Results Measurement Framework for pilot sub-basins

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1. Conceptual foundation for sub-basin monitoring and evaluation

This chapter sets to context for sub-basin results-based measurement systems. It begins by presenting a brief review of basic theories and conceptual approaches underlying monitoring and evaluation, and trends toward results-based approaches. This is followed by discussion of outcome monitoring and measurement, and sources of variation that can be expected in approaches to monitoring and evaluation in pilot and other sub-basins. These considerations are incorporated into the framework for sub-basin monitoring and evaluation presented in the next chapter. Following chapters explore how results-based measurement relates to current sub-basin plans, roles for major stakeholder groups, and needs for capacity building.

1.1. Basic evaluation theories and conceptual approaches

A recent study of the historical evolution of evaluation theory [Alkin & Christie 2004] concludes that all modern lines of evaluation theory have evolved from a combination of two lines of concern: (1) ***Accountability*** requires people to take responsibility for their actions. It includes elements of reporting, explanation and justification, but also goes further to include decision maker responsibility for goals, processes, and outcomes of their actions. (2) ***Systematic social inquiry*** centers on study of the behavior of groups of individuals in various contexts and using a variety of methods. Different approaches reflect very longstanding debate about which types of methods are most suitable for such studies. An important element of this debate involves the degree to which physical science methodologies can be applied to social phenomena, or whether qualitative or more subjective methods are more appropriate.

Building on these common concerns, evaluation theories have tended to develop through time in three major directions:

- ***Systematic methods oriented theories*** maintain an emphasis on well designed experimental studies in research, but have moved largely in the direction of 'objectives based measurement'. Much attention has been given to internal and external logical structure of programs, and to methods for comparing actual outcomes to program objectives. Some even advocate articulating the 'theory' of a specific program so that it can be compared with actual implementation. The role of evaluation is seen more as a means to increase knowledge of decision makers than to provide more direct help in improving their management decisions and processes.
- ***User decision oriented theories*** shift emphasis more directly to processes of decision making and organizational change. While some of these theories focus mainly on the information needs of program managers, others also seek to make the information useful to a broader range of stakeholders. There is also emphasis on directly involving information users in the evaluation process, and on monitoring and measurement systems that can provide an ongoing continuous flow of useful information.
- ***Value or judgment oriented theories*** place emphasis on making judgments about what is good and bad, or right and wrong. Many of these theories place strong emphasis on independent judgment by an evaluator. Some also recognize that there are many points of view among stakeholders, as well as political relationships that lead to needs for 'empowerment' of disadvantaged groups. The 'naturalistic' approach[1] is based in the concept that all individuals 'construct' their own reality. Thus, evaluation

[1] which is also known as 'constructionist' or 'fourth generation' evaluation theory [Guba & Lincoln 1989].

should try to help different groups of stakeholders negotiate a joint construction of reality, which is then used as a basis for making their own judgments about the quality of programs.

In sub-basin management, there are numerous types and levels of stakeholder and management decisions that can benefit from information derived from monitoring and evaluation. The evaluation framework proposed under this project places emphasis on providing information that is useful for managing, assessing and improving programs of river sub-basin management organizations (RSBOs). At the same time, however, it seeks to compare program outcomes with objectives specified in logically constructed plans. It also aims to provide information on different stakeholder points of view to help assist negotiation of a consensus about the directions and effectiveness of sub-basin management programs, and to help give more 'voice' to views of poor and disadvantaged groups in making policy and management decisions.

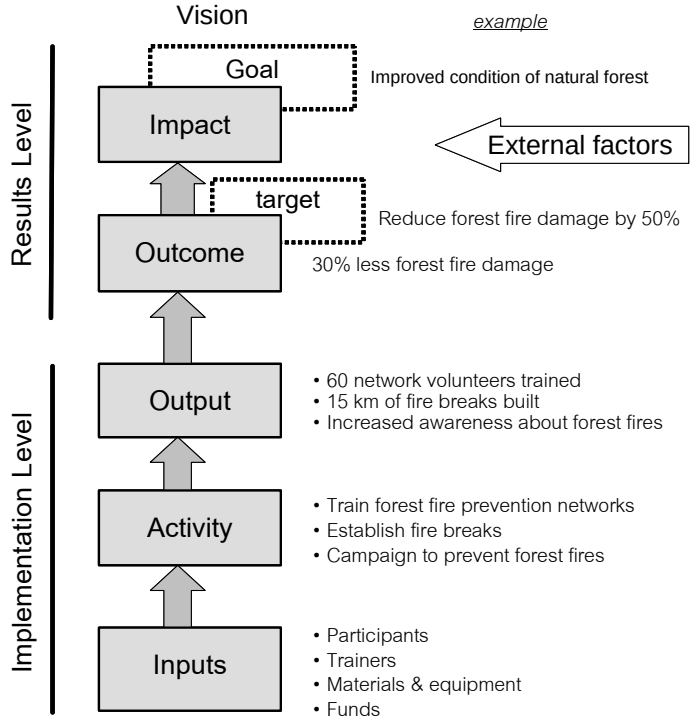
1.2. Trends toward performance and results-based monitoring and evaluation

In this era of globalization, there are growing pressures on governments and organizations around the world to respond to demands of both internal and external stakeholders for good governance, accountability and transparency, more development effectiveness, and delivery of tangible results [Kusek & Rist 2004]. Stakeholders who want better performance include governments, parliaments, citizens, the private sector, nongovernmental organizations (NGOs), civil society, international organizations, and funding organizations. Results-based monitoring and evaluation of policies, programs and projects are seen as an important tool for helping to achieve these goals.

Results-based management[2] requires movement from traditional implementation-based approaches focused on project monitoring and evaluation, into the newer area of results-based approaches. The central question in a results-based approach is 'so what?'. In other words, governments or organizations may successfully implement projects, plans or policies, but have they actually produced the intended results? How do people know how much progress is being made toward longer-term goals desired by stakeholders?

A basic example of elements of results-based approaches is shown in Figure 1. Example information is for a project aimed at improving the condition of natural forests by

Figure 1. Logical chain of results-based management



Source: adapted from Kusek & Rist 2004, p.18

[2] Also known as 'managing-for-results', 'performance-based' management, or other similar terms

reducing damage caused by forest fires, through a set of training, action and public education activities.

The lower part of the figure shows implementation components of the management process, including the planned activities, the inputs they use and the outputs they produce.

Results components are in the upper part of the figure. The outcome is the actual change in conditions that are linked with activities and their outputs, in this case a 30 percent reduction in damage from forest fires. The outcome is assessed through comparison with targets that projects have set for themselves, which in this case was a 50 percent reduction in forest fire damage. The impact is the extent to which the outcome helps achieve the higher level goal toward which the activities are aimed. In this example, the goal is improved condition of the natural forest. Higher level goals usually need to be achieved through several lines of activity. In our example, they might include reduced hunting, logging, land clearing, etc. Thus, impact assessment is usually in terms of contribution toward achieving the goal. For both outcomes and impacts, there are likely to be various other factors that also influence the degree to which targets and goals are achieved. In our example this might include unusual rainfall, changes in forest policy or economic conditions, etc.

The most prominent tool used for summarizing and presenting this type of logical structure is the Logical Framework matrix. Its basic components are shown in Figure 2. The vertical logic of the table reflects the components shown in the left side of Figure 1, while the horizontal logic shows how progress can be assessed, as well as assumptions and risks.

Figure 2. Typical Logical Framework format

	Narrative summary	Objectively verifiable indicators	Means of verification	Assumptions and risks
Results	**Goal** – the overall aim to which the project is expected to contribute	Measures (direct or indirect) to show the project's contribution to the goal	Sources of information and methods used to show fulfillment of the goal	Important events, conditions or decisions beyond the project's control necessary for maintaining the progress towards the goal
	Outcomes (or objectives) – the new situation which the project is aiming to bring about	Measures (direct or indirect) to show what progress is being made towards reaching the objectives	Sources of information and methods used to show progress against objectives	Important events, conditions or decisions beyond the project's control, which are necessary if achieving the objectives is going to contribute towards the overall goal
Implementation	**Outputs** – the results which should be within the control of the project management	Measures (direct or indirect) to show if project outputs are being delivered	Sources of information and methods used to show delivery of outputs	Important events, conditions or decisions beyond the project's control, which are necessary if producing the outputs is going to help achieve the objectives
	Activities – the things which have to be done by the project to produce the outputs	Measures (direct or indirect) to show if project activities are being completed	Sources of information and methods used to show that the activities have been completed	Important events, conditions or decisions beyond the project's control, which are necessary if completing activities will produce the required outputs
	Inputs	Resources – type and level of resources needed for the project Finance – overall budget Time – Planned start and end date		

Source: after Blakewell 2005, p. 3

Figure 3. Major components of the results-based Logical Framework Approach (LFA)

1. Identifying clear and measurable objectives (results), assisted by logical frameworks.
2. Selecting indicators that will be used to measure progress towards each objective.
3. Setting clear targets for each indicator, for use in judging performance.
4. Developing performance monitoring systems to regularly collect data on actual results.
5. Reviewing, analyzing and reporting actual results in comparison with the targets.
6. Integrating evaluations to provide complementary performance information not readily available from performance monitoring systems.
7. Using performance information for internal management accountability, for learning, and for decision-making processes, and also for external performance reporting to stakeholders and partners.

Source: Blakewell 2005, p. 4-5.

Use of the Logical Framework matrix (or "Logframe") to summarize the basic structure of a project or workplan is a very widespread practice around the world. While its use has been strongly promoted by international donor institutions, it is also widely used in national institutions and large organizations, including the government of Thailand.

But the logical framework matrix is intended to be used as only one tool in what is known as the Logical Framework Approach (LFA). Seven important components of this approach are listed in Figure 3. The LFA is concerned with wider planning procedures of problem analysis, development of objectives and indicators, and identification of risks and assumptions, as well as how they are used to help build the overall program plan [Blakewell 2005]. At least in principle, this type of program planning should be based in participatory development of a consensus among a wide range of stakeholders on a program of work, which can then be summarized in a logical framework matrix.

The components of this overall approach are very similar to elements of many types of performance and results-based management approaches that are currently being used by efforts to improve public sector programs around the world. For example:

- ***Strategic planning*** (or results-oriented planning) relates to the first 3 components.
- ***Performance measurement*** includes the first 5 components.
- ***Results-based management*** systems combine all 7 components.

While these planning and management approaches are very common, there are also two major types of criticisms about them [Blakewell 2005]. The first type of criticisms tend to center on ways that the logframe matrix is used, rather than on the concepts and processes that LFA seeks to promote. For example, sometimes the logframe is used in making a 'contract' between a project implementing organization and its funding agency. This can result in the logframe being seen as a 'blueprint' for project implementation, resulting in loss of flexibility to be able to respond to unforeseen issues, problems or opportunities that emerge during the project. Similarly, if large amounts of time and resources have been invested in participatory activities focused on development of the logframe, agreement on any changes during implementation may be very difficult.

The second type of criticisms are mainly directed toward the very simple type of logic used in both the Logframe and the LFA. Many argue that the real world is much more complex than what is explained by the simple categories of information contained in this approach. Truly meaningful development requires a very responsive, adaptive, and experimental approach that integrates learning and change during implementation of a project or program. This can result in pathways of change that are much more complex and often more indirect than what is usually reflected by information in a logframe or a results-based (LFA) approach.

Despite these criticisms, use of the logframe and the results-based (LFA) approach is very common and continues to expand. Since no feasible alternative methodology has been proposed by critics, many people, especially in government and larger organizations, see the logframe and results-based approaches to be the best available tools to help them organize their work, improve the performance of their management systems, and document their progress and problems for concerned stakeholders. Thus, many efforts are being made to help the process become as participatory, responsive and flexible as possible.

Much of the literature available on results-based management for public sector organizations is aimed at programs seeking to promote greater accountability and efficiency in national level government. Many of these publications are supported by international development banks or bilateral donor organizations, who are mainly concerned about management of the national development programs that they support. While there is a substantial amount of information in this literature that could be useful for RSBOs, much of it needs to be reinterpreted for application by sub-basin level organizations. In addition, there is also a growing literature emerging from work with and by nongovernmental and community-based organizations. Some of this literature may be more directly useful for RSBOs.

1.3. Outcome measurement and monitoring

Outcome measurement and monitoring are the heart of components 4 and 5 of the results-based LFA approach (Figure 3). But components 1 to 3 are required to establish a meaningful outcome measurement and monitoring system, and components 6 and 7 are required to make the information provided by outcome measurement and monitoring become useful for the stakeholders involved in the program. Thus, useful outcome measurement and monitoring can only be conducted within the context of an overall results-based management system.

Some of the actions required by results-based management that many people often claim are the most difficult include: formulation of clear and measurable outcome statements (component 1), selection of indicators to measure progress (component 2), and setting clear targets for each indicator (component 3). Measurement of progress also requires establishment of baseline data for each indicator, and this can also be difficult. Thus, it should not be surprising that components 1 through 5 have become the focus of a specialized field of work known as ‘performance measurement’.

One of the leaders in thinking and assistance related to performance measurement defines it as measurement on a regular basis of the results (outcomes) and efficiency of services or programs [Hatry 1999]. This concern with both efficiency and effectiveness can be seen in many activities aimed at improving performance of agencies in the government of Thailand, which has been receiving advice from international leaders in this field for at least a decade [Hatry 1996]. Recent years have also seen many international efforts to apply performance measurement in non-profit non-governmental organizations. This has resulted in various guides and handbooks, such as those published by the Urban Institute [Morley et al 2001;

Hatry & Lampkin 2001; Hatry et al 2003, 2004; Lampking & Hatry 2003] and the United Way [1999, 2002ab, 2005ab].

Hatry [1999] acknowledges that a major use of performance information is to help agencies and organizations develop and justify budget proposals. But he emphasizes that performance information is at least as important to help managers manage their work throughout the year. Public and private managers often say that performance information will not help them because their problem is too few resources to do what needs to be done. Yet they need performance information to tell them how to increase their ability to get the job done with the resources they have, as well as to provide evidence to the budget decision makers that they are indeed making good use of their resources.

A results-based approach places strong emphasis on developing objectives and indicators for the results level, as shown in Figures 1 and 2. It is important to note, however, that monitoring of indicators at the implementation level is still required to provide information that is very important for assessing performance in results-based management systems. Furthermore, performance measurement must be linked with evaluation, reporting, and use of findings if the overall system is to function properly.

The Organization of Economic Cooperation and Development (OECD) [2002] has defined monitoring and evaluation as:

- Monitoring centers on the continuous systematic collection of data on specified indicators to provide managers and stakeholders of an ongoing development activity with indications of progress in achieving objectives and in the use of allocated funds.
- Evaluation is the systematic assessment of an ongoing or completed project, program, or policy, including its design, implementation, and results. The aim is to determine the relevance and achievement of objectives, as well as development efficiency, effectiveness, impact, and sustainability. An evaluation should provide information that is credible and useful, so that lessons learned can be integrated into the decision making process of managers, project leaders, and funding sources.

In order to help bring together these various lines of thinking and experience into a useful format, the World Bank has recently published a handbook on what needs to be done to build an effective results-based monitoring and evaluation system [Kusek & Rist 2004]. The handbook describes a 10 step process that is summarized in Figure 4, together with a simple key question to be answered through activities conducted under each step.

This handbook is primarily directed toward development of systems by national governments. The steps and basic recommendations are very relevant, however, for many types and levels of organizations. It would be very useful to have another version of this handbook that uses examples that would be more directly relevant for organizations at more local levels, such as RSBOs.

If outcome measurement, monitoring and evaluation are to be fully integrated into the management system of an organization, it is very important to have high levels of stakeholder participation in all major types of activity. Since participation by local communities, groups and networks are an important reason for developing sub-basin organizations, strong efforts should be made to develop and apply tools to make their participation as effective as possible in activities that include:

Figure 4. Ten Steps to building a results-based monitoring & evaluation system

	Step or Component of the overall process	***Key Question to Answer***
1	Conducting a Readiness Assessment	Do we have what we need to start?
2	Agreeing on outcomes to monitor and evaluate	What do we want to achieve?
3	Selecting key indicators to monitor outcomes	How do we know success?
4	Baseline data on indicators	Where are we today?
5	Planning for improvement – selecting results targets	How much change should we make during our projects or plan?
6	Monitoring for results	How do we measure change?
7	The role of evaluations	How do we know how much change resulted from our projects?
8	Reporting findings	Who needs to know about our information and findings?
9	Using findings	How will our information and findings help improve our work?
10	Sustaining the M&E system within the organization	How can we keep our system healthy and productive over the long term?

Source: adapted from Kusek & Rist 2004

- Defining outcomes and identifying indicators, perhaps using tools like participatory analysis and strategic planning [Tambun 2005, United Way 2002b], outcome mapping [Earl 2001], theory of change[3], or others.
- Conducting measurements and monitoring that use participatory methods and tools based on appropriate combinations of both scientific and local knowledge [Thomas 2004ab, Booth 2001, Prewitt 2005, Ballard 2005, Pilz 2005, ETFRN 2002, van Rijsport 2002, Lawrence 2001, Volunteer monitor project[4], etc.]
- Using information in conducting analysis, program improvement, and further planning [Coupal 2001, World Bank 2002, Ramalingam 2006, etc.]

