lao's PDR 2005 population and housing Census, Committee of Planning & Cooperation, Houay Xai District, Asian Development Bank)

Indicator: Inflation Rate

Official Target: N/A

Trends: For the period 1989-2005, inflation rates for Lao varied significantly. From 1991 until 1997, inflation in Lao PDR was below 20 percent, with the lowest in 1993, 6.3%. Inflation rates in Lao PDR increased dramatically in 1998 and 1999. In 1998, inflation increased to 90.1%, a more than four-fold increase from the previous year and in 1999, it peaked at 128.4%. The following year, inflation dropped again to 23.1%. In 2005 the inflation rate of Lao PDR was 7.2%.

Drivers of trends: Inflation had not been considered a very serious issue until 1998. The devaluation of Thai baht in 1997 and the almost automatic devaluation of the Lao Kip, given the high dollarization of the economy, increased the value of the dollars circulating in the economy and the value of dollars received as loans and grants. Inflation levels in Lao PDR were higher than those reported in other Southeast Asian countries and might have had a negative impact on economic growth. The expectation is that the levels of inflation will remain below 10% for the coming years.

(Source:* Lao PDR statistical yearbook 1975-2005, National Statistics Centre, *Asian Development Bank)

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection:

- Note that GDP data for Houay Xai district were not available.
- GDP data for the Luang Namtha Province were not available / provided.
- Data were not available / provided on employment and unemployment rates, which are important economic indicators.

Summary of main concerns and challenges for the NSEC: Although the figures for the Bokeo Province show that the economy has been developing at a reasonable pace between 2000 and 2004, living standards between rural and urban villages vary significantly. With only 27% of rural villages being connected to the electricity grid and none of them being connected to a water system there are still development issues to be addressed. Regarding medical facilities, these are limited to the provincial hospital in Houay Xai. Given this, an increase in the overall number of clinics may be needed, as this one hospital is responsible for serving a population much larger than that of just Houay- Xai District. Schools are also limited with about 45% of rural villages not having their own primary school, meaning that small children would have to walk some distance to get to school.

From a statistical point of view, landlocked countries like Laos are usually less well-off than neighboring maritime countries. GDP per capita of landlocked countries is approximately 57 percent that of maritime countries, the life expectancy is on average 3.5 years lower, and educational index scores are lower by about 0.36. In addition, development rates are slower. The poorer performance of landlocked countries compared to the neighbouring maritime countries could be attributed to their reduced access to markets and opportunities, which results in higher costs for trade and transaction and which have a negative impact on investment and therefore to economic growth.

From that point of view, the biggest challenge facing Lao PDR is the improvement of the road network within its own borders so that it can take advantage of opportunities on and outside of its borders. The NSEC road and the NSEC Bridge are expected to provide the physical means to achieve this.

References/sources:

Lao PDR statistical yearbook 1975-2005, National Statistics Centre,
Lao's PDR 2005 population and housing Census,
Committee of Planning & Cooperation, Houay Xai District,
Asian Development Bank

Annexes: Table 1, Table 2, Figure 1, Figure 2

Table 1 GDP of Lao PDR in 1990-2005 at 1990 prices

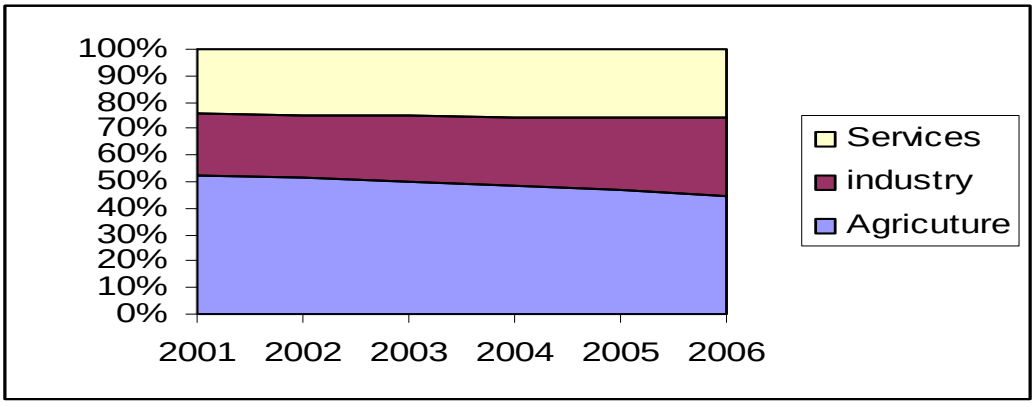
	YEAR							
Sector	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Agriculture	371,835	452,684	583,591	605,619	629,717	643,602	665,894	682,378
Industry	88,105	157,056	254,283	280,032	308,341	343,681	386,805	448,635
Services	147,376	204,345	281,491	297,462	314,464	337,205	362,535	386,919
Import Duties	5,364	20,832	7,749	8,973	10,101	11,001	12,594	13,994
GDP	612,681	835,917	1,127,114	1,192,086	1,262,623	1,335,488	1,427,828	1,531,926

Unit: Millions of Kip

Table 2 Per Sector GDP growth of Lao PDR, 1990-2005

Per sector GDP growth			
	Overall % change	**Average annual % change (1990-2005)**	**Average annual % change (2000-2005)**
Agriculture	83.52%	5.22%	2.82%
Industry	409.21%	25.58%	12.74%
Services	162.54%	10.16%	6.24%
Import duties	160.89%	10.06%	13.43%

Figure 1 Share of Lao PDR's Gross Domestic Product by sector in 2000-2005



Economy
Template 5 Agriculture

Indicator: Types of agriculture, land allocation and yield per household (HH) in the Villages located in the Project Area (Route 3) in the Provinces of Bokeo and Luang Namtha

Target: N/A

Trends: There are 10 villages which are located close to the Project area. The major types of agriculture in these villages include rice paddies, shifting (Swidden), cultivation and vegetable gardens. The villages in the Project area have 0.91 ha/HH of agricultural land and 0.10 ha/HH of residential land. Each HH has on average 0.31 ha of rice paddy, with average yield 3.1 tons/ha and on average 0.09 ha of shifting cultivation holdings with average yield 1.2 tons/ha. Only 9 percent of all HH in the area have paddy irrigation. Forest holdings are relatively small compared to other mountain villages in northern Laos, with the exception of Village 8, which has 800 ha of conservation forest. The average productivity of the forest in Village 8 per HH is 0.01 ha, and the area of regeneration forest is 0.06 ha, protected forest is 0.17 ha and conservation forest is 1.05 ha (this value is due to the large holding of 800ha for Village 8). Villages 3, 5, and 6 have no forest holdings.

Drivers of trends: N/A

Indicator: Type of land ownership

Target: The Government seeks to extend the Land Tax Document to all homeowners as a means of increasing tax revenue and broadening the administrative documentation of the properties and to allow the eventual upgrading to a Formal Title Deed.

Trends:

Many homeowners along Route 3 in Bokeo and Luang Namtha Provinces, hold a Land Tax Document, or “Yellow Paper,” particularly those in areas near the towns of Houayxay and Namtha. This is a temporary certificate which includes a Property Description, a Surveyed Plan keyed to boundary markers and a listing of adjacent property owners. With the implementation of the land allocation process, this document will eventually lead to a formal land title for the HHs. 88% of HHs at Village 5 and 34% of HH at Village 3 already hold a formal Land Title. Villages 3, 6, and 8 have no formal Land Titles. In the other five Lao Project area Villages 2-8% of the HH hold formal Land Titles.

Drivers of trends

The process to obtain a formal Land Title is likely to be lengthy because of constraints on administrative personnel and budget support.

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection: Not adequate / available information on total amount of land used for agricultural purposes, irrigation system and production.

Summary of main concerns and challenges for the NSEC:

- There is a low amount of irrigation in the area
- Some villages have no access to community forest.
- Shifting cultivation is still practiced in the area
- All villages now have a form of recognition of land ownership and the government intends to

formalize this primarily to expand the tax base.
References/sources: Socioeconomic Survey at the project villages, April 28-May 2, 2005
Annexes: Table 1

Table 1 Types of Land Ownership for HHs in Lao Project Villages

Item No.	Village	Land Title	%	Temporary Certificate	%	No Document	%	Total	%
1	Pakhao Neua	7	7	94	93	0	0	101	100
2	Oudom	50	34	95	66	0	0	145	100
3	Phibounthong	0	0	72	100	0	0	72	100
Subtotal		57	14	261	86			418	100
4	Mokkachork	2	2	96	98	0	0	98	100
5	Namkham Tai	35	88	5	12	0	0	40	100
6	Houakhoua	0	0	39	100	0	0	39	100
7	Pakhao Tai	3	3	113	96	1	1	117	100
8	Thongbiar	0	0	38	100	0	0	38	100
9	Viengmay	3	4	73	96	0	0	76	100
10	Done	5	6	77	94	0	0	82	100
Subtotal		48	10	441	90	1	0	490	100
Total		105	13	702	87	1	0	808	100

Source: Socioeconomic Survey at the project villages, April 28-May 2, 2005

Economy

Template 4 Industries

Indicator: Types of industries and ownership operating in the Provinces of Luang Namtha and Bokeo

Target: Increase the number of the industries in the project area, especially those related to the agricultural sector.

Trends: Namtha District has five stone crushing factories; three Chinese-owned businesses including a rubber-processing factory, a laundry soap factory, and a pharmaceutical factory, as well as a Thai operated sawmill. Other smaller local companies include a drinking water factory and a salt factory.

In Vieng Phoukha District the main industry is the Vieng Phoukha Coal Mine, which extracts low-grade lignite from large open pits at Ban Nam Ngeun. Officials report that the district receives no benefits from the lignite mine, on the contrary the District mainly has to deal with the problems (e.g. paddy fields lost to operation of the mine). There is also a sawmill at BanNam Fa, which is owned and operated by the Lao military's Agriculture and Forestry Development Company (AFD). There is also a company which processes aromatic wood to make perfume. This is temporarily closed until assessment can be made of sustainable harvest levels.

Bokeo Province has three sawmills, all Thai-owned, and all in the vicinity of Houey-Sai. There are at least two sand and gravel mining companies, a Korean-owned gem mining factory and a Thai and Chinese-owned manganese mine. There is also an American-owned feed mill. There are two drinking water factories. A Thai/Lao agricultural development center processes NTFPs and a fibre factory which processes mulberry tree -bark. There is a salt factory near Ban Houei Dinchi. The Vieng Phoukha Coal Mine Company maintains Route 3 through Houei Sai district and manages a port for ferrying lignite across the Mekong.

Drivers of trends: The area seems to have a number of resources to exploit such as stone, coal and lignite. However a large number of these are Chinese, Thai or internationally owned. This signifies the fact that the local authorities/ population does not have the ability and resources to establish and operate industrial establishments.

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection: Not available information on the size of these industries and their profits.

Summary of main concerns and challenges for the NSEC:

- There is a very weak industrial base most of it around resource extraction with some processing such as feed or mineral water bottling
- Most of the industry is owned by international entities

- There is a lack of skills and resources in the area necessary to accelerate the process of industrialisation
- Tax revenues from the industries present do not appear to benefit the local authorities as much as might be expected in fact some industries could be a regulatory or pollution burden on the local authority

References/sources: Data collection and interviews carried out by the local consultant.

Annexes:

Economy
Template 6 Special Economic Zones

Indicator: Boten concession area: size of the area, period of concession and status

Target:

Trends: The Chinese have a concession period of 30 years in the Boten border. The total concession area is 1460 hectares. The concession period could be extended after the 30 years. 3 villages (Ban Boten, Bo Tect and Bo Paek) have been removed from the concession area and the customer office and the slat factory have closed. A Chinese company is responsible for all compensations and the Lao government has to manage the immigration and security in the concession area.

