Community climate change adaptation planning

Climate change adaptation is the measures that enable the community to better manage their risk, especially the risk that is induced by climate which may change its pattern in the future under influence of global warming. The adaptation measures may aim at reducing risk, which could focus on reducing of exposure or sensitivity that such community may have under the pressure that drives risk in the community or to increase coping capacity of the community to cope with the changing risk. For example, the community that is at risk from severe damage caused by more severe and higher frequency of flood may choose to build dike to prevent flood, which is the measure to reduce exposure to flood, or improve their houses and facilities to reduce damage, which is the measure to reduce sensitivity to flood, or to establish fund reserve for damage repairing, which is the measure to increase their coping capacity. It should be noted that risk from climate change needs to be taken into consideration under climate context, which could be the changes in seasonal pattern, e.g. rainfall amount and distribution pattern, etc. In case of extreme weather event, it should be taken into consideration by considering frequency and magnitude of such extreme weather event over a period of time.

Changes in the future, both climate change and change in socioeconomic condition, will alter the risk profile of the community. The risk that could be of concern now may no longer threaten the community or it could be worse affect the wellbeing of the community due to the future climate pattern and change in the context of the community as result of changing socioeconomic condition, typically the result of development plan. In addition, there could be emerging risk that community has never dealt with before. The action that community uses in coping with risk at present time may no longer be effective or appropriate action in the future. Moreover, the development strategy and plan that community is planning may not sustain under future condition.

Addressing solution or action to cope with only the risk that the community is experiencing may not be enough effort for climate change adaptation, even though, the climate pressure that drives community risk may have changed from the pass, because risk and pressure that community may have to face in the future may not be as it is now. Therefore, planning climate change adaptation needs to base on the understanding of the clear context of present risk and the future concerns under various changes. Climate change adaptation as better risk management measure does not aim at maintaining current condition of the community under the changing risk profile, but to ensure that the community will still be resilience under future condition and the policy and plan that is being implemented now will reach its goal in the future. Planning for adaptation without taking the future concern and climate change into consideration could lead community to new problem, or in other word, a maladaptation, or a wasteful investment in the development plan.

Climate change adaptation needs not be addressed as a separate plan by itself, but it could be an integral part of the development plan. Mainstreaming climate change adaptation into community development strategy and plan will allow community to rely on existing planning process and institution, while at the same time be able to achieve more robust sustainable development plan.

Climate change adaptation can be addressed as follows:

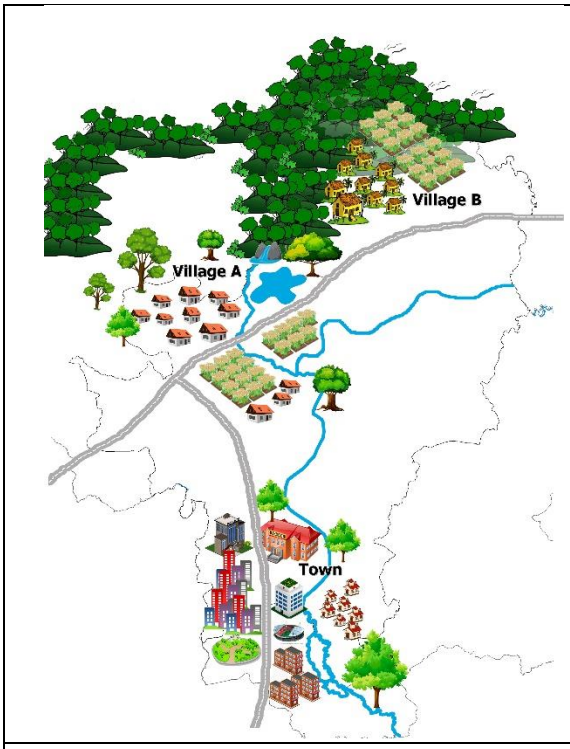
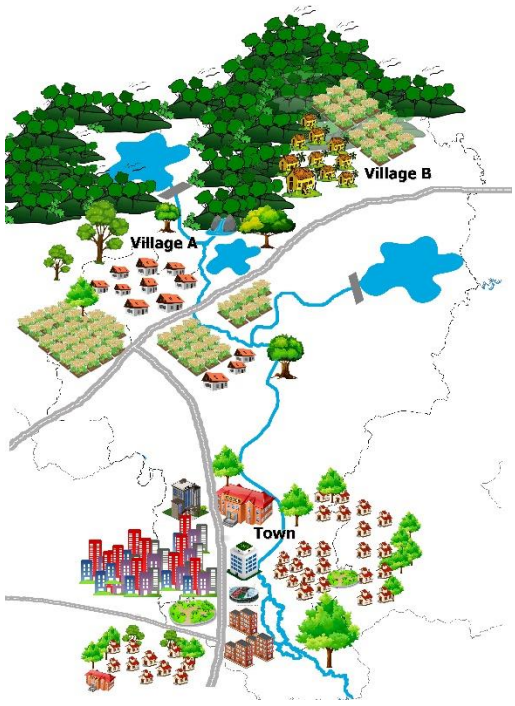
- Strategic development pathway of community to enhance resilience toward future
- Alternative plan to mobilize current community strategy to be in-line with future condition

