

# Participatory Watershed Management for the Ping River Basin

## Final Project Report



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David E. Thomas

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## Abbreviations

ADB	Asian Development Bank
ALRO	Agricultural Land Reform Office
ASB	Alternatives to Slash-and-burn Consortium of the CGIAR
ASEAN	Association of Southeast Asian Nations
AWGWRM	ASEAN Working Group on Water Resources Management
BAAC	Bank for Agriculture and Agricultural Cooperatives
CCPE	Coordinating Committee for Protection of Ping River Basin & Environment
CDD	Community Development Department
CGIAR	Consultative Group for International Agricultural Research
CMU	Chiang Mai University
DLD	Department of Land Development
DMC	Developing member countries (ADB term)
DNP	Department of National Parks, Wildlife & Plant Conservation
DoLA	Department of Local Administration
DWR	Department of Water Resources
EPA	United States Environmental Protection Agency
EU	European Union
GIS	Geographic information system
GWF	Green World Foundation
GWP	Global Water Partnership
GWP-SEATAC	Global Water Partnership Southeast Asia Technical Advisory Council
GWP-TAC	Global Water Partnership Technical Advisory Council
ICRAF	World Agroforestry Centre
IFPRI	International Food Policy Research Institute
IRBM	Integrated river basin management
IWMI	International Water Management Institute
IWRM	Integrated water resources management
JWA	Japan Water Agency
KUFF	Kasetsart University Faculty of Forestry
masl	Meters above sea level
MCC	Multiple Cropping Center, Chiang Mai University
MoAC	Ministry of Agriculture & Cooperatives
MoI	Ministry of Interior
MoNRE	Ministry of Natural Resources & Environment
MoPH	Ministry of Public Health
NARBO	Network of Asian River Basin Organizations
NASA	U.S. National Aeronautics and Space Administration
NESDB	Office of the National Economic and Social Development Board
NGO	Non-governmental organization
NSO	National Statistics Office of Thailand
OAE	Office of Agricultural Economics
OECD	Organization for Economic Cooperation and Development
ONEP	Office of Natural Resource & Environmental Policy & Planning
OTOP	One Tambon One Product program of the Thai government
PDF	Portable Document Format (readable with Adobe Acrobat)
PLP	Participatory land use planning approach
PRA	Participatory rapid appraisal

PYB	Village headman ( <i>phuyaibaan</i> )
RBC	River basin committee
RBO	River basin organization
RFD	Royal Forest Department
RID	Royal Irrigation Department
RSBO	River sub-basin organization
TA	Technical assistance
TAO	Tambon Administration Organization
TEI	Thailand Environment Institute
TOR	Terms of reference
TRF	Thailand Research Fund
UN	United Nations
USAID	United States Agency for International Development
WB	The World Bank
WFT	Wildlife Fund Thailand
WME	Watershed management expert
WWC	World Water Council
WRI	World Resources Institute



## **Part I. The Ping Sub-basin Pilot Project**

The first part of this report contains two chapters. The first chapter provides a brief introduction and background to the major trends, processes and events that led to the development and implementation of this project. The second chapter turns to an introductory overview of the objectives, structure and activities of the project under its four major components. These chapters set the stage for part two of the report, which seeks to summarize results of project implementation in chapters focusing on each of the four components of the project. The third part of the report contains chapters that provide brief summaries of lessons learned from our project implementation experience, and recommendations for efforts to further expand support for development of sub-basin management organizations.

### **1. Introduction and background**

In order to help explain the context in which this project emerged, discussions in this chapter are divided into two major sections. The first section provides background on the emergence of river basin management in Thailand, with focus on the role of the Ping River Basin in these processes. The second major section provides a very brief overview description of the diversity of conditions in the Ping River Basin and recent trends of change being driven largely by economic development and by evolving approaches to resource governance in Thailand. This very brief summary is intended to provide context for the description of the project structure and activities in the next chapter

#### **1.1. Project background**

Thailand has demonstrated impressive economic growth for more than 40 years, and its resilience is being demonstrated through its recovery from the Asian economic crisis. The development strategy that has brought this growth and structural change to the Thai economy has long relied on intensification of agriculture, rapid industrialization, and expansion of mining, fisheries, and tourism. These processes have also involved the drawing down of natural assets such as forest, water, mineral ores, fisheries, and land resources.

