SESSION 5: RESPONSES TO CHALLENGES OF THE NEXT DECADE IN THE GMS
Group Discussion Reports – Day 2
A. Food Security
B. Land, Water, and Climate Change
C. Energy
D. Private Sector - Emerging Role
On Day 2, the thematic groups focused on the following three questions:

i. What are the key policy responses needed and by whom?

ii. What are the key data, information, and knowledge responses?

iii. What are key institutional responses, both at sector and regional levels?

A. Food Security Thematic Discussion Group

As key policy responses were already dealt with in the Group’s Report to the Plenary on Day 1 (Session 3), the discussion was on key issues relating to food security, foreign direct investments coupled with land tenure, regional agricultural research, and hydropower impacts on fisheries.

Food Security: It was suggested that regionally ASEAN +3 should be the platform for food security issues as its members comprise both food exporting and food importing countries. However, the ASEAN Secretariat has limited resources to carry out activities and the GMS is seen as a dynamic region that can work effectively on food security through cross-border trade. Food security is not just about quantity but also about access and food safety. According to the FAO definition, food security is about access and affordability and about having enough to eat today and being confident to have enough for tomorrow. Compared to five years ago, more people feel food insecure today. International food prices are again rising as they did in 2008; and some policy responses undertaken then were not always very helpful. Especially in urban areas, as rural-urban migration continues, poor people need sufficient purchasing power (affordability) to buy food. Are GMS governments prepared to tackle this dimension of food insecurity, which could be exacerbated in times of crises? The new GMS Strategic Framework underlines the importance of developing backward and forward linkages. At a national level, the Lao PDR, Thailand, and Viet Nam are food secure but pockets of food insecurity remain. Hence, there is a need to improve purchasing power. In this way, people who do not own land to produce their own food or who have migrated to the city can be empowered to find other non-farm occupation to earn an income and buy food. The idea of food self-sufficiency was seen by some as an inefficient way of tackling food security. There is a need for reducing market interference, but at the same instruments like buffer stocks and funds to finance short-term measures have been known to respond to food price crises in the region.

Foreign Direct Investment (FDI): On the question whether smallholders and workers can benefit from foreign investments without being overexploited, the general response in the group was that governments should be careful with foreign investments as there is a danger of land grabbing. Thus, foreign investment deals relating to land for agricultural production need to be well structured and designed with institutional oversight that ensures existing security of land for the poor who depend on it for their livelihood. International agricultural partnerships will add significant risk leading to local marginalization (making the poor very vulnerable) unless government protects the people and domestic interests. There are many examples of countries that have suffered from similar situations, e.g., Mongolia, which is having problems at the domestic level with large-scale partnerships because these affected the livelihoods and the interest of the poor. In general, however, governments need to regulate domestic investors as well, who have long-term investments on the land; in many cases foreign investors go through domestic entities for investing in the land. It is important to strike a balance in allowing FDI that offers investments in technology and know-how with an institutional regulatory framework that protects vulnerable and poor groups. Insecurity of land tenure is a significant issue in some countries of the GMS. For instance, farmers cannot use land as collateral and are chased off their land without adequate compensation by private interests, which are granted concessions.

Regional Agriculture Research: It was suggested that there was need for a “regional center of excellence in agricultural research” in the GMS, which is equipped with up-to-date technology and can handle bio-informatics, genetic research, and biosafety, and contribute to harmonizing food safety and phytosanitary standards. It was also suggested that such a center could be hosted in Thailand as long as it had a “subregional or regional character.” In recent years, commitment to agricultural research has dropped in the GMS countries and private investments in agricultural research are not complementary. Countries may be exploited by having to depend largely on multinational companies; there should be collective action among the GMS countries to avoid this kind of exploitation. Hence, public investment is important and should go together with the private sector to avoid marginalization of smallholders. There could be synergy between ASEAN and GMS in such a venture making it important and beneficial. However, there was
also disagreement in the group about setting up such a regional center, as many countries like the PRC and Viet Nam are quite advanced in agricultural research. It was felt more important to network these research centers and provide mentoring and strengthening of the national research centers. Organizations like IFPRI already have regional offices. So it will be better to strengthen these facilities and establish a well-functioning network rather than create a new regional center.

Fisheries: In general, it is recognized that hydropower (big or small) will have an impact on fisheries. Viet Nam has been successful in segregating fisheries and other agricultural activities from hydrological development, but most of these strategies were not done in close proximity and the social groups benefiting may not have been the poorest groups. In Myanmar, as fisheries are mostly subsistence, hydropower development will have impacts, such as structural impact, loss of species, changes in sediment flow, nutrient flow, etc. There is a possibility of minimizing these impacts, but large hydropower dams will have big impacts; cost-benefit analyses will be important. It is essential to look at fisheries as a critical component in the food security equation of local people; loss of access to capture fisheries without any substitute affects nutrition and livelihoods. The “full values” of fisheries have not been determined. This kind of valuation is important because it also takes into account employment generation in sector.

B. Land, Water, and Climate Change Thematic Discussion Group

Key Policy Issues
The discussions resulted in identification of three key policy issues that needed attention in the GMS:

- Integration and harmonization of water resources across sectors
- Mainstreaming drought, flood, and sea level rise in national planning
- Land tenure and benefit sharing mechanisms.

Integration and Harmonization across Different Sectors: It is essential that different sectoral agencies are coordinating and working together. There should be more integration within existing institutions in the countries to bring about synergy among various ministries and cut through ‘silo’ thinking, as water resources are crucial for many sectors and sustainable growth and development. Governments and owners of reservoirs need to have very clear water allocation and sharing rules; for example, in many countries the owner of a reservoir manages it for a single purpose, not integrated purposes. Legislation and clear rules might be needed on how to optimize reservoir management for several purposes. Regarding agriculture, fishery, and forestry, adaptation toward drought and flood management and disaster risk reduction (DRR) has to be mainstreamed into all development policies. Integration will lead to optimal use of water resources for agriculture, fisheries, livelihoods, water supply, and power generation. For example, northeastern Thailand is using 100% of its water resources locally for agriculture and power generation using weirs and dams, leaving little fish migration between the main stem of the Mekong River and that area. Yet, capture fisheries production there is the highest in the basin and the annual capture fish production is reported to be higher than even in Tonle Sap in Cambodia. This has to do with an integrated system of canals, drains, rice fields, and ponds. The devastating floods of 2011 in Thailand have again underlined the need for closer coordination and integrated planning and management of water resources. The Lao PDR is taking a basin-level integration approach in setting up basin management committees.

Mainstreaming Drought, Flood and Sea Level Rise: Two types of hydrological changes are taking place: human-induced change by operation of hydropower dams and uncontrolled changes that are expected through climate change. There is a need to distinguish between the two because the timeframe for these changes is quite different; hydrological changes due to hydropower development will happen within 4–5 years of dam construction and commissioning; changes due to climate change are longer term: 20–40 years; management of land and water resources needs to be cognizant of these two perspectives. There is an urgent need for management of drought, flood and sea level concerns. Flooding is a serious problem now and there is an urgent need to address floods given Viet Nam’s and Thailand’s vulnerability to sea level rise. All sectoral strategies or national development plans should aim to mainstream these considerations (drought, flood, sea level rise) in their planning with adequate resources in terms of budgeting for implementing mainstreaming actions at the operational levels. These actions are usually context specific; in a policy document it is easy to mention them; but in terms of budgeting and implementation, it is more challenging to reflect climate change impact. In the Pilot Program for Climate Resilience in Cambodia, government is trying to see how the budget at national, provincial, and
commune levels can really reflect considerations for coping with climate change impacts. We have to go forward step by step. Kiribati has mainstreamed options at four levels: what can be done by communities, by local governments, by national government, and through international assistance. Each sector has prioritized interventions and the government has made these actions mandatory within a legislative framework. Once local governments have identified an action that can be undertaken, all local governments are required to take that action. There are many ways to implement and there is no single prescribed route.

**Land Tenure and Benefit Sharing:** There is talk of mainstreaming land use but there is weak land tenure that does not provide security or title to smallholders. In some countries, an adequate legal and regulatory framework for land use is lacking. In the context of land access and natural resources, there is a need to find technical ways to secure access to land and natural resources for smallholders. Viet Nam provides land use rights; Cambodia is investing in rural land registration and granting private ownership. With land tenure also comes the issue of benefit sharing. Mechanisms for sharing benefits from hydropower schemes are inadequate, although productive use of such revenue can enhance productivity and sustainability. In Viet Nam, a decree stipulates use of a small portion of revenue from hydropower operations for watershed and forest resource protection by communities. This needs to be further explored and institutionalized within a basin management approach.