Indeed, participation in all three types of activity should greatly increase understanding and the quality of results in each of the individual types. It should then become clearer where and why partnerships and further capacity building are needed to improve the overall process.

Building an effective results-based monitoring and evaluation system requires long-term effort and commitment. This is one reason why the World Bank handbook includes as its first step a 'readiness' assessment to help determine whether key commitments and basic capacities are in place and available.

1.4. Sources of variation in sub-basin monitoring and evaluation approaches

Project studies conducted by Panya Consultants and data analysis conducted by the watershed management consultant have shown that there is very substantial variation among sub-basins in the Ping River Basin,[5] including the three pilot sub-basins under this project. Variation includes dimensions related to physical and ecological characteristics, to social, economic and

[3] See http://www.theoryofchange.org
[4] See http://www.epa.gov/owow/monitoring/volunteer/issues.htm
[5] This is also confirmed by non-project studies such as CMU 2004

cultural characteristics, and to the experience and capacity of local organizations and local governments. This will probably result in substantial variation in the management approaches taken by watershed management organizations (RSBOs) in pilot sub-basins, and variation will probably increase further as organizations are established in other sub-basins .

Thus, the project has proposed five alternative models of organization for RSBOs. Working groups in each sub-basin have been considering these different approaches as they draft sub-basin action plans and seek consensus on the initial design of a long-term management organization appropriate for conditions in each of their sub-basins. The results of their considerations will influence the types of information their monitoring and evaluation system will need to provide, and how the information will be used. This, in turn, will influence what stakeholders and partners will need to be directly involved in operating and using the monitoring and evaluation system. Major factors that appear to be affecting these decisions include:

- The types of issues receiving emphasis in analysis and action plans are influencing what is seen as important for sub-basin organization mandates. In the Ping part 1 sub-basin, for example, policies related to management and use of national forest lands are seen as a more urgent concern than in other sub-basins, and leaders want strong information on local management outcomes to help them show why changes in national policies and the community forestry law are necessary and would be beneficial. Different groups in the Mae Kuang sub-basin emphasize water use and competition, upstream conservation, or downstream impacts. Ping part 5 emphasizes water storage, soil erosion, water pollution, and agricultural chemical use.
- The nature of existing local organizations and networks, together with their experience and current partnerships, are influencing the type of sub-basin organization seen as feasible in the short-term, as well as desired directions for their longer-term development. In the Ping part 5 sub-basin, for example, since most local networks are closely associated with central and provincial government agencies, agencies will probably have a strong role in the RSBO. The Ping part 1 sub-basin will probably place more emphasis on local government and more independent local networks. Such differences are likely to affect how monitoring and evaluation are conducted and how information it produces is used.
- Especially in the Mae Kuang sub-basin, the complexity of issues and social factors are resulting need for more effort to reach a sub-basin level consensus on how to most effectively integrate on-going efforts by local organizations and networks with different approaches working in different areas of the sub-basin. Some have proposed that three or more sub-groups might be required to manage work in different parts of the sub-basin, which would result in more complexities for a sub-basin monitoring and evaluation system.

We are still only beginning to see emergence of issues related to interactions among sub-basins. The first concern seen is flooding in the Chiang Mai valley, which is resulting in concern about upstream land use, especially in the Ping part 1 sub-basin. This raises the need for good monitoring and evaluation of how work plan outcomes affect flood-related environmental conditions. Results will be useful in interactions with other sub-basins located downstream.

This issue also points out the potential importance of monitoring and evaluation systems in providing information that is useful in negotiations among stakeholders. These types of

negotiations can occur within a single sub-basin, or between local stakeholders and those representing the legitimate interests of downstream or larger society. Within a sub-basin, for example, there may be important upstream-downstream issues such as pollution of water resources or land use practices on sloping land that people in the valley believe are increasing the risk of flash floods or landslides. External stakeholders may want evidence that activities in a sub-basin are not increasing risk of main river channel floods further downstream, or are not destroying biodiversity or other types of resources that are important for the whole nation. Thus, another function of sub-basin monitoring and evaluation systems is the role it may have in serving as a *negotiation support system*. And again, the types of information that the system needs to provide, and the appropriate roles for different stakeholders, will probably vary among sub-basins with different characteristics and conditions.

Another type of variation that sub-basin monitoring and evaluation systems will probably face relates to changes over time in national level policies. For example, activities to develop new laws related to water and community forestry have been going on for many years. It is possible, but still uncertain, that both laws could be enacted in the near future. But the final terms and conditions in the draft laws are still not widely known by most people, and they may still be changed before they are finally enacted. Similarly, a new national 5-year plan is being developed, and various national policies are being modified. The current political uncertainty at the national level could bring significant changes in national political leadership that could bring many more changes in national policy. Even the basic support for developing sub-basin management organizations could be seen as associated with a political faction, which could lead to efforts by other factions to end all support.

All these national laws and policies can have effects on sub-basin management plans, activities, and expected outcomes and impacts. Thus, they can also affect the types of monitoring information that is needed, and especially ways in which outcomes are evaluated.

In the results-based logical framework approach, these types of issues are seen as assumptions and risks. Many organizations that implement projects feel that risk management and coping with unexpected changes are critical for the success (or failure) of most development projects. Thus the assumptions column may be the most important part of the logical framework matrix [Blakewell 2005]. But much more emphasis is usually given to developing positive outcomes and indicators, so that consideration of assumptions and risks is often one of the weakest parts of the planning process. There is even some concern that too much attention to assumptions and risks could make the logic of a logframe become less clear, and thus reduce its chances for receiving funding.

Monitoring and measurement can tell managers and stakeholders what was done under an activity, project or workplan. Evaluation is needed to help them understand more deeply the quality of the work and why outputs have (or have not) resulted in the observed outcomes.

2. An overall framework for sub-basin monitoring and evaluation

Frameworks for monitoring and evaluation depend on objectives and important principles. As discussed in the first chapter of this report, project-level monitoring and evaluation can generally be divided into two forms according to its characteristics and objectives:

- *Monitoring and evaluation of project implementation* (or Inputs Monitoring and Evaluation) emphasizes examining use of resources and implementation processes in order to evaluate the efficiency of implementation, which requires information on project inputs and outputs. Many agencies and organizations are familiar with this form of monitoring and evaluation.
- *Monitoring and evaluation of outcomes according to project objectives* (or Project Results Monitoring and Evaluation) emphasizes evaluation of project results and impacts, which requires information on outputs, outcomes, and impacts. This is a newer form of monitoring and evaluation that is being developed in government agency systems and various other organizations.

Both of these types of monitoring and evaluation have characteristics that are similar in their level of importance, but they differ in their sources of information and in the timing of when they are conducted. For the first type, most data will come from agencies, implementers or project administrators, such as data on finance, personnel, or outputs from project implementation. For the second type, most information will be obtained from project beneficiaries or stakeholders, or from technical examination and measurement of results.

Results-based monitoring and evaluation is an important focus of this report. However, both forms of monitoring and evaluation are necessary, and their structures and implementation need to be linked together. Thus, the monitoring and evaluation framework proposed in this chapter is based on a combination of both of these forms of monitoring and evaluation.

2.1. Levels of sub-basin management and operations

A monitoring and evaluation framework for pilot sub-basins also needs to consider the organizational and operational levels at which monitoring and evaluation will be conducted. Since the focus of this project is on development of new sub-basin management organizations and plans, it is also very important to consider the roles and responsibiliies of existing organizations at other levels, and how they will be linked with the sub-basin level.

Experience under the project in working with all three pilot sub-basins has shown some similar directions in thinking about how sub-basin management organizations (RSBOs) should relate to other existing institutions and development plans. Implementation of at least most types of projects that use government funds is seen to be under the responsibility of local governments, provincial administrations, or agencies of the central government. These organizations already have their own planning systems, implementation procedures and budgets. They are also already required to collect and report various types of monitoring information related to projects they implement. There has been overall agreement that an RSBO should not try to compete with or duplicate these types of duties or functions. Thus, responsibilities and methods for most implementation-level monitoring and evaluation of projects will probably remain with these institutions.

All of these institutions are also seen as important partners participating in management processes under sub-basin management organizations (RSBOs). The role, responsibilities and leadership of each type of institution will depend on the type of organizational structure that is used in each sub-basin. There appears to be general agreement, however, that RSBOs will have important responsibilities in relation to the development, monitoring and evaluation of overall workplans for sub-basin management and development. Individual projects will be under the various strategies of overall sub-basin workplans. Thus, monitoring and evaluation at the results level will probably become a very important part of work managed and conducted by RSBOs.

Results under the first component of this project include specification of strategies, workplans and measures, together with various types of development projects for the three pilot sub-basins. Thus, the framework for monitoring and evaluation must set frames for two levels: the level of overall watershed development, which deals mainly with strategies and workplans; and the level of individual projects that are under each watershed development strategy and workplan. Accordingly, consideration of the framework for monitoring and evaluation is divided into two parts that specify a framework for project-level monitoring and evaluation, and a framework for workplan-level monitoring and evaluation. Details of theses two parts are in the following sections.

2.2. Project-level monitoring and evaluation framework

Based on their experience with monitoring and evaluation systems under the results-based management approach being adapted by various agencies in Thailand, Panya Consultants has proposed a five step process for conducting monitoring and evaluation at the project level.

Frames and methods for monitoring and evaluation of individual projects may differ according to types and categories of projects. Thus, monitoring and evaluation will vary, and especially those parts involving monitoring and evaluating project outcomes and impacts. This will be due in part to the project implementing agency, or to the agency that evaluates the project, as well as to the number and capacity of individuals and the budget that is used in conducting monitoring and evaluation. Thus, the frame studied and proposed here will not be one that should be regarded as a definitive methodological framework. Rather, it is to be used as an approach to make design, planning and implementation of monitoring and evaluation to be systematic according to the project cycle.

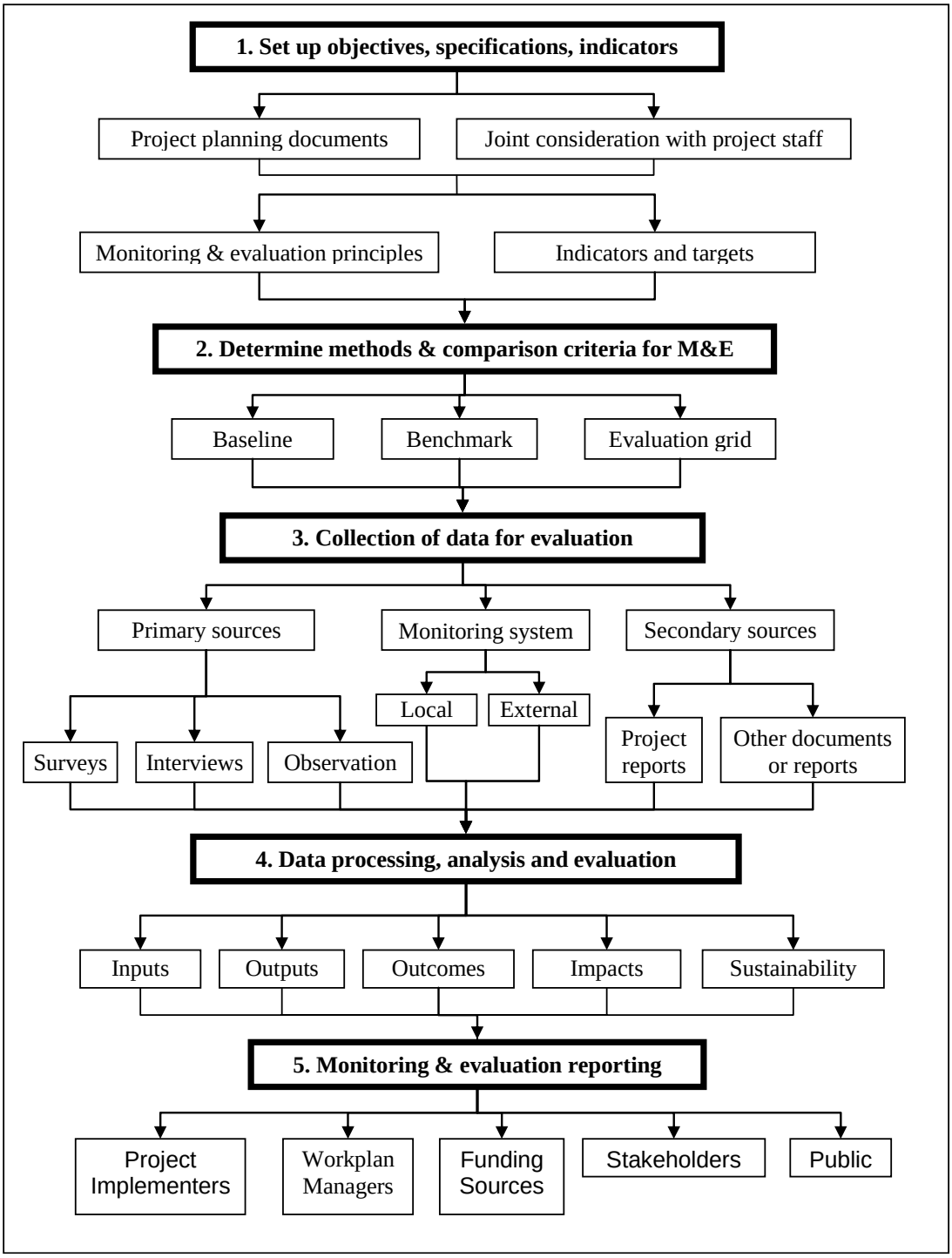
The frame for conducting project monitoring and evaluation has steps and important methods that must follow the sequence displayed in Figure 5. Details that need to be implemented are as follows:

Step 1. Set up objectives, specifications and indicators

The objective of conducting this step is to specify the scope of the frame for monitoring and evaluation, which will depend on what is the objective of monitoring and evaluation. This will be linked to evaluation principles, and to indicators that will be used in evaluation.

Implementation methods: Study, creating understanding, and analysis of project management can provide a basis for project monitoring and evaluation, by using the Logical Framework Approach (LFA) as a tool in reviewing project organization.

Figure 5. Steps & methods in implementing project monitoring & evaluation



Source: Panya Consultants

Project organization under this approach will reveal vertical relationships as shown earlier in Figure 1: (1) inputs, or resources used by activities to be implemented; (2) outputs obtained; (3) outcomes that will emerge; (4) project objectives or expected impacts. It also establishes horizontal relationships at each level, including assumptions that must be true for emergence of the results specified in the next higher level. This is all reflected in the Logical Framework Matrix model, or what is commonly known as the "Logframe", as explained in Figure 2 and outlined in Figure 6. Under the government's results-based management (RBM) system,

agencies managing projects must have specified objectives, outcomes and outputs for a project, along with clear measurable indicators and targets.

Figure 6. Model structure of a Logical Framework Matrix

	Summary of items / results	indicators	Data source & methods	Assumptions & risks
Goal / objective				
Outcome				
Output				
Activities		inputs	budget	
				Initial conditions

There are indicator selection criteria that can be used as a frame for indicator selection as follows:

- Indicators must be ***clear*** and correct, with no ambiguity about what is to be measured
- Indicators must be ***relevant*** to project objectives and needs of stakeholders
- Indicators must be ***economical*** in terms of expenses for obtaining data, and have a clear data source
- Indicators must be ***adequate*** for use in measurements under evaluation principles of both efficiency and effectiveness
- Indicators must be ***useful*** for monitoring, and flexible if conditions change.

Once indicators are selected, baseline data must be established and benchmarks need to be determined, in order to provide a basis for comparative evaluation.

In analysis to provide a basis for monitoring and evaluation, the evaluator must join with project leaders in considering and reviewing targets and indicators of each parameter of the project, in order to determine the basis for evaluation, and to provide a frame for further project evaluation. For these purposes, the model table shown in Figure 7 shows the basis for evaluation derived from conducting this step: indicators and indicator targets for a fixed period of time specified by the project.

Figure 7. Model project analysis table to provide a basis for monitoring & evaluation

Project: .....

Level of causal relationships	List of expected results and indicators	Units	Basis for monitoring & evaluation			
			Targets		Baseline	Benchmark
			Year...	Year...		
Impact	According to workplan goal / objectives - indicators	.....	.....	.....	.....	.....
Outcome	According to project objectives - indicators	.....	.....	.....	.....	.....
Output	Following from project implementation - indicators	.....	.....	.....	.....	.....
Inputs	Project activities & budgets - indicators	.....	.....	.....	.....	.....