Public awareness of the growing negative impacts of economic development on environmental conditions and quality of life has increased rapidly during recent years. Greater integration into global information systems has helped strengthen environmental awareness and efforts to seek creative means to improve environmental sustainability, including emergence of advocacy oriented civil society institutions. At the same time, efforts to reform governance structures and processes in Thailand also seek to integrate environmental and natural resource management concerns. As a result, deforestation, water scarcity and pollution, declining fish stocks, haphazard urbanization and air pollution have emerged as important issues of concern in the national public policy arena.

Moreover, there is also growing awareness that much of the impact of problems associated with environmental change falls on the poor, whose livelihoods are disrupted and health is threatened. And as livelihood options of the poor become foreclosed, many are forced to turn to alternatives that are seen as causing further natural resource and environmental degradation.

Recent establishment of the Ministry of Natural Resources and Environment (MoNRE) was in recognition that rapid economic growth cannot be sustained if natural assets are not well maintained. Its missions to conserve, protect and rehabilitate natural resources and the environment are consistent with government objectives that include sustainable development and

equitable growth. And, since the 1997 national constitution specifically entrusts the environment and natural resources of the nation to its people, and mandates their participation and involvement in environmental management and conservation, the government is now seeking to delegate more responsibility to local communities, and encourage their participation in improving environmental quality.

### *River basin management*

Among the range of environmental issues of growing concern, seasonal water availability and water quality are currently particularly high priorities for both the government and the general public. Serious floods and landslides have generated many headlines during recent years, while growing demand for dry season water and concern about water pollution from upstream agriculture and industry are a common feature of increasing public anxiety and conflict in many local areas. Given the perceived importance of interrelationships among forest, water and land management to these issues, the government is seeking to develop a river basin management framework for encouraging, facilitating and supporting participatory multi-sectoral collaboration that can help to improve management of natural resources and the environment, and to reduce rural poverty.

According to Dr. Apichart Anukularmphai, river basin management in Thailand was first initiated in 1994 when the government allocated budgets to study and prepare a strategic plan for water management in the Chao Phraya river system. The study formulated a comprehensive water management strategy for river basins, and a committee was appointed in 1998 to establish a river basin committee (RBC) for the Chao Phraya. Pilot river basin committees in the Upper Ping, Lower Ping and Pasak 'sub-basins' were officially established in 1999. Of the 25 officially delineated river basins of the country, the Ping Basin was selected as a pilot river basin both because of its strategic importance in relation to resources, livelihoods and rural poverty, and because of strong concern about impacts of deforestation, soil erosion, sedimentation, water use and pollution.

### *Upper and Lower Ping 'sub-basin' committees*

As part of water sector studies in the Upper Ping and Lower Ping 'sub-basins' supported under a loan from the Asian Development, three working groups were established with responsibility for preparing basin plans, collecting and maintaining basin data and information, and conducting public relations and awareness raising campaigns. It was also agreed to sub-divide the Upper Ping into 15 smaller sub-basin watershed working groups, and the Lower Ping into 18 district working groups. Although meetings in 2000 sought to prepare plans for pilot areas, agencies did not want to change agency plans they had already made. This experience led to development of a Water Sector budgetary request process to provide authority for river basin committee planning.