**Key Data, Information, and Knowledge Responses**

The MRC has a vast library covering over 50 years of research; there is a portal that allows access to data and there are other databases that may not be well known; a lot of information is available. For example, ground water information was researched and data collected in 1970s, 1980s, and early 2000s; there may not be most recent updates but the data could form a basis to update. Information on hydrological acceleration and hydropower development is available on a number of basins; missing, however, are accurate and comprehensive data on fisheries. Research can be promoted by providing incentives to national universities and national institutes to focus on issues beyond agriculture. However, there is a reluctance to share data. Ministries hesitate to release good data. Technical agencies realize that fundamental water monitoring data relating to surface water are essential for reliable forecasting; there is a need to invest in management information systems, research, and data gathering, but central agencies may be reluctant to undertake such investment. A data clearinghouse within the GMS would be useful, which can list existing information, provide easy access to data, and network with other data holding institutions in the region. There are still areas that need further research—not only fisheries, but also vulnerability assessments, climate change impacts, and ecosystem services from forests, watersheds, and wetlands.

**Key Institutional Responses**

**River Basin Approach:** Basin-level integration and establishment of basin organizations is now being pursued by the Lao PDR. The Nam Ngum River Basin organization has been recently established and this process will expand to other river basins in the Lao PDR. However, there is a need to link basin initiatives with national water resource use objectives. Having a central institution to follow up what is happening in the basins is important because at the district level, national goals seem to dissipate. There needs to be stronger intersectoral coordination, and ADB and other development partners could support this process. Translation of data into decision making is still weak. In the Lao PDR, investments in water resources are ongoing but assessment, monitoring, and project management capacity are weak or lacking.

**GMS-wide Working Group:** At the initiation of the GMS Economic Cooperation Program, water resource related issues were expected to be covered by the MRC. The reality is that the Mekong River is only one of many river basins in the GMS and the MRC mandate does not allow it to work outside the Mekong basin. Furthermore, the MRC covers the lower Mekong basin leaving out two countries of the upper Mekong basin. It was suggested that a GMS-wide working group on water be established for integration and harmonization across different sectors. But this was rejected. It is an institutional mechanism that has been examined and proposals have been made and the GMS members have decided that is not an approach they want. However, there is a need for GMS arrangements and the different working groups to address water as a development issue because it does impinge on agriculture, environment, transport, and hydropower. Water is a cross-cutting issue that impacts on all developmental aspects. Yet, the prospects of establishing a GMS working group on water in the foreseeable future are dim. Another idea is to establish a GMS working group on climate change, which would integrate issues all across different working groups and must include water. Given the situation that it will be
difficult to establish any kind of new working group in the GMS, it was suggested that there could be a GMS strategy or vision statement on water. There is a GMS Transport Strategy and Economic Corridor Forum and strategic action plans but there is none on water transport, including navigation. A clear vision and strategic framework exists covering overall development, but a green economy vision is also missing.

**Capacity Building:** Private sector operations will increasingly gain in importance and the public–private partnership (PPP) model will gain strength. However, private participation in infrastructure development, such as hydropower, is financially more rewarding than water provision. PPP could play a role in the Lao PDR on maintenance of roads, especially through hydropower and mining investments. Pure PPP in the road sector in the Lao PDR is difficult because of low traffic volumes; but road maintenance contracts to hydro and mining concessionaires are an attractive proposition, which may have some poverty alleviation impact through employment generation. Capacity building through PPP ventures needs to be explored. Identifying champions and promoting the concept of leadership is important. In this context, the Network of Asian River Basin Organizations has recently established a leadership program, in which Indonesia and Malaysia are making their water champions available to other countries to learn how they are implementing river basin management. Institutional capacity for assessing investments, decision making, and appraisal for investments is needed. Also needed are strengthened capacity for proper economic analysis and proper project management capacity to handle concessions in forestry, mining, irrigation, and agriculture, and to oversee private participation.

**Transboundary Cooperation:** Apart from the Mekong River basin, the Red River basin, with 40% of the water coming from the PRC, needs to address such issues as regulation of seasonal water flows in the dry season and during droughts, and pollution control that requires transboundary cooperation between the PRC and Viet Nam. Currently, there is no agreement on data sharing or any sort of cooperation between the two countries on the management of the water resources of the Red River.
## C. Energy Thematic Discussion Group

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<th>Key Institutional Responses (sector)</th>
<th>Key Institutional Responses (regional)</th>
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<tbody>
<tr>
<td>Energy policies need to be focused and long term</td>
<td>Assess effectiveness of current energy policies</td>
<td>Ministries of energy</td>
<td>Resources (fossil fuel, renewables) data – mapping, lack of information</td>
<td>Sectoral (energy, transport, industry, etc.) agency efficiency improvements</td>
<td>RPTCC, subregional energy forum</td>
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<td>Internalize environmental and social costs in PDP</td>
<td>Ensure that important stakeholders understand EIA, internalize environmental &amp; other impacts</td>
<td>Relevant ministries (e.g. energy, environment), project developers, civil society</td>
<td>Valuation of ecosystem services Resource information Cost-benefit analysis</td>
<td>Energy, water, forestry, agriculture, rural development Use existing EIA process especially at the policy level Consider SEA</td>
<td>MRC, RPTCC, SEF, Working Group on the Environment, GMS EOC, ASEAN (ASOEN, Energy Center)</td>
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<td>planning</td>
<td>Legislation supporting SEA (cf. case of VN)</td>
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<td>Corporate Social Responsibility (CSR) policies</td>
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<td>Ensure social, economic, and environmental feasibility of projects, including conduct of EIAs NAMAs</td>
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<td>Energy efficiency/ DSM should be considered in PDP</td>
<td>Review PDP</td>
<td>Relevant ministries (e.g. energy, industry, trade/commerce, construction, transport)</td>
<td>Efficiency ratings/standards, labeling, incentives (e.g. rebates) Conservation supply curve (McKinsey Industrial efficiency agreements between governments</td>
<td>All sectors</td>
<td>IEA, Knowledge sharing with ASEAN+3, GMS Authority, Asian Environmental Compliance Enforcement Network</td>
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<td>Legislation (e.g. building codes, industrial/applied standards Off-grid electrification)</td>
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<td>Maximize the participation of civil society in pushing for energy reforms</td>
<td>Increased consultations with civil society Involvement in EIA policies including health issues</td>
<td>National governments</td>
<td>Project knowledge (i.e., EIA, social safeguards reports, etc) Transparency Least-cost modeling Economic and social costs</td>
<td>Websites Government to fund local civil society organizations to disseminate information Independent regulators</td>
<td>ADB and development partners Regional media</td>
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<td>Energy sector planning should be harmonized with water resources planning</td>
<td>IWRM strategy</td>
<td>Relevant ministries (e.g. energy, water resources, meteorology, hydrology, planning and investment, irrigation, fisheries, agriculture)</td>
<td>Water input analysis</td>
<td>energy, water resources, meteorology, hydrology, planning and investment, irrigation, fisheries, agriculture</td>
<td>GMS Agriculture and Environment MRC</td>
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<td>Increased coordination with water authorities</td>
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<td>Regional water quality monitoring</td>
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<td>Current water policy practices</td>
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<td>Establish water quality standards</td>
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<td>Biofuels: countries should provide clear guidance on how this industry is to be developed and managed</td>
<td>Review potential for biofuels and provide guidance for biofuels development</td>
<td>Relevant ministries (e.g. agriculture, energy, transport, science, and technology)</td>
<td>Market demand for biofuels</td>
<td>Relevant ministries (e.g. agriculture, energy, transport, science, and technology)</td>
<td>ASEAN</td>
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<td>Subsidies for biofuels should not create negative impacts on land and food security</td>
<td>Renewable fuel standards</td>
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<td>Requirement for water, land, other resources</td>
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<td>Resource/land use mapping</td>
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D. Private Sector - Emerging Role

Kewal Thapar, Consultant, ADB and Facilitator: I would like to set the broad framework as to what the role of the private sector can be and the increasing emphasis that is being laid by the Asian Development Bank and by other multilateral agencies and governments on private sector participation. We live in a turbulent world, especially the financial world, and public financing for projects is slowly drying up. We can see this happening in Europe and the USA and the fallout is also witnessed in these regions. Private sector participation and funding therefore become a very important aspect of project financing, especially environmental and projects in sustainable development. We will hear today from Mr Tak Sriratanobhas, Vice President, Project and International Trade of the Mitr Phol Group and Acting Managing Director, Petro Green Company Thailand, about how they have created the sugar distribution chain and the supply management system, and how this is to be sustainable.