1.1 ***Drivers of trends:*** *99% of the investments in the Concession area are made by Chinese companies and the majority of the businesses in that area such as casinos, hotels, restaurants, and trading of goods (e.g. cell-phone, electronics, clothes, …etc) are run by Chinese people. However, there are some Lao worker undertaking permitted works as employees in the Casinos and restaurants.*

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection:

Summary of main concerns and challenges for the NSEC:

- The opportunity for the local authority to maximize economic and social benefits from special economic zones
- The environment damage and regulatory burden on the local authorities
- Capacity building and resources needed to allow the local communities to benefit from special economic zones

References/sources: Planning and investment of LNT province.

Annexes:

Economy

Template 3 Tourism

(Key issue EC2: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development))

Indicator: Principal Economic Indicators for tourism in Lao PDR

Target: To promote actively the abundant natural and cultural assets of Lao PDR in order to attract more international visitors.

Trends: During the fifteen year period 1993-2007 the Lao's PDR tourism industry has experienced rapid expansion. The total annual number of visitors increased from 102,946 that it was in 1993 to 1,632,943 in 2007. The majority of tourist visitors were from Asia and Pacific, mainly from Thailand, (over 50% of the total number of tourists visiting the country) followed by Europe, America, Africa and others. The expectation is that by 2015 the number of tourist visitors will increase to 3,572,000. Regarding the annual revenue from tourism, this has also increased significantly. From USD 6,280,000 that it was in 1993 to increase to USD 233,304,695 in 2007 and the expectation for 2015 is USD 388,748,338.

Drivers of trends: The Lao PDR authorities have recognized the importance of natural and cultural assets of their country and they have actively tried to promote them in an effort to attract more visitors, not only from neighbouring countries, but also internationally. Recently developed concepts like "ecotourism" and "community based tourism" (CBT) (a concept that was created in western societies and it is closely linked to the ideas of equal rights and sustainable development) provide new challenges for local communities in Lao PDR. Tourism can increase income and therefore reduce poverty in many of the marginalized areas of the country. However, if not implemented wisely tourism can cause negative impacts to the local communities. Some of these impacts have already become apparent and they include opium-tourism, and inappropriate behaviour towards tourists.

(Sources: National Tourism Administration)

Indicator: Principal Economic Indicators for tourism in the Province of Luang Namtha

Target: To support the local communities in the expansion of tourism and nature conservation.

Trends: Following national trends, the number of tourist arrivals to Luang Namtha increased from 4,732 in 1995 to over 24,700 in 2000. For the period 1998-2004 the number of tourists visiting the Luang Namtha Province annually increased from 18,600 to 41,658, this accounted for about 5-7% of the total Lao tourism over that period. In 2007 after the reconstruction of the road, the number of tourists visiting Luang Namtha increased to over 61,000. The average daily expenditure of tourists has also increased from 9 USD in 2000 to 16 USD in 2005. It is estimated that in 2005, tourism in Luang Namtha generated over 3.15 million USD.

Drivers of trends: The authorities in the Province of Luang Namtha have recognized the importance of its natural and cultural assets and have made significant effort on promoting tourism in the area as a mean to increase income and therefore reduce poverty. Tourism growth in the

Luang Namtha Province has increased mainly due to the Nam Ha Ecotourism Project (NHEP) which was launched in October 1999. In addition in 2002 CBT was integrated into the Rural Development of Mountainous Areas (RDMA) Programme.

(Sources: LNTA, 2008, UNESCO-Lao National Tourism Authority Nam Ha Ecotourism Project).

Indicator: Types of tourism in the Province of Luang Namtha

Target: The development of the Muang Sing district, focusing on the Ahka population group which is the main ethnic group in the area.

Trends: Muang Sing is mainly visited by young backpackers. Wealthier, older tourists have begun to visit this area as well, but they generally do not spend as much time in Muang Sing and the surrounding areas as younger travellers.

Drivers of trends: The main interests in the area for the international tourists are forest trekking, visiting the ethnic villages, visiting the waterfalls and kayaking/rafting. Other activities include mountain biking, safari, visiting the caves and camping. These are mainly activities which attract younger people.

Indicators: Type and number of tourism establishments in Bokeo and Luang Namtha Provinces

Target:

Trends: During the period 2001-2007, the number of accommodation establishments in Bokeo Province increased from 21 to 32, and the number of rooms from 254 to 378. Of the 32 accommodation establishments, only 4 were hotels while the rest were guest houses. During the same period in Luang Namtha the number of accommodation establishments increased from 39 to 56 and the number of rooms from 312 to 615. The majority of the establishments were also guest houses with a total of 53 guest houses and only 3 hotels. During the period 2002-2005 the number of restaurants in the Bokeo Province increased significantly from 18 to 32, while in Luang Namtha the number of restaurants dropped from 18 over the period 2002-2004 to only 10 in 2005. In terms of the number of accommodation establishments, Luang Namtha is seventh and Bokeo is fourteenth out of the 17 provinces of the Lao PDR. The majority of accommodation establishments are located in the capital, Vientiane and in the Vientiane and Luang Prabang Provinces.

Drivers of trends: Many low-cost guesthouses and hotels have been constructed in district centres to accommodate the growing number of visitors. At present, there are 19 in Namtha District, 12 in Sing District, 2 in Vieng Phoukha and 4 in Long District. The cost of overnight accommodations ranges from US$ 1 – 15.

(Source: National Tourism Administration)

Relevant laws, policies, plans and institutional arrangements: In response to the need to develop a sustainable model for community-based culture and nature tourism - collectively known as community-based ecotourism (CBE) - the Office of the UNESCO Regional Advisor for Culture in Asia and the Pacific launched the Nam Ha Ecotourism Project (NHEP) in Luang Namtha Province in October 1999. The main goal of NHEP is to assist in poverty reduction and contribute to conservation and protection of Lao's PDR environment and cultural heritage by developing an

economically viable ecotourism development model. The project is implemented by the National Tourism Authority (NTA) of the Lao PDR with the cooperation of the Ministry of Agriculture and Forestry and the Ministry of Information and Culture. The project's main donors are the Government of New Zealand through NZODA and the Government of Japan through the International Finance Corporation's Trust Funds Programme.

The term 'community-based tourism' (CBT) is recent. It is mainly considered as a tool that integrates the goals of the general concept of sustainable development. In 2002 CBT was integrated into the Rural Development of Mountainous Areas (RDMA) Programme supported by German Technical Cooperation (GTZ). The project helped train guides in Muang Sing and organised a tourism awareness workshop for the public sector representatives. CBT is a concept that was created in western societies and is closely linked to Western ideas of environmental protection, equal rights and sustainable development. In addition CBT is directed towards Western markets to attract more international tourists. In order to achieve this it is necessary under the implementation of CBT for local people to get special training in order to meet the necessary requirements for the development of the project.
(Source: UNESCO-Lao National Tourism Authority Nam Ha Ecotourism Project)

PM's Decree 164 (1993) legally established a National Protected Areas system. This decree has three objectives: the protection of forests, wildlife and water, the maintenance of natural abundance and environmental stability and the protection of natural beauty for leisure and research.

Problems and issues encountered during data collection:
There were not provided / available data on Bokeo Province tourism figures.

Summary of main concerns and challenges for the NSEC:

- The NSEC project is expected to ease the movement of people in the areas of Bokeo and Luang Namtha.
- The expectation is that this project will increase tourist arrivals.
- However it is important to take all necessary measure to ensure that the natural beauties and the heritage will be protected in order to keep attracting visitors to the area.
- There is a need for more investment and capacity building to maximise the potential tourism activities whilst ensuring they are environmentally, socially and economically sustainable as well as fair and equitable among different groups

References/sources:
LNTA, 2008
UNESCO-Lao National Tourism Authority Nam Ha Ecotourism Project
National Tourism Administration
Lao PDR Statistical yearbook 1975-2005, National Statistics Centre

Annexes: Figure 1, Figure 2, Table 1, Table 2, Table 3

Figure 1 Number of tourist arrivals (in millions of visitors) in 1993-2015

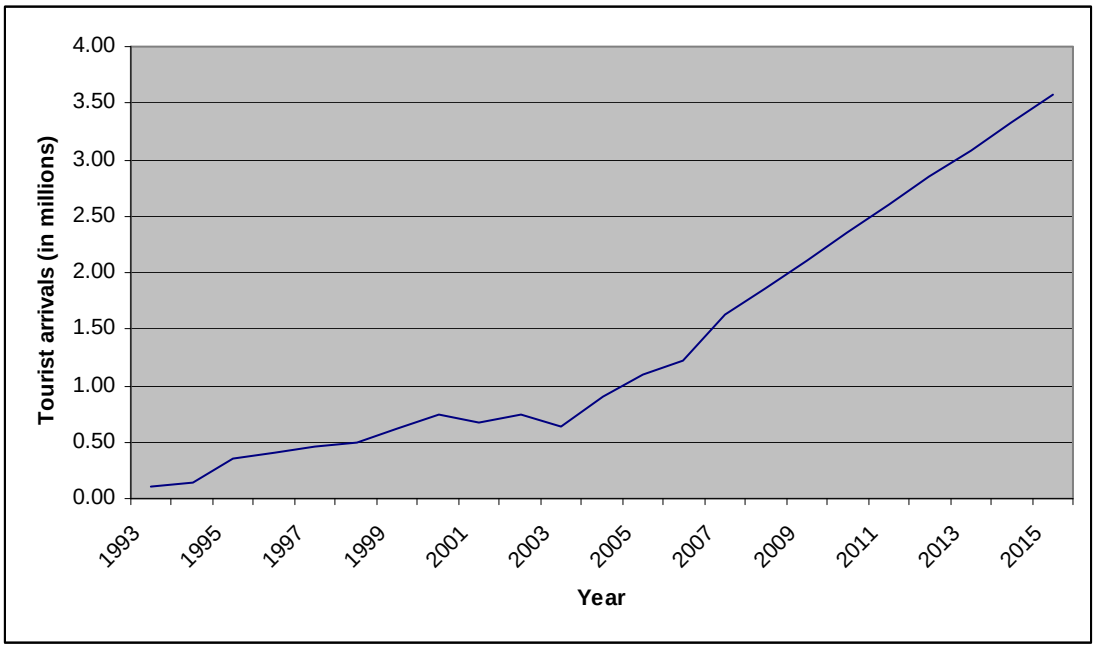


Figure 2 Number of tourists by Continent in 1995-2005

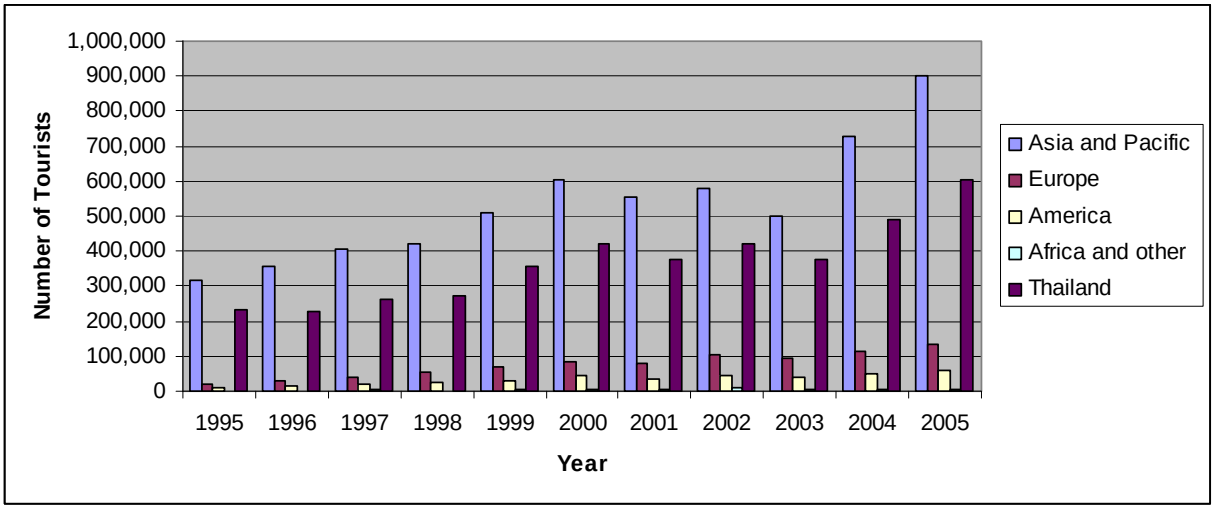


Table1 Number of tourist visits and income from tourism in Luang Namtha (1999- 2008)

