



## **Participatory Scenarios for Sustainable Management of an ASB Benchmark site in Thailand: The case of Mae Kong Kha Sub-watershed of Mae Chaem Watershed<sup>1</sup>**

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### **Abstract**

Upstream/ downstream conflict in most watersheds all over the world, particularly in the Montane Mainland Southeast Asia (MMSEA) ecoregion, is increasing because of increasing deforestation for high input, mono-cropping practices in the upland/highlands and competition for water due to urban and industrial expansion in the lowlands. The Ban Mae Khong-kha, 100 sq. km. lower sub-watershed of the Mae Chaem watershed in Chiangmai, Thailand was selected as one of the Alternative-to-Slash-and-Burn (ASB) benchmark research sites in 1994, as it represents a 'meso-scale' upper tributary watershed of Thailand and the MMSEA. The major conflict here was between the downstream community of Northern Thai (Khon Muang) who accused the upstream Karen (Pgakanyaw) community of practicing subsistence paddy rice cultivation and high-input maize monoculture which caused stream pollution and soil degradation. Various recommendations have been proposed by government, academics, and civil societies working in the area, all of which created uncertainties in terms of securing income and livelihoods for the upstream community. Participatory scenarios for natural resources management and planning (PSNRMP) is a novel technique for 'participatory planning' in which all the stakeholders join in a well-structured discussion on how they want their community to be and what actions should be taken to achieve those goals set by the community while academic/researchers just provide scientific information needed during the planning process. This technique has been used successfully elsewhere in the world, and could be a useful tool for easing the conflict as well as empowering local communities and administrators to participate in planning for sustainable natural resources managements. The purposes of this study were: 1) to conduct a pilot PSNRMP in the project area; 2) to introduce the concept and scenarios process to all stakeholders, the community, decision makers, and researchers; 3) to validate the outcome with the larger scale expert scenarios previously conducted for the watershed; 4) to explore the appropriate mechanisms/ methodologies/logistics for PSNRMP, and mechanism(s) for cross-scale integration with the global ASB sites and 5) to share lessons learnt with ASB and other communities. PSNRMP was conducted according to the ASB-MA guidelines with three well-structured workshops of 25 participants equally distributed to represent all stakeholders and groups of genders, age, ethnic backgrounds, locations along the stream, and all sectors involved in the communities. After the 3<sup>rd</sup> workshop, not only was the upstream-downstream conflict resolved, but also seven recommendations/policies were developed for proposing to the Sub-district Administrative Organization. Some recommendations, especially for conserving natural resources using indigenous knowledge, were different from those suggested by the previous expert scenarios. This study provides not only plausible policies from the community for sustainable management of the Mae Kong Kha Sub-watershed, but also the possibility to validate the larger-scale expert scenarios as well as cross-scale integration for both national and among international ASB sites.

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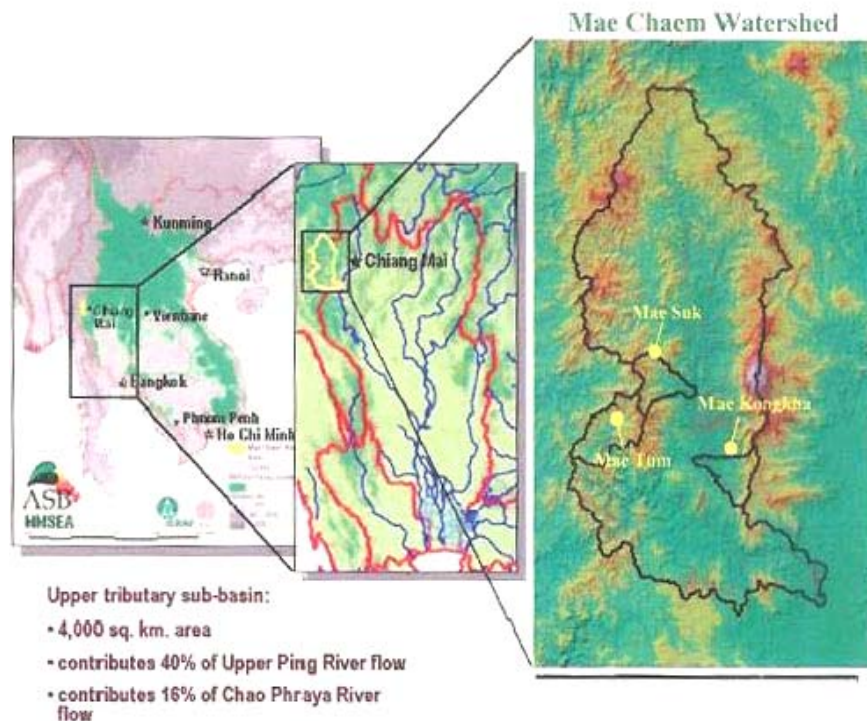
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## **Introduction**