Mr Tak Sriratanobhas, Vice President, Mitr Phol Group, Thailand: I do not have a fancy presentation today but we have an information brochure available for participants. Our sugar mill is just 50 years old, formed by sugar cane farmers in Thailand; it grew quite fast over the last five decades. When you hear about sugar mills, you probably think about water pollution, waste, dumping of molasses and waste water, and smoke from burning bagasse; but we are entering into a new era of the sugar industry. Sugar is not only the sweetener; it is comprehensively used in the food supply chain. Our mill is Thailand’s largest sugar producer and the second largest in the PRC through its joint venture company East Asia Sugar. In addition to Thailand and PRC, Mitr Phol has operations and investments in Cambodia, the Lao PDR, Viet Nam, and most recently Australia. Its key business units include sugar, ethanol, biomass energy, fiberboards, logistics and paper. Mitr Phol works from the plantation fields right up the production line to the sugar on the table; but along the way we have utilized all the by-products. I do not want to use the term “waste” here and prefer to use the term “by-product” and we maximize and create the value chain of the by-product. When sugar cane is delivered by the farmer to the mill, we separate the juice from the fiber known as bagasse. In the past, bagasse was burned and poorly generated electricity to the turn the steam turbine just enough to operate the sugar mill. We are now using an improved model with high pressure for the boiler and turbine in a closed system with a scrubber that collects all the dust for re-use and only steam evaporates through the chimney; this tripled the generation of power output leaving us with a surplus of power that we can export to the local grid or communities. We can generate from 5,000 tons of cane crushed about 15 MW of electricity of which 6-7 MW are used by the plant and the rest is sold to the Electricity Generating Authority of Thailand (EGAT), which it sells to the community. The plant in Khon Kaen supplies 50 MW of electricity to the city and most of the household in Khon Kaen are using electricity generated from the sugar mill. Apart from generating electricity from bagasse, we use some of it to produce particle board that can substitute use of wood. In our investments in Guangxi in the PRC, we produce pulp and paper from the fiber/bagasse although the quality of the paper is not that of office stationary; it is more like cardboard paper. In the past, the residue from processing the sugar cane syrup called molasses was dumped in the river contributing to pollution; today, molasses is no more a waste product as it is converted into ethanol, while the by-product of filtering the sugar leaves behind the filtering cake, which is rich in micro nutrients, is used as fertilizer in the sugar cane fields. In the process of refining ethanol, we get vinessse, which can be used as a liquid fertilizer, enriching the soil nutrients or recycled in the power plant boiler.

Besides creating the value chain of by products from sugar cane processing we are also concerned about limited land availability. Usually the argument from anti-biofuel advocates is that ethanol production competes with staple food production. I must counter this argument because we are extracting ethanol from the by-products of sugar cane, which is a food item needed by society and the ethanol production can be attributed to the same amount of land as the sugar cane output, retaining food as well as producing energy from the molasses. Mitr Phol has also set up research and development facilities to increase yield from sugar cane varieties so that less land can be used for increased output for the farmer. Basically in Thailand, the output of sugar cane is about 8-9 tons per rai (6.25 rai in 1 ha) or about 50 tons from 1 ha; Mitr Phol is promoting varieties that can yield up to 12 tons/rai or 75 tons per hectare, using rai irrigation project and organic materials as fertilizers. Current experiments are showing an output up to 20 tons per rai, (175 tons per ha), double of the current average productivity, which is our goal in the future provided there is efficient use of inputs. Last but not least, we put in a lot of effort in the community and we provide lot of support in irrigation, ponds for water and aquaculture, home gardens, and other livelihood activities supplementing their incomes. So that is a brief presentation of Mitr Phol’s zero waste and environmentally
Balancing Economic Growth and Environmental Sustainability

friendly production with contribution to community and social responsibility.

Kewal Thapar, Facilitator: Thank you very much Mr Tak. What we have heard in this session is a real life experience, a real life product, an integrated, sustainable development project that has all the elements we would like; you have got corporate social responsibility, profits, and returns commensurate with market levels; you have got an example that is replicable. Mitr Phol has actually done investments abroad. Congratulations. Now we can move on to Dr Khaing, who will speak on public-private partnership in Myanmar. We have heard in the morning about the growth of Myanmar and the fact that hotel rooms are not available to accommodate all the investors and visitors. So let us hear about the role of the private sector in Myanmar and how that can develop.

Dr Ohnmar Khaing, Country Coordinator, Food Security Working Group, Myanmar: My presentation (see paper) describes gaps between the public and private sectors and identifies initial steps for closing the gaps and improving the public-private partnership development framework through capacity development and institutional strengthening to balance development and environment. I have briefly reviewed the impacts of economic growth and environmental awareness in the GMS—especially on livelihoods, income, and access to food—and indirect impacts on ecosystems and water resources. Current problems in public-private partnerships are described, giving Myanmar as an example, pointing to the need for commitment of policy and political will; the lack of technology transfer and dissemination to the public; and lack of awareness at all levels. Capacity development and institutional strengthening efforts are needed in order to help people’s livelihoods become more resilient. Possible actions and resources are described, such as development of national strategies and multi-stakeholder consultation for monitoring livelihood resilience, linking social responsibility and the importance of long-term private-public partnerships.

Kewal Thapar, Facilitator: Dr Khaing has given us a very strong and forceful presentation on aspects relating to regional cooperation and the role of the private sector. Typically, as we are all aware of, the private sector arrives well before the government. And it is the private sector that actually first sets up and creates the bonds and the regulatory frameworks as we have seen in Viet Nam and we will see now in Myanmar. That is how it happens: the private sector follows money, initiative, and innovativeness. Now we will move on to Mr Archie Beaton, who is the Executive Director of the Chlorine Free Products Association of Illinois, USA.

Archie Beaton, Chlorine Free Products Association, USA: In the GMS, the Pulp and Paper Industry has an opportunity to create a period of dynamic paradigm shift in adopting sustainable technologies. Over the past 15 years many advances in computerization, nano technology, chemistry, substrates, and processes have made it more economically feasible to retrofit a mill creating a “closed loop” or TEF (totally effluent free) facility. On the economic front, not only can the mills in the GMS eliminate big amounts of chlorinated toxins, increase green energy production, decrease water consumption immensely, decrease GHG emission, and produce high quality pulp and paper products, but also increase profitability through the upgrades. Many mills around the world are developing additional revenue streams via solar, wind, steam, etc. I visited a plant that was not only TEF but it had 5 revenue streams. Debarked wood is chipped and fed together with the cooking chemicals into digesters. The bark is burned and recovers energy in the form of steam. After cooking, the cellulose is washed and bleached with hydrogen peroxide in the closed loop water system. The bleached cellulose is then dried and delivered in bales. The whole process takes approximately 40 hours. During cooking the digesters, hemicellulose and lignin are released. The hemicellulose is fermented and distilled into ethanol. The lignin is refined and with the subsequent ultrafiltration processed into lignosulfate. It is then dried and packed. The cooking chemicals are then recovered and energy in the form of steam is used during the process. It is now possible to eliminate waste water filled with a chlorinated toxic soup, containing chlorine compounds such as dioxin, furans, PCBs, etc., thus helping aquatic and dairy farmers. Implementing of TEF technologies will reduce exposure to known human carcinogens, reduce human health costs, and help to implement advanced water recycling and water treatment. Increased profitability must take place while bleached kraft market pulp and paper products are at profitable levels, well above operating costs. With regional support, elimination, or tremendous reduction, in the effluent discharges from bleached kraft pulp mills (via the elimination of chemical wastewater discharges) is an important way of reducing operating costs, improving environmental impacts, and reducing negative effects on natural resources.

Kewal Thapar, Facilitator: Thank you Mr Archie Beaton. We will now go to the last speaker of this session, Dr
Kalyanamitr (popularly known as Audi), President of ENERCEL and Senor Advisor on the National Science Council.

Dr. Chieanchuang (Audi) Kalayanamitr, Advisor National Science Council, Thailand: With your permission, I have two topics to talk about: The first is on energy, showing why the private sector is going to make a big impact in the GMS. There are developments taking place outside the country as well as inside Thailand. In two-and-a-half years the ASEAN Economic Community (AEC), like the EU will be established, easing trade flows between its member states. Customs barriers will be lifted. Full market integration is aimed for 2025. As a law maker, I am involved in reviewing and abrogating seven different Acts in order to comply with conditions of a common market. The second is about the signing of an MoU and agreements with the PRC, bringing about large infrastructure investments in Thailand; the PRC has the money, the power and the human resources. The projects cover bullet train, water resources, power sector, human resources, and sea and ocean, with a commitment of Yuan 70 trillion. This will have a big impact. The PRC will take most of the business. The third is about Myanmar, which is opening up and this is also a big impact for Thailand. There may be a 100,000 MW power deal between Myanmar and Thailand. Dependence for power on Myanmar alone will be sufficient to cover the needs of Thailand. Right now, Thailand only generates 40,000 MW; with Myanmar opening up and supplying power to Thailand, it will be more than double.