	Year	Number of tourists	Income (USD)
Before road Reconstruction	1999	20,700	662,400
	2000	24,770	1,188,960
	2002	19,319	1,081,864
	2003	29,720	1,902,080
	2004	41,658	2,377,600
	2005	49,258	3,152,512
	2006	55,000	4,400,000
After road Reconstruction	2007	61,000	N/A
	2008	55,000 (9 months)	N/A

Table 2 Main interests of international tourists in Luang Namtha 2004–2005

Activity	2004 (n = 210)	2005 (n = 170)
	% indicating an interest	
Forest Trekking	77	78
Visiting Ethnic Villages	74	75
Visiting Waterfalls	44	54
Rafting/Kayaking	35	43
Mountain Biking	29	42
Safaris 4	40	41
Visiting Caves	40	40
Seeing Cultural Shows	-	29
Camping	20	24
Bird Watching	21	19

Table 3 Number of Hotels, Guest Houses, Rooms, and Beds, in 2007

Province	Hotels			Guest Houses		
	No	Rooms	Beds	No	Rooms	Beds
Attapeu	3	75	139	13	165	200
Bokeo	4	80	132	28	298	448
Bolikhamxay	14	394	435	23	177	264
Champassak	31	865	1357	111	1014	1279
Houaphanh	5	97	162	40	324	45
Khammouane	6	280	430	38	344	506
Luang Namtha	3	71	94	53	544	923
Luang Prabang	21	624	1047	203	1538	2392
Oudomxay	9	245	429	57	542	836
Phongsaly	4	76	85	34	222	323
Saravanh	0	0	0	23	362	411
Savannakhet	13	487	700	68	1140	1367
Sayabouli	3	79	102	48	482	608
Sekong	2	40	57	15	124	146
Vientiane Capital	79	3002	3933	169	2474	3752
Vientiane Province	4	413	856	157	1871	3143
Xieng Khouang	10	204	299	40	489	644
Total	**211**	**7032**	**10257**	**1120**	**12110**	**17287**

Economy

Template 2: Transport and Trade

(Key Issue EC2: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development))

Key issue EC4: Limited and inequitable trade in goods, services, FDI and movement of people (information division, health, education, logistics, culture))

Indicator: Length and Specification of the corridor in the northern provinces of Louang Namtha and Bokeo in Lao PDR and plans for the future.

Official target: Transportation infrastructure development. This is one of the Eight National Socio-Economic Priority Programmes of the Government of Lao PDR in their strategy for reducing poverty and graduating from the ranks of the least developed countries by the Year 2020.

Trends: NSEC Project Road 3 which connects Houayxay on the Mekong River with Boten on the border with PRC was completed in March 2008. Road 3 has total length 227231km and its construction was funded by Thailand, China and ADB. Its primary goal is to strengthen the linkages between the Greater Mekong Sub-region (GMS) members. The reconstruction of the 49 km of Houay Goan/Maung Ngeun (Thailand/Lao PDR border)-Pakbeng road, which forms part of an additional north-south route to Kunming, is expected to be completed at the end of 2008. The construction of the Houayxay-Chiang Khong International Mekong Bridge, which will complete the North-South Economic Corridor (NSEC) Western Corridor Yunnan-Lao PDR-Thailand, is expected to be completed by 2009. Thailand has agreed 50 percent of financing of the Chiang Kong-Houangxay International Mekong Bridge, with the remaining loan to come from China. The NEC and the NSEC Bridge are expected to reduce the average time required to transport goods and facilitate the move of vehicles, passengers and goods.

Drivers of trends: The biggest challenge facing Lao PDR is the improvement of the road network within its own borders so that it can take advantage of opportunities on and outside of its borders. The NSEC road and the NSEC Bridge will provide the physical means to do this.

Indicator: Waterway, road and civil aviation transport capacity in the Provinces of Bokeo and Louang Namtha.

Target: To increase the capacity of transport network in order to assist to the development of the region and the reduction of poverty

Trends:

Waterway: There are 147 boats arriving/departing Houay Xai which are operated from the Lao side. Of these 147 boats, 105 are speed boats, 26 have the capacity to transport up to 50t and the remaining 16 can transport up to 100t. The speedboats make an average of 4 to 5 round trips daily. This number increases during the dry season due to the greater number of tourists. For the larger vessels the number of trips increases from 12 to 56. This is because the number of trips by 50t to 100t vessels in the dry season is much lower due to the reduction in water depth.

(Sources : Oriental Consultants Co., Ltd. in association with Lao Transport Engineering Consult Asian Engineering Consultants Corp., Ltd. 2005)

Road: In Bokeo province the number of vehicles increased from 348 in 1995 to 5046 in 2004, with an average annual growth rate of 34.6%. However vehicles ownership in Bokeo Province is very low, with 35 motor vehicles per 100 people. Approximately 74 percent of these were motorcycles indicating the importance of two-wheeled vehicles in serving the transportation needs of people. In terms of public

transport there are 13 public intercity buses that operate from Houay Xai to Luang Namtha, Luang Praban, and Vientiane.

In Luang Namtha municipality, there are now paved roads in centre of the town. There are noticeably more motorcycles and bicycles than in 1997. There are three wheeled tuktuks which serve as taxis and there seem to be more pick-up trucks and Sport Utility Vehicles as well. Tractors pulling passenger carts are still found within town and along the outlying roads.

Aviation: Houay Xai has its own airport and is located just south of the town's urban area. There are only three flights per week all with destination to the capital Vientiane. The airport consists of a single runway that is 1,600m in length and 30m in width that is capable of handling ATR72 aircraft.

Luangnamtha airport construction work was completed in February 2008. There are three flights weekly all to the capital Vientiane. The airport consists of the runway (1,600m long, 30m wide). This Airport can handle 72 seat airplanes such as: ATR Aircraft which can provide a good service for passengers and tourists who visit Luang Numtha Province.
(Sources: Lao air line Company March 2008)

Indicator: Value of Import and Export Trade in the Provinces of Bokeo and Luang Namtha

Target: N/A

Trends: The total value of trade between Laos and Thailand at Chiang Khong Port has steadily increased from 236.48 million baht in 1995 to 938.28 million baht in 2004. However there has been an overall decrease in the growth rate of trade over the period 2000-2004. The majority of trade is between Chiang Khong and Houay Xai, but there is also a portion that goes downstream to Pak Beng and Luang Prabang.

The total value of trade between Laos and Thailand at Chiang Saen has also steadily increased but it still remains lower than at Chiang Khong. In 1995 the total value of trade was 42.03 million baht and this increased to 334.89 million baht in 2004. However there has been an overall decrease in the growth rate of trade over 2000-2004.The function of Chiang Saen from Lao perspective is to service points in the north to locations such as Luang Namtha

In 2004, the biggest export item from Thailand to Laos was agricultural produce (243.43 million baht) followed by soft drinks/energy drinks (156.17 million baht) and vehicles/vehicle spare parts (141.51 million baht). In the case of Laos, the biggest export item to Thailand is mining products (lignite) (123.77 million baht), wood products(111.54 million baht) and fish and livestock (63.04 million baht), which accounts for 83 percent of all exports.

Drivers of trends: The trade between China and Thailand is more important than between Lao and Thailand. Additionally dangerous natural obstacles separate Chiang Khong and Chiang Saen, preventing the passage of goods ships of any consequential size. Therefore, these two ports serve different markets in Lao PDR. Therefore the improvement of Route 3 together with the construction of the NSEC Bridge would have an impact on this trade as a result of large savings in transport time and in terms of served areas.

Relevant laws, policies, plans and institutional arrangements: The GMS Cross-Border Transport

Agreement (CBTA) is a compact and comprehensive multilateral instrument that covers all relevant aspects of cross-border transport facilitation. The CBTA has entered into force with its ratification by all six GMS member countries in 2003. On 30th April 2004, an amended version of the CBTA was signed to reflect the revision of Article 17 of CBTA on mutual recognition of driving licences and the inclusion of Annex 16 in the list of annexes and protocols.

Quadripartite Agreement on Commercial Navigation on Lancang-Mekong River was signed by Thailand, Lao PDR, Myanmar and China on 20th April 2000 in Tachiliek to facilitate commercial navigation on the Upper Mekong River. China assisted in the improvement of 331-kilometer navigation channel (i.e. removal of 10 major shoals and rapids).

On 29 July 2003 the Ministry of Public Works and Transport (MPWT) issued regulations on Environmental Assessment for Road Projects in Lao PDR (No. 2926/MCTPC) in order to define the principals and the methodologies for the environmental assessment of road projects. These include the necessary mitigation measures for negative environmental impacts from the implementation of road projects. In addition to this, the MCTPC issued a Road Law in 1999 which specifies the principles and the rules for managing, planning, modelling and constructing roads as well as the regulations for road safety, environmental protection and traffic control

Problems and issues encountered during data collection: Not available / provided information on local road network and official targets of the local authorities

Summary of main concerns and challenges for the NSEC:

The main funding for the construction of the NSEC in the area of Lao comes from Thailand and China or other funding organisation and therefore the development of the project depends on foreign funds. However it is very important that these countries will benefit from the NSEC project and therefore they are willing to contribute financial in the project. Lao will benefit from this project since it will link it to other economies.
The road dominates transport and trade and may compete directly with trade on the river.