In mountainous watersheds of mainland Southeast Asia, there is specific concern on the land use policy. National governments in the region have placed increasing emphasis on rapid economic development, international trade, and global economic interaction. Many of these mountainous areas are populated by ethnic minority communities located in upper watersheds of important river systems that supply the region's major 'rice bowl' lowland agricultural systems. Dramatic agricultural production increases in lowland irrigated areas have helped spawn rapid growth of nearby urban-industrial mega-cities. Demand for water in the lowland has been growing and become more diversified due to increasing urban populations and their economic and political power, increasing competition for water as well as concern about the longer-term sustainability of water supplies and related environmental services. The tendency has been increasing for lowland societies to look upstream for the source of their growing problems. This has focused more attention on changing land-use practices of ethnic minority communities inhabiting mountainous, upper-watershed regions, who have traditionally based their livelihoods on various forms of shifting cultivation. Government programmes now focus on halting shifting cultivation, substituting commercial sedentary agriculture, and the increasing area under permanent forest cover. Upper watershed minority communities find it increasingly difficult to meet basic food security means when they try to adapt to more traditional land-use systems. Multi-dimensions of policies and management raise conflicts and uncertainty among all stakeholders with different objectives and perceptions on natural resources management practices.

## **Background of the project area**

The Ban Mae Khong-kha, 100 sq. km. lower sub-watershed of the Mae Chaem watershed in Chiangmai, Thailand, was selected as one of the Alternative-to-Slash-and-Burn (ASB) benchmark research sites in 1994, as it represents a 'meso-scale' upper tributary watershed of Thailand and the MMSEA. It is located in the lower area of the Mae Chaem watershed, approximately 12 km from the district town (Figure 1). The upper area of the sub-watershed is located on the same ridge as Doi Intanon, and the sub-watershed is oriented towards the west. The total area is 100 square km. The sub-watershed is inhabited by two ethnic groups. Karen (Pgakanyaw) make up the majority of the population at the higher elevation of the upper and middle parts of the sub-watershed; northern Thai (Khon Muang), the minority group of the sub-watershed, live in the flat, downstream areas. The communities of Mae Kongkha sub-watershed have various land-use practices, according to their livelihood strategies, cultural beliefs, and local needs of each group, as shown in Table 1 and Figure 2. Land-use categories are shown in Table 2 and Figure 2. In the past, the opium poppy was cultivated in the upper areas of the sub-watershed. However, forestry officials, the Mae Chaem Watershed Development Project and the police worked to encourage the villagers to stop planting opium, and replace the area with pine. At that time the villagers practiced only shifting cultivation, in spite of the officials' discouragement. Subsequently, for the past 20 years, areas under shifting cultivation changed into permanent fields. Now, the main commercial crops in this area are feed maize, seed maize, soybeans, shallots, pumpkin, and cabbage. Currently, maize is the most widely planted crop, and the area under seed maize is growing. The major conflict here was between the downstream community of Northern Thai (Khon Muang) who accused the upstream Karen (Pgakanyaw) community of practicing subsistence paddy rice cultivation and high-input maize monoculture which caused stream pollution and soil degradation. Various recommendations have been proposed by government, academics, and civil societies working in the area, all of which created uncertainties in terms of securing income and livelihoods for the upstream community.