Source: Panya Consultants

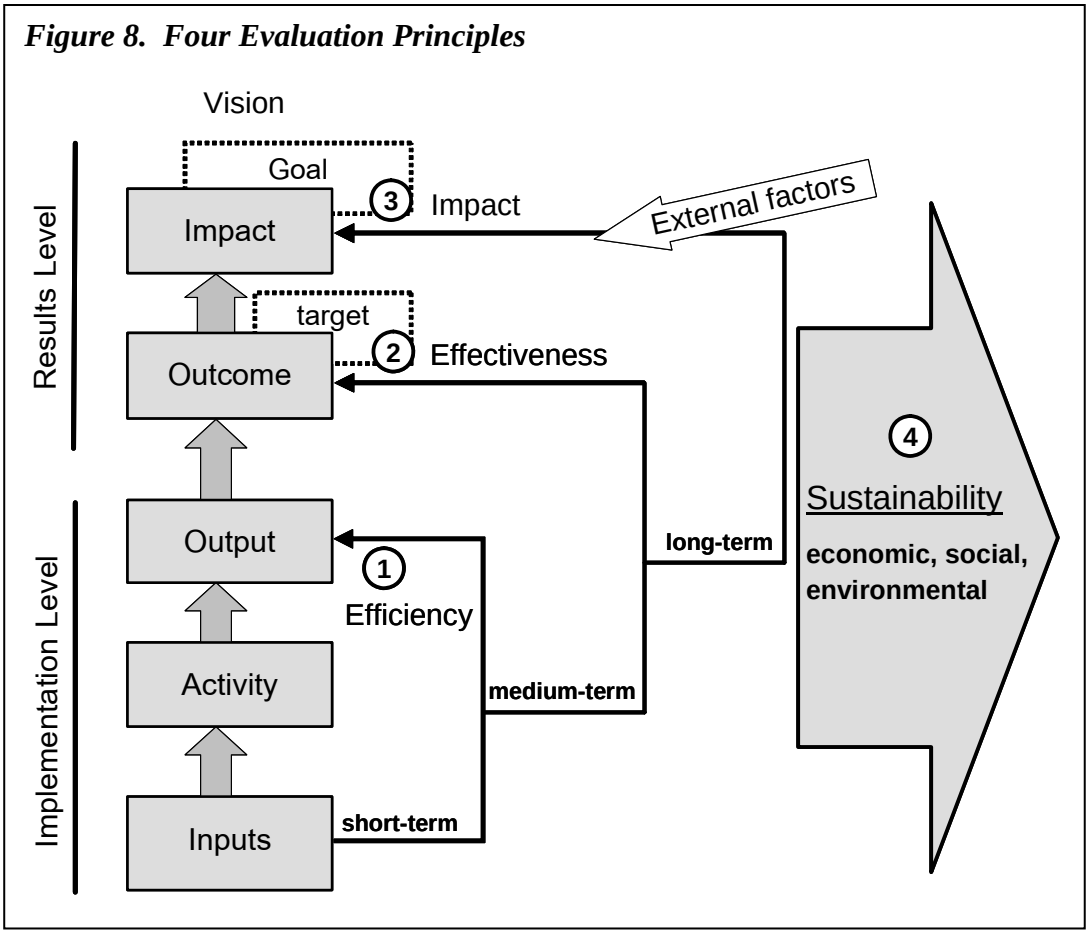
In terms of establishing principles for monitoring and evaluation, this can be done for all stages in the project cycle, or for only one stage. Thus, it is important to make clear

monitoring and evaluation specifications. Common specifications will be in line with the project's scope of work, by considering the order of relations of project plans. In specifying the scope of work, we use four main monitoring and evaluation principles as criteria for consideration of each project. All or only one of these principles can be used, depending on the evaluation objectives mentioned above.

- Efficiency considers use of resources or inputs of the project and outputs that are derived from it
- Effectiveness is investigated according to the objective of the project
- Impact considers project objectives, goals, and external factors
- Project sustainability includes consideration of economic, social and environmental aspects

Figure 8 shows how these evaluation principles relate to the project cycle .

Figure 8. Four Evaluation Principles



Step 2. Determine monitoring & evaluation methods & comparison criteria

The objective of conducting this step is to specify the methodological approach for monitoring and evaluation, as well as specifying the criteria for comparing change in indicator values.

Implementation methods. It has already been pointed out that evaluation must make a comparative analysis in order to evaluate how much indicators have changed. Initial criteria used for comparing change are indicator targets specified when establishing the project. However, evaluation using comparison with a specified target may encounter changes that make the specified targets inappropriate, because a starting point could not be determined to compare with the end point in order to assess change that needs to happen in the indicator. Thus, it is important to establish a starting point or baseline data for the indicator, and a final point or benchmark, as criteria for comparative evaluation of change.

Baseline data for indicators is actual data on the status of indicators before implementation of the project. An example is a project that aims to solve water pollution problems by using biological oxygen demand (BOD) as an indicator, where without the project the water source has a value of 10 mg/l. This value is baseline data that will be used as a criterion in comparing change after conducting the project. However, process indicators will hot have baseline data. When implementation is completed, the process is also believed to be finished. Most of these types of projects will have characteristics similar to studies, such as study of river pollution conditions, or a planning project, for example.

Benchmarks may be considered to be the highest target levels needed. These may be determined from accepted standard values, such as the standard value for BOD of water in a main river channel in Thailand, which is set to be not more than 2 mg/l.

Determining the methodological frame for monitoring and evaluation. In determining the frame for conducting monitoring and evaluation, a table can be built to show the evaluation program. The Evaluation Grid is a tool for determining the scope of activities to be conducted according to evaluation principles. The form of the table will include a list of evaluation principles, items for evaluation, questions to be used in evaluation, data sources, and methods for collecting data, as shown in Figure 9. Conducting a program according to this table includes approaches and methods as follows:

Figure 9. Model Evaluation Grid

Evaluation principle	Items for evaluation	Questions used in evaluation	Source of data	Data collection methods
1. efficiency				
2. effectiveness				
3. impact				
4. sustainability				

Evaluation principles. As mentioned earlier, evaluation principles provide frameworks that help us know what aspects of evaluation need to be conducted, such as evaluating outputs, evaluating outcomes, evaluating impact, or evaluating efficiency. Other items in the table will specify what will need to be conducted to allow evaluation according to the principles.

Items to be evaluated. Every evaluation principle will use indicators following from specifications made in establishing the project (inputs, outputs, outcomes, impacts)

- *Efficiency evaluation principle:* items to be evaluated will be related to input and output aspects.
- *Effectiveness evaluation principle*: items that must be evaluated will be related with the output, outcome and impact levels that have resulted from project implementation
- *Impact evaluation principle*: items that must be evaluated will be related to both positive and negative impacts caused by the project, including economic, social and environmental aspects.
- *Sustainability evaluation principle:* items that must be evaluated will be related to sustainability indicators established for economic, social and environmental aspects

Questions used in evaluation. These will depend on what criteria or variables are to be used for evaluation under each evaluation principle. Thus, questions must be related in order to gain data that is important for evaluation:

- *Efficiency evaluation principle:* questions used will relate to time used for implementation, implementation expenses, output quantity, output quality
- *Effectiveness evaluation principle*: questions used will relate to outputs, outcomes, and impacts, in terms of both quantity and quality
- *Impact evaluation principle*: questions used will relate to each indicator. Usually, evaluation at this level will include a whole workplan or program of projects.
- *Sustainability evaluation principle*: questions used will be directly related to each sustainability indicator

Data and information sources for each variable will differ along with different characteristics of each project, resulting in various sources of data;

- *Efficiency evaluation principle:* main information sources are agencies or project implementers, or those participating in project implementation.
- *Effectiveness evaluation principle:* Since this relates to many levels, information sources include project implementers, beneficiaries, or those experiencing impacts of the project, together with information from monitoring systems, documents or reports
- *Impact evaluation principle:* Main information sources will be from beneficiaries and stakeholders in the area of project implementation, or from monitoring systems, documents and reports
- *Sustainability evaluation principle:* Information sources are all related parties, documents and reports

Methods for collecting data and information. Determining data collection methods will need to consider limitations in terms of time, manpower, and budget, together with the characteristics of indicators that will be evaluated. Methods will include surveys, tests, technical analysis, group interviews, and studies of monitoring data, secondary data, documents and reports.

Results of establishing the evaluation program table referred to above will be similar to a handbook in conducting project monitoring and evaluation work. The evaluator will be able to apply it in determining the scope for conducting the work. In any event, this evaluation program can be adjusted according to what is appropriate.

Step 3. Collecting data for evaluation

Data collection will be according to methods specified in the Evaluation Grid table. It may be divided into three main parts: one part for gathering data from primary sources, a second part for collecting data from secondary sources, and a third part for gathering data from monitoring systems at various levels. They may be summarized by data category, source, and data collection method, according to the evaluation principles as follows:

Figure 10. Examples of data sources according to evaluation principles.

Evaluation principle	Data category	Source of data	Data collection methods
Efficiency	Outputs, activities, production factors, time for implementation	Project implementers, supporters, & managers	Interviews, review project documents & program documents
Effectiveness	Project outputs, outcomes & impacts	Project leaders, beneficiaries, parties receiving impact, monitoring systems	Survey, observation, in-depth interview, questionnaire, technical evaluation, regular monitoring systems, compilation of specialized studies
Impact	Economic, social & environmental data	Stakeholders, direct & indirect beneficiaries, monitoring systems, expert specialists	Survey , technical evaluation, in-depth interview, local & external monitoring, compilation of specialized studies
Sustainability	Economic, social & environmental policies	High-level managers, policy level, stakeholders, expert specialists	Survey, in-depth interview, compilation of specialized studies

Monitoring systems. Various types of monitoring systems can be important sources of information for project monitoring and evaluation. Since projects will be implemented in the context of sub-basins or smaller sub-watersheds, we can consider the potential use of monitoring systems at two levels:

- *Local level monitoring systems* may include components that already exist within sub-basins or more local areas, or they may be developed as part of the sub-basin management process. Local governments, for example, will already have some types of information systems that are regularly updated with information on their plans and projects, and at least some types of conditions in their area. Local units of government agencies will probably keep information on projects that relate to their work, and may also collect information to monitor conditions related to their agency, such as watersheds, parks, agriculture, public health, community development, etc.

  There may also be various local networks, groups or local knowledge specialists who keep records on different types of conditions in local areas. Since strengthening and further development of local networks and groups appears to be an important part of the management approach in pilot sub-basins, they will probably have even more potential to provide monitoring data and information in the future.

  At the village level, leaders provide data and information for government development monitoring systems such as กชช.2ค, จปฐ., etc. It may be possible to develop coordination

linkages with these types of monitoring systems, which might be particularly useful at outcome and impact levels.

- *External monitoring systems* also exist at several levels, and they may be able to provide important information useful for evaluating outcome, and especially impact levels.

  At the national level various types of data are compiled by the National Economic and Social Development Board (NESDB) and the National Statistics Office (NSO), as well as by some national NGOs and networks. Individual ministries also have monitoring systems operated by agencies under them. In the Ministry of Natural Resources and Environment this includes the departments of national parks, water resources, pollution control, and environmental quality promotion. In the Ministry of Agriculture and Cooperatives it includes the Royal Irrigation Department, Land Development Department, Office of Agricultural Economics, and the Department of Agricultural Extension. The Ministry of Public Health has its own monitoring systems, as do other ministries, organizations and networks that collect periodic data on environmental, economic, social and health-related issues.

  There are also some regional-level monitoring systems operated by organizations such as NESDB and various ministries, NGOs and networks, as well as by some institutes and projects located within universities and colleges.

  Various organizations conduct some types of monitoring at river basin levels, such as the Royal Irrigation Department and the Water Resources Department. Ping River Basin committees and organizations may increase systematic monitoring efforts during coming years. There are also various monitoring efforts by some NGOs and independent institutes, but not very many of them have been able to remain stable enough to develop long-term monitoring data.

  At the province level there is a significant amount of monitoring activity conducted by various agency offices (environment, health, etc.) under the Provincial Governor, some of which are based on data first compiled at district office level or at tambon or village level. There are also various private sector associations related to commerce, industry, tourism, etc., that periodically collect various types of information on the status of conditions in their field of interest. Similarly, there are various NGOs with information on some types of issues, as well as public sector associations, such as provincial associations of TAOs.

Step 4. Data processing, analysis and evaluation

Data processing and data analysis will depend on requirements of evaluation principles to evaluate which aspect, what will be used as criteria in each aspect, and what different importance weights will be assigned to factors to be used in evaluation. Data processors must know this in order to establish a processing framework to derive evaluation results for each evaluation principle. The methodological approach for conducting data processing and analysis has steps that can be summarized as:

1) Determining variables and variable importance weights to be used in evaluation according to evaluation principles specified in step 1.

- *Efficiency evaluation principle*. Project efficiency is seen as an indicator of one aspect of project success. It can be seen from relationships between project inputs and outputs, and it examines internal relationships that are direct results of the project.

Measurement of efficiency can be done in terms of efficiency that yields the highest output (maximum output) and efficiency that uses the least amount of resources or expenses (minimum cost). Thus, the criteria used in judging efficiency will be investigated from internal project variables: outputs in terms of both quality and quantity, production investment costs, and the duration of time for conducting the project, by examining whether these variables happened or occurred according to specifications when establishing the project or not. In judging the level of efficiency from these variables, it may be important to consider the level of importance assigned to each variable, in order to make a clear judgment that is in line with needs. To emphasize weight or give importance to a variable, there is no definitive principle. For example, assignments of importance to the variables output quality, production investment, output quantity, and implementation time might be 30, 30, 20, 20 percent, respectively.

- *Effectiveness evaluation principle*. According to evaluation principles, implementation success or achievement are components of results that are caused by implementation of projects. They have linkage relationships with: outputs that are direct results of implementation (immediate outputs), which cause outcomes that are medium-term continuations of results from project outputs (intermediate outputs), and impacts that are long-term continuations of results from outcomes (long-term outputs). Impacts are seen as the ultimate goal of project implementation. Thus, criteria that can be used to judge project results include consideration of project outputs, outcomes and impacts together. In determining the importance levels of these three factors, about 60 percent of importance will generally be given to outcomes, about 30 percent to efficiency, and about 10 percent to impact.
- *Impact evaluation principle*. Project impacts are continuations of results from project outcomes. They tend to be long-term results that arise according to project objectives, and they may employ outcomes from other projects in the work plan program as well. Impacts usually tend to be examined at the macro level, using economic, social and environmental variables as factors in results measurement.
- *Sustainability evaluation principle*. Measuring the sustainability of outputs and outcomes caused by a project looks at whether they will probably continue or not after project implementation is finished. Variables used in measuring sustainability consider economic and financial factors, social factors in organizations and stakeholder participation, and environmental factors. Sustainability will be especially affected by project results with negative effects on the environment.

2) Determining evaluation criteria. Criteria are the levels or standards that are used to measure implementation success or project outcomes. Criteria may be comparison-based criteria that are derived from comparisons with previous results, with norms of projects generally, or with absolute criteria. Absolute standards are derived from rationally determined standards that are widely accepted by all parties, such as industrial standards or environmental pollution standards. Uses of comparison criteria in evaluation follow from discussions under step 2. Evaluation uses methods to assign a score (rating) to each variable. Determinations of evaluation ratings generally employ five levels: good, somewhat good, adequate, somewhat low, low. In practice, other categories can be used, depending on the consensus view of all parties involved.

3) Processing. This is the step of comparing actual results from project implementation with expected results. There are two steps in conducting this work:

- Comparison of data collected for each variable with targets, standards or benchmarks, depending on evaluation principles for each case. This yields results expressed as percentages that can be used to assign criteria ratings specified according to the approach in step 2).
- Ratings for each variable are then adjusted according to importance weights as determined under step 1), in order to yield ratings and estimates of variables for each evaluation principle.

Step 5. Monitoring & evaluation reporting

Monitoring and evaluation reporting are part of the objective of project monitoring and evaluation framework that seeks to use data and information from monitoring and evaluation to benefit decisions related to project management. This is to assure that project implementation follows its specified directions and purposes, and includes use of monitoring and evaluation results as lessons for future projects. And because monitoring and evaluation under this framework includes monitoring and evaluation in terms of both project implementation and project achievements, basic monitoring and evaluation reporting should be divided into two parts: a report on monitoring and evaluation of implementation process results, and a report on monitoring and evaluation of project outcomes. In any event, both reports may be combined in a single volume, or divided into separate volumes, depending on the evaluation frame and the duration of monitoring and evaluation.

- Report on monitoring and evaluation of implementation process results (or Input Monitoring and Evaluation Report). This part of the report has content related to monitoring of production input use and outputs obtained, together with whether implementation processes followed specified directions and objectives or not, and what problems or obstacles were encountered that prevented implementation or caused it to not follow objectives. This type of report should occur during project implementation and provide project managers with information useful for project management. Thus, this report should be short and concise, and completed within the specified deadline, so that the information can be usefully applied immediately. This report will mainly cover evaluation of implementation efficiency.
- Report on monitoring and evaluation of project outcomes (or Project Benefit Monitoring and Evaluation Report). Usually this report will be on outcomes or benefits that result from project implementation. Thus, it tends to be done after a period of time following project completion. Information from this report is useful as lessons for implementing similar projects in the future, or can be used to determine additional measures to help projects achieve their specified outcomes. This report will cover evaluation of project efficiency and effectiveness, or will be in the form of a project impact evaluation conducted as a post evaluation.