References/sources:

Oriental Consultants Co., Ltd. in association with Lao Transport Engineering Consult Asian Engineering Consultants Corp., Ltd. 2005
Lao air line Company March 200
Thailand Office of Commerce, Chiang Rai

Annexes: (Table 1, Table 2, Table 3, Table 4)

Table 1 Trends in vehicle ownership in Bokeo Province

Type of Vehicle	Year										Average Annual Growth
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Motorcycle	258	492	539	554	607	704	1151	2,326	3,416	3,718	34.51
Pickups	68	104	177	260	297	362	496	777	972	1,022	35.14
Cars/Jeeps	0	0	0	0	0	0	12	31	38	40	49.38
Trucks	6	15	23	30	34	44	53	58	68	78	32.98
Tuk-Tuk & Tricycle	16	28	58	82	98	105	151	168	179	188	31.49

Total	348	639	797	926	1,036	1,215	1,863	3,360	4,673	5,046	34.60

Source: DCTPC of Bokeo Province

Table 2 Trade Volume between Thai & Laos at Chiang Khong (unit: millions of baht)

Thai-Lao Trade at Chiang Khong	Year							Av. Annual Growth 1995-2000	Av. Annual Growth 2000-2004
	1995	1996	1997	1998	1999	2000	2004		
Total Exports to Laos	155.75	179.25	198.40	365.89	472.77	481.38	643.02	25.32%	7.51%
Total Imports from Laos	80.73	88.62	123.51	26.08	120.32	103.49	295.26	5.09%	29.97%
Total Trade Value	236.48	267.87	321.91	391.97	593.09	584.87	938.28	19.85%	12.54%

Source: Thailand Office of Commerce, Chiang Rai

Table 3 Trade Volume between Thai & Laos at Chiang Saen (unit: millions of baht)

Thai-Lao Trade at Chiang Saen	Year								Av. Annual Growth 1995-2000	Av. Annual Growth 2000-2004
	1995	1996	1997	1998	1999	2000	2001	2004		
Total Exports to Laos	40.20	8.99	1.21	1.07	37.36	12.94	260.2	269.68	-20.28%	113.66%
Total Imports from Laos	1.83	15.89	103.73	128.27	576.02	218.57	241.07	65.21	160.27%	-26.09%
Total Trade Value	42.03	24.88	104.94	129.34	613.38	231.51	501.27	334.89	40.67%	9.67%

Source: Thailand Office of Commerce, Chiang Rai

Table 3 Top Three Exports/Imports between Thailand, Laos, & China at Chiang Khong and Chiang Saen in 2004 (unit: millions of baht)

Directional Flow of Goods	No.1	No.2	No.3	% of Total Value of Trade
Thailand - Laos via Chiang Khong & Chiang Saen	Agricultural Produce (243.43)	Soft Drinks/Energy Drinks (156.17)	Vehicles & Spare Parts (141.51)	59%
Laos - Thailand via Chiang Khong & Chiang Saen	Mine Products (123.77)	Wood Products (111.54)	Fish & Livestock (63.04)	83%

Source: Thailand Office of Commerce, Chiang Rai

Economic: Thailand

Economy

Template 1: National & local GDP

(Key issue EC1: National and Local Economic GDP Growth)

(Key issue EC5: More employment (equity dealt with under social theme)

Introduction:

Advice to local consultants – this template needs to cover for example:

(i) National GDP and per capita GDP
(ii) Provincial GDP and per capita
(iii) Levels of unemployment
(iv) Employment by sector
(v) Informal and formal sector employment

Please consider current state & recent & future trends (including government targets)

Indicator: National GDP and per capita GDP, Provincial GDP and per capita GDP in Thai Provinces along NSEC

Official target: N/A

Trends: Thailand national GDP increased from 4,922,731 million baht (149,174 US $) in 2000 to 8,469,060 million baht (256,638 US $) in 2007 (nominal values). Over the same period per capita income increased from 79,098 baht (US $ 2,396) to 128,917 baht (US $ 3906) (nominal values). Thai economic growth as a whole has been growing on average at 5% per year since 2000. However, economic instability is observed during the first half of the decade with economic growth having some significant fluctuations: from 4.75% in 2000 it fell to 2.17% in 2001 and it peaked at 7.14% in 2003 to fall again to 6.34% in 2004 and to 4.53% in 2005.

Total Provincial GDP in the provinces along NSEC increased from 1,428,967 million baht in 2000 to 1,832,420 million baht in 2007 (real terms) Provincial income break down by provinces along NSEC shows that Bangkok dominates all the provinces as it is the capital of Thailand where most economic activities concentrate 900,293 million baht in 2000 to 1.065,280 million baht (real terms) in 2007. Aside from Bangkok, the three adjacent provinces of Ayuthaya, Pathum Thani and Saraburi also indicate high economic activities. On the other hand Phayao and Sukhothai have registered the lowest Provincial GDP. The remaining provinces all share similar levels of provincial income.

In 2007, most provinces along the NSEC generated around $US 1,000 to $US 3,000 per capita income. Bangkok and its surrounding provinces, Pathum Thani, Ayuthaya and Saraburi are the four provinces with highest per capita GDP. In Bangkok, per capita GDP increased from 7,389 US $ in 2000 to 9,708 US $ in 2007. Chiang Rai, Phayao and Sukhothai, are the provinces with the lowest per capita GDP.

Drivers of trends: Thai economy has transformed from agrarian to an industrial and services dominated one. This transformation initiated in 1970s and the decline of the agricultural sector can be seen in the declining agricultural value added and the continued urban migration. During the four past decades, rural farmers found new careers in the urban areas.

Bangkok is the capital of Thailand where most economic activities concentrate and together with its three adjacent provinces of Ayuthaya, Pathum Thani and Saraburi dominate all the provinces along NSEC. These three provinces surrounding Bangkok host a large number of factories providing goods and services to the capital. Ayuthaya has the highest per capita GDP amongst the provinces as it hosts the majority of the industrial estates and suburban factories and it has a very small population.

All figures are available in the annex, tables 1, 2 and 3

Sources of information: National Economic and Social Development Board

Indicator: Unemployment rate in the provinces along NSEC

Target: N/A

Trends: Most of the 17 provinces along NSEC enjoy low levels of unemployment rates, ranging between 1% and 3%. Over time, unemployment rates for most of the provinces are showing declining trends particularly for the stronger economic provinces such as Bangkok, Phatum Thani and Ayuthaya where the unemployment rates have been declining since 2000. Most of the other provinces also have very stable unemployment rates. However there are some provinces such as Chiang Mai, Tak and Sukhothai that were much more affected from the Asian economic crisis of 1997 and hence they might still experience higher rates of unemployment.

Drivers of trends: Most of the provinces experience low and stable unemployment rates. This is partially explained by the fact that Thai economy has a less formal structure in rural areas that enables the wage rates to be determined in such a way to help absorb the unemployment.

All figures are available in the annex, table 4

Sources of information: National Statistical Office

Indicator: Employment by sectors in the provinces along NSEC in 2006

Target: N/A

Trends: For the majority of the Thai provinces along the NSEC, agricultural sector has the higher share of employment, followed by manufacturing and wholesale sectors. In the Provinces of Phayao, Sukhothai, Kamphaeng Phet, Nakhon Sawan and Chai Nat, agriculture is the dominant sector with over 50% of the total employment. For the provinces of Sarabury, Ayutthayam, Pathum Thani and Sing Bury, manufacturing is the main sector with shares equal to 37%, 48%, 39% and 29% respectively followed by wholesale, hotels, construction and agriculture. There are no figures available for Bangkok, however the expectation is that the structure is similar to the adjacent provinces of Ayutthayam and Pathum Thani.

Drivers of trends: As already noted, the provinces surrounding Bangkok host a large number of factories providing goods and services to the capital and therefore they have increased manufacturing, wholesale and construction sectors. On the other hand in the poorer provinces of Chiang Rai, Phayao and Sukhothai the main sector is agriculture, however there has also been some development on the manufacturing and wholesale sectors.

All figures are available in the annex, table 5

Source: "Survey of Informal Employment", National Statistical Office

Indicator: Informal and formal sector employment in the provinces along NSEC in 2006

Target: N/A

Trends: For the majority of the provinces along NSEC, the informal sector provides much more employment than the formal employment, with the exception of the provinces surrounding Bangkok, the rest of the provinces have over 50% employment share on the informal sector. For the adjacent to

the capital provinces of Sarabury, Ayutthayam and Pathum Thani formal sector dominates with 155%., 165% and 231% shares respectively.

Drivers of trends: As noted above, agriculture is the main employment sector for most of the provinces; therefore the share of informal employment is high. On the other hand for the provinces which are surrounding Bangkok, the main sectors are wholesale and manufacturing and therefore there is a high percentage on the formal sector.

All figures are available in the annex, table 6.

Sources of information: "Survey of Informal Employment", National Statistical Office

Relevant laws, policies, plans and institutional arrangements:

Government Policy and Plans driving Development in NSEC Areas include the following: For the economically developed regions surrounding the capital the development policies focus on increasing competitiveness to ensure economic development, investments on technology, infrastructure and transport, while in the least developed regions along NSEC there are issues like poverty reduction quality of life, security and drug prevention to be addressed. In detail the major development policies for each province include:

Provinces/Policies	Major Provincial Development Policies
Chiang Rai	Boarder Trade, Industrial Competitiveness, Handicraft (OTOP), Ecotourism, Arts and Culture, Human Resource, Quality of Life and Human Capital, Sustainable Natural Resources.
Phayao	Social and Quality of Life, Economics, Land and Natural Resources, Science Technology and Innovation, Foreign Affairs and International Economics, National Security and Good Governance
Chiang Mai	Safe Agriculture, Community Products, Industries, Trade and Investment, Poverty Reduction, Bird Flue Prevention, Logistics, Innovation System.
Lamphun	Poverty Reduction, Drug Prevention, Corruption, Economic Opportunities and Sustainability, Strengthening Community Development, Sustainability of Natural Resources and Environment. and Information Technology.
Lampang	Northern (Lana) Arts and Culture, Sufficiency Economy, Safe Tourism, Reducing Global Warming, Quality of Life, International Standard Education, Ceramics and Quality Local Products, and Sustainable Agriculture
Tak	Human Development, Increase Value Added for Agricultural Products, Infrastructure, Ecotourism and Culture, Natural Resource Conservation, National Security.
Sukhothai	Water Resource Management, Poverty Reduction, Tourism, Economic and Social Development, Public Services and People Participation,
Phitsanulok	Center of Transportation and Freight, Center of Information Technology in the North, Healthy Province, Quality Service from both Private and Public Sectors, Agricultural Markets and Processing, Tourism, Sports and Conventions, Participation of Local Government and the Public in Providing Clean Amenities, Holistic Approach towards Economic and Social Development and Poverty Reduction.

Kamphaeng Phet	Human Development, Improving Efficiency in Production, Trade and Services, Strengthening Local Community, Strengthening Natural Resource Base and Environmental Conservation, Infrastructure, Improve Energy Efficiency and Promote Renewable Energy, and Improving Public Service and National Security.
Nakhon Sawan	Poverty Reduction and Income Distribution, Social Capital Development, Enhancing Competitiveness, Sustainable Development, Holistic Development,
Chai Nat	Improve Productivity, Provide Opportunity and Income Distribution, Human Development, Strengthening Local Community, Health and Sport Development, Learning Society, Drug Prevention, Accident Prevention, and Maintaining Peace.
Sing Buri	Social Capital and Social Infrastructure, Natural Resource and Environmental Conservation, Cultural Rehabilitation, Improve Rice and Farm Productivity, Improve Value Added, Promote Historical and Farm Tourism, Improve Inland Transportation, Poverty Reduction and Public Governance.
Lop Buri	Increase Value Added, Food Safety, Tourism, Quality Society, Education and Learning Society, Strengthening Democracy and Stability, Natural Resource and Environmental Management, Good Governance.
Saraburi	Income and Employment Generation, Industry and Agricultural Export Promotion, Tourism, Human and Social Development, Logistics, Natural Resources and Environmental Conservation, Good Governance.
Ayutthaya	Restructuring Production and Improve Technology for Improving Productivity, Natural Resources and Environmental Conservation, Improve Long Term Sustainability of the Tourism Sector, Human and Social Development and Improve Quality of Life, Safe Agriculture, Transportation and Logistics,
Pathum Thani	Education and Research for Enhancing Productivity, Trade and Services, Improve Competitiveness in Production, Trade and Services, Tourism Promotion, Construct Data Base Leading to Holistic Development.