**Figure 1: Geographic and geomorphologic map of Mae Chaem Watershed, Chiang Mai, Thailand, in which the project area Mae Kongkha Sub-watershed is located.**

In 1998, Suan Pah Sirikit project had supported the villagers to establish the Mae Kongkha-Mong Luang Watershed Network, which combines natural resources management, livelihoods, and culture in an effort to establish a resources management system that is appropriate for the local communities. Member villages of the network have representatives on the network committee, and have established regulations for the network. The network regulations are based on regulations of the member villages. For example, if there is a case of illegal cutting of logs, the network will handle the problem with internal discussions. Fines and other penalties are decided and handed out by the network itself. Nonetheless, upstream/downstream conflict still exists.

**Table 1: Basic information of the project area Ban Mae Khong Kha sub-watershed**

Village	Mhong luang	Kongka	Omlan	Pha peung	Ommeng	Nayang din	Total
<b>Population (2003)</b>	703	292	345	411	602	257	2,610
Male	374	147	176	209	298	138	1,342
Female	329	145	439	202	304	119	1,538
Households	163	56	83	83	161	61	607
<b>Land Use (% total area)</b>	31.5	11.9	10.3	19.4	7.9	19.1	100.0
Reserved forest (birth, spirit)	19.6	6.5	4.9	11.4	0.5	9.8	52.7
Utilization forest	3.3	2.0	1.5	1.6	0.7	4.9	13.9
Rice field	0.8	0.6	0.8	0.7	1.1	0.1	4.1
Field crop	7.5	2.6	2.8	5.5	5.2	4.2	27.8
Residential	0.4	0.2	0.3	0.1	0.4	0.1	1.5
<b>Climate (2002)</b>							
Temperature (°C) : Max	29.3	29.65		33.11		33.68	
Min	18.53	17.29		19.51		16.26	
Average Relative Humidity (%)	85.41	70.14		84.54		87.95	
Rainfall (mm)	1950	1971		1139		791	