In addition, data and information directly from monitoring systems may also be useful in some management processes. It will be most useful when it is information that is collected frequently enough that it can help project and workplan managers to see how activities are making progress during implementation of a project or workplan.

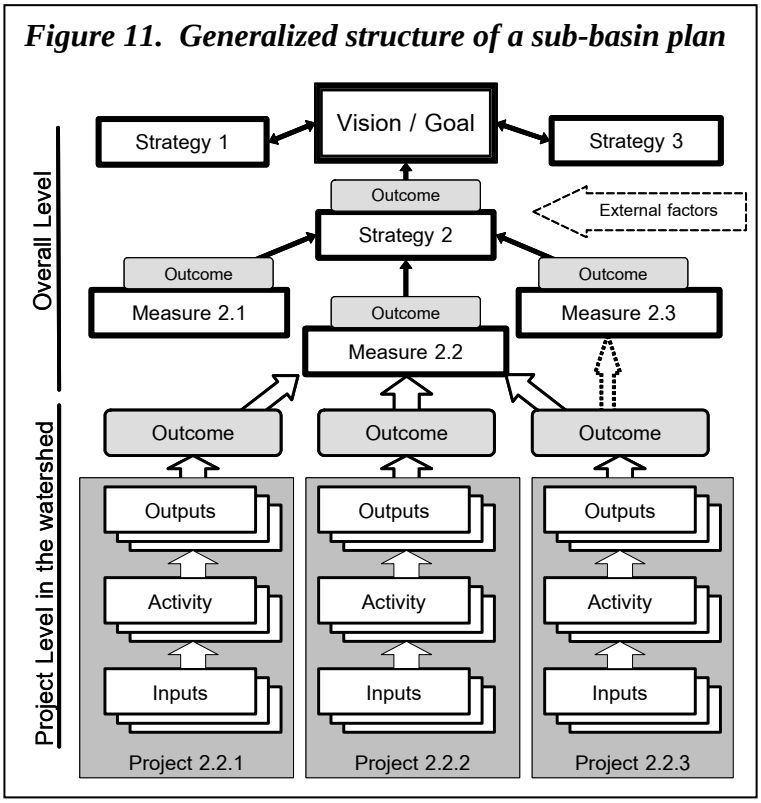
Moreover, Figure 5 shows five different categories of potential users of monitoring and evaluation reporting services.

- ***Project implementers*** are the main target group for reports in implementation process results, and may be able to use some data directly from regular monitoring systems. They may also be users of project outcome reports, especially where the information can relate to improved design of future projects, to information that can be provided to those who fund or provide other forms of assistance to their projects, or to sub-basin stakeholders who help decide whether their future project proposals should be included in overall sub-basin workplans.
- Overall sub-basin ***workplan managers*** are one of the major target users of project outcome reports. They will compile information from these types of reports as part of the process of monitoring and evaluating the overall sub-basin workplan.
- ***Sources of funding and support*** will also be prominent users of both implementation process reports and project outcome reports related to projects they support, and to projects similar to ones for which they are considering providing support. They may also want to learn lessons that can be applied in projects that they support elsewhere.
- ***Stakeholders*** are another important potential user of results from monitoring and evaluation activities. It will be important for the long-term sustainability of a sub-basin management organization for major stakeholder groups to see that sub-basin management is achieving important results that have a real impact on issues that are of concern to them. The sub-basin management organization may need to consider whether they should package information from different types of monitoring and evaluation reports to fit the main concerns of different stakeholders, and to provide the information in a format that is appropriate for different stakeholder groups. This type of reporting might even take the form of a regular periodic report and/or newsletter on important monitoring and evaluation results related to issues of concern by, for example, farmers, water user groups, watershed management networks, occupational groups, entrepreneurs or business groups, forest conservationists, public health groups, etc. There may also be a need for periodic reporting to external stakeholders such as provincial administrations, central government agencies, downstream sub-basins, or environmental monitoring organizations, for example.
- The ***general public*** may also be a potential user of findings from results-based measurement. It is important to meet general public needs for information in order to maintain the credibility of the sub-basin management process, and gain popular support that can help it remain viable over the long term. They will probably be most interested in information at the outcome and impact level, and possibly in information on efficiency that is aggregated at a measure or strategy level so that they can see how well their tax monies are being spent. This user group will probably require a different form of information packaging and dissemination.

2.3. Sub-basin management-level monitoring and evaluation framework

The main focus of this project is on developing sub-basin level management organizations and sub-basin-level management planning. Working groups in each of the three pilot sub-basins have developed planning frameworks for their sub-basins. These frameworks generally have an overall vision statement and various levels of goals and objectives that determine the direction of their management program or 'workplan'. Sub-basin workplans are then sub-divided into three more levels of organization. Figure 11 shows a generalized example of how these workplans are organized.

Figure 11. Generalized structure of a sub-basin plan



The overall workplan seeks to achieve the sub-basin vision, which is quite broad. Thus, several strategies have been developed to achieve the sub-basin vision. There are then several measures through which each strategy will be implemented, and each measure is divided into various specific projects. How the general structure is now being adjusted to be more appropriate for conditions in each sub-basin is discussed in the next chapter.

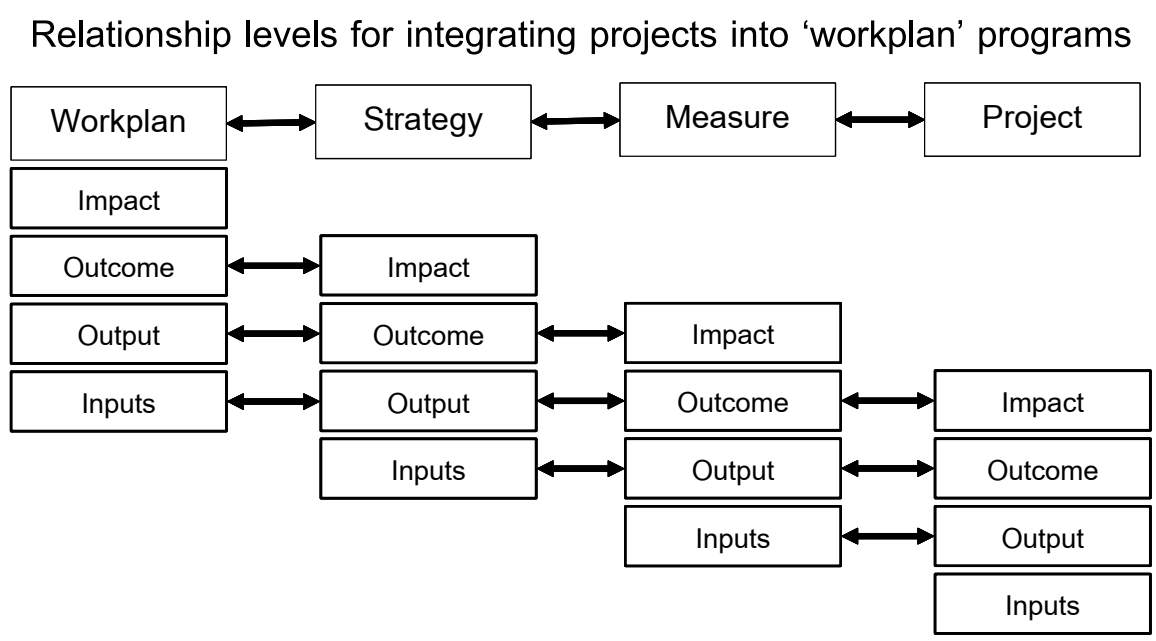
The framework for monitoring and evaluation at the project level has been discussed in the previous section. Project-level monitoring and evaluation includes forms of evaluation at both the project implementation process level, and at the project outcome and impact level.

The issue here is how to monitor and evaluate the overall workplan at the sub-basin and strategy levels. The main focus of monitoring and evaluation at these levels is on outcomes of projects, measures and strategies, and their impacts on overall economic social and environmental conditions in the sub-basin. Use of the logical framework matrix (Logframe) and the logical framework approach can also be useful in helping to provide systematic organization of the complex sets of concepts and information that are needed at this level.

In order to conduct monitoring and evaluation at this level, it is important to specify expected outcomes for each level where monitoring and evaluation will be conducted. Appropriate indicators must also be determined for each outcome, as well as baseline data and relevant benchmarks, in order to provide the basis for comparisons that can determine how much progress has been made. This will help identify strengths and weaknesses in strategies and in the overall workplan, which may need more attention or adjustments to improve the overall sub-basin management program.

As for methods for monitoring and evaluation at the program or "workplan" level, they will combine results from monitoring and evaluation of individual projects under the workplan by applying indicators from individual projects in constructing indices. Methodologies for evaluation of the overall workplan will follow the same framework as for monitoring and evaluation of individual projects under the workplan. Following the methods and steps for conducting monitoring and evaluation of individual projects, results of individual projects are integrated in order to evaluate overall results at the workplan strategy level. There are differences, however, in matching levels of inputs, outputs, outcomes and impacts. Considerations are at a broad level and do not go into as much detail as the project level. Evaluation combines results from all projects, and compares results with workplan targets, baselines or benchmarks. Integration of projects into workplans has relationships among levels as shown in Figure 12.

Figure 12. Structural relations & data exchange between projects & 'workplans'.



Source: Panya Consultants

Study and analysis of workplans to provide a basis for evaluation specifications will be according to Figure 13 by using methods that can be summarized as follows:

- Grouping of projects to be consistent with workplan strategies, or as specified in the workplan
- Transfer of data from projects into workplan strategies according to the chart shown above, in order to adjust the planning model according to its logical framework matrix (Logframe), and build a basis for monitoring and evaluation by using the same model as used for individual projects, as in the table below.

Methods:

- *Inputs*. Transfer items in the output level and budgets of each project into the input level of the workplan strategy
- *Outputs*. Transfer items in the outcome level of all separate projects, and summarize them in the ouput level of the strategy for use as targets for workplan indicators

- *Outcomes*. Indicators and targets are according to those specified for the strategy in the work plan. Results of project-level impacts are used as data.
- *Impacts*. This will usually be the overall objective of the workplan.

Figure 13. Example format for a strategy-level evaluation & indicators table.

Strategy: .....

Level of causal relationships	List of expected results and indicators	**Units**	Basis for monitoring & evaluation			
			Targets		Baseline	Benchmark
			Year...	Year...		
Impact	According to workplan goal / objectives - indicators	.....	.....	.....	.....	.....
Outcome	According to strategy objectives - indicators	.....	.....	.....	.....	.....
Output	Following from strategy implementation - indicators	.....	.....	.....	.....	.....
Inputs	Strategy activities & budgets - indicators	.....	.....	.....	.....	.....

Source: Panya Consultants

This same process can first be used to integrate results from projects into the measures level, if it is appropriate. Results from the measures level can then be integrated into workplan strategies. It is also possible to use this approach to integrate results from strategies into the overall workplan level. The levels at which this approach is applied will depend on what is appropriate for the monitoring and evaluation objectives and processes used in each sub-basin.

Approach for monitoring and evaluation of the workplan-level outputs, outcomes and impacts described above. The approach for monitoring and evaluation at the workplan level will be the same approach as that used for conducting evaluation of individual projects. However, since the workplan level will be an overall evaluation of development at the whole watershed level, it will emphasize evaluation of outcomes or achievements and impacts of development plans under the various collaboratively determined strategies for the watershed. Although various parts may have the same indicators as some individual projects, the scale and coverage of the goals will be much larger than for individual projects.

It is also very important for those responsible for monitoring and evaluation reporting to develop mechanisms for communicating information in their reports to stakeholders other than project-level and sub-basin-level managers, for use in their work related to sub-basin analysis, planning and management. Thus the information needs of stakeholders must be reviewed, and appropriate forms for communicating this information must be developed. Information must be in forms that are appropriate for the situation and information users in each sub-basin.

There needs to be an assessment of needs for continuous monitoring of some types of sub-basin conditions, and how such information could provide feedback to stakeholders at multiple levels. Some parts might be through partnerships with technical agencies or others collecting relevant time series data, while other parts might use local collaboration with participatory methods. This issue is discussed further in other sections of this report.

3. Sub-basin action plan logic and performance indicators

The framework approach for monitoring and evaluation discussed above uses a project design tool in the form of the logical framework matrix (or Logframe), which is also a tool for determining the basis for monitoring and evaluation. Thus, specification of indicators for various levels of the project is usually determined during the project planning stage by those organizing the project. However, sometimes project organization may not follow the form of the Logframe, or it may not specify indicators. Especially for indicators of outcomes and impacts of projects in areas that are interlinked with natural resources and the environment, public health and livelihoods of people in the watershed, it is important to review and re-determine indicators.

The frame for developing indicators has three important steps that must be conducted:

1) *Determining the scope for establishing indicators*. Since monitoring and evaluation under this study has parts both for monitoring and evaluation of individual projects, and for monitoring and evaluation of the overall "workplan" program, we will use a conceptual framework that refers to projects according to the Logframe model of project organization in establishing indicators. This is appropriate for evaluating individual projects, and is capable of integrating results from individual projects into evaluation of the overall workplan.

2) *Indicator selection*. Criteria used as a frame for indicator selection include:

- Indicators must be ***clear*** and correct, with no ambiguity about what is to be measured
- Indicators must be ***relevant*** to project objectives and needs of stakeholders
- Indicators must be ***economical*** in terms of expenses for obtaining data, and have a clear data source
- Indicators must be ***adequate*** for use in measurements under evaluation principles of both efficiency and effectiveness
- Indicators must be ***useful*** for monitoring, and flexible if conditions change.

3) Once indicators are selected, baseline data must be established and benchmarks need to be determined, in order to provide a basis for comparative evaluation.

However, since indicators are established according to the project framework described above, determination of indicators will depend on how objectives and aims of workplans and important projects are specified, because their specification must be harmonized. Thus, specified indicators are examined from implementation plans for managing natural resources and environment (action plans) for each of the 3 pilot sub-basins as criteria for consideration.

The first initial draft of action plans for each of the three pilot sub-basins sought to have a similar overall structure. During the final round of revisions, working groups in each sub-basin responded to requests from stakeholders within their sub-basin to adjust the plans to fit more closely with local views of conditions and problem situations in their sub-basin. This has demonstrated the importance of processes oriented more toward planning that is appropriate for local problems and conditions, than toward fitting a single template format. Resulting overall plan structures for each sub-basin are summarized in Figure 14, along with an indication of the level at which initial efforts have been made to establish indicators for monitoring and evaluation.

Figure 14. Summary of levels and terminology in current draft sub-basin plans

	Sub-basin		
Planning level	**Ping part 1**	**Mae Kuang**	**Ping part 5**
Vision / mission level	Vision statement	Vision statement	Vision statement
Policy / approach level	Goal (1)	Goal (1) Objectives (4)	Goals (3) Objectives (5)
Sub-basin level	Workplan	Workplan	Workplan
Broad components	Strategies (6)	Strategies (4)	Strategies (4)
Specific components	*** Measures (22)	*** Measures (14)	Measures (17)
Implementation level	Activities (35)	Projects/groups (111)	*** Projects (67)

*** *level of specified "indicators'*

The following sections provide more detail on the current status of planning frameworks and development of performance indicators in each of the three pilot sub-basins.

3.1. Ping part 5 sub-basin

The planning framework used in the Ping part 5 sub-basin is closely in line with the generalized structure shown in Figure 11. Details of the vision, goals and objectives of the plan are shown in Figure 15, and the strategies and measures contained in the sub-basin workplan are shown in Figure 16.

Initial efforts to determine indicators for monitoring and evaluation have focused at the project level. Although at this point these are really expected outcome statements rather than indicators, most have become quite clear during the most recent round of revisions within the sub-basin.

Outcomes at the measures level. In order to help clarify the types of outcomes expected under different levels of the Ping part 5 sub-basin workplan, expected outcomes ("indicators") that have been specified for each project are listed in Figure 17 under the measure with which they are associated. Outcomes are then categorized on the left side according to the general type of outcome that is expected. It is then quite easy to get a general picture of the types of results expected from different measures, which can then be compared with the title of the measure for consistency. The listing of multiple but quite simply stated outcomes under each measure allows us to see quite easily the basic type of objectives for each measure.

Outcomes at the strategy level. This same approach then allows us to re-aggregate expected outcomes by the types of outcomes under each strategy, as shown in Figure 18. This again allows us to see quite clearly the expected results under each strategy:

- Strategy 1 is named "conservation and restoration of natural resources and the environment", and what it seeks to achieve focuses mainly on building various type of knowledge in local communities, and achieving tangible improvements in natural resources related mainly to water, but also to forest and soil conservation.