In Thailand, the law makers are amending the law on establishing special economic zones and passing the public-private partnership (PPP) law. In the past it was either 100% government or private sector investment; we had a joint venture law but this will be replaced by the PPP, promoting similar to investments as in Nam Theun 2 in the Lao PDR. The subway in Thailand is a PPP venture. Earlier, ADB was working closely with government agencies; in future, PPP mechanisms will replace sovereign borrowing and it could be threat to institutions like ADB, unless it re-orient itself to finance PPPs. Another problem, internally, is government policy on minimum wage. Some investors, like me, are moving factories to neighboring countries like Cambodia. In Thailand, the minimum wage, due to political agitation, is set to increase to more than Baht 300; with rising labor costs, investors will look elsewhere. By moving out my electronics factory to Cambodia, I pay Baht 80 per day, immediately increasing my profit margins. I nearly moved to Myanmar but the economic zone does not have enough power, unlike Cambodia. Any country in the GMS politicizing the economy will force an exodus of the private sector to more competitive bases of production. In the energy sector, power will be decentralized and it is likely that there will be small producers of power promoting clean air technologies. As the economies in the EU and the USA are hit and there is low demand, growth will be focused in Asia as the region will create the demand, displacing exports outside the region. Myanmar, particularly, is indicating decentralized demand and Thai investors are already involved in infrastructure contracts, particularly in port construction and operation with long-term leases. Also the industrial zones and port projects in Myanmar are 10 times in size of that in Thailand. Myanmar is the gateway to the Indian Ocean and it is only 270 km from Bangkok, slightly further than Pattaya. On environmental sustainability, Thailand is aiming at emission reductions by converting diesel trucks to liquid propane gas, with also an eye on exports to the USA and gaining carbon credits. This could save up to 65% on diesel imports in Thailand and also reduce emissions. In the USA, a law is providing road tax rebates as incentives to convert from diesel to propane as well as making it mandatory for government vehicles in city limits to either use gasoline or natural gas; they are also subsiding installation costs.
ELIMINATING TOXIC EFFLUENTS FROM PULP AND PAPER INDUSTRY: CREATING GREEN JOBS AND SUSTAINABLE ECONOMIES IN THE GREATER MEKONG SUBREGION

Archie J. Beaton

Abstract

In the GMS the Pulp and Paper Industry has an opportunity to create a period of dynamic paradigm shift in adopting sustainable technologies. Over the past 15 years many advancements in computerization, Nano technology, chemistry, substrates, and processes have made it more economically feasible to retrofit a mill creating a "Closed Loop" or TEF (Totally Effluent Free) facility.

On the economic front not only can the mills in the GMS eliminate mass amounts of chlorinated toxins, increase green energy production, decrease water consumption by billions of m³, decrease GHG emission and produce high quality pulp and paper products but also in the upgrades increase profitability. Many mills around the world are developing additional revenue streams via solar, wind, steam, etc. and I visited a plant that was not only Totally Effluent Free (TEF) but it had 5 revenue streams. Debarked wood is chipped and fed together with the cooking chemicals into digesters. The bark is burned and recovers energy into the form of steam. After cooking, the cellulose is washed and then followed by bleaching with hydrogen peroxide in the closed loop water system. The bleached cellulose is then dried and delivered in bales. The whole process takes approximately 40 hours. During the cooking the digesters, hemicellulose and lignin is released. The hemicellulose is fermented and distilled into ethanol. The lignin is refined and with the subsequent ultrafiltration processed into lignosulfate. It is then dried and packed. The cooking chemicals are then recovered and energy in the form of steam is used during the process.

The opportunity to dramatically reduce the environmental degradation of the lands in the GMS is at hand. It is now possible to eliminate waste water filled with a chlorinated toxic soup, containing chlorine compounds such as dioxin, furans, PCBs, etc. Saving the aquatic and dairy farmers products from being laden with hormone disrupters, protect the people from these toxins entering their bodies from the food, air and water they ingest. Focus on reduction of harvesting old forests, or development of a monoculture forest, by growing and utilizing bamboo as a feed stock which requires far less processing, offers small and large farmers an opportunity to harvest and sell to the mills. Green Jobs – Green Economy based on local resources.

Implementing of TEF technologies will reduce exposure to known human carcinogens, reduce human health costs, help to implement advanced water recycling, and water treatment. Increased profitability must take place during periods like now where bleached kraft market pulp and paper products are at profitable levels well above operating costs. With regional support, elimination, or tremendous reduction, in the effluent discharges from bleached kraft pulp mill (via the elimination of chemical wastewater discharges) is an important way of reducing operating costs, improving environmental impacts, and negative effects on natural resources.

Successful recycling of bleach plant filtrates has been long recognized as the last major technological requirement in achieving the goal of Effluent-Free pulping. During the last 10 years, dramatic successes have been achieved in the recycling of bleach plant filtrates.

All of these advancements include the increased use of "environmentally benign" chemicals for pulping and bleaching, and a greater consideration of the life cycle of the forest. Many producers are considering the best steps to take now, in the face of economic uncertainty, to successfully retrofit an existing facility for Effluent-Free operation.

1. Introduction

This paper responds to the people’s statement for Rio+20 with regard to sustainable development of the pulp and paper industry in the Greater Mekong Subregion (GMS), using examples from the industry in other regions.

On the 17th August in Bangkok Thailand2 a statement was signed by 52 women and men from 18 countries – Bangladesh, Burma, Cambodia, China and Hong Kong SAR, India, Indonesia, Kyrgyzstan, Lebanon, Mexico, Pakistan, Philippines, Sri Lanka, South Korea,

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1 Executive Director, Chlorine Free Products Association.

Spain, Thailand, Timor Leste, USA, and Vietnam – and representing peasants, agricultural workers, fisher folk, indigenous peoples, workers, women, youth and students, refugees and stateless persons, academia, environmental and support NGOs and networks met in Bangkok, Thailand.

The multi-faceted, yet interconnected crises encompassing the economic, political and ecological spheres are causing unparalleled suffering all over the world. Worst afflicted are people from poor countries, most especially women and indigenous peoples.

This crisis of global capitalism further propels profit-driven and unsustainable development that causes irreversible damage to the world’s environment. This crisis results in the global climate meltdown, the appropriation of natural resources and the destruction of lives and livelihoods, especially of ecologically sensitive indigenous and traditional livelihood systems.

Rio+20 in 2012 thus comes at an opportune time, when the world’s governments and peoples are obliged to think of alternatives to the current development model with its ever-increasing failures. It presents opportunities to push urgently and comprehensively the agenda for genuine people-centered sustainable development. Indeed, solutions exist. And they are in our hands, the people, who in our communities, workplaces, farms and forests, make the building blocks of genuine people-centered sustainable development.

The time has come, and actually it is way past due, that no wastewater discharge should be permitted from any Bleached Kraft Pulp Mill (BKPM). The long term goal of a TEF Effluent-Free operation is technologically and economically feasible with available technology. There are today BKPMs who have turned this goal into a reality. These companies, guided by corporate objectives, are aided by the scientific literature and by published TEF Effluent-Free successes in pulp and paper processes.

Over the past 15 years since the first comprehensive concept for an Effluent-Free bleached kraft pulp mill (BKPM) was presented, there is one Greenfield BKPM in operation which will be capable of Effluent-Free operation; there are two existing BKPMs presently modifying their process systems for Effluent-Free operation; and there are eight BKPMs which have taken significant steps toward eliminating their wastewater discharge. Active interest in the introduction of reduced effluent and effluent-free processes must be taken up by government.

2. Human Health

The health effects of the pollutants produced by pulp and paper mills are as follows.

Chlorine and Chlorine dioxide:
Chlorine is a severe short and long term respiratory irritant at levels above 1 ppm (odour threshold 60-200 ppb); chlorine dioxide is a severe short and long term respiratory irritant at levels above 0.1 ppm (odour threshold 100 ppb). Both compounds kill at high levels. The characteristic response to short term chlorine and chlorine dioxide exposure is Reactive Airway Dysfunction Syndrome (RADS), airway inflammation and bronchial hyper-responsiveness, which may last for three years and can result from one acute exposure.

Nitrogen Oxides (NOx):
NO2 is acute respiratory irritant at 1 ppm for 15 minutes. It is a harmful air contaminant, a precursor to smog, ground level ozone, fine particulate matter and acid rain.

Particulate Matter:
The lungs and respiratory tract can expel large particles and therefore are not a great risk. The greatest health impact is felt from particles with smaller sizes – designated PM 10 (microns) or less, and especially PM 2.5 – which penetrate the lungs and can stay there for extended periods of time. PM 10 is linked to serious health impacts including chronic bronchitis, asthma, and premature deaths. PM 2.5

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9 http://paper.e2hel3.com/health-effects
10 ibid.
11 ibid.
12 ibid.
Balancing Economic Growth and Environmental Sustainability

has been recognized to have the potential for the greatest health impact on a larger segment of the general public.

**Sulfur oxides (SO₂, SO₃ and solid sulfates)**: Sulfur oxides are irritants to the eyes and respiratory system at 5 ppm for 10 minutes. SOₓ is a precursor to fine particulate matter formation. Sulfuric acid is implicated in bronchitis, emphysema, eye, nose, and stomach irritations, and possible lung cancer in exposed workers. Total Reduced Sulfur compounds, including hydrogen sulfide, methyl mercaptain, di-methyl sulfide, and di-methyl disulfide

These can cause an extraordinarily foul-smelling, toxic gas. H₂S Irritates eyes at 50 ppm, and causes death at 100 ppm. The human nose detects it at about 1 ppb, and the sense of smell can be permanently damaged.

3. **Water**

A precious and scarce resource is a critical factor to alleviate poverty and hunger, for sustainable development, for environmental integrity and for human health.¹⁴ The GMS has an abundant fresh water resource that needs protection and monitoring. The GMS must set into place the kind of protection that ensures that all mankind in the region has available fresh clean water and that rivers run clean with fish that do not threaten human health via the toxic chlorinated or halogenated poisons embedded in the flesh.