Workshops began making it clear that stakeholders must play a higher role than government officials, and in 2001 more stakeholders, NGOs and academicians were added to river basin committees. But since projects are implemented by agencies, representatives of agencies remained necessary. As Dr. Apichart notes, stakeholder participation increased after establishment of working groups for basin planning, information systems, and public relations and awareness. Stakeholders started realizing their roles, and their desire to have their share in planning and decision-making processes. Stakeholder motivation became clear as key players started to emerge and play leading roles in consultative meetings. They began questioning roles of government agencies and their contribution to RBCs, and soon began demanding changes in the organizational set-up and composition of members that were implemented in 2001. Selection procedures for stakeholder representation were also challenged, resulting in a broader stakeholder

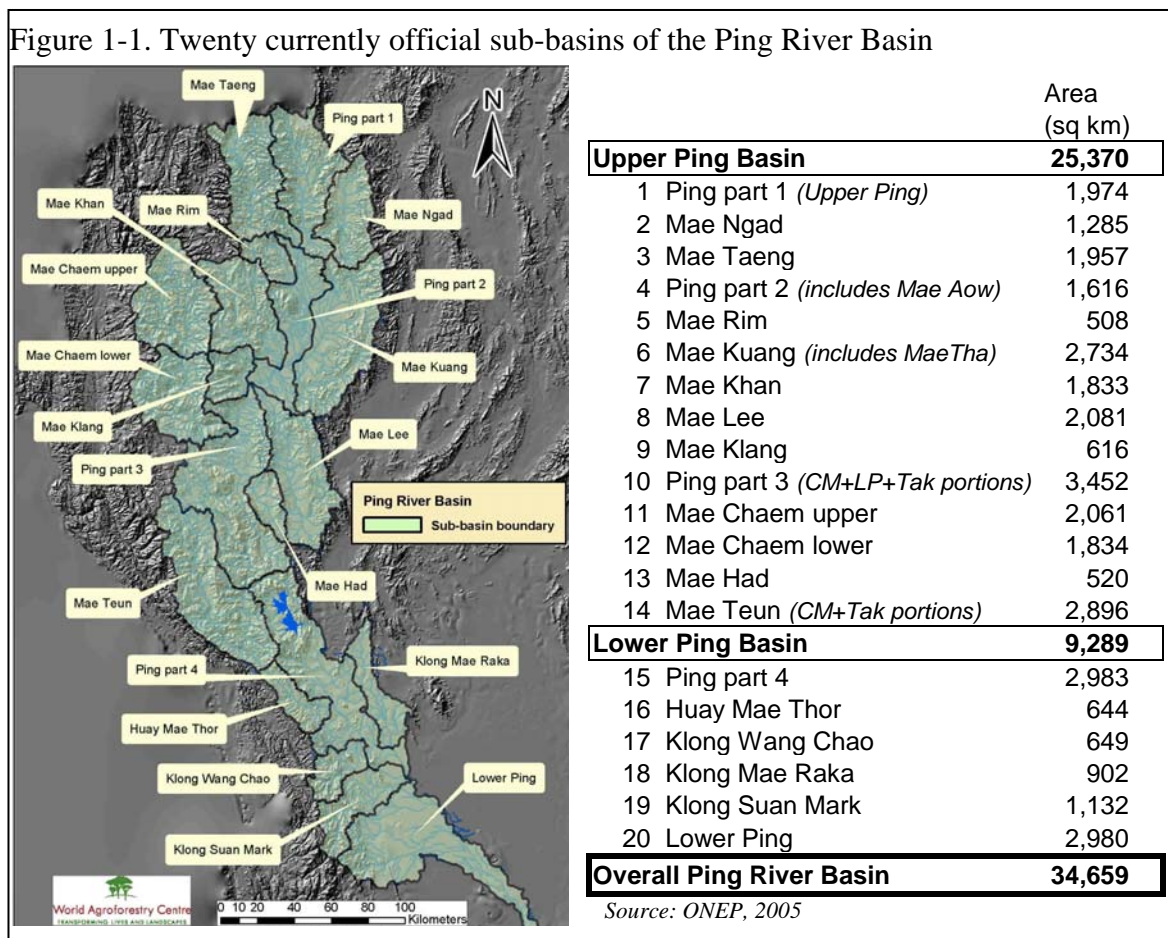
base with representation down to village level with selection by either election or popular consent. While some RBC groups conducted extensive processes seeking to ensure transparency and achieve effective and active representation, agency interaction in other areas is still limited to ‘consultative participation’.