Figure 15. Ping part 5 sub-basin vision, goals & objectives

Vision: Forest on the mountains, water in the fields, beautiful environment, sustainable nature

Goals:

1. Develop, promote, conserve, & restore natural resources & the environment
2. Use of natural resources that has value and is appropriate with ways of life
3. Reduce use of agricultural chemicals
4. Reduce pollution problems from the environment

Objectives:

1. To conserve & restore natural resources & the environment to be rich & sustainable for the people to have good quality of life
2. Promote people & communities jointly caring for, conserving & restoring natural resources & the environment, in order to build community capacity in managing natural resources & the environment
3. To provide people and stakeholders from all parts of the community with awareness and consciousness for participating in managing natural resources & the environment
4. To address community pollution through prevention, solution of problems, and efficient control
5. Community environments are beautiful and build the quality of life of people in the communities

Figure 16. Ping part 5 sub-basin strategies & measures

Strategies & Measures

Strategy 1. Conservation & restoration of natural resources & the environment

- 1.1 Developing & promoting knowledge on ways to restore natural resources & environment
- 1.2 Solving problems of water shortage, floods, & encroachment of waterways & riparian areas
- 1.3 Reforestation
- 1.4 Reducing agricultural chemical use & using natural materials in soil maintenance

Strategy 2. Management of natural resources and the environment

- 2.1 Provide knowledge & public relations for managing natural resources & environment, soil, water, air, forest, & wildlife
- 2.2 Establish networks to watch for threats of river bank collapse in riverside areas
- 2.3 Build networks to guard against illicit logging, forest destruction and forest fires
- 2.4 Establishing organizations for unified management of all sub-basin resources
- 2.5 Participation of the people in making management plans for natural resources & environment in Ping part 5 sub-basin
- 2.6 Promote & support in occupations appropriate for the potential of communities, natural resources & environment, and occupations that use local knowledge and principles of the sufficient economy philosophy

Strategy 3. Management of environmental pollution for better quality of life, public health & livelihoods of the people

- 3.1 Training to provide knowledge & understanding related to household hygiene practices, & campaigns & public relations on sanitation, for better quality of live, public health and health
- 3.2 Improving community environments to be more pleasant by considering community culture and local knowledge in managing natural resources & environment to increase safety and absence of disease
- 3.3 Manage garbage and wastewater and reduce air pollution

Strategy 4. Build consciousness of environmental stewardship

- 4.1 Build consciousness of community members to have awareness & participation in conserving & restoring natural resources & environment in their communities
- 4.2 Training to provide knowledge for youth as extremely important in national development & caring for natural resources & environment in the future
- 4.3 Environmental conservation campaign using public relations media that is modern, easy to understand & worth following
- 4.4 Training to provide knowledge & understanding related to use of chemicals in agriculture

Figure 17a. Ping part 5 Measures – Types of Expected Outcomes

Strategy 1. Conservation & restoration of natural resources & the environment

1.1 Developing & promoting knowledge on ways to restore natural resources & environment

KNOWLEDGE nat res	1 people's knowledge about natural resources
	2 increased knowledge of nature conservation
WATER	3 increased water storage, no flood problems

1.2 Solving problems of water shortage, floods, & encroachment of waterways & riparian areas

WATER	1 increased moisture, more water source capital
	2 increased water source capital
	3 increased water storage, no flood problems
	4 decreased river bank collapse problems
WATER health	5 sufficient water for consumption & domestic use

1.3 Reforestation

PARTICIPATION forest	1 increased participation of people in caring for forest
FOREST	2 amount of forest not reduced, increased economic forest

1.4 Reducing agricultural chemical use & using natural materials in soil maintenance

KNOWLEDGE agric	1 increased number of people with knowledge about making compost
	2 increased number of people with knowledge of agricultural chemical hazards
PLANTS / SOIL	3 increased area of plants to provide soil cover

Strategy 2. Management of natural resources and the environment

2.1 Providing knowledge & public relations for managing natural resources & environment, soil, water, air, forest, & wildlife

KNOWLEDGE NRE	1 increased consciousness of the people in conservation of NRE
ORG group env	2 increased number of Lower Ping protection groups
ORG group user	3 Increased number of efficient water user groups
HEALTH garbage/water	4 reduced disposal of garbage into river

2.2 Establish networks to watch for threats of river bank collapse in riverside areas

ORG network	1 increased number of networks to report river bank collapse threats
PLANTS / SOIL	2 increased planting of vetiver grass

2.3 Build networks to guard against illicit logging, forest destruction and forest fires

PARTICIPATION forest	1 individual violators receive punishment
FOREST	2 reduced damage from forest fires (2)

2.4 Establishing organizations for unified management of all sub-basin resources project

ORGANIZATION	1 Organization members have increased capacity for managing water resources
	2 structure of NRE organization has increased efficiency
PARTICIPATION nre	3 increased number of people participating in managing natural resources & environment

2.5 Participation of the people in making management plans for natural resources & environment in the Ping part 5 sub-basin

KNOWLEDGE NRE	1 people have increased knowledge in managing NRE
ORGANIZATION	2 individuals involved in making NRE plans have increased efficiency
	3 increased budget for individual development

2.6 Promote & support in occupations appropriate for the potential of communities, natural resources & environment, and occupations that use local knowledge and principles of the sufficient economy philosophy

ORG group user	1 increased number of strong community occupational groups
LIVELIHOODS	2 communities have good supplementary occupations
	3 increased occupational funding source
	4 increased efficiency in household finance
	5 increased number of households able to reduce expenses (2)

- Strategy 2 is named “management of natural resources and the environment”, and much of what it seeks to achieve is focused on building and strengthening organizations at local group, network and sub-basin levels. It also seeks to build some types of knowledge and increase local participation in natural resource management. Behavioral change is expected to affect local livelihoods by improving household financial management and supplementary occupations. Direct effects on natural resources aim to reduce damage from forest fires and soil erosion. There is one water-related health outcome.

Figure 17b. Ping part 5 Measures – Types of Expected Outcomes *(continued)*

Strategy 3. Management of environmental pollution for quality of life, public health and better livelihoods of the people

3.1 Training to provide knowledge & understanding related to household hygiene practices, & campaigns & public relations on sanitation, for better quality of live, public health and livelihoods

PLANTS / SOIL health	1 increased number of people planting home gardens
HEALTH	2 reduced number of people getting dengue fever
	3 increased number of people participating in exercise activities
HEALTH garbage	4 increased number of households managing their garbage

3.2 Improving community environments to be more pleasant by considering community culture and local knowledge in managing natural resources & environment to increase safety and absence of disease

KNOWLEDGE health	1increased number of people knowledgeable about medicinals
ORG network	2 increased number of easily understandable disaster warning systems
PARTICIPATION health	3 increased number of people participating in sanitation activities
	4 increased number of people participating in sanitation campaigns
HEALTH garbage	5 increased number of people burning leaves & garbage correctly

3.3 Manage garbage and wastewater and reduce air pollution

KNOWLEDGE water	1 increased number of households & entrepreneurs with knowledge about wastewater treatment
WATER health	2 reduced amount of household waste water
	3 reduced amount of wastewater from industrial factories
HEALTH air	4 reduced amounts of pollution from particulate matter & smoke
HEALTH garbage	5 increased number of garbage disposal sites
	6 increased number of households who separate garbage correctly
	7 increased number of sanitary garbage disposal sites

Strategy 4. Build consciousness of environmental stewardship

4.1 Build consciousness of community members to have awareness & participation in conserving & restoring natural resources & evnironment in their communities

KNOWLEDGE NRE	1 increased number of people in communities who highly value NRE (2)
ORGANIZATION	2 <environment camp project>
ORG media-communic	3 public relations that reaches communities well

4.2 Training to provide knowledge for youth as extremely important in national development & caring for natural resources & envirionment in the future

PARTICIPATION nre	1 increased number of youth joining the environment project (3)

4.3 Campaign on environmental conservation by using public reations communications media that is modern, easy to understand & worth following

ORG media-communic	1 increased number of communications media on NRE that are easy to understand, modern, & worth following (6)

4.4 Training to provide knowledge & understanding related to use of chemicals in agriculture

KNOWLEDGE agric	1 increased number of households knowledgeable about agricultural chemical hazards
ORG media-communic	2 increased amount of communication media on safe use of agricultural chemicals
HEALTH agriculture	3 reduced amount of people affected by agricultural chemical hazards
LIVELIHOODS health	4 increased number of people using agricultural chemicals safely

- Strategy 3 is named “management of environmental pollution for quality of life, public health and better livelihoods of the people”. The focus of half of its outcomes is on directly improving health conditions, primarily through improved management of garbage. It also seeks to build knowledge and participation related to health-related issues, and to have some direct effects on health-related aspects of water and crop management.
- Strategy 4 is named “build consciousness of environmental stewardship”, and more than two-thirds of its achievements are expected to focus on building knowledge and providing information through media distributed through sub-basin organizations. It also seeks to expand participation by youth, and to have direct effects on health and livelihoods through improved handling of agricultural chemicals.

Figure 18a. Ping part 5 Strategies – Types of Expected Outcomes

Strategy 1. Conservation & restoration of natural resources & the environment

KNOWLEDGE nat res	1	increased knowledge of nature conservation
	2	people's knowledge about natural resources
KNOWLEDGE agric	3	increased number of people with knowledge of agricultural chemical hazards
	4	increased number of people with knowledge about making compost
PARTICIPATION forest	1	increased participation of people in caring for forest
FOREST	1	amount of forest not reduced, increased economic forest
WATER	2	increased water source capital
	3	increased moisture, more water source capital
	4	increased water storage, no flood problems (2)
	5	decreased river bank collapse problems
WATER health	6	sufficient water for consumption & domestic use
PLANTS / SOIL	7	increased area of plants to provide soil cover

Strategy 2. Management of natural resources and the environment

KNOWLEDGE NRE	1	increased consciousness of the people in conservation of NRE
	2	people have increased knowledge in managing NRE
ORGANIZATION	1	increased budget for individual development
	2	structure of NRE organization has increased efficiency
	3	individuals involved in making NRE plans have increased efficiency
	4	Organization members have increased capacity for managing water resources
ORG network	5	increased number of networks to report river bank collapse threats
ORG group env	6	increased number of Lower Ping protection groups
ORG group user	7	increased number of strong community occupational groups
	8	Increased number of efficient water user groups
PARTICIPATION nre	1	increased number of people participating in managing NRE
PARTICIPATION forest	2	individual violators receive punishment
FOREST	1	reduced damage from forest fires (2)
PLANTS / SOIL	2	increased planting of vetiver grass
HEALTH garbage/water	1	reduced disposal of garbage into river
LIVELIHOODS	1	increased number of households able to reduce expenses (2)
	2	increased occupational funding source
	3	communities have good supplementary occupations
	4	increased efficiency in household finance

Outcomes at the overall sub-basin workplan level. The same approach was used to aggregate outcomes at the overall sub-basin workplan level, as summarized in Figure 19. This overall view of the Ping part 5 sub-basin plans shows that more than half of the outcomes it seeks to achieve are focused on expanding and strengthening various forms of social organization, on increasing knowledge about natural resources, agriculture and health, and to a somewhat lesser degree increasing levels of participation in activities related to natural resources and health. The remaining expected outcomes are split between direct effects on natural resources (mainly water, but also forest, soils and home gardens), and direct effects expected to improve health and livelihoods, with particular emphasis on management of garbage, household financial management, supplementary occupations, and safety in using agricultural chemicals.

This summary of overall expected outcomes can now be compared with the vision, goals and objectives of the sub-basin plan, as shown in Figure 15.

Figure 18b. Ping part 5 Strategies – Types of Expected Outcomes *(continued)*

Strategy 3. Management of environmental pollution for quality of life, public health and better livelihoods of the people

KNOWLEDGE water	1	increased number of households & entrepreneurs with knowledge about wastewater treatment
KNOWLEDGE health	2	increased number of people knowledgeable about medicinals
ORG network	1	increased number of easily understandable disaster warning systems
PARTICIPATION health	1	increased number of people participating in sanitation activities
	2	increased number of people participating in sanitation campaigns
WATER health	1	reduced amount of household waste water
	2	reduced amount of wastewater from industrial factories
PLANTS / SOIL health	3	increased number of people planting home gardens
HEALTH	1	increased number of people participating in exercise activities
	2	reduced number of people getting dengue fever
HEALTH air	3	reduced amounts of pollution from particulate matter & smoke
HEALTH garbage	4	increased number of garbage disposal sites
	5	increased number of people burning leaves & garbage correctly
	6	increased number of sanitary garbage disposal sites
	7	increased number of households managing their garbage
	8	increased number of households who separate garbage correctly

Strategy 4. Build consciousness of environmental stewardship

KNOWLEDGE NRE	1	increased number of people in communities who highly value natural resource & the environment (2)
KNOWLEDGE agric	2	increased number of households knowledgeable about agricultural chemical hazards
ORGANIZATION	1	<environment camp project>
ORG media-communic	2	increased number of communications media on NRE that are easy to understand, modern, & worth following (6)
	3	increased amount of communication media on safe use of agricultural chemicals
	4	public relations that reaches communities well
PARTICIPATION nre	1	increased number of youth joining environment project (3)
HEALTH agriculture	1	reduced amount of people affected by agricultural chemical hazards
LIVELIHOODS health	1	increased number of people using agricultural chemicals safely

Figure 19. Ping part 5 Overall Sub-basin Workplan – Types of Expected Outcomes

KNOWLEDGE	*NRE*	1 increased consciousness of the people in conservation of NRE
		2 people have increased knowledge in managing NRE
		3 increased number of people in communities who highly value natural resource & the environment (2)
	natural resources	4 increased knowledge of nature conservation
		5 people's knowledge about natural resources
	water	6 increased number of households & entrepreneurs with knowledge about wastewater treatment
	agriculture	7 increased number of people with knowledge of agricultural chemical hazards
		8 increased number of households knowledgeable about agricultural chemical hazards
		9 increased number of people with knowledge about making compost
	health	10 increased number of people knowledgeable about medicinals
ORGANIZATION		1 structure of NRE organization has increased efficiency
		2 increased budget for individual development
		3 individuals involved in making NRE plans have increased efficiency
		4 Organization members have increased capacity for managing water resources
		5 <environment camp project>
	networks	6 increased number of networks to report river bank collapse threats
		7 increased number of easily understandable disaster warning systems
	groups	8 increased number of Lower Ping protection groups
		9 increased number of strong community occupational groups
		10 Increased number of efficient water user groups
	media-communic	11 increased number of communications media on NRE that are easy to understand, modern, & worth following (6)
		12 increased amount of communication media on safe use of agricultural chemicals
		13 public relations that reaches communities well
PARTICIPATION		1 increased number of people participating in managing NRE
		2 increased number of youth joining environment project (3)
	forest	3 increased participation of people in caring for forest
		4 individual violators receive punishment
	health	5 increased number of people participating in sanitation activities
		6 increased number of people participating in sanitation campaigns
NATURAL RESOURCES		
- FOREST		1 amount of forest not reduced, increased economic forest
		2 reduced damage from forest fires (2)
- WATER		3 increased water source capital
		4 increased moisture, more water source capital
		5 increased water storage, no flood problems (2)
		6 decreased river bank collapse problems
	health	7 sufficient water for consumption & domestic use
		8 reduced amount of household waste water
		9 reduced amount of wastewater from industrial factories
- PLANTS / SOIL		10 increased area of plants to provide soil cover
		11 increased planting of vetiver grass
	health	12 increased number of people planting home gardens
HEALTH		1 increased number of people participating in exercise activities
		2 reduced number of people getting dengue fever
	air	3 reduced amounts of pollution from particulate matter & smoke
	garbage/water	4 reduced disposal of garbage into river
	garbage	5 increased number of garbage disposal sites
		6 increased number of people burning leaves & garbage correctly
		7 increased number of sanitary garbage disposal sites
		8 increased number of households managing their garbage
		9 increased number of households who separate garbage correctly
	agriculture	10 reduced amount of people affected by agricultural chemical hazards
LIVELIHOODS		1 increased number of households able to reduce expenses (2)
		2 increased occupational funding source
		3 communities have good supplementary occupations
		4 increased efficiency in household finance
	health	5 increased number of people using agricultural chemicals safely

3.2. Mae Kuang sub-basin

The current overall planning framework in the Mae Kuang sub-basin is also closely in line with the generalized structure shown in Figure 11. Details of the vision, goal and objectives of the plan are shown in Figure 20, and the strategies and measures contained in the sub-basin workplan are shown in Figure 21. The four objectives appear to be broad outcome statements for each of the four strategies of the plan.