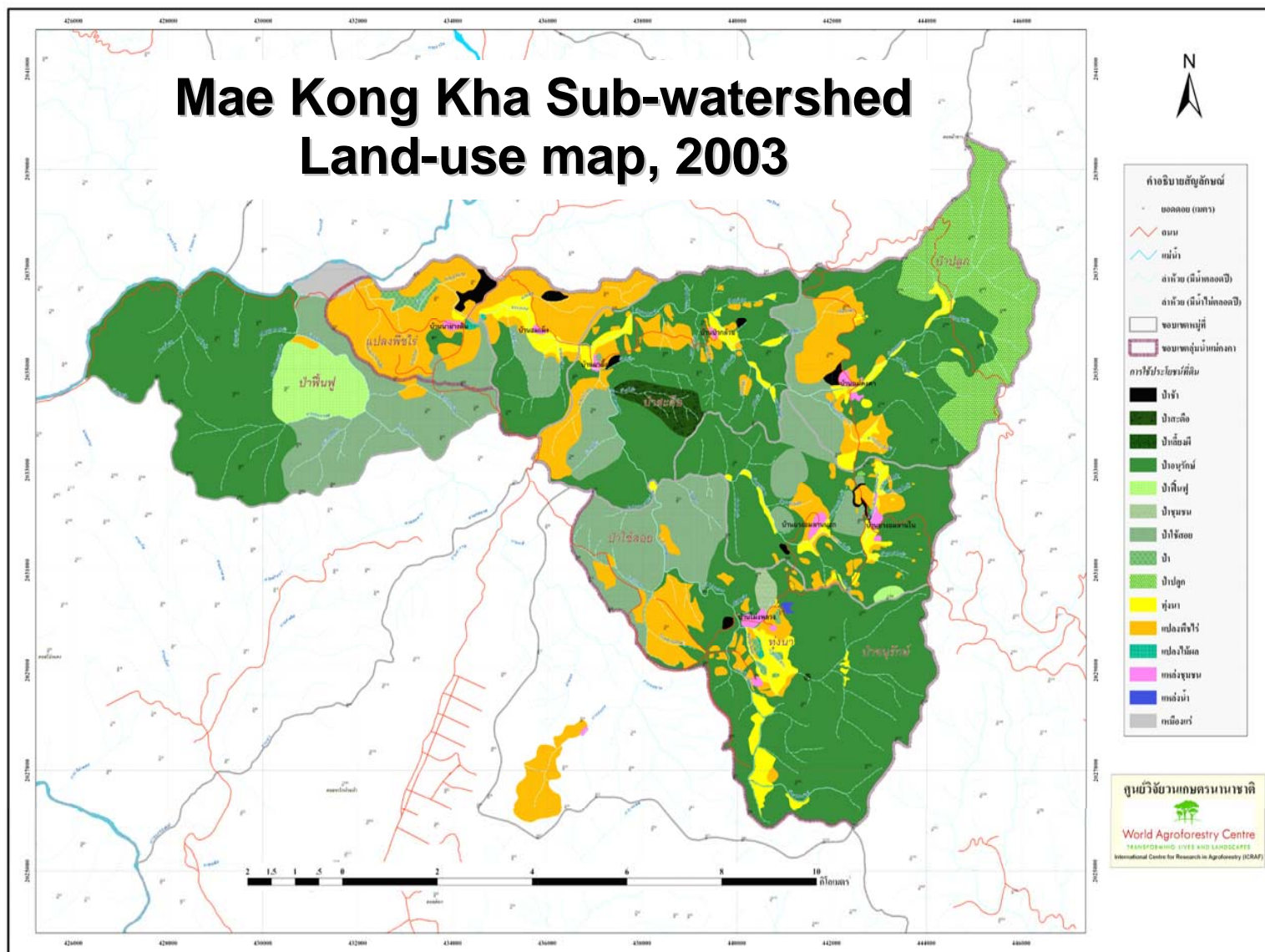


Figure 2. Land-use map of Mae Kong Kha sub-watershed established by ICRAF and the community.

## Scenarios: Definition and purposes

A scenario is a story that offers an internally consistent and plausible explanation of how events unfold over time (Gallopín et al. 1997; Raskin et al. 2002). Sequences of events and interactions, rather than specific timescales, are usually emphasized. Decision-makers in the business community and elsewhere have employed scenarios, or sets of stories about the future, for several decades as an approach to making decisions in the face of uncertainty (Chermack et al. 2001; Coates 2000; Davis 1998). Scenarios are generally useful for encouraging systematic planning in situations of uncertainty (van der Heijden 1996) or revealing a range of dynamic processes and causal chains that lead to alternative outcomes (Rotmans et al. 2000). The intention of scenario planning is to consider a variety of possible futures that include the important uncertainties rather than to focus on the accurate prediction of a single possible future (van der Heijden 1996, Peterson et al. 2003b). Scenarios were first used after World War II as a method for war game analysis (van der Heijden 1996). Their value was quickly recognized by Herman Kahn (Kahn and Weiner 1967) and others who developed the use of scenarios for other strategic planning applications. Scenarios were refined at Royal Dutch/Shell by Pierre Wack in the 1970s and 1980s, and Shell became a leader of the scenario approach in business planning. Today scenario development is used in a variety of different contexts ranging from political decision-making (Kahane 1992, Kahane 1998), to business planning (Wack 1985, Schwartz 1996, Davis 1998), to local community management (Wollenberg et al. 2000, Peterson et al. 2003b) and global environmental understanding (Gallopín et al. 1997, Cosgrove and Rijsberman 2000, IPCC 2001, UNEP 2002, van Notten et al. 2003). Unlike other decision-making techniques such as prediction, forecasting, and other single future outlooks, scenarios are a cognitive, and imaginative mechanism of decision-making that use more holistic, integrated and participatory approaches to illuminate the intrinsic heterogeneity and complexity of ecosystem management. Scenarios extend prediction and forecasting methods to provide additional and relevant alternatives to help decision makers to think, talk, plan and act imaginatively in pursuing a more sustainable society. (Lebel et al, 2005).