It is my understanding that recent access to water (a basic necessity for all life) is continuously being threatened by privatization and shortages in some states. There is a restructuring of the water industry in Malaysia, because of an immediate solution to water rationing and water shortages faced every year. If water conservancy is the goal, then new and adapted regulations are warranted.

I am not sure how the water is controlled in the GMS or what it will require to bring all interested parties into the discussion. But in the US there are about 53,000 water agencies, getting all of them along with businesses to come together and develop a coherent point of view about water management isn’t going to happen all at once. The challenge of water conservation around the world will require that we balance out all of these needs and develop a global perspective.

The motivation around the world is high to minimize water usage in paper mills, meeting stricter governmental regulations, combined with the focus to reduce costs through more efficient water and energy consumption. Many paper mills are actively pursuing plans to significantly reduce fresh water use and to return water to rivers cleaner than it arrived. Our organization can attest to that with more than 200 audits of many different types of mills.

4. Eliminating Toxic Pulp Mill Effluents

An example: The water quality of three pulp mills in the GMS is a comparison of the bleaching plants that are the largest toxicity source in terms of Toxicity Emission Factor (TEF). BAPACO was high on TEF, but not in COGIDO where the discharge of black liquor is the largest contribution of toxicity. For this reason, the total toxicity discharged from COGIDO with TEF>6000 was much higher than BAPACO with TEF of 750. For the Thai mill, the TEF of the pond system effluent alone was already much higher than TEF of the other two mills.¹⁵ These TEF levels from the mills would not meet the minimum standard to be certified under the Sustainable Manufacturing Initiative.¹⁶

In the US the State of Louisiana Department of Environmental Quality recently put a Bogalusa paper plant on notice that it is liable for a massive fish kill in the Pearl River, setting in motion the legal process for potentially issuing penalties and fines, DEQ issued a compliance order and a notice of potential penalty to Temple Inland for its role in the incident that clogged the Pearl River through Washington and St. Tammany Parishes with thousands of dead fish.

In reviewing the key trends in key environmental areas including air and water quality, water availability, GHG emissions, and climate change all stand out as negative side effects of this growth in the GMS.

Technology has now combined with public demand, environmental regulation, and economics to permit the construction of Greenfield BKPMs which will operate Totally Effluent-Free and to the permit retrofit of existing BKPMs to operate Total Effluent-Free.

¹³ http://paper.c2he3.com/health-effects
¹⁵ Resources, conservation and recycling, Source 1996, vol. 18, no1-4, pp. 87-105 ISSN 0921-3449, Elsevier Science
¹⁶
¹⁷ Katie Urbaszewski, Bogalusa paper mill admits fault as dead fish flow to Lake Pontchartrain, The Times-Picayune, Wednesday, August 17, 2011
The need to be sustainable in the pulp and paper market has come as a natural consequence of the following:
2) Effluent-Free BKPM technology are in operation now for more than 10 years producing market brightness pulp at lower capital and operating costs than those for a standard reference BKPM19.
3) It is now technically possible to retrofit an existing BKPM to operate Effluent-Free, produce market brightness pulp and reduce operating costs20.
4) The public has a perception that our products and mill discharges contain harmful chemicals, and consumer demands for “Environmentally Friendly” products and processes continue to escalate in intensity.
5) Environment regulations in all countries are moving steadily toward total elimination of wastewater discharge in existing and new BKPMs.

The first requirements for Effluent-Free operation are to use chemicals which are inherently recyclable, or react to form air, water, and process make-up chemicals; and to provide a means for removal of the non-process elements which enter the system. These requirements are most easily satisfied by the use of TCF bleaching chemicals; although there are the possibilities of Effluent-Free operation using ECF bleaching chemicals. One major producer, SAPPi, Ltd., had developed an ECF bleaching system which included recovery and removal of non-process elements, but abandoned this concept and has installed a system which will initially reduce effluent discharge by 35%, and later permit Effluent-Free operation with TCF Bleaching21. BKPMs who retrofit their bleach plants for TCF operation will be the first to convert to a TEF.

The innovative technologies of the SAPPi, Ngodwana Mill, however, permitted this facility to be designed, constructed and operated as the most water-efficient mill in the world, with a discharge of only 11.6 m³ per ADMT of product22.

Many of the internal process water recycling technologies which are in operation at this facility have yet to be adopted for water conservation in BKPMs constructed in subsequent years.

The following discusses the background of pulping, bleaching, and progress toward Effluent-Free production; one of the reasons why, for many, ECF was a misstep; and the direction of future pulping processes. The environmental and market conditions in major pulp producing countries are presented, along with their response in the production of TCF pulps.

5. Background

Chlorine chemistry use in pulp bleaching has been, and is widely used today, to complete the delignification of pulp after cooking, and to facilitate the removal of lignin in subsequent bleaching stages. Issues of toxicity of bleach plant effluent have been raised through the years, and chlorine is strongly linked to toxicity. Nevertheless, chlorine, and now chlorine compound based chemicals continue to be the principle bleaching agents. In the late 1990’s change among pulp producers were adjusting to new realities of the marketplace, the environment, and the availability of new, lower cost technologies23.

Since 1975, the effluent quantity per ton of pulp from a typical bleached kraft pulp mill (BKPM) has been reduced by more than 50%24. The effluent quality, as measured by toxicity, BOD, COD, color, odor, and foam has steadily improved through this period25. These improvements were made largely as a result of increased government regulation of effluent quality26, as well as the energy crisis of the 1970’s27. During this time, the cost of treating and
heating large quantities of process water was continuously evaluated against the cost of using new technologies to reduce effluent flow and to recover valuable chemicals.

Today, a typical BKPM in the United States has a water supply of 133 m³ of water per ton of pulp and discharges effluent at the rate of 110 m³ per ton. The latest Greenfield BKPM in the United States has reported a water intake equivalent of 113 m³ per ton and effluent discharge of 69 m³ per ton. The most water-efficient BKPM in the United States reports an effluent discharge of 54 m³ per ton. The typical mill uses such large quantities of water because of the process design of the facility, use of chlorine chemistry and processing equipment limitations.

6. Technologies which lead to Effluent-Free Operation

This purge is necessary because of the process design which includes chlorine and chlorine compounds in the bleaching process. Nevertheless, this design demonstrated the practicality of operating with low effluent flows and pointed to future further reductions. At the time of the original design, contingency plans were proposed to eliminate effluent from the bleach plant in the future, either by closing the filtrate loop within the chlorine based bleach plant; or by converting to an Oxygen-Ozone-Peroxide bleach plant and recycling filtrates through the recovery system. In 1996, as a further building block toward effluent-free operation, a new Ozone bleaching stage was added. The process following the existing Oxygen stage will permit an additional 35% reduction in effluent.

In January 1992, an Effluent-Free TCF bleached chemithermomechanical pulp mill started operation in Canada. This facility has been in continuous operation with complete reliability of its Effluent-Free process, producing high quality pulp. With a total water supply of 2 m³ per ton, all incoming water exits with the pulp, sludge, or to atmosphere through evaporation. Although this facility has no provision for process chemical recovery, the ability to complete closes a pulp mill water circuit, and to operate totally chlorine-free, with zero effluent, has been and continues to demonstrate the value of TEF technology.

In mid-1992, a United States pulp and paper manufacturer started up the first North American Bleach Plant utilizing ozone as a principle bleaching chemical. Operating results have satisfied their expectations for chemical usage and fiber properties. Although this bleach plant continues to use chlorine dioxide in the final brightening stage, lab data from this facility reportedly shows that an effluent flow of 7 m³ per ton is possible.

7. Pressures for Change

Since the US EPA Promulgated the Cluster Rules the Pulp and Paper Industry had settled into a routine, that it is accustomed to, responding methodically to new reports of undesirable elements in BKPM effluent. An individual company or the industry will evaluate the new information and then make appropriate process and/or equipment changes. Not much has changed here in North America.

Since the first dioxin study and numerous subsequent studies, consideration and implementation of new pulping and bleaching technologies have been proceeding at a faster pace than at any time in the past. The rate of change appears to be accelerating again as the public focus is on sustainability issue like water uses, GHG, forestry, etc. that are driving change.

Public awareness and concern about chlorine toxins, chemicals discharged to public waters or present as residuals in the mill’s products and solid waste were added to the traditional pressures for environmental improvement. These have led to new interest in developing and applying non-chlorine bleaching, modified pulping, and other technologies to further reduce chemical discharges.