### DWR Planning Process

With establishment of the Ministry of Natural Resources and Environment (MoNRE) in 2003, river basin programs found a new home in the Department of Water Resources (DWR). During the transitional stage, consultants prepared a basin water resource management framework under instructions to assist basin working groups and stakeholders to identify their own needs and their own ideas of how to solve their problems, through grassroots level workshops and building local capacity in planning processes. Large detailed sets of water resource-focused assessments, plans and projects were reported in a six volume final report to the Department of Water Resources.

### DNP-DWR Planning Process

With endorsement by the Prime Minister, the new MoNRE leadership embraced efforts to make the Ping River Basin a model for effective river basin organization, and began launching a new round of initiatives. During April 2003, a meeting was organized in Chiang Mai to gather ideas for a united multi-sector approach for managing the Ping River Basin. In order to broaden the mandate for river basin management, accelerate implementation, and draw in more field resources of the new ministry, a new Cabinet Resolution in July 2003 established the Ping River Basin Restoration Project to be conducted in the 20 sub-basins of the Ping River Basin shown in Figure 1-1. MoNRE then convened a meeting of Upper Ping and Lower Ping “sub-basins” during September 2003 to seek ideas for appropriate approaches for the project. During



December 2003 the Prime Minister attended a meeting of 2,500 people from the Ping River Basin convened at Chiang Mai University to announce the policy of the Ping River Basin serving as a pilot project, and to launch united participatory efforts to raise consciousness and awareness of the value of natural resources and the importance of their role in the heritage of future generations. Religious and cultural traditions were also mobilized to help seek the commitment of people in the Ping River Basin

Under this new wave of effort the Department of National Parks, Wildlife and Plant Conservation (DNP) took the lead for activities in the Upper Ping Basin, while activities in the Lower Ping Basin were under the Department of Water Resources. Sub-basins became the main units for more localized operations, with 14 sub-basins specified for the Upper Ping and 6 sub-basins for the Lower Ping. In May 2004, a 47.5 million baht budget was approved to begin implementing priority activities in the Ping River Basin. Under these efforts:

- The DWR quickly launched a series of planning activities in Lower Ping sub-basins that built on results of their previous studies and plans. This enabled them to move quickly to implementing specific projects, which initially focused mainly on 'check dams'. Other plans for larger water resource structures required more time for design, approval and construction.
- In the Upper Ping, the DNP launched a new round of 'participatory action planning' processes through committees and working groups under their leadership, resulting in another set of plans and projects. DNP appears to have made considerable efforts to formulate plans based on local ideas and perceived needs, and the scope was expanded to forest and watershed conservation, and environmental issues such as garbage and use of agricultural chemicals.
- The Department of Environmental Quality Promotion and the Office of Natural Resources and Environmental Policy and Planning (ONEP) began commissioning studies and activities to support various efforts, but coordination among efforts appears to have been limited.

Planning efforts sought to identify short, medium and long-term projects. Much of the focus of priority short-term activities to address natural resource and environmental issues focused on reforestation, planting *vetiver* grass, building check dams, establishing data systems that would seek to integrate scientific and local knowledge, and developing campaigns and environmental volunteer networks in sub-basins.