Sources of information: Provincial Development Plans

Problems and issues encountered during data collection:
Summary of main concerns and challenges for the NSEC: The expectation is that NSEC will offer new opportunities for further development to all provinces in the region. Some of the provinces aim at increasing their competitiveness in sectors like trade and technology and manufacturing. NSEC will provide the opportunities for having better and more access to other markets either in Thailand or abroad. These sectors are expected to profit from the development of NSEC and this will benefit those provinces aiming at reducing poverty. Tourism and ecotourism will also get benefit from NSEC. Some of these provinces are also aiming at sustainable natural resources management and environmental conservation. The development of the NSEC might have some negative impacts on these objectives in case mitigation measures are not considered by the developers.
References/sources: National Economic and Social Development Board National Statistical Office “Survey of Informal Employment”, National Statistical Office Provincial Development Plans
Annexes: Table 1, Table 2, Table 3, Table 4, Table 5, Table 6

Table 1 National GDP and per capita GDP

Year	2000	2001	2002	2003	2004	2005	2006	2007
Nominal GDP (mil. baht)	4,922,731	5,133,502	5,450,643	5,917,369	6,489,476	7,095,619	7,830,329	8,469,060
Nominal GDP (mil. $US)	149,174	155,561	165,171	179,314	196,651	215,019	237,283	256,638
Per capita GDP (baht)	79,098	81,915	86,322	92,960	101,086	109,563	120,037	128,917
Per capita GDP ($US)	2,396	2,482	2,615	2,816	3,063	3,320	3,637	3,906
GDP Growth Rate (%)	4.75	2.17	5.32	7.14	6.34	4.53	5.11	4.75

Source: National Economic and Social Development Board

Note 1 $US = 33 baht

Table 2 Provincial GDP (in real terms) measured in million baht

Provinces/Year	2000	2001	2002	2003	2004	2005	2006	2007
Chiang Rai	18,565	18,673	19,693	20,502	20,797	21,758	22,227	22,873
Phayao	7,929	7,887	8,281	8,357	8,720	9,569	9,703	10,048
Chiang Mai	40,788	41,737	44,816	45,927	47,007	48,260	50,386	52,081
Lamphun	32,421	27,997	29,562	28,617	30,126	31,250	35,243	37,965
Lampang	21,783	22,903	23,708	23,949	24,465	25,289	25,301	25,600
Tak	10,160	10,311	10,474	11,135	12,435	12,520	13,160	13,649
Sukhothai	10,738	11,266	10,683	12,074	12,271	11,810	11,993	12,609
Phitsanulok	21,060	19,540	20,369	21,820	21,036	21,594	22,316	23,625
Kamphaeng Phet	17,516	16,848	24,640	34,506	32,997	32,049	35,382	37,312
Nakhon Sawan	24,348	25,291	26,720	30,418	30,652	30,686	31,559	33,227
Chai Nat	10,211	11,041	11,561	11,356	11,157	11,530	11,867	12,129
Sing Buri	7,865	8,072	8,565	9,414	9,946	10,322	10,498	10,857
Lop Buri	35,615	33,877	35,523	36,609	39,768	39,898	39,931	41,136
Saraburi	42,195	43,467	51,291	55,423	61,116	69,488	73,623	74,566
Ayutthaya	141,433	137,740	146,952	179,509	192,871	195,848	213,001	230,982
Pathum Thani	86,047	87,059	78,388	84,310	92,720	95,701	122,275	128,481
Bangkok	900,293	926,770	937,439	969,398	1,035,773	1,076,339	1,092,324	1.065,280
Total	**1,428,967**	**1,450,479**	**1,488,665**	**1,583,324**	**1,683,857**	**1,743,911**	**1,820,789**	**1,832,420**

Source: National Economic and Social Development Board

Table 3 Provincial per capita GDP measured in US$

Provinces/Year	2000	2001	2002	2003	2004	2005	2006	2007
Chiang Rai	829	839	884	916	997	1,094	1,101	1,349
Phayao	777	802	900	909	1,025	1,181	1,265	1,332
Chiang Mai	1,436	1,495	1,664	1,728	1,780	1,910	2,075	2,315
Lamphun	3,176	2,955	3,281	3,380	3,716	4,062	4,927	4,560
Lampang	1,227	1,301	1,374	1,418	1,462	1,541	1,648	1,743
Tak	1,048	1,111	1,139	1,318	1,544	1,640	1,970	2,109
Sukhothai	885	943	934	1,080	1,167	1,211	1,333	1,405
Phitsanulok	1,318	1,247	1,395	1,514	1,556	1,698	1,875	1,963
Kamphaeng Phet	1,378	1,256	1,609	2,012	1,999	2,091	2,413	3,021
Nakhon Sawan	1,078	1,147	1,310	1,538	1,665	1,865	2,092	1,938
Chai Nat	1,420	1,549	1,614	1,618	1,713	1,858	2,040	2,109
Sing Buri	1,654	1,688	1,785	1,953	2,128	2,323	2,514	2,767
Lop Buri	2,058	2,033	2,176	2,235	2,447	2,614	2,711	2,767
Saraburi	3,327	3,426	3,842	4,147	4,624	5,093	5,528	6,501
Ayutthaya	7,330	7,452	8,060	9,814	10,568	11,009	12,409	13,093
Pathum Thani	5,703	5,805	5,202	5,576	6,146	6,439	7,588	7,548
Bangkok	7,389	7,689	7,681	7,922	8,576	9,053	9,431	9,708

Source: National Economic and Social Development Board

Table 4 Unemployment Rates

Provinces/Year	2000	2001	2002	2003	2004	2005	2006
Chiang Rai	2.0	0.8	1.0	2.5	3.5	2.2	2.5
Phayao	3.2	1.9	2.3	1.8	1.3	1.3	0.9
Chiang Mai	4.8	2.4	2.1	2.3	2.0	3.1	1.8
Lamphun	1.8	1.3	1.5	1.7	1.5	1.1	0.6
Lampang	1.8	2.2	1.5	1.3	1.5	1.5	1.1
Tak	6.7	4.0	2.9	3.6	2.3	2.2	2.1
Sukhothai	4.2	2.3	2.2	1.3	1.0	1.8	1.7
Phitsanulok	1.9	1.3	1.3	1.3	2.6	1.8	6.4
Kamphaeng Phet				2.6	1.7	1.3	1.5
Nakhon Sawan	2.3	1.6	1.1	0.5	1.3	0.3	1.4
Chai Nat		3.2	1.6	1.2	1.0	1.6	0.8
Sing Buri	3.3	2.1	1.4	1.4	2.5	2.3	1.6
Lop Buri	1.3	2.6	3.1	3.1	1.9	2.5	1.6
Saraburi	2.5		1.8	1.8	1.7	1.8	2.0
Ayutthaya		3.0	2.4	1.9	1.7	1.8	1.2
Pathum Thani	3.0	3.7	2.1	2.4	1.4	0.9	1.1
Bangkok	2.2	2.8	2.6	2.3	2.1	1.9	1.5

Source: National Statistical Office

Table 5 Employment by sector in 2006

	Chiang Rai	Phayao	Chiang Mai	Lam-phun	Lam-pang	Tak	Suk hothai	Phit sanulok	Kam phaeng Phet	Nakhon Sawan	Chai Nat	Sing Buri	Lop Buri	Sara buri	Ayut thaya	Pathum Thani
Agriculture	45.8%	51.9%	37.9%	38.2%	39.6%	47.8%	59.3%	45.1%	57.8%	50.2%	53.0%	4.5%	37.6%	15.2%	0.0%	5.4%
Fishing	1.3%	1.0%	1.0%	0.1%	0.4%	0.3%	1.0%	1.2%	0.1%	0.8%	0.4%	2.5%	0.6%	0.4%	0.6%	0.2%
Mining	0.1%	0.4%	0.0%	0.1%	0.5%	0.3%	0.1%	0.0%	0.3%	0.4%	0.2%	0.3%	0.1%	0.5%	0.0%	0.0%
Manufacturing	9.8%	9.2%	15.6%	25.0%	15.4%	9.5%	8.0%	8.5%	5.1%	10.4%	12.8%	29.3%	18.6%	36.9%	48.1%	38.7%
Electricity	0.2%	0.2%	0.2%	0.3%	1.7%	0.2%	0.2%	0.4%	0.1%	0.3%	0.2%	0.5%	0.5%	0.3%	0.3%	0.5%
Construction	7.0%	8.9%	6.5%	6.8%	8.5%	7.2%	6.1%	8.7%	5.6%	6.2%	6.3%	8.3%	7.3%	5.5%	6.5%	5.4%
Wholesale	15.4%	11.7%	15.0%	16.0%	15.3%	15.0%	11.5%	13.4%	15.7%	14.6%	10.6%	22.0%	15.7%	15.8%	16.5%	16.4%
Hotel	5.6%	4.1%	7.0%	4.1%	4.7%	5.1%	4.6%	6.6%	4.3%	5.3%	6.0%	7.7%	6.5%	7.4%	9.3%	8.0%
Transport	1.9%	1.1%	2.0%	1.0%	1.8%	2.6%	0.9%	2.0%	1.0%	1.3%	0.0%	2.9%	1.9%	5.1%	4.4%	8.5%
Financial	0.6%	0.6%	0.9%	0.4%	0.5%	0.4%	0.2%	0.5%	0.3%	0.7%	0.4%	1.2%	0.4%	0.7%	0.6%	1.6%
Real estate	1.1%	0.6%	2.7%	1.1%	1.0%	0.8%	0.3%	1.9%	0.5%	0.8%	0.6%	1.3%	1.0%	2.5%	2.9%	3.2%
Public	2.1%	3.2%	2.8%	2.0%	3.1%	3.8%	2.6%	3.8%	3.0%	2.6%	3.7%	5.5%	3.3%	3.1%	3.3%	3.0%
Education	3.1%	3.1%	2.9%	2.2%	3.2%	2.8%	2.0%	3.6%	3.1%	2.8%	2.3%	5.4%	2.8%	2.5%	2.9%	2.8%
Health	2.4%	1.9%	2.0%	1.1%	1.8%	2.3%	1.8%	1.7%	1.2%	1.6%	1.9%	3.5%	2.2%	1.4%	1.2%	1.8%
Other community	2.9%	1.7%	2.6%	1.3%	2.1%	1.6%	1.2%	2.4%	1.3%	1.8%	1.2%	4.7%	1.3%	2.4%	2.8%	3.8%
Private Households	0.7%	0.5%	0.8%	0.2%	0.5%	0.5%	0.3%	0.1%	0.7%	0.4%	0.5%	0.5%	0.3%	0.4%	0.5%	0.8%

Source: National Statistical Office

Table 6 Informal and formal sector employment in 2006

Provinces/Year	2006		
	Formal Employment	Informal Employment	Total
Chiang Rai	180,572	522,308	702,879
Phayao	64,383	210,366	274,750
Chiang Mai	339,036	565,197	904,233
Lamphun	77,064	142,764	219,828
Lampang	151,744	268,666	420,410
Tak	69,296	174,020	243,316
Sukhothai	57,274	262,710	319,984
Phitsanulok	135,507	293,316	428,822
Kamphaeng Phet	102,405	348,773	451,178
Nakhon Sawan	134,723	441,771	576,493
Chai Nat	55,200	158,569	213,770
Sing Buri	59,669	67,036	126,705
Lop Buri	161,218	261,294	422,512
Saraburi	235,370	151,650	387,021
Ayutthaya	247,907	150,600	398,507

Pathum Thani	307,885	133,062	440,947
Bangkok			
Total			

Source: "Survey of Informal Employment", National Statistical Office.