- Innovative measures or new solutions in risk management to enhance robustness of current risk management plan to cope with future risk

Planning community climate change adaptation

Planning climate change adaptation could start from asking question to challenge the existing community strategy and plan or the way that they are responding to current risks under certain climate pressures, whether those strategies and plans are robust enough for the future or whether they will still be effective solution in the future and seeking for a better way to manage the risk to use in establishing development pathway of the community. Adaptation could be planned for individual or household, or for the community as collective action. It needs to address short-term benefit as well as long-term benefit to justify such action or measure to be taken.

Follows are examples based on the case study.

	
Present	**Future**

Reading document #4

Community A: Rice paddy farmer

Current Risk	*Future risk & concern*	*Adaptation pathway / option*	*Short-term & Long-term benefit*
Reduced household income caused by crop damage from flood in high rainfall year	• Higher risk caused by expansion of rice paddy into flood prone area and higher frequency and magnitude of high rainfall year. • Emerging risk on dry season rice damage caused by limited water supply due to higher demand of water from expanding town.	Income diversification to other agriculture product. • Livestock • Controlled environment farming, e.g. mushroom • Switch dry season rice to crops that use less water	Increase income diversity and opportunity to increase total household income. Also, enhance resilience of community toward future risk.

Community A: Villager

Current Risk	*Future risk & concern*	*Adaptation pathway / option*	*Short-term & Long-term benefit*
Household damage from flood Reduced household income from low fish capture in the dry year	• Lower risk on household damage from flood by new dam. • Higher risk on reduced household income from reduced fish stock in natural habitat as impact from the new dam.	• Implement fish sanctuary in the river to maintain fish stock • Aquaculture in dam reservoir and high intensity aquaculture in village e.g. snail, eel, frog, etc.	Increase income from higher fishery production. Also, ensure supply for fishery in the long term.

Community B: Hillside rice farmer

Current Risk	*Future risk & concern*	*Adaptation pathway / option*	*Short-term & Long-term benefit*
Reduced household income caused by rice damage from fluctuation in rainy season onset	• Higher risk caused by higher fluctuation of rainy season onset. • Emerging risk from loss of soil fertility which leads to lower rice productivity as rice farming will based on fixed farmland as result of forest conservation policy and higher rainfall intensity in the future.	• Switch agriculture system from rice to other perennial crops.	Perennial crops are more resistance to fluctuation of rainy season onset and help reduce soil erosion in the long term.

Community B: Villager

Current Risk	*Future risk & concern*	*Adaptation pathway / option*	*Short-term & Long-term benefit*
Household damage from flashflood caused by heavy rainfall event. Reduced household income from less NTFP availability caused by prolonged summertime.	• Higher risk caused by higher frequency of heavy rainfall event. • Higher risk on reduced household income due to longer summertime in the future could lower the NTFPs availability and overexploitation of NTFPs by people from outside the village.	• Implementing eco-tourism and homestay as new source of income. • Improve household design/material to cope with more serious flashflood in the future. • Produce NTFP at household e.g., bee farming, etc. • Implementing controlled NTFPs harvesting regulation of avoid over harvesting.	New source of income for villager and improve resilience in both short-term and long-term. The regulation on NTFPs harvesting will guaranty NTFPs supply in the long term.