The Pulp and Paper industry realized that simple process and equipment changes would not solve these problems, so they began to focus on more comprehensive improvements. The issue of sessions and is an important factor in corporate decision making. This issue has

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precipitated an industry revolution in thinking and has prompted consideration of the following alternatives:

- Change the process
- Change the method of introducing chlorine
- Lower the chloride
- Change the chemicals to chlorine-free
- Treat the effluent
- Treat the product

Following technologies are available to reduce both the total quantity of BKPM effluent and the quantity of undesirable elements in the effluent:

Pulping
With present BKPM designs, organic and inorganic chemicals which enter the bleach plant are discharged to waste treatment along with the bleaching chemicals. To the extent that pulp can be further dignified in the digester while maintaining final pulp properties, lesser quantities of bleaching chemicals will be required and the discharge of organics and inorganics will be reduced. Typically, mills dignify in the digester to kappa number 32 for pine and kappa number 29 for hardwood. Oxygen delignification is the most widely implemented step in reducing the amount of organic and inorganic compounds remaining to be treated during bleaching and in reducing the amount of organic/inorganic compounds to be discharge. Oxygen stage filtrate is routinely returned through the chemical recovery cycle.

Bleaching
Bleaching process modifications included the use of various levels of chlorine dioxide as a substitution for elemental chlorine. These efforts were directed toward “environmentally compatible” production processes. High chlorine dioxide substitution reduced the discharge of detectible high levels of dioxin in the effluent and reduced the measured AOX. The next modifications eliminated the use of any elemental chlorine. This step further reduces, but does not eliminate, the discharge of toxic compounds. 

BKPMs are responding to those demands by experimenting with, and using ozone, peroxide peracids, enzymes, and other chemicals to further reduce or eliminate the use of chlorine containing compounds.

This current impetus for change arises from a new force felt by the industry, that of the consumer. The public is demanding products and effluent that bear no potential environmental or health risk.

8. A Paradigm Shift

What we see, is not merely more of the same slow evolutionary accommodation to new realities, but rather a fundamental shift in the paradigm, or rules under which our business will operate. There is frequently confusion when such a fundamental change occurs. In this case, however, the new rules are quite clear, environmental regulations and consumer demands will affect operations. In the case of pulp mill effluents will be under scrutiny until there is no longer any effluent.

In the long term for BKPMs to survive in the end it must convert to chlorine-free and Effluent-Free. Those who see this now, and plan accordingly, will be successful. Some who understand this new paradigm shift are taking action to establish themselves for these new conditions. Those manufacturers who realized there was an opportunity to sell TCF pulp, enjoyed a premium price for their product during the first five years; found they could sell full production during the cyclical downturns of 1990-1993 and 1996-1999; and realized the operating cost advantage of using lower cost TCF bleaching chemicals. To those who wait there is the likelihood of becoming the marginal producer; last on-line during up times and first off-line during down times.

9. Environmental Issues in Sweden, Finland, Europe, Australia/Asia

Sweden has been recognized as a leader in environmental progress. It is interesting to note that operating performance of Swedish mills shows substantially lower AOX discharge than their regulations require. The Swedish Environmental Protection Agency confirms the Scandinavian laws of 15 Kg per ton COD and 0.2 Kg per ton AOX. The typical Swedish mill effluent averages less than 15 Kg per ton of COD, 0.5 Kg AOX per ton.

Finland has effluent discharge regulations which are similar to those in Sweden, in that they are based on Best Available Technology, and that cooperation, rather than

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confrontation is sought between the regulatory agencies and the mills.

Because Finish mills are heavily dependent upon export for their viability, they are supplying ECF and increasing quantities of TCF pulp to satisfy this growing market. The world’s first BKPM capable of Effluent-Free operation is now in operation in Finland. This facility is located at Rauma, on the south-eastern coast, had its start-up in Mid-1996. The mill is based on displacement batch cooking and TCF bleaching.

EU and especially the German speaking countries are providing the greatest demand for chlorine-free pulp and paper products. Coordination of environmental regulations is extremely cumbersome in Europe because of the many competing national interests. An ambitious five year study has been undertaken in an attempt to coordinate this effort and resolve potential conflicts of interest. However, since this region already has more than 30% of the TCF mills, the issue may well be decided before the study is complete.

The European market has clearly stated that, for a given paper product specification, there is a strong preference for TCF pulp. The pulp and paper industry is learning that comparable TCF products can be manufactured at lower costs than with chlorine-based technology. To those in the pulp and paper industry who made the changes early, there was a market price premium for TCF products, which helped to compensate for the capital costs of conversion to TCF Technology. This same premium may be an incentive to those operating in the GMS.

Australia and Asia in the past have shown little published activity in the area of TCF production. Environmental issues are receiving increasing concern in Australia with the Gunns Pulp Mill taking the headlines which will now require the mill produce TCF pulp and paper products or even a TEF mill. The Australian guidelines for new bleached eucalyptus kraft pulp mills are now being updated. There is some information which indicates that any new mill in Australia would have to be both TCF and perhaps Effluent-Free in order to be licensed. A new mill will most certainly use the latest technology that has been developed in the northern hemisphere.

Environmental issues in Asia appeared to have little impact on the early design or the operation of its pulp and paper facilities. There is, however, an awakening interest in environmental issues in Asia. The first designed to be easily converted to low effluent, ECF or to efficient TCF processes.

**Plan of Action for the mills in GMS**
If the long term objective is to continue manufacturing and implement a sustainable pulping plan, not following the path of the US who will never see another Greenfield Mill built. Then it is clear that facilities will eventually be operated Effluent-Free.

Each company should:
- First: Obtain a complete picture of the existing facility. A through study of the processes and equipment should be undertaken. This study should include pulp, water, chemistry, chemical heat, and energy balances.
- Second: Prepare a new process design including pulp, water, chemical heat, and energy balances for the facility as it would be, when operated Effluent-Free. This should be based on a TCF bleach plant which may include Oxygen, Ozone, and Peroxide. Detailed capital cost estimates should be included for constructing the required new facilities, and for upgrading existing facilities.
- Third: Develop a logical program, using a “Building Block” approach, to get from the existing, to the ultimate configuration. For example, when new environmental guidelines or regulations are imposed, there will be certain costs incurred for minimal compliance. If minimal compliance systems will late be abandoned, they become avoided costs in comparison with those environmental investments which result in the same environmental improvement but also become Building Blocks toward the ultimate mill configuration. Alternatively, as existing systems require replacements due to obsolescence or excessive maintenance costs, the replacement systems can be installed in accordance with the master plan.
- Fourth: Execute the development program, with implementation in phases to satisfy new regulations as they arise, or to meet potential cost/benefit criteria.

If each company follows these procedures, they will have a logical plan to stay in compliance with environmental regulation. They will be more likely to invest in TCF technology today for Effluent-Free operation in the future, than to invest in technology which must later be abandoned.
The Support and Governments of the GMS
In the entire region the Pulp and Paper Industry is considered vital to its economy. Should GMS consider proposing financial incentives be granted to BKPMs which make environmental improvements greater than the basic requirements.

10. Economics of the Greenfield TCF/Effluent-free BKPM

The most important factor in the effective pursuit of sustainable development is ‘getting the price right’. Unless prices are assigned to air, water, and land resources that presently serve as cost-free receptacles for the waste products of society, resources will tend to be used inefficiently and environmental pollution will increase.

Capital Costs are estimated to be $35 Million less for a TCF/Effluent-Free Greenfield BKPM than for a new ECF BKPM. Principal incremental savings arise from elimination of the waste treatment plant and chlorine dioxide plant. Principal incremental costs arise from the larger evaporator system, and cooling towers.

Operation Costs are estimated to be $30 per ton less for a TCF/Effluent-Free Greenfield BKPM than for a new ECF BKPM. Principal incremental savings are for bleaching chemicals, makeup cooking chemicals, and the effluent treatment plant operation.

Basis of Design and other data have previously been presented, as a guide, for individual use in making an independent evaluation of these alternatives. This evaluation may become of academic interest only, however, if no one would, today, build a Greenfield ECF BKPM.

11. Retrofit of an Existing BKPM for Effluent-free Operation

Initially, low KAPPA pulp cooking followed by oxygen, ozone, and peroxide bleaching will likely become the standard for pulping and bleaching processes. Advances in pulping chemistry, greater experience with bleaching techniques, and closed cycle operation will permit higher yields and lower operating costs.

Ultimately biological technologies will replace chemical processes. Some work has already shown that these technologies are potentially more selective in preserving cellulose and more cost effective.

Life Cycle Approach
Life cycle approach to the forest products industry has dictated that solid materials, now considered waste from the pulping process, be returned to the forest to replace the nutrients which were removed with the wood.

11. Conclusion

The time is here now where governments can regulate a no wastewater discharge being permitted from any BKPM. Environmental regulations and public demands will continue to converge until the only possible result will be to operate an environmentally begin, Effluent-Free BKPM.

On the Green Economy
We must make sure that we do not allow the corporatization of the Green Economy agenda. Technological fixes and market-based incentives are false solutions to the ecological and climate crises and will not advance sustainable development.

For sustainable economies to develop, it is crucial to democratize ownership as is done in the EU communities, control and decision making over productive resources and assets. The GMS should consider a move from a capital investment model towards an appropriate mix of more democratic modes such as cooperative, community-based and driven, commons or public forms of ownership to ensure that economic activity provides sustainable livelihoods and meets the developmental goals of the community and society.