Usually, scenario planners start by determining a set of focal questions or issues in conjunction with their primary stakeholders. This is followed by assessing the current state of a system and identifying alternative pathways that the system might take (Peterson et al. 2003b). The focal questions often revolve around the key uncertainties or unknowns in the system. The next step is to build storylines by projecting these questions into the future, which can be done either qualitatively or quantitatively. For complex systems, various methods can be used in an iterative procedure (Alcamo et al. 1998). For ecosystem assessment, scenarios are seen as a fundamental prerequisite for strategic thinking and planning. In this context, scenarios are used to facilitate strategy formulation and evaluation, develop an understanding of the uncertainty inherent in ecological systems, and test the robustness of any strategies against a set of possible futures (Lebel et al, 2005). Participatory scenarios for natural resources management and planning is a novel technique for 'participatory planning' in which all the stakeholders join in a well-structured discussion on how they want their community to be and what actions should be taken to achieve those goals set by the community while academic/researchers just provide scientific information needed during the planning process (Table 1). At the present, as Thai government encourages decentralization and community participation in self-governance via the Tambon<sup>3</sup> Administrative Office (TAO), the participatory scenario might be a promising approach not only to ease this conflict but also to empower communities and local administrators for participatory planning.

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<sup>3</sup>'Tambon' is a Thai word for 'Sub-district'. Tambon Administrative Office (TAO) is a community governing body elected from all population in a Tambon to formulate all development plans & budgets for that Tampon according to the need of its community. It is considered as the grass-root unit of democratic, self-governing organization, by the people for the people.

**Table 2. Steps in the Scenario Development Process** (from Bennett & Zurek, 2004)

When	Step	Who
Before first workshop	Decide on purpose of scenario and stakeholder involvement	Core team in consultation with main stakeholder groups
At first workshop	Icebreaker: Getting people to think about the long-term future	Stakeholder group with core team facilitation
	Introduce the concept of scenarios	Core team
	Back casting (revisiting history) exercise <sup>a</sup>	Stakeholder group with core team facilitation
	Identify main areas of uncertainty <sup>a</sup>	Stakeholder group with core team facilitation
	Develop focal questions to be addressed by scenarios <sup>a</sup>	Stakeholder group with core team facilitation
	Identify main drivers of change <sup>a</sup>	Stakeholder group with core team facilitation
	Develop first set of storylines	Stakeholder group with core team facilitation
	Decide on modeling capacity	Stakeholder group and core team
Between workshops	Prepare documentation material of first workshop	Core team
	Model runs	Modeling teams
At the second workshop	Critically assess storylines and incorporate model results <sup>a</sup>	Stakeholder group with core team facilitation
	Identify important surprises <sup>a</sup>	Stakeholder group with core team facilitation
	Identify implications of scenarios for the main stakeholder groups in the area	Stakeholder group with core team facilitation
	Decide on final storylines	Stakeholder group with core team facilitation
	Evaluate the implications of each scenario for addressing identified uncertainties	
<i>Optional</i>	Wider stakeholder feedback session and scenario iterations	Core team facilitation
After workshop	Final write up of scenario storylines and their implications	Core team
	Dissemination of scenarios write-up	Core team

<sup>a</sup>The sequencing of these steps can vary.

Therefore, the purposes of this study were: 1) to conduct a pilot PSNRMP in the project area; 2) to introduce the concept and scenarios process to all stakeholders, community, decision makers, and researchers; 3) to compare the outcome with the larger scale expert scenarios previously conducted for the watershed; 4) to explore the appropriate mechanisms/ methodologies/logistics for PSNRMP, and mechanism(s) for cross-scale integration with the global ASB sites and 5) to share lessons learnt with ASB and other communities.