Mobilizing community climate change adaptation

Once adaptation option has been identified, it is crucial to establish understanding about the enabling factor, the condition or factor that will make the adaptation happen, and critical success factor, the

condition or factor that will make the adaptation success and/or sustain in the long run. This will also help the planner to understand whether such adaptation option can be implemented by community themselves or the assistance from external parties is required.

Follows are examples based on the case study.

Community A: Rice paddy farmer

Adaptation option	*Enabling factor*	*Critical success factor*
Income diversification to other agriculture product. • Livestock	• Capital for investment	• Veterinary care support
• Controlled environment farming, e.g. mushroom	• Capital • Knowledge & know-how • Market demand	• Food processing facility in community • More research for diversity in variety
• Switch dry season rice to crops that use less water	• New established market • Know-how	• Continuous agriculture promotion • Capacity building for local agricultural expertise in crop management • Labor force *(note: this labor intensive could prevent migration)*

Community A: Villager

Adaptation option	*Enabling factor*	*Critical success factor*
• Implement fish sanctuary in the river to maintain fish stock	• Institutional arrangement to control catch quantity / method – fishing gears / season • Add more fish to natural habitat	• Fish breeding facility in community • Zoning – water control in dry season to create fish habitat
• Aquaculture in dam reservoir and high intensity aquaculture in village e.g. snail, eel, frog, etc.	• Capital for investment • Knowledge & know-how	• Access to market • Food processing facility in community

Community B: Hillside rice farmer

Adaptation option	*Enabling factor*	*Critical success factor*
• Switch agriculture system from rice to other perennial crops	• Alternate revenue to support livelihood until tree will be ready for harvesting	• Monitor progress and provide agriculture advisory

	• Need to mix with crops which provide quick return • Know-how on new crop cultivation • Market demand	• Continuous agriculture promotion, which requires institution support, i.e. extension agricultural support unit in community

Community B: Villager

Adaptation option	*Enabling factor*	*Critical success factor*
• Implementing eco-tourism and homestay as new source of income.	• Demand study for proper strategic planning • Tourist promotion • Improve road and access to tourist attraction spots • Capacity building e.g. English speaking, Tourist support / service • Hygiene improvement for home-stay condition – requires investment and capital	• Tourist support facility (natural-look design) • Regulation to ensure environment protection • Regulation / law enforcement to ensure public safety • Waste management • Souvenir (need support in design / quality control)
• Improve household design/material to cope with more serious flashflood in the future.	• Awareness in the increasing risk and needs for improvement	• Capital for investment • Knowledge & know-how
• Produce NTFP at household e.g., bee farming, etc.	• Capital for investment • Knowledge & know-how • Market demand	• Market acceptance • Quality control – grade (certificate) • By product development
• Implementing controlled NTFPs harvesting regulation of avoid over harvesting.	• Proper institution arrangement to issue and enforce the regulation	• Monitoring system for violation in NTFPs collecting

According to this example, many adaptation options require various external supports, either to get them started and to ensure success or sustainable in the long term. The supports needed include advisory, technical support, financial support and institution support from local authority. Understanding the requirement for these external supports will lead to engagement of proper parties to jointly mobilize the climate change adaptation at the community.

Selecting and evaluating adaptation options

Once the adaptation options are identified, it should be noted that in many cases not all of them can be implemented due to some limitation that might impost on particular option. A simple multi-criteria analysis on each option would help planner to understand the constrain and properly select the adaptation option that can be immediately mobilized or pending for proper condition to arise or need to be dropped out.

Following is an example of simple multi-criteria analysis on the adaptation options.

	Capital cost	Timely	Accessible know-how	Accessible / sufficient resources	Technical feasibility	Financial feasibility	Social acceptance	Institutional support	Negative spillover effect
Option 1	High / low	Long / short	Yes / no	Yes / no	Yes / no	Yes / no	Yes / no	Yes / no	Yes / no
Option 2									
Option 3									
Option n									

- Capital cost: Does the adaptation require high investment cost?
- Timely: How long would it take to implement the adaptation?
- Accessible know-how: Is the needed knowledge and know-how available and whether the planner be able to access it?
- Accessible / sufficient resources: Is the needed resources sufficiently available and whether the planner be able to access them?
- Technical feasibility: Is the adaptation option technically feasible under the community context?
- Financial feasible: Is the adaptation financially feasible? Does it provide proper cost-benefit and proper return on investment?
- Social acceptance: Does the adaptation option acceptable according to the cultural believe or fit the norm of the society in the community?
- Institutional support: In case that the adaptation option requires authority support for implementation, e.g. law and regulation, does planner gain proper institutional support from the authority?
- Negative spillover effect: Does the adaptation option cause negative effect to others community?