Figure 20. Mae Kuang Sub-basin Vision, Goals & Objectives

Vision: Restored local knowledge; Mae Kuang sub-basin has abundant water; deteriorated soil, water and forest disappear; increased economic value; support for all communities
Goal: To conserve and restore natural resources and improve environmental quality in the Ping watershed in order to provide good livelihoods and sanitation for the people
Objectives: 1. To provide the Mae Kuang sub-basin with rich & productive natural resources & environment, especially water resources that are the main basic resource in the local reservoir named by H.M. the King as Udom Thara 2. To care for and restore soil, water, and forest resources, which are natural resources that are important for livelihoods of the people in the Mae Kuang watershed, build capacity, knowledge, strength and participation of people in the watershed 3. People in the watershed are able to have balanced livelihoods, have strong community economies, and are able to have basic household incomes that are in balance with nature 4. People in the watershed have good quality of life, livelihoods, and physical health, and communities in the watershed have strength to better themselves by helping each other

Figure 21. Mae Kuang Sub-basin Strategies & Measures

Strategies & Measures	
Strategy 1. Management of natural resources & environment through participation of the people	
1.1	Control & enforcement of regulations & laws related to pollution prevention
1.2	restore existing local organizations to have knowledge & capacity
1.3	Build people's participation in management of natural resources & environment
1.4	Establish holistic natural resources management organizations in the watershed
Strategy 2. Conserve and restore natural resources to be fertile & productive	
2.1	Care for and look after natural resources & the environment to be fertile & productive
2.2	Strictly enforce use of laws & local codes and punish violators destroying forest resources
2.3	Develop potential and build networks to guard natural resources & the environment
2.4	Promote conservation-based tourism, & preservation of livelihoods, traditions, culture & local knowledge
Strategy 3. Build economic strength of communities to increase basic household & community incomes	
3.1	Promote employment & local occupations by supporting occupational knowledge & methods appropriate for local potential
3.2	Campaign for people to recognize savings so they can control & reduce unimportant household expenses
3.3	Build opportunities for people & community entrepreneurs to access occupational finance sources
Strategy 4. Good quality of life, health & livelihoods	
4.1	Training & providing knowledge related to community hygiene
4.2	Improve community environmental conditions to be pleasant
4.3	Promote, campaign & public relations on sanitation for better quality of life, health & livelihoods

Initial efforts to determine indicators for monitoring and evaluation have focused at the measures level. At the present time, these 'indicators' are really only restatements of the name of the measure. Thus, most are not yet even clear outcome statements, and much work remains to be done to determine how they can actually be measured under a results measurement framework.

Many of the problems seen in the structure of the planning framework in the Mae Kuang sub-basin appear to relate to the difficulties that have been encountered in trying to merge plans developed in different parts of this quite complex sub-basin. Debate and negotiations are still active among upper areas where conservation is emphasized, middle areas where resource use is emphasized, and lower areas where addressing negative impacts of upstream activities are emphasized. Networks and leaders within the Mae Kuang sub-basin acknowledge that more time will be needed to reach consensus on many issues and further refine the plan structure.

Figure 22a. Mae Kuang Measures – Types of Expected Outcomes

Strategy 1. Management of natural resources & environment through participation of the people

1.1 Control & enforcement of regulations & laws related to pollution prevention

PARTICIPATION	increased enforcement of regulations & laws related to pollution prevention

1.2 restore exising local organizations to have knowledge & capacity

ORGANIZATION know	existing local organizations are restored by increased knowledge & capacity

1.3 Build people's participation in management of natural resources & environment

PARTICIPATION nre	increased management of natural resources & environment through people's participation

1.4 Establish holistic natural resources management organizations in the watershed

ORGANIZATION	increased establishment of holistic natural resource management organizations in the watershed

Strategy 2. Conserve and restore natural resources to be fertile & productive

2.1 Care for and look after natural resources & the environment to be fertile & productive

PARTICIPATION nre	increased care for natural resources & environment to make them fertile & productive

2.2 Strictly enforce use of laws & local codes and punish violators destroying forest resources

PARTICIPATION forest	increased enforcement of laws & local codes & strict punishment of violators destroying forest resources

2.3 Develop potential and build networks to guard natural resources & the environment

ORGANIZATION netwk	increased development of potential of networks to guard natural resources & the environment

2.4 Promote conservation-based tourism, & preservation of livelihoods, traditions, culture & local knowledge

LIVELIHOODS	increased conservation-based tourism & preservation of livelihoods, traditions, culture & local knowledge

Stragtegy 3. Build economic strength of communities to increase basic household & community incomes

3.1 Promote employment & local occupations by supporting occupational knowledge & methods appropriate for local potential

LIVELIHOODS	local occupations receive increased promotion and support in knowledge & methods appropriate for local potential

3.2 Campaign for people to recognize savings so they can control & reduce unimportant household expenses

LIVELIHOODS	People have increased recognition of savings and are able to control and reduce unimportant household expenses

3.3 Build opportunities for people & community entrepreneurs to access occupational finance sources

LIVELIHOODS fund	People & community entrepreneurs have more ability to access occupational finance sources

Strategy 4. Good quality of life, health & livelihoods

4.1 Training & providing knowledge related to community hygiene

KNOWLEDGE health	increased training and provision of knowledge related to community hygiene

4.2 Improve community environmental conditions to be pleasant

LIVELIHOODS	more community envirionmental condtiions are improved to be pleasant

4.3 Promote, campaign & public relations on sanitation for better quality of life, health & livelihoods

KNOWLEDGE health	increased campaigns & public relations on sanitation

Outcomes at the measures level. In order to help clarify the types of outcomes expected under different levels of the current Mae Kuang sub-basin workplan, expected outcomes ("indicators") that have been specified are listed in Figure 22 under the measure with which they are associated. Outcomes are then categorized on the left side according to the general type of outcome that is expected. It is then quite easy to get a general picture of the types of results expected from different measures, which can then be compared with the title of the measure for consistency. The complex single statement outcomes for many measures still leave much ambiguity about the basic outcomes expected from each measure.

Outcomes at the strategy level. This same approach then allows us to re-aggregate expected outcomes by the types of outcomes under each strategy, as shown in Figure 23. This again allows us to see quite clearly the expected results under each strategy:

Figure 23. Mae Kuang Strategies – Types of Expected Outcomes

Strategy 1. Management of natural resources & environment through participation of the people

ORGANIZATION	1 increased establishment of holistic natural resource management organizations in the watershed
knowledge	*2* existing local organizations are restored by increased knowledge & capacity
PARTICIPATION	1 increased enforcement of regulations & laws related to pollution prevention
nre	*2* increased management of natural resources & environment through people's participation

Strategy 2. Conserve and trestore natural resources to be fertile & productive

ORGANIZATION *netwk*	1 increased development of potential of networks to guard natural resources & the environment
PARTICIPATION *nre*	1 increased care for natural resources & environment to make them fertile & productive
forest	*2* increased enforcement of laws & local codes & strict punishment of violators destroying forest resources
LIVELIHOODS	1 increased conservation-based tourism & preservation of livelihoods, traditions, culture & local knowledge

Stragtegy 3. Build economic strength of communities to increase basic household & community incomes

LIVELIHOODS	1 local occupations receive increased promotion and support in knowledge & methods appropriate for local potential
	2 People have increased recognition of savings and are able to control and reduce unimportant household expenses
fund	*3* People & community entrepreneurs have more ability to access occupational finance sources

Strategy 4. Good quality of life, health & livelihoods

KNOWLEDGE *health*	1 increased training and provision of knowledge related to community hygiene
	2 increased campaigns & public relations on sanitation
LIVELIHOODS	1 more community envirionmental condtiions are improved to be pleasant

- Strategy 1 is named "Management of natural resources & environment through participation of the people", and what it seeks to achieve appears to focus mainly improving organizations and increasing participation, including enforcement of laws and regulations to prevent pollution.
- Strategy 2 is named "Conserve and restore natural resources to be fertile and productive". One portion of what it seeks to achieve appears to focus mainly on expanding network organizations to protect natural resources, and on increasing participation to care for and enforce laws and regulations related to natural resources. A second portion of what it seeks to achieve focuses on promoting eco-based tourism, and preservation of livelihoods, culture, traditions and local knowledge.
- Strategy 3 is named "Build economic strength of communities to increase basic household and community incomes", and what it seeks to achieve appears to focus mainly on promoting "appropriate" local occupations, on encouraging households to increase savings and reduce unnecessary expenses, and on helping local people and entrepreneurs gain more access to sources of occupational finance.

- Strategy 4 is named "Good quality of life, health and livelihoods", and what it seeks to achieve appears to focus mainly on increasing local knowledge about hygiene and sanitation, and on improving community environmental conditions to be more "pleasant".

Outcomes at the overall sub-basin workplan level. The same approach was again used to aggregate outcomes at the overall sub-basin workplan level, as summarized in Figure 24. This overall view of expected outcomes currently stated in the Mae Kuang sub-basin plans shows that one-half of the outcomes would result in stronger organizations and increased participation, with considerable emphasis on conservation and enforcement of laws and regulations. Just over one-third of their outcomes relate to improving livelihoods through several still quite ambiguous lines of activity, and remaining outcomes focus on increased local knowledge about community hygiene and sanitation.

Figure 24. Mae Kuang Overall Sub-basin Workplan – Types of Expected Outcomes

KNOWLEDGE *health*	1	increased training and provision of knowledge related to community hygiene
	2	increased campaigns & public relations on sanitation
ORGANIZATION	1	increased establishment of holistic natural resource management organizations in the watershed
networks	2	increased development of potential of networks to guard natural resources & the environment
knowledge	3	existing local organizations are restored by increased knowledge & capacity
PARTICIPATION	1	increased enforcement of regulations & laws related to pollution prevention
nre	2	increased management of natural resources & environment through people's participation
	3	increased care for natural resources & environment to make them fertile & productive
forest	4	increased enforcement of laws & local codes & strict punishment of violators destroying forest resources
LIVELIHOODS	1	increased conservation-based tourism & preservation of livelihoods, traditions, culture & local knowledge
	2	local occupations receive increased promotion and support in knowledge & methods appropriate for local potential
	3	People have increased recognition of savings and are able to control and reduce unimportant household expenses
	4	more community envirionmental condtiions are improved to be pleasant
fund	5	People & community entrepreneurs have more ability to access occupational finance sources

This summary of overall expected outcomes can now be compared with the vision, goals and objectives of the sub-basin plan, as shown in Figure 20.

Based on a review of the various plans and lists of projects that were assembled for consideration during the planning process, there is good reason to believe that there may be various lines of activity and types of projects that are not reflected in the higher level outcomes that are currently stated in the Mae Kuang sub-basin plan. For example, objective 1 places emphasis on water resources, but outcomes of strategy 1 do not indicate any direct effects on water. Indeed, there are not yet any outcomes related to direct effects on natural resources or health. One suspects that this is due to a combination of too little time available for work by sub-basin networks and leaders, and the difficulties they are having in reaching a rapid consensus that can overcome some still quite basic differences of opinions. In any event, considerable work will be necessary to articulate clear outcomes and measurable indicators required for an effective results measurement system in the Mae Kuang sub-basin.

3.3. Ping part 1 sub-basin

The sub-basin management plan for the Ping part 1 sub-basin shows some interesting differences from plans in other sub-basins. During the last round of review and improvements by networks and leaders in the Ping part 1 sub-basin, some significant changes were made in the structure of the sub-basin plan. The overall direction of the plan now centers on a clearly articulated vision statement and one quite clearly stated goal, as shown in Figure 25.

Figure 25. Ping Part 1 Vision & Goal

Vision Beautiful forests, clear water, development with united hearts & promoting local wisdom

Beautiful forests, clear water means resources are rich, have biodiversity, are sources of food & medicines to care for disease, and communities have access to their benefits

Development with united hearts means collaborative linkage mechanisms among all local parties, no matter if at the level of groups, peoples organizations, local agencies, local governments, temples, schools, etc.

Promoting local wisdom means rehabilitation and gathering of local knowledge, presenting information, and building acceptance

Goal

Communities have knowledge & awareness about local resource problem situations, and apply it in building participatory strategies with all local parties for sustainable management of natural resources in the watershed

While the action plan still retains a structure consisting of strategies and measures, the number of strategies has been increased to six, as shown in Figure 26. The nature and sequence of these strategies show a long-term vision of sub-basin management that is based on further building and developing processes that have already begun within the sub-basin. Thus, the strategies within the plan appear to map out an initial phase for sub-basin activities that seeks to build local capacity and consensus among sub-basin stakeholders

Figure 26a. Ping Part 1 Strategies & Measures

Strategy 1. Building capacity of community organizations (human resource development)

- 1.1 Support and promote provision of knowledge to community organizations at all levels
- 1.2 Further build on the base of resource management activities conducted by local peoples organizations
- 1.3 Promote establishment of networks among peoples organizations to manage natural resources in the sub-basin & sub-watersheds
- 1.4 Support and promote continuing inheritance of local knowledge
- 1.5 Support & promote providing knowledge in occupations appropriate for community potential and location
- 1.6 Support & promote sanitation & hygiene for improving quality of life & health

Strategy 2. Studying and gathering of community datasets and knowledge

- 2.1 Make an information system for peoples resource-based management organizations in the sub-basin & sub-watersheds
- 2.2 Study & collect knowledge datasets and local knowledge about local natural resource & environmental management
- 2.3 Establish implementation-based research in collaboration with local communities in the watershed
- 2.4 Establish processes for data analysis and evaluation of problem conditions in the watershed

Strategy 3. Building mechanisms for collaboration with local parties

- 3.1 Build collaboration among communities & local government organizations in managing resources in watersheds
- 3.2 Raise the level of communities in natural resources & environment planning that can join with local governments
- 3.3 Promote establishment of networks among peoples organizations to manage natural resources in the Ping part 1 sub-basin & local sub-watersheds

Figure 26a. Ping Part 1 Strategies & Measures *(continued)*

Strategy 4. Promote & support natural resource management activities (natural resource conservation)
- 4.1 Restore natural resources & environment
- 4.2 Control and protect community natural resources
- 4.3 Community collaboration in determining directions of resource management
- 4.4 Use ways of life & culture as tools in management & activities

Strategy 5. Managing resources and watershed management organization structure
- 5.1 Raise the level of community organizations in holistic watershed management
- 5.2 Develop organizational mechanisms for managing watersheds and community organizations
- 5.3 Formulate plans for managing sustainable use of resources

Strategy 6. Policy monitoring & advocacy
- 6.1 Monitor, examine & present opinions about state resource management policies
- 6.2 Supplement processes of various networks in following laws demanded by communities, such as the community forestry law

Outcomes at the measures level. In order to help clarify the types of outcomes expected under different levels of the Ping part 1 sub-basin workplan, expected outcomes ("indicators") that have been specified are listed in Figure 27 under the measure with which they are associated. As with the other pilot sub-basins, outcomes are then categorized on the left side according to the general type of outcome that is expected. This provides a general picture of the types of results expected from different measures, which can then be compared with the title of the measure for consistency. Some of the single statement outcomes at the measures level are still quite complex and ambiguous about specific outcomes expected from each measure. They are, however, considerably more clear than the types of measures-level outcome statements in the Mae Kuang plan. As an example of how some of these statements could be made more clear, measure 1.2 has been split into two outcome statements in order to demonstrate the two types of outcomes that it includes.

One can reasonably expect that more specific measures for each of these outcomes could be developed as the specific activities to be conducted under each measure are designed in more detail and articulated using tools such as the LogFrame. Moreover, there are strategies during this initial phase that are specifically directed toward developing local information and data systems that could help identify specific measurable indicators, means of measurement, and appropriate baseline data.

Outcomes at the strategy level. The same approach is taken to re-aggregate expected outcomes by the types of outcomes under each strategy, as shown in Figure 28. This again allows us to see quite clearly the expected results under each strategy:

- Strategy 1 is named "Building capacity of community organizations (human resource development)", and about half of the outcomes it seeks to achieve focus mainly on building knowledge and organizational capacities of existing local organizations at various levels within the sub-basin. Remaining outcomes focus on local participation and more direct (but still quite general) health and livelihood outcomes.
- Strategy 2 is named "Studying and gathering of community datasets and knowledge", and what it seeks to achieve focuses on building a local data and information system in local organizations that incorporates strong participation in increasing local capacities and in utilization of the system to assess and address local problem situations.