- Public enterprises should remain in public control and privatization should be reversed.
- Promote sufficiency-based economies (i.e. catering primarily towards meeting local needs and demands, developing local capacities, based on available resources, appropriate technologies and resource sharing).
- Manufacturing should promote closed-loop production where products are designed with minimum use of energy and materials, longer life-spans and with maximum reuse and recycling of parts and components.
- Promote mass public transportation systems.

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36 Stewart Elgie, Faculty of Law University of Ottawa, Achieving a Low-carbon, High-octane Economy: The Wealth of Nature: how fixing the economy can save the planet http://www.slideshare.net/Fedcan/stewart-elgie-on-achieving-a-lowcarbon-highoctane-economy
• Implement genuine agrarian, aquatic, pastureland and forestry reforms; and promote biodiverse ecological agriculture that benefits small producers, especially women and indigenous people.
• Stop profit-oriented exploitation and destruction of natural resources that destroy lives and livelihoods.
• Stop industrial corporate agriculture and fisheries that do not adhere to advanced sustainable activities.
• No to renewable energy that depends on monoculture and biomass extraction.
• Respect and promote community-based and farmer-driven efforts in organic agriculture, seed banking and on-farm improvement of crop varieties and animal breeds.
• People-centred sustainable economies should promote the rights of indigenous peoples and local communities in accordance with UNDRIP including rights to land and resources, and free, prior and informed consent (FPIC).

• Producers must have a clear vision of their ultimate mill process configuration, when operated Totally Effluent-Free, in order to build toward this plan, and avoid making capital investment in processes which increase their current risk, and will be later be abandoned.

Even with a reduction in research and capital appropriation expenditures, there has been rapid development and implementation of technologies that will eliminate the discharge of BKPM process wastewater. The first Greenfield BKPM, capable of Effluent-Free operation, started up 10 year and is meeting initial design expectations.

The first BKPM, retrofit for closed cycle, from bleach plant to recovery, has been in operation for 10 years. This mill demonstrates the elimination of process effluent to be achievable with available technology, and to be economically feasible.
THE PUBLIC-PRIVATE PARTNERSHIP ROLE IN DEVELOPMENT AND ENVIRONMENT: CAPACITY DEVELOPMENT FOR SUSTAINABLE PUBLIC-PRIVATE PARTNERSHIP

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Abstract

The paper describes gaps between the public and private sectors and identifies initial steps for closing the gaps and improving the public-private partnership development framework through capacity development and institutional strengthening to balance development and environment. The paper briefly reviews the impacts of economic growth and environmental awareness in the GMS, especially on livelihoods, income, and access to food, and indirect impacts on ecosystems and water resources. Current problems in public-private partnerships are described, giving Myanmar as an example, pointing to the need for commitment of policy and political will; the lack of technology transfer and dissemination to the public; and lack of awareness at all levels. Capacity development and institutional strengthening efforts are needed in order to help people’s livelihoods become more resilience. Possible actions and resources are described, such as development of national strategies and multistakeholder consultation for monitoring livelihood resilience, linking social responsibility and the importance of long-term private-public partnerships.

1. Introduction

Public-private partnership (PPP) implies a common understanding of shared goals, a willingness to repartition responsibilities for their achievement and a continuing public-private dialogue on what needs to be done to promote their realization, and a supportive policy and institutional framework. Partnership goes beyond business concerns, and extends into all policy areas, including education, health, human rights, immigration and citizenship, science and technology, foreign relations, arts and culture. There is a widespread trend to broaden participation in governance by strengthening the interface between the state and nonstate actors and people-centered sustainable development.

The Greater Mekong Subregion, made up of Cambodia, the People’s Republic of China, the Lao People’s Democratic Republic, Myanmar, Thailand, and Viet Nam, is endowed with a rich and diverse natural resource base. The Mekong River itself has historically supported economic development and sustained rural livelihoods. However, differing political, economic, institutional, and cultural circumstances across the countries of the subregion have resulted in uneven progress toward sustainable development.

Public-private partnerships are expected to increasingly form the cornerstone of the implementation plans for sustainable development. Innovative partnerships—including within countries from decision to the community levels as well as at transboundary and regional levels—that bring together various partners from different sectors, are expected to be the key to the long-term sustainability of balance between development and environment (UNEP, 2011).

The purpose of this paper is to provide some preliminary thoughts on ideas and issues in this regard for consideration and further action. The paper looks at partnership in the pursuit of balancing subregional development with environmental goals, with a focus on some innovative examples of PPP, and some of the main issues arising, notably increasing opportunities in the private sector, giving an agricultural business example from Myanmar.

The paper is divided into three main sections, which deal respectively with impacts of economic growth and environmental awareness in GMS especially the impacts on livelihoods, income and asset to food and indirect effects, impacts in ecosystems and water resources; the current constraints and gaps between private and public partnership by giving the example of Myanmar, need commitment of policy and political will; lack of technology transfer and dissemination to the public; lack of awareness at all levels; and capacity development and institutional strengthening efforts include increasing opportunities in the private sector, the business-enabling environment, promotion of cooperative social responsibility regulation, and a final section which briefly touches on the role of the regional community with regard to the foregoing.

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2. Impacts of Economic Growth and Environmental Awareness in the GMS

Subregional trade has increased but, because road corridor projects and trade facilitation measures under the GMS Cross-Border Transport Agreement are not fully developed, the total intraregional trade (in 2006), taken as a percentage of the sum of GMS countries’ total exports (6.5%), was still low compared with the 52%, 59%, and 52% intraregional trade shares, respectively, of Asian (as a whole), European Union, and North American countries (in 2006) (ADB, 2008).

A system of transnational rail and road routes that links transport systems, power grids and markets across and beyond the sub-region is being created to stimulate and take full advantage of economic opportunities arising from fuller integration in the regional and global economy. This extensive infrastructural structure integrating all GMS countries into an unique “growth area”, is one of the most tangible signs of the rapid pace of regional integration in development, and one that deeply affects people’s mobility, facilitating in-country and—in tandem with visa harmonization and cross-border transport facilitation—intraregional travel.

2.1. Impacts on Livelihoods

Infrastructure development and the related growth of the transportation sector in the GMS, besides facilitating movement and migration, also directly creates job opportunities for mobile work forces, including bus and truck drivers and migrant construction workers.

However, in some cases, infrastructural development is a “push” factor, causing people to move by impinging on their environment and affecting their livelihoods. New roads and bridges connect villagers in remote and isolated communities to a world where their agricultural skills do not easily transfer and where few coping mechanisms are available, landing them into conditions of poverty and motivating them to seek alternatives. Construction and other development projects also at times imply displacement and resettlement of local communities, especially ethnic minority populations, which may result in migration of those who have lost their land and other sources of livelihood, or who find their new places of residence untenable or unacceptable (AMC and MMN, 2005).

The expansion of trade and liberalization and initiatives put further pressure on environmental sustainability in the subregion. The sustainable use of water and natural resources in the Mekong basin is directly and inevitably related to human and survival in the subregion. The promising development of hydropower and setting up regional power grids to support regional power trade are models for future development.

Economic corridors are meant to attract investment and generate economic activities along an area, usually with the aim of providing livelihood for people. They are meant to provide two fundamental attributes for development: lower distribution costs and improved supply of land for economic activities.

2.2. Ecosystems and Water Resources

Achieving a balance between trade, investment liberalization, and environmental conservation is one of the key challenges facing the members of the GMS. Environmental protection awareness is an urgent need since growing development affects ecosystems and water resources. Illegal trade in the subregion, particularly of wildlife and timber products, is also undermining the sustainability of the GMS environment (Dosch, 2010). Illegal wildlife trade involves hundreds of millions of individual plants and animals and tens of thousands of species across the GMS.

The most important concern for GMS is poverty, which is probably the main cause of watershed and ecosystem degradation. There is not much reliable data to indicate whether poverty is more acute in lowland areas than elsewhere in the subregion. Poverty-driven expansion of cultivation in upstream areas can destroy watershed resources. At the same time, rapid growth of agribusiness has been seriously threatening the region’s environment. Land tenure is an important socioeconomic factor that greatly affects farmers’ decisions regarding land use, land conservation, and farm development.

At present in Myanmar, there are more than 53 watersheds with dams that provide crucial water supplies. These watersheds cover a total land area of 3.56 million ha. The natural resources in catchments that supply water for irrigation, hydropower, and industrial and domestic uses will need sustainable management to maintain and continue a stable ecological balance between people and the ecosystems. Although exact data on the extent of degraded lands in these watersheds are not available, there is evidence of widespread soil erosion, formation of gullies and landslides, increased sediment deposit in the dams and reservoirs, irregular stream flows, and decreasing
crop yields. A time will ultimately come when the upland environment becomes inhospitable for sustainable living.

3. Current Constraints and Gaps between Private and Public Partnership

While governments in most countries of the Mekong subregion have been gradually adopting laws to create a simple and transparent rules-based private sector environment in a market oriented system, protection of the environment and sustainable use of resources have regularly taken a back seat in the industrialization process. Economic growth and social development remain a priority in the fight against poverty throughout the region. Yet the ecological footprint shows that, despite the fact that a significant part of the GMS population lives in absolute poverty, the subregion is already living beyond its ecological carrying capacity (World Bank. 2006).