Economy
Template 5 Agriculture

Indicator: Value and growth rate of agriculture sector in provinces along the NSEC

Target: N/A

Trends: For most of the provinces along the NSEC, the proportion of agricultural sector in their provincial GDP has become smaller since 2000. Besides Tak and Saraburi provinces, the average growth rate of this sector during the period 2000-2007 was less than 4%. However, for more than half of the provinces in the NSEC, 15% or more of their provincial GDP comes from the agriculture.

All figures are available in the annex, tables 1 and 2

Drivers of trends: The smaller proportion of agricultural sector in the provincial GDP reflects the industrialization of the Thai economy. For some of the provinces along the NSEC, like Chiang Rai, Phayao and Sukhothai, agricultural sector is still high proportion of their GDP. On the other hand Bangkok and the surrounding provinces like Ayuthaya, Pathum Thani and Saraburi which are the most industrialized provinces obtain a very small percentage of their GDP from the agricultural sector.

Source: National Economic and Social Development Board

Indicator: Type of produce, cultivated area, yield and productivity figures.

Target: With the policy to become kitchen of the world, agricultural land is prevented from being changed to other uses. The Department of Agriculture is aiming to introduce minimal chemical use practices and increase productivity.

Trends: The most commonly grown agricultural products are rice (rain fed), corn, sugar cane, cassava, soy bean and beans. Rice productivity in the northern provinces is lower than that in the central provinces. The overall productivity can be considered good with room for improvement. The areas of cultivation are comparable among the provinces in the corridor.

Sukothai, Chai Nat, Phayao and Chiang Rai Provinces are mainly agriculture orientated. Figures of these provinces in 2007 were as follows:

- Sukothai: Cultivated land 2 million rai and yield 14.8t/rai
- Chai Nat: Cultivated land 1,2 million rai and yield 14.2t/rai
- Phayao: Cultivated land 1,1 million rai and yield 6t/rai
- Chiang Rai: Cultivated land 2,1 million rai and yield 6.3t/rai
- From the industrialised provinces along the NSEC in 2007 Sara Buri had 1,2 million rai cultivated land and 25.4t/rai yield.
- Figures for Ayutthaya were not available
- Figures for Pathum Thani were not complete but land dedicated to cultivation of rice in 2007 were 607 thousand rai and the yield 850kg/rai.

▪ Kamphaeng Phet Province had the largest cultivated land 3.1 million rai and 23t/rai yield. *625rai equal 1km^2* **Drivers of trends**: N/A ***Source: Provincial Agriculture Office***
Relevant laws, policies, plans and institutional arrangements:
Problems and issues encountered during data collection:
Summary of main concerns and challenges for the NSEC:
References/sources:
Annexes: Table 1, Table 2

Table 1 Value of agriculture sector (real terms) (Million baht)

Provinces	2000	2001	2002	2003	2004	2005	2006	2007
Chiang Rai	4,231	4,354	4,582	5,310	4,836	4,925	4,740	4,991
Phayao	2,101	1,992	2,179	2,197	2,210	2,326	2,443	2,570
Chiang Mai	5,383	4,875	5,986	6,147	5,179	5,422	5,346	5,812
Lamphun	1,760	1,548	1,633	1,712	1,682	1,644	1,755	1,719
Lampang	1,934	1,903	1,855	2,025	2,007	1,963	2,030	2,157
Tak	1,771	2,303	2,008	2,515	2,830	2,452	2,640	2,947
Sukhothai	3,261	3,614	2,968	4,082	4,070	3,321	3,386	3,691
Phitsanulok	5,256	5,157	4,442	5,332	4,999	5,075	4,995	5,378
Kamphaeng Phet	5,175	5,164	4,813	5,800	5,106	4,695	5,230	5,408
Nakhon Sawan	7,088	7,868	7,102	8,926	8,592	7,867	7,968	8,926
Chai Nat	2,997	3,341	3,550	3,893	3,769	3,686	3,664	3,738
Sing Buri	1,527	1,499	1,535	1,814	1,790	1,746	1,665	1,820
Lop Buri	4,523	4,697	4,567	5,202	4,750	4,637	5,427	5,051
Saraburi	2,236	2,236	2,795	3,276	3,973	3,354	2,833	3,864
Ayutthaya	2,594	3,139	3,187	3,145	3,173	2,897	3,144	2,973
Pathum Thani	1,630	1,866	2,032	1,777	1,830	1,774	1,969	1,952
Bangkok	1,052	1,191	1,339	1,513	1,169	1,153	1,112	1,183

Source: National Economic and Social Development Board

Table 2 Percentage of agriculture sector in provincial GDP (%)

Provinces	2000	2001	2002	2003	2004	2005	2006	2007
Chiang Rai	22.79	23.32	23.27	25.90	23.25	22.63	21.33	21.82
Phayao	26.50	25.26	26.31	26.28	25.35	24.31	25.17	25.58
Chiang Mai	13.20	11.68	13.36	13.39	11.02	11.24	10.61	11.16
Lamphun	5.43	5.53	5.52	5.98	5.58	5.26	4.98	4.53
Lampang	8.88	8.31	7.82	8.46	8.20	7.76	8.02	8.43
Tak	17.43	22.33	19.17	22.58	22.76	19.59	20.06	21.59
Sukhothai	30.37	32.08	27.78	33.81	33.17	28.12	28.23	29.27
Phitsanulok	24.96	26.39	21.81	24.43	23.77	23.50	22.38	22.76
Kamphaeng Phet	29.55	30.65	19.53	16.81	15.47	14.65	14.78	14.49
Nakhon Sawan	29.11	31.11	26.58	29.34	28.03	25.64	25.25	26.86
Chai Nat	29.35	30.26	30.71	34.28	33.78	31.97	30.87	30.82
Sing Buri	19.42	18.57	17.93	19.27	17.99	16.92	15.86	16.76
Lop Buri	12.70	13.86	12.86	14.21	11.94	11.62	13.59	12.28
Saraburi	5.30	5.14	5.45	5.91	6.50	4.83	3.85	5.18
Ayutthaya	1.83	2.28	2.17	1.75	1.65	1.48	1.48	1.29
Pathum Thani	1.89	2.14	2.59	2.11	1.97	1.85	1.61	1.52
Bangkok	0.12	0.13	0.14	0.16	0.11	0.11	0.10	0.11

Source: National Economic and Social Development Board

Economy

Template 4 Industries

Indicator: Types of industries operating in the Thai Provinces along NSEC

Target: N/A

Trends: Agriculture is one of the major industries in the provinces along the NSEC. The main agricultural products produced in the region include rice, maize, sugarcane soy beans and fruits. Factories which use agricultural products as raw material exist in all provinces. These include rice/flour mills, product segregation, tobacco processing and fruit preservation.

Most of these factories are located in the provinces of Chiang Rai and Chiang Mai. Chiang Rai has 1,165 rice/flour mills, 47 product segregation, 27 tobacco processing and 19 fruit preserving factories. Chiang Mai has 905 rice/flour mills, 102 product segregation, 54 fruit preserving and 12 tobacco processing factories. Pitsanulik, Lampang and Najhon Sawan also have a significant number of factories processing agricultural products, with 714, 626 and 639 agricultural factories respectively. Ayutthaya, Pathum Thani, and Sing Buri, have less agricultural factories, 142, 115 and 50 respectively. The capital, Bangkok has 462 a large number of agricultural factories.

Retail and wholesale trade are also a major industry in the region. Other industries include mining, transportation and tourism.

Figures are available in the annex, tables 1 and 2

Drivers of trends: The area is predominantly agricultural therefore in most provinces agriculture is the major industry. However there are provinces such as Sing Buri, Lop Buri and Sarabury have heavier industry since they are located close to Bangkok, the capital, where most industrial activities are concentrated and they serve a large amount of population.

Sources: Provincial Development Plans and Department of Factory Works

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection:

Summary of main concerns and challenges for the NSEC:

References/sources: Provincial Development Plans and Department of Factory Works

Annexes: Table 1, Table 2

Table1 Industry Sectors

Provinces/Industries	Major Industries
Chiang Rai	
Phayao	Agriculture and Fisheries (Rice, Glutinous Rice, Maize, Rubber, Lichie, Longan), Retail and Wholesale Trade, Auto Repairs, and Defense.
Chiang Mai	Services, Public Services, Industries (Food Processing, Agricultural Industry, Transportation and Food and Beverages), Agriculture (Rice, Longan, Lichies, Galic, Onions) and Trade
Lamphun	Industries (Industrial Estates), Agriculture (Longan, Onion, Gallic, Maize, and Mango), Retail and Wholesale Trade.
Lampang	Retail and Wholesale Trade, Mining (cement industry) and Agriculture.
Tak	Agriculture, Forestry, Industry, Retail and Wholesale Trade,
Sukhothai	Agriculture (Rice, Soy Bean, Maize, Sugarcane and Tobacco and Fruits), Industries and Transportation
Phitsanulok	Agriculture (Rice, Maize, Cassava, Livestock and Sugarcane), Retail and Wholesale Trade.
Kamphaeng Phet	Agriculture, Industries and Mining
Nakhon Sawan	Industries (Rice Mills, Farm Machinery, Agricultural Processing and Textile), Retail and Wholesale Trade, Agriculture (Rice, Maize, Soybean, Sugarcane and Cassava)
Chai Nat	Agriculture (Rice, Cassava and Sugarcane), Industries, Retail and Wholesale Trade, and Tourism.
Sing Buri	Industries, Retail and Wholesale Trade, and Agriculture (Rice and Sugarcane)
Lop Buri	Industries, Retail and Wholesale Trade, Agriculture and Livestock.
Saraburi	Industries, Retail and Wholesale Trade, Transportation, Agriculture and Livestock.
Ayutthaya	Industries (Industrial Estates), Retail and Wholesale Trade, Agriculture and Livestock.
Pathum Thani	
Bangkok	

Source: Provincial Development Plans.

Table 2 Number of factories using agriculture products as raw material

Type of factory	Tobacco processing	Product segregation	Oil extraction	Preserved fruit	Rice/ flour mill	Sugar	Total
Chiang Rai	27	47	-	19	1,165	-	1,258
Payao	12	24	-	8	242	-	286
Chiang Mai	7	102	5	54	904	1	1,073
Lamphun	2	84	-	11	242	-	339
Lampang	6	40	2	15	562	1	626
Tak	-	25	1	12	72	-	110
Sukhothai	-	69	1	4	419	1	494
Pitsanulik	-	61	1	6	645	1	714
Kamphaeng Phet	-	53	2	2	199	3	259
Nakhon Sawan	-	96	-	12	526	5	639
Chai Nat	-	45	-	4	129	-	178
Sing Buri	-	7	2	-	40	1	50

Lob Buri	-	39	-	4	126	1	170
Saraburi	-	44	2	4	102	2	154
Ayutthaya	-	29	5	7	99	2	142
Pathum Thani	-	23	3	28	61	-	115
Bangkok	-	28	11	47	370	6	462

Source: Department of Factory Works

Economy

Template 3 Tourism

(Key issue EC2: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development))

Introduction:

Advice to local consultants – this template needs to cover for example:

(i) Figures on tourism (total numbers, duration of stay, money spent etc) including flows between the corridor counties (and from other regions)
(ii) Type of tourism (e.g. backpacker, eco tourism, self drive, gambling etc)
(iii) Policies plans and incentives for increasing tourism
(iv) Project future growth
(v) Tourism attractions and visitation rates

Please consider current state & recent & future trends (including government targets)

Indicator: Number of visitors, length of stay, expenditures and number of trips in the provinces along the NSEC

Target: The Tourism Authority of Thailand and the related industries are in co-operation to promote tourism. They provide information and packages to attract foreign visitors and encourage Thai to travel more.