Figure 27. Ping part 1 Measures – Types of Expected Outcomes

Strategy 1. Building capacity of community organizations (human resource development)

1.1 Support and promote provision of knowledge to community organizations at all levels

ORGANIZATION	knowledge	1	Local organizations at all levels in watersheds begin developing knowledge potential that can be used in participatory management of resources in the watershed

1.2 Further build on the base of resource management activities conducted by local peoples organizations

KNOWLEDGE		1	Communities are aware of and understand problem conditions in the area,
PARTICIPATION		1	and participate in managing natural resources & the environment

1.3 Promote establishment of networks among peoples organizations to manage natural resources in the sub-basin & sub-watersheds

ORGANIZATION	network	1	Existing local organizations join together in community networks to manage natural resources in the Ping part 1 sub-basin and local sub-watersheds with substance & participation

1.4 Support and promote continuing inheritance of local knowledge

KNOWLEDGE		1	Use of concepts & local knowledge consistent with community ecosystems

1.5 Support & promote providing knowledge in occupations appropriate forcommunity potential and location

LIVELIHOODS		1	Communities in the Ping part 1 sub-basin & local sub-watersheds receive promotion of occupations appropriate for community potential & the local area

1.6 Support & promote sanitation & hygiene for improving quality of life & health

HEALTH		1	Have support for basic public health & household and community sanitation

Strategy 2. Studying and gathering of community datasets and knowledge

2.1 Make an information system for peoples resource-based management organizations in the sub-basin & sub-watersheds

ORGANIZATION	data	1	Communities begin to use the knowledge base in NRE management planning, in order to bring relevance to problem conditions & needs of communities in the area

2.2 Study & collect knowledge datasets and local knowledge about local natural resource & environmental management

ORGANIZATION	data	1	Have studies & knowledge collections related to resource management, such as forest utilization, bamboo, fuelwood use, weir management

2.3 Establish implementation-based research in collaboration with local communities in the watershed

PARTICIPATION		1	Communities have capacity to initiate & collaborate in villager research

2.4 Establish processes for data analysis and evaluation of problem conditions in the watershed

PARTICIPATION		1	Communities begin exchange on problem situations at local levels

Strategy 3. Building mechanisms for collaboration with local parties

3.1 Build collaboration among communities & local government organizations in managing resources in watersheds

PARTICIPATION		1	Local governements in the area participate, support & promote activities of villagers

3.2 Raise the level of communities in natural resources & environment planning that can join with local governments

PARTICIPATION		1	Communities draft participatory NRE management plans that can join with local governments

3.3 Promote establishment of networks among peoples organizations to manage natural resources in the Ping part 1 sub-basin & local sub-watersheds

ORGANIZATION	network	1	Existing villager organizations join together in community networks in order to manage natural resources in the Ping part 1 sub-basin & local sub-watersheds in a solid & participatory manner, together with building mechanisms to move community resource management plans into the organization

Strategy 4. Promoting & supporting natural resource management activities (natural resource conservation)

4.1 Restore natural resources & environment

FOREST-WATER-SOIL		1	Natural resources are fertile & abundant

4.2 Control and protect community natural resources

PARTICIPATION	nre	1	Communities participate in sustainable management & use of resources

4.3 Community collaboration in determining directions of resource management

PARTICIPATION		1	Communities & the state collaborate in conducting activities

4.4 Use ways of life & culture as tools in management & activities

ORGANIZATION	network	1	Networks of community organizations that manage resources have activities for resource conservation & restoration using community local knowledge

Strategy 5. Managing resources and watershed management organization structure

5.1 Raise the level of community organizations in holistic watershed management

PARTICIPATION		1	Communities participate in thinking, analysis, determinations, & follow-up

5.2 Develop organizational mechanisms for managing watersheds and community organizations

ORGANIZATION		1	(short term) get a community organization structure for watershed management & capable of adapting to various situations

5.3 Formulate plans for managing sustainable use of resources

ORGANIZATION		1	(long term) Begin study of villager organizational models for watershed management together with various partners

Strategy 6. Policy monitoring & advocacy

6.1 Monitor, examine & present opinions about state resource management policies

ORGANIZATION		1	Initiate mechanisms for following & advocating laws affecting communities

6.2 Supplement processes of various networks in following laws demanded by communities, such as the community forestry law

PARTICIPATION	policy	1	communities become aware and join in advocating laws, such as the community forest law

Figure 28. Ping part 1 Strategies – Types of Expected Outcomes

Strategy 1. Building capacity of community organizations (human resource development)

KNOWLEDGE		1	Communities are aware of and understand problem conditions in the area,
		2	Use of concepts & local knowledge consistent with community ecosystems
ORGANIZATION	network	1	Existing local organizations join together in community networks to manage natural resources in the Ping part 1 sub-basin and local sub-watersheds with substance & participation
	knowledge	2	Local organizations at all levels in watersheds begin developing knowledge potential that can be used in participatory management of resources in the watershed
PARTICIPATION		1	and communities participate in managing natural resources & the environment
HEALTH		1	Have support for basic public health & household and community sanitation
LIVELIHOODS		1	Communities in the Ping part 1 sub-basin & local sub-watersheds receive promotion of occupations appropriate for community potential & the local area

Strategy 2. Studying and gathering of community datasets and knowledge

ORGANIZATION	data	1	Communities begin to use the knowledge base in NRE management planning, in order to bring relevance to problem conditions & needs of communities in the area
		2	Have studies & knowledge collections related to resource management, such as forest utilization, bamboo, fuelwood use, weir management
PARTICIPATION		1	Communities have capacity to initiate & collaborate in villager research
		2	Communities begin exchange on problem situations at local levels

Strategy 3. Building mechanisms for collaboration with local parties

ORGANIZATION	network	1	Existing villager organizations join together in community networks in order to manage natural resources in the Ping part 1 sub-basin & local sub-watersheds in a solid & participatory manner, together with building mechanisms to move community resource management plans into the organization
PARTICIPATION		1	Local governements in the area participate, support & promote activities of villagers
		2	Communities draft participatory NRE management plans that can join with local governments

Strategy 4. Promoting & supporting natural resource management activities (natural resource conservation)

ORGANIZATION	network	1	Networks of community organizations that manage resources have activities for resource conservation & restoration using community local knowledge
PARTICIPATION		1	Communities & the state collaborate in conducting activities
	nre	2	Communities participate in sustainable management & use of resources
FOREST-WATER-SOIL		1	Natural resources are fertile & abundant

Strategy 5. Managing resources and watershed management organization structure

ORGANIZATION		1	(short term) get a community organization structure for watershed management & capable of adapting to various situations
		2	(long term) Begin study of villager organizational models for watershed management together with various partners
PARTICIPATION		1	Communities participate in thinking, analysis, determinations, & follow-up

Strategy 6. Policy monitoring & advocacy

ORGANIZATION		1	Initiate mechanisms for following & advocating laws affecting communities
PARTICIPATION	policy	1	communities become aware and join in advocating laws, such as the community forest law

- Strategy 3 is named “Building mechanisms for collaboration with local parties”, and what it seeks to achieve focuses on building networks among local organizations, strengthening participation by local governments, and community-initiated planning that is able to join with local government processes.
- Strategy 4 is named “Promote & support natural resource management activities (natural resource conservation)”. Most of what it seeks to achieve appears to focus on building network organizational capacities and on participation by both communities and state agencies. A single outcome appears as a general outcome for all specific natural resource outcomes – this is a very clear example of a measures level outcome that needs to be broken down according to the expected outcomes of specific activities under the outcome aimed at directly affecting natural resources in the sub-basin.

- Strategy 5 is named "Managing resources and watershed management organization structure", and what it seeks to achieve focuses on short and long-term measures that would develop sub-basin organization structures, along with one outcome focusing on community participation in these processes.
- Strategy 6 is named "Policy monitoring and advocacy", and what it seeks to achieve focuses on developing organizational alliance mechanisms to follow and advocate laws and policies affecting sub-basin communities, together with an outcome regarding local community participation in these processes.

Outcomes at the overall sub-basin workplan level. The same approach was again used to aggregate outcomes at the overall sub-basin workplan level, as summarized in Figure 29. This overall view of expected outcomes stated in the Ping part 1 sub-basin plans shows that nearly 80 percent of expected outcomes at the measures level relate to improved organization and local participation in basic processes underlying sub-basin problem analysis, planning, management, monitoring and evaluation. Remaining outcomes focus (1) on awareness, understanding and use of knowledge, and (2) on direct impacts on natural resources, livelihoods and public health, which will need to be disaggregated by activities under the measures in order to be measurable. This summary of overall expected outcomes can now be compared with the sub-basin vision and goal, as shown in Figure 25.

Figure 29. Ping part 1 Overall Sub-basin Workplan – Types of Expected Outcomes

KNOWLEDGE	1	Communities are aware of and understand problem conditions in the area,
	2	Use of concepts & local knowledge consistent with community ecosystems
ORGANIZATION	1	(short term) get a community organization structure for watershed management & capable of adapting to various situations
	2	(long term) Begin study of villager organizational models for watershed management together with various partners
	3	Initiate mechanisms for following & advocating laws affecting communities
network	4	Existing local organizations join together in community networks to manage natural resources in the Ping part 1 sub-basin and local sub-watersheds with substance & participation
	5	Existing villager organizations join together in community networks in order to manage natural resources in the Ping part 1 sub-basin & local sub-watersheds in a solid & participatory manner, together with building mechanisms to move community resource management plans into the organization
	6	Networks of community organizations that manage resources have activities for resource conservation & restoration using community local knowledge
knowledge	7	Local organizations at all levels in watersheds begin developing knowledge potential that can be used in participatory management of resources in the watershed
data	8	Communities begin to use the knowledge base in NRE management planning, in order to bring relevance to problem conditions & needs of communities in the area
	9	Have studies & knowledge collections related to resource management, such as forest utilization, bamboo, fuelwood use, weir management
PARTICIPATION	1	and communities participate in managing natural resources & the environment
	2	Communities have capacity to initiate & collaborate in villager research
	3	Communities begin exchange on problem situations at local levels
	4	Local governements in the area participate, support & promote activities of villagers
	5	Communities draft participatory NRE management plans that can join with local governments
	6	Communities & the state collaborate in conducting activities
	7	Communities participate in thinking, analysis, determinations, & follow-up
NRE	8	Communities participate in sustainable management & use of resources
policy	9	communities become aware and join in advocating laws, such as the community forest law
NATURAL RESOURCES	1	Natural resources are fertile & abundant
HEALTH	1	Have support for basic public health & household and community sanitation
LIVELIHOODS	1	Communities in the Ping part 1 sub-basin & local sub-watersheds receive promotion of occupations appropriate for community potential & the local area

3.4. Further development of outcome indicators

Working groups in the three pilot sub-basins have been trying to develop indicators to measure outcomes at measure or project level. In most cases they are making good progress. Indicators in the first draft plan in each sub-basin were really just a rearrangement of the words used to describe the measure or project associated with them. In the case of the consolidated Mae Kuang workplan, they are still at this stage, although at least one of the component workplans that were merged into the consolidated plan included efforts to make some real outcome statements.

In all cases, what they have achieved at this point is really a set of expected outcome statements. Some of these are quite clear and can be used for at least the first round of results-based measurements. Other outcome statements, however, are still too broad and general to be measured, so that additional work will be needed before the results-based measurement framework can begin to be implemented.

Suggested lines of further activity include:

- ***Review expected outcomes (current plan "indicators")*** to see that they are clear, relevant, economical, adequate and useful. Since many outcome statements are still too broad and general to be measured, they need to be clarified so that specific measurable indicators can then be identified. Many of the most broad and complex indicators are provided at the level of measures, rather than the project level. Based on the example of the Ping part 5 sub-basin, the others may want to consider making clear outcome statements for each project or activity under the measure, which can then be aggregated to bring more clarity at the measure level.
- ***Determine ways to make real measurements that can indicate progress toward expected outcomes.*** Even in the case of Ping part 5, it is still not clear how various expected outcomes will actually be measured. In other words, they have not yet identified real measurable indicators. In many cases, a major part of the problem is that there are not yet enough details available about the design of individual projects or activities under each measure. Thus, once more detail on project design is available, outcome statements can be reviewed and modified, and appropriate measurable indicators can be identified. It may also be useful to provide sub-basin planners with more information on tools such as simple qualitative methods for measuring some types of outputs with which they are having difficulty.
- ***Determine sources of needed baseline and benchmark data***. Once real indicators are identified, then they will need to seek appropriate baseline data and any relevant benchmark data. Many of the current outcome statements assume a baseline of zero, since the focus is on measuring what is actually done by the project. In some cases this will be appropriate, but in others this may be focusing too much on the project implementation process rather than on the results level. Where baseline data needs are identified, secondary sources or methods for collection of primary data will also be needed. Again, there are likely to be additional needs for assistance with access to information and/or methods and tools for collecting baseline data. Some measures include projects or activities that seek to build information systems in sub-basins that may also help provide baseline data for other measures.

- ***Set clear outcome targets for projects and/or measures***. Once really measurable indicators have been identified and baselines have been established, targets need to be established for the amount of change that is expected to be achieved during implementation of the project, activity or measure. In many cases, initial efforts to set targets are likely to be difficult, and the targets are likely to be quite different from what can really be achieved during implementation. This is normal and should be expected. It will take time and experience to gradually improve abilities to make more accurate estimates of expected outcome targets.
- ***Establish any local outcome-level monitoring systems that are needed***. For some types of information needed to assess progress toward expected outcomes, it may be necessary to develop local monitoring systems, as discussed at several points in this report. In establishing any local monitoring systems, careful consideration needs to be given to selection of indicators and measurement methods, as well as how often the measurements will be made, who will be responsible for measurements and keeping the data, and how will costs of operating the system be supported.
- ***Identify who needs to receive information about results, and how it will be used***. This is a very important issue for at least two reasons. First, results measurements are a waste of time and resources if the findings are not used. And second, design of monitoring and evaluation processes need to be matched with the needs of users. Several potential types of users whose needs may be considered are discussed under step 5 in section 2.2.
- ***Identify external partnerships or sources of assistance where needed***. Good assessments of progress at the outcome level often requires information that may be beyond the current capacity of individual projects or sub-basin management organizations to collect. In some cases, someone else may already be collecting relevant data. In other cases, there may be useful simple tools or participatory approaches that are not yet known in the sub-basin. These are only a few of many reasons why external partnerships and sources of assistance for developing and operating sub-basin results management systems should be explored.

One particularly important challenge is understanding and monitoring natural resource and environment processes and conditions that are now beginning to be linked with public health, livelihood and poverty issues. Initial directions are indicated in the expected outcomes of each pilot sub-basin. Considerable attention and probably assistance and exchange through external partnerships will be needed to further improve these approaches.

3.5. Further development of impact indicators

Much less progress has been made so far at the impact level. This is not surprising because in many ways work at the outcome level is important for establishing effective impact monitoring and evaluation.

Suggested lines of activity to improve the basis for results measurement at the impact level include several issues that are similar to issues at the outcome level:

- ***Clear links from strategies to overall vision, goals & objectives***. Impact monitoring and evaluation will probably be most important at the overall sub-basin level. In this context it will also probably be most useful to be able to make impact assessments of

sub-basin strategies as well as the overall sub-basin workplan. In order to help clarify and support this process, sub-basins may need to consider a bit more carefully how the strategies they have selected are linked with the overall vision, goals and objectives of sub-basin workplans.

- ***Indicators for vision / goal / objective levels.*** In sections 3.1 to 3.3 current expected outcomes were aggregated to measure, strategy and overall workplan levels. This resulted in a list of outcomes for each of these levels that are to be further improved. Sub-basin groups may now need to review these lists of outcomes to be sure that they can be clearly linked to all necessary parts of their objective, goal and vision statements. During this process, they may find a need to establish some additional indicators that can help evaluate the integrated effects of combined measures and strategies under the overall sub-basin workplan.
- ***Determine information needs and sources, including baseline and benchmark data***. Once suitable goals, objectives and indicators are clearly established, they will then need to seek appropriate sources of information, baseline data and any relevant benchmark data. While many of these needs are likely to be similar to needs at the outcome level, there will probably be even more needs for linkages with broader national information systems and partnerships that can help provide information and assistance on impact-level indicators.
- ***Linkages with monitoring systems of external agencies / organizations***. Following from the previous point, sub-basin organizations will probably want to establish some clear linkages with regular monitoring systems operated by external agencies and/or other types of organizations.
- ***Establish any local impact-level monitoring systems that are needed***. After existing monitoring systems and other sources of information have been identified, remaining information needs can then be reviewed to determine what may be most useful and feasible in terms of adding or establishing local monitoring of impact-level information needs.
- ***Identify who needs to receive information about impacts, and how it will be used***. As with all other types of monitoring and evaluation, it is very important to know who needs to receive information on impact evaluation and how they will want to use it. This will help design of evaluation processes to be as efficient, effective and useful as possible, and will also help determine the best formats for evaluation output.
- ***Identify external partnerships or sources of assistance where needed***. As with work under all types of evaluation, sub-basin monitoring and evaluation participants should try to identify external partnerships and sources of assistance wherever they are useful. This is likely to be especially important at the impact level, and they may want to consider seeking assistance from technical specialists in this field located in local or regional educational institutions or independent institutes.

4. Determining roles and responsibilities

Determination of roles and responsibilities for monitoring and evaluation needs to consider the structure and roles of organizations in the sub-basin related to management of natural resources and the environment. In order for monitoring and evaluation to be practical and viable, each organization and stakeholder group needs to focus on aspects that are appropriate for their role in sub-basin management.