Answers to these questions will help planner to understand the constrain of each adaptation option and be able to select the option that could be implemented. Please note that the most effective adaptation option that can be best option to manage community risk may have many constrains and may not be able to implement until those constrains have been lifted.

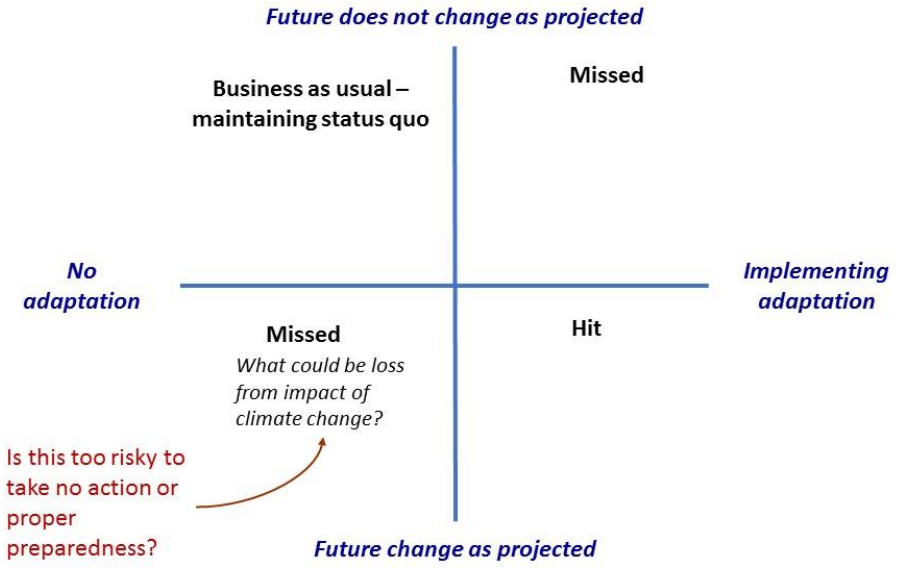
Planner may select few criteria as critical criteria that need to be met in order to select certain options. For example, social acceptance, if such option is against some cultural believe in the community, the option may not be implemented. Or technical feasibility, if the option is not technical feasible within the community context or according to physical constrain of the community, such option may have to be dropped out.

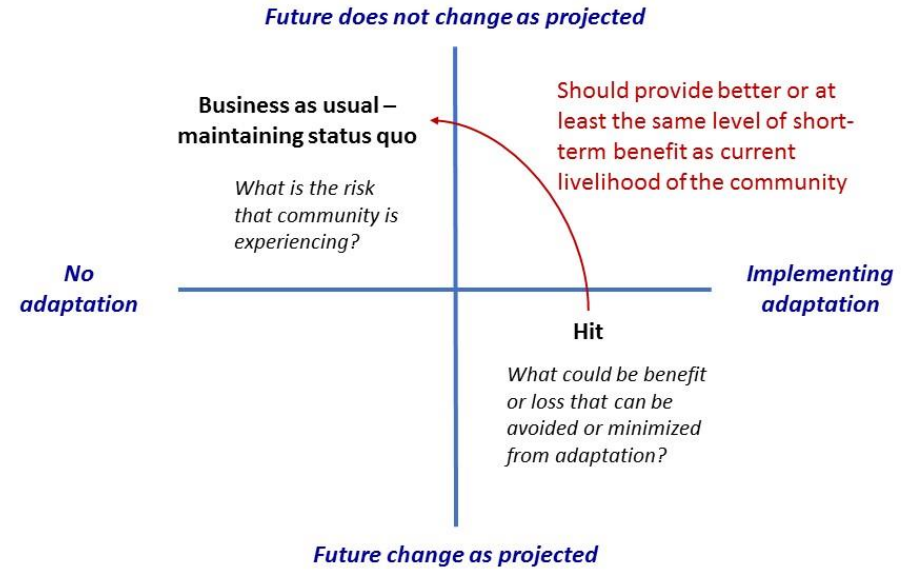
Another aspect in selecting adaptation option is that the adaptation aims to address risk in the long term while community concern about their wellbeing in the short term and expect immediate return for their effort. However, the climate change is an uncertain condition. The projection of climate pattern into the far future is based on certain assumption, especially the level of greenhouse gases in the future. Therefore, the future climate that is used to assess future risk is a hypothetical condition, which may or may not happen at all. In this regard, the adaptation planning has to base on current risk and short term benefit as described, but there could be certain situation that community may