Trends: In 2005 the total number of visitors to the 17 provinces along the NSEC was 55,246 thousand. In 2006 the number of visitors increased by 7.7% to 59,513 thousand and in 2007 to 60,636 thousand, an increase equal to 1.8%. Since 2005 many provinces along the NSEC experienced a slower growth in the number of visitors while in 2007, only seven of the provinces along the corridor enjoyed a double digit growth rate.

The majority of tourists visit Bangkok. In 2007 Bangkok attracted 35,954 thousand visitors followed by Chiang Mai, Ayutthaya, Lop Buri, Saraburi and Pitsanulik with respectively 5,357, 3,785, 2,990, 2,573 and 2,071 thousand visitors in 2007.

In 2007 the occupancy rate for most of the corridor provinces was less than 50% reflecting the slowing down in tourism. In 2007, the highest occupancy rate was in Pathum Thani, 76.17%, followed by Ayutthaya, 73.64%, Bangkok 67.96% and Saraburi 53.63%.

The statistic reveals that visitors would like to visit most of these provinces more than once a year; the average trips per person in 2007 were 2.2, while they stayed on average about two days, the average length of stay in the corridor provinces in 2007 were 2.2 days.

The mean expenditure per person per day is 1276.2 Baht. In Bangkok the average expenditure in 2007 was 3,197 baht/person/day, higher than the average. In Chiang Mai the expenditure in 2007 was 2,729 and in Chiang Rai 2,516 baht/person/day.

Figures are available in the annex, table 1 and table 2

Drivers of trends: With unsettled political situation, tourism in Thailand is likely to slow down.

Source: Tourism Authority of Thailand

Indicator: Tourism attractions and visitation rates in the provinces along the NSEC

Target: N/A

Trends: The 17 provinces along the NSEC offer a wide range of activities. There are two cultural and one natural World Heritage sites located in Sukhothai, Ayutthaya and Saraburi, respectively. Most tourists visit the region for general tours, shopping tours, entertainment and cultural tours, while other activities include eco-tour and adventure.

Drivers of trends: N/A

Source: Tourism Authority of Thailand

Indicator: Number of visitors and mode of transport from the corridor countries

Target: N/A

Trends: The majority of visitors from the corridor countries come from China, followed by Lao and Vietnam. In 2000 there were 754 thousand visitors from China, 71 thousand from Lao and 45 thousand from Vietnam. In 2007 there were 907 thousand from China, 514 from Lao and 238 from Vietnam. There has been a significant increase in the number of visits from Lao and Vietnam within this period. The major mode of travelling has been air with the exception of Lao which is dominated by road due to long adjacent border with Thailand.

Figures are available in the annex, table 2

Drivers of trends: N/A

Source: Tourism Authority of Thailand

Relevant laws, policies, plans and institutional arrangements:

Problems and issues encountered during data collection:

Summary of main concerns and challenges for the NSEC:

References/sources: Tourism Authority of Thailand

Annexes: Table 1, Table 2, Table 3, Table 4

Table 1 Number of visitors and growth rates (thousand persons)

Provinces	2000	2001	2002	2003	2004	2005	2006	2007	Average growth rate
Chiang Rai	1,123	1,085	1,082	1,053	1,149	1,148	1,333	1,436	
%		-3.36	-0.26	-2.72	9.17	-0.08	16.06	7.80	**3.59**
Phayao	396	412	409	413	440	424	427	419	
%		4.17	-0.88	1.02	6.73	-3.66	0.72	-1.92	**0.83**
Chiang Mai	3,362	3,453	3,461	3,400	3,899	3,998	5,590	5,357	
%		2.71	0.23	-1.76	14.67	2.55	39.84	-4.18	**6.88**
Lamphun		376	348	330	429	589	734	796	
%			-7.45	-5.19	30.13	37.21	24.66	8.48	**13.33**
Lampang	482	487	472	483	525	546	785	744	
%		1.03	-3.10	2.28	8.77	4.03	43.82	-5.21	**6.41**
Tak	574	606	620	632	658	753	821	904	
%		5.73	2.15	2.02	4.11	14.38	9.06	10.09	**6.71**
Sukhothai	681	693	716	640	673	612	633	707	
%		1.72	3.33	-10.65	5.20	-8.99	3.36	11.62	**0.52**
Phitsanulok	1,912	1,941	1,946	1,950	2,046	1,800	1,900	2,071	
%		1.55	0.26	0.18	4.91	-12.00	5.56	9.02	**1.15**
Kamphaeng Phet	245	259	265	277	302	344	354	384	
%		5.79	2.46	4.48	8.79	14.14	2.68	8.53	**6.63**
Nakhon Sawan			607	644	683	674	749	909	
%				6.13	5.95	-1.33	11.26	21.24	**8.40**
Chai Nat			204	213	180	205	221	243	
%				4.32	-15.53	14.21	7.43	10.24	**3.57**
Sing Buri			213	243	250	261	278	313	
%				14.18	2.96	4.29	6.60	12.60	**8.03**
Lop Buri	2,095	2,162	2,232	2,263	2,618	2,784	2,807	2,990	
%		3.20	3.25	1.38	15.67	6.35	0.83	6.52	**5.21**
Saraburi		1,614	1,589	1,650	1,902	2,241	2,467	2,573	
%			-1.56	3.85	15.27	17.83	10.10	4.30	**8.09**
Ayutthaya	2,451	2,802	2,834	2,712	3,024	3,261	3,374	3,785	
%		14.30	1.14	-4.31	11.52	7.83	3.48	12.17	**6.40**
Pathum Thani						767	868	1,051	
%							13.29	20.98	**17.07**
Bangkok	23,276	24,514	26,518	29,304	32,791	34,839	36,172	35,954	
%		5.32	8.18	10.51	11.90	6.24	3.83	-0.60	**6.41**

Source: Tourism Authority of Thailand

Table 2 Length of stay, expenditure, number of trips and occupancy rates in corridor provinces in 2007

Provinces	Length of stay (day)	Expenditure (baht/person/ day)	Number of trip per year	Occupancy rate of established accommodation
Chiang Rai	3.02	2,516	2.10	35.39
Phayao	2.51	936	1.83	24.17
Chiang Mai	3.13	2,729	2.20	42.02
Lamphun	2.08	729	2.53	38.24
Lampang	2.22	1,611	2.31	33.08
Tak	2.21	1,292	1.93	29.87
Sukhothai	1.93	1,084	1.49	44.69
Phitsanulok	2.34	1,233	2.46	40.34
Kamphaeng Phet	1.90	752	2.23	24.71
Nakhon Sawan	1.88	863	2.78	44.12
Chai Nat	1.69	626	1.73	33.63
Sing Buri	1.79	643	1.98	50.98
Lop Buri	2.18	755	1.79	43.99
Saraburi	1.63	735	3.01	53.63
Ayutthaya	2.11	1,308	2.47	73.64
Pathum Thani	1.59	686	1.99	76.17
Bangkok	3.54	3,197	1.99	67.96

Source: Tourism Authority of Thailand

Table 3 Visitors from corridor countries and mode of travel (thousand persons)

Foreign visitor		2000	2001	2002	2003	2004	2005	2006	2007
Laos	**Total**	71	82	91	101	112	204	276	514
	by air	9	9	8	9	11	13	13	15
	by land	57	65	71	81	91	172	237	485
	by boat	5	8	12	11	10	19	26	14
Vietnam	**Total**	45	68	84	118	136	179	227	238
	by air	40	56	70	104	111	113	132	103
	by land	3	7	10	9	17	48	65	115
	by boat	2	4	5	4	8	19	30	20
China	**Total**	754	801	798	607	730	777	949	907
	by air	748	793	789	596	719	764	929	878
	by land	3	3	5	7	6	9	14	19
	by boat	4	5	4	5	4	4	6	10

Source: Tourism Authority of Thailand

Table 4 Visitors' activities (percentage)

	General tour	Shopping tour	Adventure	Water related	Eco-tour	Health related	Sport related	Entertainment	Cultural tour	Other
Chiang Rai	87.16	21.39	5.04	2.42	3.67	4.57	1.63	4.38	19.57	16.56
Phayao	89.37	21.14	3.41	1.82	2.16	3.32	2.15	2.49	12.43	12.14
Chiang Mai	80.21	39.83	13.95	7.65	9.07	7.53	5.10	15.32	17.68	14.57
Lamphun	65.54	36.90	18.89	15.98	3.00	7.45	1.43	10.15	18.55	27.93
Lampang	80.95	24.06	4.81	4.49	9.69	4.12	4.73	8.95	20.11	22.40
Tak	78.12	8.61	11.46	2.13	3.29	1.76	1.81	2.17	7.79	15.26
Sukhothai	82.29	15.98	3.34	2.57	5.16	4.04	3.95	3.11	33.08	8.85
Phitsanulok	77.26	8.35	3.79	1.20	2.51	2.82	3.76	24.50	16.94	12.27
Kamphaeng Phet	83.71	7.43	4.13	2.12	2.00	2.07	1.05	3.07	23.72	6.44
Nakhon Sawan	76.13	16.81	2.19	2.70	4.46	3.45	1.65	7.80	6.07	16.58
Chai Nat	90.06	23.35	1.96	1.14	10.02	0.00	0.00	8.85	6.10	16.51
Sing Buri	81.27	23.15	0.00	0.16	0.04	0.06	0.00	0.00	13.44	76.24
Lop Buri	71.71	19.01	2.13	1.30	2.59	0.89	1.09	8.08	31.75	29.95
Saraburi	93.74	38.32	2.37	1.73	18.39	1.18	0.44	0.77	24.99	19.24
Ayutthaya	72.89	40.22	4.08	2.38	6.17	8.06	1.39	15.06	30.63	23.12
Pathum Thani	74.56	12.10	2.08	1.21	1.71	7.94	2.13	10.19	14.64	31.41
Bangkok	89.33	50.70	0.00	2.00	0.00	11.79	4.25	22.52	23.78	15.81

Source: Tourism Authority of Thailand

Economy

Template 2: Transport and Trade

(Key Issue EC2: Complementary economic development among countries: Agriculture, tourism, trade & industry (sector development))

Key issue EC4: Limited and inequitable trade in goods, services, FDI and movement of people (information division, health, education, logistics, culture))

Introduction:

Advice to local consultants – this template needs to cover for example:

Transportation:

(i) Status of the corridor - are all roads built? What is the specification of the roads
(ii) Future plans to upgrade roads (medium and long), eg by passes
(iii) Status of the railway and future plans
(iv) Status river transport and future plans
(v) Status air transport and future plans
(vi) Computer models of future traffic flows / trade flows
(vii) Interchanges road, rail, water and air

Trade

(i) Existing and projected trade flows and routes between the corridor countries (Excluding Vietnam)
(ii) What are main commodities and products
(iii) Policies and incentives to increase and control trade

Please consider current state & recent & future trends (including government targets)

Indicator: Status of the corridor

Trends: The 4 -lane major route along the corridor construction is under the supervision of the Department of Highways. The construction plan along the corridor provinces 5 routes to be all completed by 2009 with total highway length 508km.

Route	Year	Length (kilometer)
Saraburi - Nakhon Ratchasima	2007	156
Bangpa-in (Ayuthaya) -Saraburi	2008	43
Bangpa-in (Ayuthaya) - Ang Thong	2009	60
Lampang – Lamphun – Chiang Mai	2009	99
Saraburi - Bangpakong	2009	150

Source: Department of Highways

Furthermore, some existing intercity highways from Nakhon Sawan, Pitsanulok, Tak, Sukhothai and Saraburi shall be upgraded to four-lane traffic during 2006 and 2010.