It is clear that RSBOs will be expected to play an important role in results-based monitoring and evaluation at the sub-basin level. All five of the alternative organizational models proposed for consideration in pilot sub-basins include a strong role in monitoring and evaluation, as does the general organizational model proposed by the implementation consultants for use in pilot sub-basins. Although local groups in some of the pilot sub-basins are reviewing and modifying proposed organizational arrangements to be more appropriate according to needs and capacities in their sub-basin, they all still include a strong role for the sub-basin organization in monitoring and evaluation.

It is also clear, however, that monitoring and evaluation in sub-basins will need to include coordination among processes conducted at different levels. As pointed out in sections 2.2 and 2.3 above, implementation of most projects is to be conducted by existing groups, organizations and government units in areas of the sub-basin under their jurisdiction. At the same time, however, these projects will be part of overall sub-basin workplans and strategies. Since the RSBO is to play a central role in monitoring and measuring the results of sub-basin workplans and strategies, coordinated arrangements will be needed in order for the overall process to be efficient and effective.

Based on consideration of these issues, the following sections provide suggestions for roles and responsibilities related to monitoring and evaluation for major sub-basin stakeholder groups.

4.1. Community groups, community organizations, networks & business groups

Since community organizations have areas of responsibility that are limited to only one part of a sub-basin, their roles and responsibilities in monitoring and evaluation should be mainly limited to the level of projects implemented within their community areas. In these cases, community organizations need to designate individuals responsible for project monitoring and evaluation duties. They will follow the framework, approach and steps for project monitoring and evaluation discussed in section 2.2. Under the step for reporting results of monitoring and evaluation, persons responsible for monitoring and evaluation by community organizations will report their findings to the next higher level of management organization, so that they can be integrated into monitoring and evaluation at the sub-basin workplan level.

	Project Level	*Overall Level*
Leadership	**Projects under their responsibility**	report project information to sub-basin
Information source	as participant or if have impacts	monitoring data, stakeholder, have impacts
User of results measurements	improve management & design	as sub-basin / RSBO stakeholder

For some types of projects, specialized local groups, networks or even private sector organizations may play this type of role, either as the leader or in collaboration with an

community organization. This is especially likely in cases where they are participating in implementation of the project and/or when they have special perspectives, knowledge or skills appropriate for monitoring and evaluation of particular types of projects or activities. Networks and private sector organizations may also help coordinate monitoring and evaluation activities when project implementation includes several local community areas.

All of these types of groups also have potential roles to play in monitoring and evaluation at the overall sub-basin level. Their roles at this level will place particular emphasis on information they can provide to overall sub-basin monitoring and evaluation processes. Some groups or networks may have important social, economic or environmental monitoring data they can provide. Many may also be able to provide useful information in their status as stakeholders, and particularly if they have experienced particular positive or negative impacts resulting from implementation of sub-basin plans.

Another type of role that community organizations and local networks can play at both levels is as a user of monitoring and evaluation findings, and a channel for communication and dissemination of findings to those who will find them useful.

4.2. Sub-basin management organizations

Since sub-basin management organizations have areas of responsibility that include their entire sub-basin, their roles and responsibilities in monitoring and evaluation should mainly cover the overall sub-basin workplan level. As with community organizations, sub-basin management organizations need to designate individuals to whom overall workplan-level monitoring and evaluation duties will be delegated. They will follow the framework, approach and steps for project monitoring and evaluation discussed in section 2.3.

	Project Level	*Overall Level*
Leadership		**Main Leadership**
Information source	data to assist outcome/impact levels	sub-basin plans / database / monitoring
User of results measurements	help improve projects under workplan	improve management / sub-basin plans, help negotiations among stakeholders

Sub-basin management organizations also have an important role to play in terms of information for monitoring and evaluation. They will be the main point for collection of overall information on project monitoring and evaluation from different sources within the sub-basin. They will also have important responsibilities for collecting data and information needed for outcome and impact level evaluations at the overall sub-basin level, and some of this data may be useful for outcome-level evaluation at the project level. Thus, they will need to establish linkages with both local and external monitoring systems, and they may also support further development of local monitoring systems to improve data needed for management, monitoring and evaluation at different levels within the sub-basin.

Both the monitoring information and the results of evaluations at the overall sub-basin level will be important inputs into future sub-basin problem analysis and workplan development. This type of information can also be very important in supporting negotiations among different stakeholders during analysis and planning processes. Successful negotiations can increase participation by and benefits for various stakeholders, while reducing conflict and negative impacts.

4.3. Local government organizations

Local government organizations include Tambon Administrative Organizations, Province Administrative organizations, and municipalities, which have been considered in parts of this study related to organizations. Individuals from some of these organizations – especially Tambon Administrative Organizations and municipalities – will have roles following from their status as designated members of the sub-basin management organization. Their roles and responsibilities in monitoring and evaluation may be limited to self-evaluation at the project level, with particular emphasis on project management processes. Additional roles and responsibilities of project implementers include building a project-related database at input, output and outcome levels in accordance with project plans. This will help support data for monitoring and evaluation by community organizations and the sub-basin management organization.

	Project Level	*Overall Level*
Leadership	**Projects under their responsibility**	report project information to sub-basin
Information source	Project database / plans	information system / as key institution
User of results measurements	improve management & design	as RSBO collaborator / stakeholder

The main roles of Province Administrative Organizations will probably be as a source of funding and support, as well as helping coordination between sub-basin workplans and province plans and development processes. Thus, their role in monitoring and evaluation should emphasize information on province plans and higher-level stakeholders. They should be a user of monitoring and evaluation findings to help them assess projects for which they have provided support, and they may use this information to help improve projects that they support elsewhere in the province.

4.4. Provincial and central government agencies & organizations

Two other types of government organizations are also important for monitoring and evaluation. Various central government agencies have field implementation units responsible for areas and various types of work in sub-basins. Individuals from some of these agencies will have roles that follow from their status as designated members of the sub-basin management organization. As with local governments, their leadership roles and responsibilities in monitoring and evaluation may be limited mainly to self-evaluation at the project level, with particular emphasis on project management processes. These agencies will have their own processes and procedures for monitoring and evaluation of projects directly under their responsibility. They will need to designate persons responsible for providing information on the results of their findings to the sub-basin management organization, in order to help build the sub-basin-level database. These units can also provide important linkages with monitoring systems operated by their agency, which can be of great assistance in providing information for evaluation at outcome and impact levels for both individual projects and the overall sub-basin workplan. These agencies are also stakeholders representing interests of broader society in sub-basin management, and resources or conditions under their responsibility may have positive or negative impacts from sub-basin projects and/or workplans. They may also be a source of funding or other types of support for individual projects. Thus, they will also be an important user of the results of monitoring and evaluation at both project and overall sub-basin levels.

Local units of central government agencies

	Project Level	*Overall Level*
Leadership	**Projects under their responsibility**	report project information to sub-basin
Information source	Project database / plans as participant, or if have impacts	monitoring data, agency plan data, stakeholder, have impacts
User of results measurements	improve management & design, help projects elsewhere	source of funds/assistance, status of programs, help programs elsewhere

Provincial governments

Leadership		
Information source	data on outcome / impact indicators	monitoring data, province plans, stakeholder, & other information
User of results measurements	source of funds / support, help projects elsewhere	status of programs/conditions in province, funding source, help programs elsewhere

The provincial government is another type of government organization important for monitoring and evaluation processes. Under the overall authority and responsibility of the Provincial Governor, the provincial government includes many different types of units at the province level, as well as district administrations, sub-district *kamnan*, and village headmen. While the results from this study project suggest that these officials are not likely to be directly in charge of implementing individual projects, they have responsibilities to monitor and supervise most types of activities taking place within their jurisdictions. They also have a leading role in the provincial planning process, and may be an important source of funding and other types of support for individual projects or activities. Thus, their main roles in monitoring and evaluation are likely to be as a source of various types of information, and as an important user of the results from monitoring and evaluation.

4.5. Academic and other organizations

Other organizations may include private sector organizations, public sector organizations, educational institutions, or other types of institutions related to natural resources and the environment, public health or livelihoods. Even though they may not be directly related with monitoring and evaluation of projects and workplans in the watershed, these organizations – especially educational institutions or natural resource and environment institutions – may have a role as an external evaluator, particularly in evaluation of the impacts of projects and workplans. Moreover, monitoring and evaluation of indicators for outcomes and impacts may require use of technical specialists to collect data. One example might be indicators of various types of pollution. Thus, it may be important to have an organization with technical specialists to be responsible for this type of evaluation. There is also a growing number of regional and national level networks that may help provide access to technical specialists from various types of institutions to help support or lead various monitoring and evaluation activities.

NGOs, independent institutes, higher-level networks

	Project Level	*Overall Level*
Leadership	may assist with evaluations	may assist with evaluations
Information source	monitoring data, indicators, standards, methods, tools, & training	monitoring data, indicators, standards, methods, tools, & training
User of results measurements	for dissemination, analysis	for dissemination, analysis

Academic institutions

Leadership	may assist / lead evaluations	may assist / lead evaluations
Information source	monitoring data, indicators, standards, methods, tools, & training	monitoring data, indicators, standards, methods, tools, & training
User of results measurements	for analysis, dissemination, teaching	for analysis, dissemination, teaching

Various of these types of institutions may be able to provide access to different types of indicator monitoring data and information on standards, benchmarks, or new monitoring and evaluation tools that may be especially useful for evaluation at the outcome and impact levels. They may also be a potential user of the results of monitoring and evaluation at project and overall sub-basin levels as input into wider analysis and as a channel for dissemination of information and experience. Educational institutes may also be able to use such information in helping to strengthen their education and training programs.

5. Guidance note for building capacity in results-based measurement

Experience from governments and public and private organizations around the world has demonstrated that building an efficient and effective results-based measurement system requires a long-term process. The Thai government has been trying to build results-based measurement into its management systems for more than 10 years, and it is clear that many government officials either do not yet fully understand the system, or do not understand why it is important and useful.

In many ways, progress under this pilot project indicates that there is considerable potential for integrating results-based measurement into sub-basin management processes. Even at very local levels, people are becoming familiar with the idea of developing vision statements, objectives and strategies as part of their planning process. Working groups in pilot sub-basins also seem to understand the need to identify the expected outcomes of individual projects or groups of projects, and indicators that could help them know whether results are achieved.

Everyone involved realizes, however, that there are still many gaps and needs for improvement to build efficient and effective results-based measurement systems at sub-basin level.

5.1. Issues, gaps and needs for implementing results-based measurement

Gaps in understanding and needs for capacity building may be summarized into five issue areas:

- Understanding the results-based measurement approach
- Building and strengthening the approach through plans and the planning process
- Developing systematic methods for collecting necessary data and information
- Building skills and tools to analyze results
- Using the results to improve sub-basin management programs

In terms of understanding the results-based measurement approach, it is clear that the approach and some of the concepts it uses are still quite new for many people in pilot sub-basins, as well as for many officials and community workers who are sources of assistance for them. Thus, there is a need for practical basic introductory information on results-based management in a format that can be easily understood by people working with sub-basin management organizations and major stakeholders. This introductory information should focus on answering three basic questions:

- Why is results measurement important?
- How it can be used by managers and stakeholders to improve projects, & management workplans & programs?
- How can local information systems be built to support it?

5.2. Strengthening the logic of sub-basin management plans

The processes of analysis of local problems and development of sub-basin plans to help solve those problems are the obvious place to begin strengthening results-based management. And since the Logical Framework Approach and the Logical Framework Matrix (LogFrame) provide the basic organizing tools for results-based measurement, practical information, 'hands-on' training, and possibly a handbook could be developed in order to provide:

- A clear explanation of the Logical Framework Matrix (Logframe), what the rows and columns mean, how they relate to each other, and the types of information that it requires. This would provide the "basic training" in Logframe concepts and project analysis both for individuals in the sub-basin management organization, and for the various project implementing organizations in the sub-basin. It may be useful to have separate training sessions for managers of individual projects and managers who will work mainly at the overall sub-basin plan level. The specific curricula or training content will depend on the current level of knowledge of the participants. In any case, it should include numerous relevant practical examples.
- What are its strengths and weaknesses? While the basic Logframe table may seem to appear quite simple, it is often very difficult to use with some types of activities. As introduced in section 1.2, the LogFrame has sometimes been used in ways that creates new types of problems. And in some cases its simple cause and effect relationships may not fit well with the processes a project or activity is trying to use. Some practical examples of both good applications and poor applications of the Logframe would probably be useful.
- How can local participation be integrated into the Logframe approach? As explained in section 1.2, the Logframe approach is the process that develops the reasoning that is then used to fill in the Logframe Matrix. This process can be conducted by a few elite leaders sitting in a room, or it can involve a very long and complex process that includes detailed participation by a wide range of stakeholders. And many levels in between these two extremes are also possible. It is also possible to use other types of participatory processes to develop the reasoning for a project, measure or strategy, so that the information needed for the Logframe is just one part of what results from the processes. There is a growing number of English language publications that discuss many issues and approaches, and it may be useful to review, summarize and translate some of the main points into Thai.
- How to work with information that is difficult to measure. There is often a tendency for outcomes and indicators in a Logframe to place strong emphasis on things that a person can easily see and count. But some very important expected outcomes cannot be easily seen and counted, such as awareness and knowledge. Other expected outcomes, such as healthy forest ecosystems can be seen but are very difficult to measure. It may be useful to review the lists of expected outcomes in current sub-basin plans to identify major types of outcomes that will be difficult to measure, and suggest some approaches that can help sub-basin organizations to work with these issues. Some simple qualitative methods may be useful for this purpose.
- How to improve expected outcomes, indicators & measurement methods. Since development of an efficient and effective results-based measurement system is a long-term process, it may be useful to place initial emphasis on what is needed to get started with the types of information currently available. At the same time, however, people and local organizations need to be encouraged to look to the future in thinking about how they

can improve their identification of expected outcomes and the ways that they measure results. They can then develop a capacity building strategy to develop their skills, tools, and sources of information through a process of gradual improvement.

The main roles and responsibilities for the sub-basin management organization in monitoring and evaluation are focused at the sub-basin level. But these processes will depend on good monitoring and evaluation information coming from those who are actually implementing individual projects under overall sub-basin workplans. It will also depend on external sources of monitoring data and other types of necessary information. Thus, it is clear that effective sub-basin results-based measurement processes will depend on good working relationships and close coordination with several types of organizations and levels of government.

In order to help build a strong foundation for this work, capacity building activities need to include practical information on how sub-basin results measurement can link with:

- TAO and *tessaban* planning and management systems
- Provincial planning systems
- Planning and management systems of government agencies related to natural resources and environment, public health, livelihoods, and any other key topics in sub-basin plans
- Higher level monitoring, evaluation and management at Ping River Basin levels
- Regional and national environmental monitoring systems
- Provincial and national systems that monitor health, livelihoods, income, poverty, etc.

5.3. Expanding the tools for results-based management

As this project encouraged sub-basin working groups to develop outcome statements and indicators for their plans, one very frequent type of complaint was the lack of information on and access to information on indicators from monitoring systems that already exist in Thailand, and the standards and benchmark values that they use. Thus, a 'resource collection' that compiled this type of information in a form that could be easily accessed and used by sub-basin organizations, and perhaps some training on how the information can be accessed and used, would be useful contributions toward capacity development.

There is also a quite large and growing number of methods and tools being used by efforts to improve results-based management approaches in public and private organizations around the world. Much of this information is now available through the internet, but very little of it is available in Thai language. Thus, another useful capacity building approach would be to review this literature and select some of the most useful parts for translation into Thai language 'resource collections' of information on topics. A few examples might include:

- participatory monitoring (environmental, economic, social aspects) [Ballard 2005, Pilz 2005, Lawrence 2001, Prewitt 2005, van Rijsoort 2002, EPA 1997ab, 2003ab, 2005, *etc.*]
- use of both local & scientific knowledge in monitoring [EPA 2000, Thomas 2004a, *etc.*]
- participatory evaluation [Coupal 2001, ETFRN 2002, UNDP 1997, World Bank 2002]
- participatory development of local visions & desired outcomes [Earl 2001, Kemper 2005, Rmalingam 2006, Tambun 2005, United Way 2005a, 2002ab, *etc*.]
- use of monitoring and evaluation information to support negotiations among stakeholders and management of conflict [Ramsar 2004, Thomas 2004ab, van Noordwijk 2001, articles in van Noordwijk 2006, *etc.*]

5.4. Using information from results-based measurement

A results-based measurement system cannot help improve sub-basin management unless the information it produces is actually used. Five different potential user groups were identified under step 5 of the monitoring and evaluation approach described in section 2.2, and potential uses by various stakeholders were mentioned in section 4. The categories used in either or both of these sections could be used to develop a set of practical booklets that suggest and describe ways in which information from the results-based measurement system can be used for each of these types of groups. This could then provide the basis for local orientation and training sessions focused on each particular type of user.

As part of this process, it would be important to explain potential uses of the various types of potential reporting products from a results-based monitoring and evaluation system. This should include the time intervals at which different types of monitoring or evaluation information can be reported, and how this might match with processes such as project management, sub-basin-level reviews and planning, and even stakeholder negotiations and conflict management.

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Additional websites:

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