#### *ONEP-World Bank Planning Process*

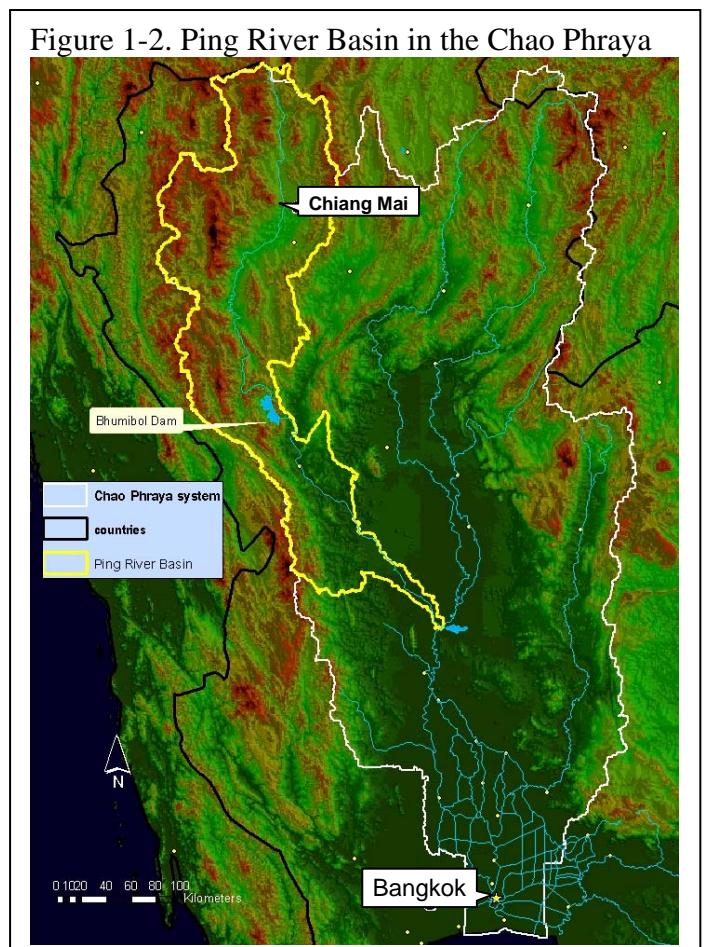
Also during 2004, the Office of Natural Resources and Environmental Policy and Planning obtained funding assistance from the ASEM II fund managed by the World Bank for technical assistance for the Participatory Watershed Management for the Ping River Basin Project. This project, which is the subject of this report, has sought to establish and test 'pilot' sub-basin management organizations that are able to conduct action planning processes to develop short, medium and long term plans to address natural resource, environment, health and poverty issues in the pilot sub-basins. Details of the project design and implementation are summarized in subsequent chapters of this report. Considering the above context, it should not be too difficult to understand why various government agencies, local governments, local communities, civil society organizations and other stakeholders initially saw this project as another in a series of waves of planning for river basin activities.

## 1.2. Initial status of the Ping River Basin

The Ping River Basin is the largest of the eight river basins that together form the Chao Phraya river ‘system’. The Chao Phraya system covers about 30 percent of Thailand’s land area. It is home to about 40 percent of the national total population and is said to employ more than three-fourths of its work force, and generate about two-thirds of national GDP. Lower portions include fertile Central Plains ‘rice bowl’ agricultural production areas, most historically important centers of power in the Siamese Kingdoms, and the urban-industrial mega-city of Bangkok.

With a catchment area of about 35,000 km<sup>2</sup>, the Ping River Basin covers about 22 percent of the larger Chao Phraya river system within which it is nested (Figure 1-2), and contributes about 24 percent of the system’s average annual runoff. Along with the Wang, Yom and Nan river basins, the Ping is one of the four ‘upper’ tributary river basins that merge together and become known as the Chao Phraya River at Nakhon Sawan. Together, these four tributary basins contribute more than 70 percent of the total average annual runoff that feeds the entire Chao Phraya river system and its highly complex system of downstream barrages and irrigation canals. Thus, from the centers of political and economic power in the lower Chao Phraya, the four ‘upper’ river basins are viewed as areas to be protected from any activities that would threaten water-consuming downstream processes.

When it was completed in 1964, the Bhumibol Dam conceptually and functionally split the Ping River Basin into lower and upper portions. Protection and maintenance of the capacity of this strategically important irrigation, water control and electrical generation facility has become another major feature of efforts to manage water and watersheds, especially in ‘upper’ portions of the Ping River Basin.



### *Gradients of diversity in the Ping River Basin*

Overall, the Ping River Basin is part of a gradient of change that begins in Bangkok and passes through the lowlands of the Central Plains, before entering the Ping River Basin at Nakhon Sawan. It then proceeds through the lower North into major valleys of the upper North, before ending in mountainous upper sub-basins with very small areas where lowland traditions can be established. This gradient is physical in terms of terrain and its upstream direction, it is demographic in terms of population density, it is economic in terms of integration, and it is cultural and linguistic in terms of traditions, language, livelihoods and lifestyles. The ‘center-periphery’ character of this gradient is underscored by the concentration of rural poverty in uppermost sub-basins.