Drivers of trends: N/A

Indicator: Road, rail, waterway, and civil aviation transport capacity in the corridor provinces

Target: N/A

Trends: Transportation of commodities in Thailand is dominated by road. In 2005 road transportation

accounted for 87% of the total transportation; the remaining 13% was via waterway, rail and air.

Road: In 2005, the road network in Thailand covered almost one 100,000 km under the responsibility of three different agencies. The 4 -lane major route along the corridor is under the Department of Highways supervision.

Road network in 2005	**Length (km)**
Department of Highways	51,777
Department of Rural Road	44,000
Express way network in Bangkok Metropolitan	207

Source: Department of Highways

Rail: Rail is another important mode of transportation not just for commodities but also for passengers. In 2004, approximately 46 million passengers traveled by rail. The Thai rail network covers 4,180 km connecting 46 provinces. Out of the 17 Corridor Provinces, 9 are serviced by the rail network; these include Chiang Mai, Lamphun, Lampang, Pitsanulok, Nakhon Swan, Lob Buri, Sing Buri, Ayutthaya, Pathum Thani and Bangkok.

State Railway of Thailand	**2000**	**2001**	**2002**	**2003**	**2004**
Passenger (in thousand persons)	53,973	52,081	51,009	48,607	45,942
Cargo (in thousand tons)	9,171	8,776	8,889	10,521	12,883

Source: Center of Information Technology and Communication

Waterway: Within the corridor provinces, there are two river routes: Chopraya River and Makong River. Chopraya River runs from Aytthaya to Bangkok and then to the Golf of Thailand. Makong River runs along the Thai border. In Chiangrai, there are two ports for the river transportation among the corridor countries. The first port is Chiangsan, which can dock in total 8 100-ton gross and 11 300-ton gross ships. The other is Chiangkhong which can dock up to 3 100-ton gross ships. Within the first 6 months of 2005, Chiangsan Port's monthly operation showed a significant increase compared to 2004, both in boat, cargo and passenger movement.

Chiangsan Port's operation	**2004**		**2005**	
	12 months	**monthly**	**6 months**	**monthly**
Boat movement	1,700	141	1,128	188
Cargo inbound (ton)	21,991	1,832	20,130	3,355
Cargo outbound (ton)	52,423	4,368	54,130	9,012
Passenger inbound	1,418	118	1,945	324
Passenger outbound	663	53	497	82

Source: Port Authority of Thailand

Aviation: There are nine airports in seven corridor provinces. Chiang Rai, Chiang Mai and Bangkok – Suvarnabhum airports are the three international airports. The opening of the Bangkok-Suvarnabhum international airport in 2006 lead to a significant shift to the number of flights, passengers and cargo (ton) movement from the Don Mueang airport which was the major international airport until then. In the two other international airports in the corridor provinces, Chiang Rain and Chiang Mai, there was also a slight increase in the number of passengers and the aircraft movement between 2006 and 2007 while cargo movement

significantly decreased.

Airports along the corridor	Aircraft movement		Passenger		Cargo (ton)	
	2006	2007	2006	2007	2006	2007
Chiang Rai	5,600	6,822	687,768	754,460	4,309	2,741
Chiang Mai	24,951	26,967	3,205,396	3,263,387	26,099	22,869
Lampang	1,627	1,573	52,300	44,424	29	32
Tak -Tak	0	0	0	0	0	0
Tak - Mae Sot	1,267	930	0	30	0	0
Sukhothai	1,813	1,295	32,021	35,154	0	0
Phitsanulok	18,989	18,084	178,584	155,266	415	381
Bangkok -Don Mueang	212,354	51,116	30,127,849	4,803,313	874,807	22,753
Bangkok -Suvarnabhum	74,251	261,592	10,888,180	39,540,933	297,921	1,209721

Source: Department of Aviation

Indicator: Value of trade with the corridor countries through Chiang Rai

Target: With regards to trade, the Thai Government aims to integrate the Thai economy as part of a powerful global economy, targeting on the development of a global marketing network, which are able to respond to the rapidly changing consumer needs.

Trends: In 2007, the total value of exports was 5,242 billion baht and the total value of imports was 4,870 billion baht, with a positive trade balance of 372 billion baht. Despite these figures, Thai international trade has been slow down from 27.67% in 2000 to 2.35% in 2007. Trade with the corridor countries has been expanding steadily. In 2007, total trade with China was 1,075 billion baht, with Laos 61 and with Myanmar 114 billion baht.

China: In 2007 the trade with China through Chiang Rai accounted for about 1% of the total trade with China. The total value of exports to China through Chiang Rai was 5,225 million baht, and the total value of imports from China through Chiang Rai was 1,001 million baht. The top traded items in terms of value with China through Chiang Rai were agricultural products and consumption goods. Exports also included machinery and equipment, electrical appliances, gasoline and lube, while imports included chemical products, processed timber and wood products, machinery and equipment.

Laos: In 2007 only 3% of the total exports to Laos (1,374 million baht) and 6% of the total imports from Lao (910 million baht) were through Chiang Rai. The main export to Laos through Chiang Rai was agricultural products (209 million baht) followed by construction materials (196 million baht) and consumption products (133 million baht). Other exports included food and beverages, fuels and trucks. Imports from Laos included lignite (247 million baht), processed timber (162 million baht) and heavy trucks (149 million baht). Other products included machinery and equipment and some types of fruit or other agricultural products.

Myanmar: In 2007, the trade with Myanmar thru Chiang Rai accounted for about 4 percent of the total trade. ***About 11% of total export to Myanmar was through Chiang Rai while only 1% of the imports from Myanmar was through Chiang Rai.*** The top export item in terms of value, was miscellaneous products (1,194 million baht) while the top import item from Myanmar through Chiang Rai was teak. Other import

products included liquor, oranges, garlic and cattle, while exports included consumption and agricultural products, fuel, tyre and iron sheet.

Drivers of trends: N/A

Sources: Office of International Trade and Chiang Rai Custom Check Point

Relevant laws, policies, plans and institutional arrangements:
The Government strategy on international trade policy is as follows:

Trade in Goods and Services

(1) Support and promote helping resolve trade obstacles overseas.
(2) Develop and promote Thailand as a centre for trade in goods and services in the region as well as a centre for international exhibitions.
(3) Promote e-commerce to create opportunities for entrepreneurs in accessing the global market by expeditiously pushing forward measures and legislation essential for the conduct of e-commerce.
(4) Accelerate measures to improve the administrative efficiency of the agencies concerned, both within and outside the country, in order that they may carry out their duties in supporting and promoting exports, whether in terms of marketing, providing information or event unfair exploitation of tourists, and take effective measures to eliminate the difficulties faced by tourists.

International Economics
(1) Support free trade in the international arena, taking into full consideration the level of preparedness and national interests of the country as well as the interests of domestic entrepreneurs. Push for the amendment and revision of laws that pose an obstacle to the Thai private sector in international trade competition.
(2) Emphasize a proactive role in the international trade and economic arena. Push for the holding of negotiations in the international arena, based on the principles of justice and bearing in mind the interests and limitations of developing countries.
(3) Support and advance the free trade policy of the ASEAN Free Trade Area. Promote trade and investment with neighboring countries as well as border trade. Promote the development of Thailand into a base for the production of goods and the provision of services in the region.
(4) Promote and support entrepreneurs from the private sector to play a part in providing trade and investment data as well as in analyzing the possible impact brought about by international trade and investment regulations. This would be of benefit in setting the directions and strategy of Thai foreign policy as well as international trade and investment negotiations.

Problems and issues encountered during data collection:

Summary of main concerns and challenges for the NSEC:

References/sources:
Ministry of Transportation
Department of Highways
Center of Information Technology and Communication
Port Authority of Thailand, Department of Aviation
Ministry of Commerce with Custom Department cooperation

Ministry of Commerce with Custom Department cooperation Office of International Trade Chiang Rai Custom Check Point
Annexes: Table 1, Table 2, Table 3

Table 1 Cargo transported by mode (thousand tons)

Mode	1999	2000	2001	2002	2003	2004	2005
Road	392,244	397,976	400,241	434,918	440,018	435,147	430,275
Rail	9,264	9,171	8,776	8,893	10,521	12,883	8,200
River	17,910	25,235	17,833	25,043	25,839	26,825	29,630
Coastal	21,970	23,347	19,657	24,795	22,941	25,862	25,625
Air	56	57	66	56	54	53	39
Total	**441,444**	**455,786**	**446,573**	**493,705**	**499,373**	**500,770**	**493,769**

Source: Ministry of Transportation

Table 2 International trade and growth rate

Year	Trade (million baht)				Growth rate (%)			
	Total	Export	Import	Trade balance	Total	Export	Import	Trade balance
2000	5,262,197.9	2,768,064.8	2,494,133.1	273,931.7	27.67	25.01	30.76	-10.73
2001	5,633,665.5	2,884,703.9	2,748,961.6	135,742.3	7.06	4.21	10.22	-50.45
2002	5,698,833.5	2,923,941.4	2,774,892.1	149,049.2	1.16	1.36	0.94	9.80
2003	6,464,406.0	3,325,630.1	3,138,775.9	186,854.3	13.43	13.74	13.11	25.36
2004	7,674,756.1	3,873,689.6	3,801,066.6	72,623.0	18.72	16.48	21.10	-61.13
2005	9,192,715.6	4,438,691.0	4,754,024.6	-315,333.6	19.78	14.59	25.07	-534.21
2006	9,880,294.8	4,937,372.2	4,942,922.5	-5,550.3	7.48	11.23	3.97	98.24
2007	10,112,149.2	5,241,962.8	4,870,186.4	371,776.3	2.35	6.17	-1.47	6,798.31

Source: Ministry of Commerce with Custom Department cooperation

Table 3 Total trade with the corridor countries (million baht)

Year	Trade	China		Laos		Myanmar	
		Value	Growth (%)	Value	Growth (%)	Value	Growth (%)
2003	Total trade	487,129	33.72	23,213	9.99	55,411	4.83
	Import	251,071	18.59	4,297	7.12	37,213	-4.39
	Export	236,058	54.70	18,916	10.66	18,198	30.59
	Trade balance	**-15,014**	**-74.60**	**14,619**	**11.75**	**-19,016**	**-23.9**

2004	Total trade	615,317	26.32	27,993	20.59	78,845	42.29
	Import	329,632	31.29	4,611	7.31	54,519	46.51
	Export	285,616	20.99	23,383	23.61	24,327	33.68
	Trade balance	**-43,946**	**192.70**	**18,772**	**28.41**	**-30,192**	**58.77**
2005	Total trade	816,322	32.67	40,091	43.22	100,296	27.21
	Import	448,917	36.19	9,125	97.90	71,913	31.90
	Export	367,405	28.64	30,965	32.43	28,382	16.67
	Trade balance	**-81,512**	**85.48**	**21,840**	**16.34**	**-43,531**	**44.18**
2006	Total trade	967,502	18.52	58,473	45.85	117,557	17.21
	Import	521,524	16.17	19,753	116.47	88,708	23.35
	Export	445,978	21.39	38,720	25.04	28,849	1.65
	Trade balance	**-75,546**	**-7.32**	**18,968**	**-13.15**	**-59,859**	**37.51**
2007	Total trade	1,074,817	11.09	61,479	5.14	113,974	-3.05
	Import	564,566	8.25	16,295	-17.51	80,031	-9.78
	Export	510,251	14.41	45,184	16.69	33,043	14.54
	Trade balance	**-54,315**	**-28.10**	**28,889**	**52.30**	**-46,988**	**-21.50**

Source: Ministry of Commerce with Custom Department cooperation