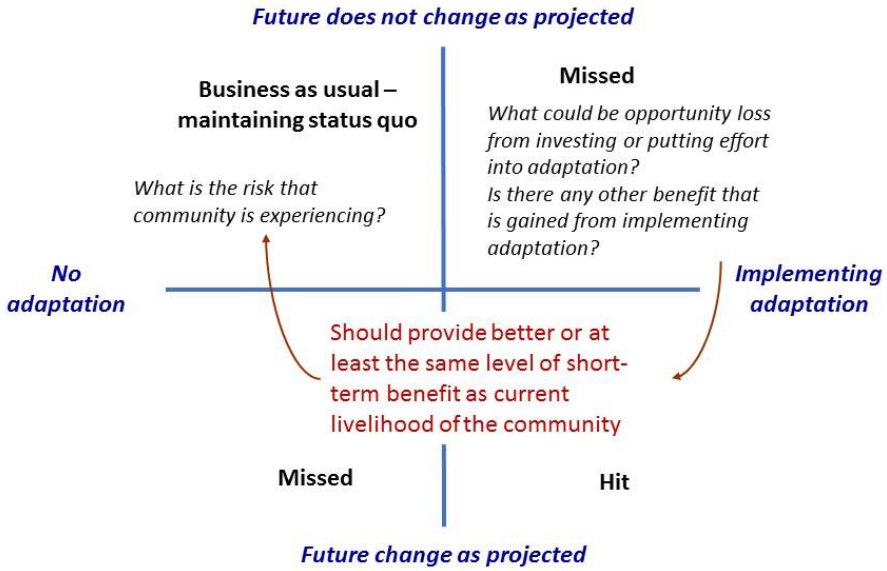
have to make decision on certain choices and making such decision based on uncertainty will become a great challenge to the planner.

One approach to handle the decision making under uncertainty condition of the future is to evaluate benefit on multiple situation under the following framework.

Under this framework, planner may evaluate each adaptation option and weight the decision making under different situation to decide whether such adaptation should be taken or not. Preferable option is the one that can yield benefit under "Hit" condition and "Missed", when adaptation is implemented but future does not change as projected, is at least equal to or have greater benefit than the "Business as usual" situation. In case of "Missed", when no adaptation is taken and future change as projected, the planner should consider whether the risk from loss due to impact of climate change is too risky to take or not.


Future does not change as projected
Business as usual – maintaining status quo
Missed
No adaptation
Implementing adaptation
Missed
What could be loss from impact of climate change?
Hit
Is this too risky to take no action or proper preparedness?
Future change as projected


Future does not change as projected
Business as usual – maintaining status quo
What is the risk that community is experiencing?
Should provide better or at least the same level of short-term benefit as current livelihood of the community
No adaptation
Implementing adaptation
Hit
What could be benefit or loss that can be avoided or minimized from adaptation?
Future change as projected



Analysis under this frame work could base on quantitative analysis, e.g. economic analysis, to give figure in term of money, or just simply qualitative assessment of benefit and loss.

Summary:

The climate change adaptation planning relies mostly on creative thinking about risk management and future of community. It has to base on thoroughly assessment of community context, current risk and future risk from climate change and change in socioeconomic condition. The assessment and the adaptation planning need to engage local stakeholders as they can provide insight about the community and the planning process needs to involve multi-parties. The planner needs to lead the assessment among these stakeholders with solid framework in order to properly interact with each stakeholder and be able to contextualize and form a realistic adaptation plan.