## Conducting Participatory Scenarios

Pilot participatory scenarios for Mae Kong Ka Sub-watershed of Mae Chaem Sub-basin were conducted according to the guideline shown in Table 2. The vision narrative storylines method was used due to its simplicity which might easily be adopted later by the community (Wollenberg et al. 2000). A core team was set from Thai researchers who had undergone Training as Scenarios Facilitators organized by ASB-MA and ICRAF in September, 2004. There were 5 members, 3 were national research scientists closely involved with the project site and the other 2 were well-trained natural resources management researchers with a good knowledge of the site but new to the area and suitable as the outside facilitators. The team met and planned the whole activities from compiling all available data and policies involved, selecting stakeholders, formulating structure and logistics of all the workshops, as well as communicating with the local community.

## **Stakeholders selection, ethical considerations, and communication**

Twenty five participants were strategically selected and equally distributed to represent all main stakeholders and groups of genders, age, ethnic, and all sectors involved in the communities. It was, therefore ensuring usefulness and legitimacy of the assessment, and representing the hopes, fears, and insights of diverse groups, especially those that often are under-represented in social discourse. In addition to the two TAO Chief Executives and councils members, there were Head of the six villages; 2 representative of males, females and youth from each village; 4 local NGO representatives; district government official, provincial representatives from Department of Agriculture, Ministry of Natural Resources and Environment and Forestry Department; representative from Co-operatives which is local financial institution; and 3 resource persons from relevant research institutions (CMU, ICRAF, etc.).

About a month before starting the first workshop, all communities involved will be informed about objectives of the scenarios activity and be encouraged to prepare themselves thinking about their concern, fear, hope and ideas for their future. During the workshops, the facilitators will use all possible techniques to ensure full and equal participations of all participants. After all workshops, report will be disseminated to all participants as well as their communities and other ASB partners.

## **Scenarios workshops**

### ***The first workshop***

After one month the preparation period, the **first one-day-scenarios workshop** was conducted to introduce scenarios concept to all stakeholders. Techniques for icebreaking, role switching and future visualization by selecting favourite pictures were used to accustomize all participants for being more opened and sharing ideas. The unexpected-overacheived outcome of this workshop was that most participants were enthusiastic and lively to join the discussion on their problems, concern, hope and fear. Besides increasing population, low income and well-beings for the present and future generations, uncertainties about government development policies especially on forest and natural resource management and land title were their highest concern. Resource persons supported the group with technical information regarding status of the decreasing forest, soil qualities and quality and and quantity of water. Participants also suggested on the date and participants who should be involved in the real scenarios workshop.

As a consequence, the three following **focal questions** had been formulated:

- 1) How to reduce deforestation and increase reforestation?
- 2) How to maintain and sustain annual water quality and quantity for the whole basin?
- 3) How to provide well-being for the increasing population with minimum depletion of forest and maximum sustainable natural resources management?

Another one day follow-up workshop was conducted a month after the first one to explain and illustrate example of scenarios exercise conducted elsewhere for better understanding and preparation of the real scenarios exercise.

### ***The second scenarios workshop***

A two-days workshop to conduct scenarios was followed one month after the follow-up workshop (delayed due to a funeral ceremony in one of the villages). The meeting room was set to mimic the basin map and all participants were arranged to sit according to the geographical location of their villages in the basin, with resources persons at the back. It was started by the the elders revealed history of the area and stautus of the forest in the past, then the youngers stated their current livelihoods, fear and hope for the basin future. In conclusion, they agreed that the problems in the basin were:

- reducing forest area
- declining of non-timber products such as bamboo shoot, wild mushrooms, fishes in the stream, and the absence of wildlife

- declining of soil fertility resulting in low crop yield and high production cost
- increasing population resulting in less land for agriculture
- more frequent flood and drought
- low income and increasing expense due to modern development
- declining livelihoods and well-beings
- lack of legal land title
- losing cultural identities
- upstream/downstream conflict due to competition for water

This last problem was tactfully addressed using the facilitator technique to generate dialog among upstream, mid stream and downstream communities. Admitting that all parties had equally caused damages, this problem was eased and better co-operation would be forthcoming.