The constraints to the development of partnerships are mainly attitudinal and organizational. The prevailing culture of each GMS government may include risk avoidance, secrecy, and suspicion of the private sector. Reorientation training can displace this established culture and bridge the gap between public and private sectors, but widespread change is a long-term process, particularly in the former centrally planned command economies in which entrepreneurial activity has only recently been decriminalized. Productive interaction with the private sector may be used to reinforce responsiveness, transparency, impartiality, objectivity, and accountability as major professional values of the civil service. GMS governments need a regional governance framework for effective PPP in the subregion to balance development and environmental protection.

The constraints on government spending and the focus on tackling national debt will increase the requirement for substantial volumes of private sector capital to meet essential infrastructure needs and goes on to suggest that the proposed establishment of a National Infrastructure Bank in Myanmar will support PPPs and help reduce borrowing costs on essential infrastructure projects.

3.1 Commitment of Policy and Political Will

Political will is very important by having realization on community’s livelihood resilience by decision makers; raising awareness on development, its advantages, disadvantages, and cooperation among all stakeholders; and raising awareness on countries’ involvement in regional and global forums to balance recent development with environmental concerns.

Traditionally, environmental concerns have not been a primary policy focus of the subregion’s governments. Regarding coordination and collaboration among GMS countries, where the government performs a balancing role, looking after the interests of such groups as customers in the area of utility tax regulation as well as business, the relationship with the private sector should be at arm’s length rather than cozily cooperative. Otherwise, there is the risk that civil servants and big business collude in their own interest at the expense of the general public, or at the expense of such groups as small and medium-sized enterprises, which are left out of the mainstream of collaboration.

There needs to be more clarity across diverse regulatory frameworks in different states to enhance the efficiency of the PPP process. Additionally, more consideration must be given to the structuring of PPP deals to encourage sustainable investment, such as using a cooperative social responsibility approach to development. Government support is fundamental to the functioning of a strong PPP market. This support can take the form of clear and consistent regulatory and legal frameworks, as well as the creation of an infrastructure project pipeline to improve transparency and encourage private sector investment.

A new report (RICS 2011) highlights that the potential PPP market has not been adversely affected by the global financial crisis and is, therefore, in a relatively strong position to help finance infrastructure development in the GMS. Cooperation between government and the development industry will be needed in order to deal with such problems as the lack of a clear framework for projects, absence of rigorous contracts, and weak regulatory support. Additionally, steps need to be taken to encourage institutional investment, for example, from pension funds for public sector staff, to help provide additional funding for projects.

3.2 Lack of Technology Transfer, Awareness and Dissemination to the Public

Poorly-planned and executed development activities, such as road construction, logging, mining, and big hydropower projects in fragile watershed areas, impair streams and pollute the environment. No reliable statistical data are available in Myanmar in this regard. Inadequate institutional and organizational arrangements as well as lack of technical expertise and information sharing have made watersheds worse in Myanmar over the years. Expansion of gullies in
depth and width is revealing the serious level reached in watershed and water resources degradation.

The major handicaps in Myanmar watershed management are the insufficient number of professionals and lack of a proper policy framework. Myanmar needs a good PPP mechanism in this important issue to improve relationships between all stakeholders. Experience in many developing countries has shown that watershed management or soil conservation projects can only develop when trained and experienced personnel are available. Since watershed management is based on a multidisciplinary approach, government institutions from various disciplines should cooperate and work together to survey, design, and implement watershed management activities. A central institution and interdepartmental coordination at all levels are required to minimize duplication of effort and to promote effective implementation.

In the absence of a cooperative work among government departments, unplanned and decentralized upland rural development is likely to accelerate environmental degradation, making the population in the watershed highly vulnerable to natural disasters, such as floods and landslides. In highly active or heavily populated watersheds, torrential mountain streams often cause heavy damage to nearby villages and downstream areas, including heavy deposits of sediment in storage reservoirs and irrigation channels.

4. Capacity Development and Institutional Strengthening Efforts

The main constraints to strengthening institutions are lack of appropriate regional inclusive policies for balancing development and environment by applying firm, clear rights for people. Lack of resource allocation and equitable beneficial between policy and regulation and decision maker and citizen by individual government also observed. Inclusiveness of multi stake holders is a real need to put in policy formulating process.

For information sharing in the GMS, the channel is only disseminated by the Government, not inclusive consultation from private and public concern. National budget from each GMS country should include regional collaborative private- public efforts and forums.

In the case of Myanmar, National Plan of Action for development projects does not include input from scientists, policy makers, and implementers, and technical inputs and expertise are very limited. Sometimes, incomplete infrastructure makes life and livelihoods in affected communities more vulnerable. Lack of standards and guidelines has resulted implementing poor quality systems in development projects; transparency also is greatly needed. Social aspects and sense of ownership are ignored by the authorities, which is threatening to local people.

The whole GMS needs a proper coordination channel at every level, including that of communities. In all sectors, a key element of capacity building is the establishment of revolving funds for self-reliant groups, to be managed within communities in each country and on a subregional basis.

4.1. Development of National Strategy and Multistakeholder Consultation

In order to secure future private investment and development, particularly from institutional investors, the construction industry needs to communicate more clearly the investment potential of infrastructure as an investment asset class, including risk-return characteristics and diversification benefits. Additionally, it is essential to improve the transparency of infrastructure investment markets to enable performance benchmarking across asset classes and to create innovative investment vehicles to best match investor risk profiles and investment capacities. At the same time, it is very important to include public concern on projects.

It is observed that most frameworks in GMS countries have started as useful or voluntary guidelines and a number are progressing into international standards or legislative frameworks. The GMS countries must include some very important elements, such as a “Do No Harm” framework. Equally important, private and public efforts must be inclusive in a national framework and strategy, involving all stakeholders as equal partners and transparent in their functioning and in their accountability.

4.2. Livelihood Resilience, Linking Social Responsibility

Promotion of Entrepreneurship and Small Enterprises. There are a number of unique features in “small” enterprises, including micro, small, and medium-size enterprises (SMEs) that can play a key role in a nation’s economic success. Although entrepreneurship is important for all types of enterprises, it is especially important for SMEs, which typically constitute the bulk of total enterprises by number. In many countries, enterprises in these categories account for more than half of industrial employment and as much as a third of the national product and export earnings.
They tend to be highly innovative, make excellent use of scarce capital and skills, and provide a range of services and goods to the large corporations. In countries where economic units are often too large to be economically efficient, many new small units are needed because they are responsible for a great deal of technological progress. The lack of small-scale entrepreneurs, especially the “missing middle” (small and medium-sized entrepreneurs), is a handicap to economic progress.

Multistakeholder engagement and dialogue are the most important factors in making progress in these areas, since much of the development has come from interactions between public, private, and civil society sectors, as part of improving governance, transparency, and right to operate for corporations. Much more attention on rights of citizens and their livelihood and the co-responsibilities of governments and business are also critical to sustaining progress.

Job Creation in the Nonfarm Rural Economy in Myanmar is in urgent need. There is a need to create jobs targeting the landless poor, through investments in small-scale social, economic, and environmental infrastructure schemes and by supporting rural nonfarm enterprises through capacity building in entrepreneurship, skills training, and product development.

United Nations agencies and nongovernment organizations can contribute their assessments of the non-agricultural rural economy and opportunities for development interventions, as well as cost-benefit analysis of possible interventions. Many organizations are seeking ways to create short-term and seasonal jobs for the landless poor and marginal farmers through social infrastructure projects: rural roads and footpaths, irrigation channels, health centers, schools, and community buildings. Private-public relationships in this regard are crucial to decreasing unemployment among the population in Myanmar.

The Myanmar Government has prioritized developing livelihood options for the rural poor through community-based infrastructure schemes, the development of agro-businesses, and private-sector abattoir and meat-processing enterprises. However, the Government should review all the regulations and rules to ensure benefits for local people.

4.3. Long-Term Private-Public Partnership

Most GMS governments have realized that the rural poor can enhance their food security and increase their incomes only if project designs and activities are built on their production systems, alternative livelihood strategies, environmental protection awareness, and proper allocation of resources. To be effective, therefore, development to reduce poverty must be linked to a proper understanding of poverty processes and environmental protection—how these affect different groups of poor people across the GMS. To this end, GMS governments need to increase effective collaboration with the private sector—toward corporate social responsibility—as well as with local stakeholders in developing programmatic and their implementation. Through experience, GMS governments are acquiring a wealth of knowledge and skills on the processes that contribute to the generation and perpetuation of poverty, and how to reduce poverty by balancing development and environment.

Regional cooperation and collaboration on balancing development and environment should be strongly supported by each country through PPP, with primary concern on improving livelihoods and ensuring long-term sustainability. GMS forums must urgently initiate dialogue involving all stakeholders, covering clusters of each group from each country, to obtain diverse inputs toward regional cooperative and collective mechanisms that will improve trust building and synergy on balancing development and environment.

References


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