### ***Identifying drivers***

From identifying all the problems, drivers of changes were discussed and identified as follows:

- Direct drivers: - population pressure, either from within the basin or migration
- increasing expense to keep up with modern development
  - decreasing natural resources (soil, water, land, forest) quality and quantity
  - lack of knowledge on sustainable and/or alternative agriculture practices
  - lack of education opportunity

- Indirect drivers: - law and regulation on community forest
- law and regulation on land title

### ***Developing storylines***

After revisiting all the elements in the focal questions and considering problems, concern and hope, three visions for the next 20 years of the basin were drafted out as follow:

- S1:** With the existing rate of population increase, more forest will be cut down for high input agriculture. Crop yield and income might be increased in the first few years, but will later decline and thus chemical fertilizer and pesticides use will increase. As a consequence, quality and quantity of forest, biodiversity, and soil and water resources will deteriorate as well as livelihoods and well-beings. With existing law, they might be punished for illegal logging.
- S2:** With more external influence from the modern society, people will change from agroforestry and adopt urban lifestyles, working in the nearby town for more stable income, establishing other activities such as conventional tourism, selling or surrendering land to professional resort investments (either legal or illegal), and working as employees. More youngsters will move to town for trade and/or casual labour jobs. More income may be generated, but living costs and expenses will increase and exceed earnings. As a consequence, the landscape will be changed, natural resources may or may not be depleted but communities will lose the right for self natural resources management and conservation, as well as independent livelihoods and well-being, self-esteem and cultural identity.
- S3:** More alternatives and sustainable, diversified activities, adopting organic farming or other high-value crops with less land required, using indigenous knowledge and beliefs to conserve forest and natural resources, and biodiversity, reforestation using native plants, and established eco- and cultural tourism to generate more incomes, and more self-awareness, co-operation and participations within the communities. As a consequence, landscape and natural resources will be restored in good status, man and forest will be co-inhibited, independent livelihoods and well-beings, self-esteem and cultural identity will be sustained, and be compliant with whatever the law and/or regulation changes are made.

All participants agreed that S3 was the best, desirable scenario.

### **Drafting strategic recommendation**

The group then proceeded to draft policy recommendation to achieve this vision for the sub-watershed future as follows:

1. Establish local regulations, through the committee of sub-watershed network, to oversee the sharing natural resources (soil, water and forest);
2. Promote natural resources conservation using indigenous knowledge and beliefs, such as birth spirit and spirit forest, establish fire protection corridor;
3. Use native plants and traditional measures to protect soil erosion and restore water quality;
4. Establish 'Farmers Group' for production and marketing planning, and acquire new technique for diversified, sustainable and organic agriculture. Acquire & adopt higher value, lower input farming activities that deplete less natural resources;
5. Establish eco- and cultural tourism to generate supplementary incomes as well as to help protect environment;
6. Preserve natural fishes and prohibit use of poison for fishing;
7. Establish strategies to promote better livelihoods and well-beings especially for education and health.

These recommendations will be submitted to the TAO and the Mae Kongkha-Mong Luang Watershed Network to be adopted as the future workplan.

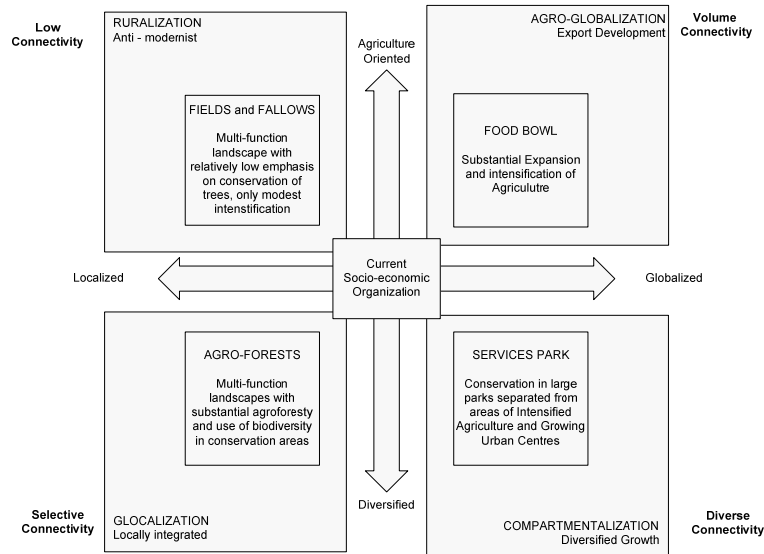
### **Reflections from the participants**

After the 3<sup>rd</sup> workshop, participants expressed their satisfaction on resolving the upstream-downstream conflict, as well as increasing their ability for self-planning. At the beginning of the exercise, the major problems that they always addressed were 'no help from the government', 'not enough officials interest' and 'no legal entity to the land and community forest bill'. These are still considered to be the main problems, but they now considered that there were something they still can do without them and what strategy to use to get attention for those problem.

### **Cross-scale scenarios comparison**

An attempt to project how plausible futures might be unfold under certain development policies was made using 'soft model' to construct the 'expert scenarios' for the whole basin level (Tomich & Palm, 2004; Lebel, 2004). The four scenarios were drafted out by experts using a land-use change model and data, and considering globalization, international trade, connectivity, and system resilience as the main drivers and uncertainties. It was suggested that the 'SERVICE PARK' scenario would make Chiang Mai continue to win as a regional hub for tourism while the 'AGRO-FORESTS' scenario, although being more resilient, might not serve well for globalization and international trade.

Our participatory scenarios were done without disclosing these expert scenarios to all participants to avoid prejudice and expert-domination, and to accelerate free participation from the villagers. Comparing our scenarios to these expert scenarios, similarity in storylines could be drawn. The S1 could be comparable to 'FIELD and FALLOWS' and 'FOOD BOWL', S2 to 'SERVICE PARK', and S3 to 'AGRO-FOREST'. However, favouring S3 to S2 by our participants illustrates the difference between decision makers in different scales, and the recommendations, especially for conserving natural resources using indigenous knowledge, were different from what suggested by the previous expert scenarios. This is due largely to the different main drivers and uncertainties considered important at different scale, as local decision makers mostly focused on endogenous drivers while exogenous drivers were focused more by



**Figure 3** Expert scenarios for Mae Cheam River Basin using soft model (Lebel, 2004)

decision makers working at larger scales. **Most importantly, this finding will complicate, and even make it impossible, to direct down-scaling of the larger scale scenarios to use in the smaller scale cases, and vice versa.** This is confirm the finding of the MA Subglobal Assessment that in fulfilling effective natural resource management and achieving total participatory planning or policy draft, complementary local participatory scenarios would be more realistic and possible to implement at the local scale that the scenarios generate in the global/national/regional scales (MA, 2005; Capistrano et al, 2005; Lebel et al, 2005).

## Conclusions

This study provides not only plausible policies for the community for sustainable management of the Mae Kong Kha Sub-watershed, but also the possibility to validate the larger scale expert scenarios. As the scenarios work of the other ASB benchmark sites is still on-going, multi-locational comparison will be done in near the future. Expert scenarios exercise, although providing useful preliminary trend for future planning for the national or regional scales, was conducted in the scale too large to deal with heterogeneous issues for each local community within the watershed, as well as lack of participation from the local community. Conducting the participatory scenarios exercise at a smaller scale would be more useful, not only for addressing views of the whole community but also for validating the robustness of those expert scenarios as well as exploring the possibility for cross-scale scenarios integration.

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