The 'lower' portions of the Ping River Basin below the Bhumibol Dam are located near the western margin of the 'lower north' region in Nakhon Sawan, Kamphaengphet and Tak provinces. While the Ping Basin covers substantial portions of Tak and Kamphaengphet, it includes only a quite small portion of Nakhon Sawan province. Areas within the Ping Basin are strategically important, and provincial capital cities are all located within or near the boundary of Ping Basin. Especially in lowland areas of Nakhon Sawan and Kamphaengphet provinces that are contiguous with the lowlands of the Central Plains, irrigated commercial agriculture and industrial activities have been growing in major valleys along the Ping River. Irrigated paddy rice production is extensive in valley lowlands, while reserved forest on gently sloping uplands have been displaced by large production areas of industrial crops such as cassava and sugarcane, as well as maize, oranges and other crops. Penetration of these processes into smaller tributary valleys to the west, has often been fairly limited, but livestock production is widespread. While some of these processes have also extended into lowland areas of Tak Province, this province also includes more substantial 'upland' areas of hills and mountains, as well as more remote valleys beyond the western boundaries of the Ping River Basin. With the Bhumibol Reservoir located within its boundaries, this province is located at the transition between the 'lower' and 'upper' parts of the Ping River Basin.

Within the 'upper' portion of the Ping River Basin further to the north, lowlands of the inter-montane Chiang Mai – Lamphun Valley are home for a major center of people and economic activity that has evolved from the Lanna empire, for which it was the center of power before its 'merger' with Siam as part of Thailand's nation-building process. Dominant cultures in the Chiang Mai – Lamphun Valley also have strong traditions based in lowland irrigated paddy agriculture, water management, and river bank life. Major lowland valleys have been integrated into Thailand's economic and social development infrastructure and programs, and Chiang Mai City is Thailand's second largest city (but still more 10 times smaller than Bangkok). Boundaries of Chiang Mai and Lamphun provinces provide a close, but not quite perfect fit with natural boundaries of 'upper' portions of the Ping River Basin. Intensive mixed farming, horticulture and tree crops have been expanding in the lowlands, along with part-time farming, while upland field crops such as maize have been shifting to more remote valleys.

Still within the 'upper' Ping, but beyond its large river valleys lie a set of 'uppermost' tributary valleys, where lowland paddy-centered civilizations have been limited to relatively small valley floors, nested within large areas of steeply sloping lands and mountain ridges. These 'uppermost' tributary areas include a diverse range of ethnic groups employing various livelihood strategies and agroecosystem management practices. Some groups are believed to pre-date ethnic Thai groups, while others are seen as fairly recent migrants into Ping Basin areas. Different groups employ various combinations of paddy, mid-elevation rotational forest fallow agriculture with preserved forest patches, or highland 'pioneer'-type shifting cultivation in the past included opium production. Opium crop substitution brought intensive vegetable and fruit tree horticulture to highland zones, while commercial upland crops such as maize have joined upland rice in the midland zones.

Until recent years, mountain ethnic minorities were not considered part of mainstream society, they had no citizenship, and government administration treated them as a 'welfare' issue or as a target for opium crop substitution, shifting agriculture eradication, or in some cases resettlement. Their land use claims were precluded by declaration of forest reserves that blanketed those areas, and are now being replaced by more stringent protected watershed and expanded national park and wildlife sanctuary status. These areas are home for most of the rural poor in the Ping River Basin, and their land use practices are seen as threats to water resources and biodiversity.

While this ‘center-periphery’ gradient has existed in the Ping River Basin for a substantial period of time, there is nothing static about conditions along this gradient. Major processes of change have already swept through the Ping River Basin into even its furthest reaches, and these processes are continuing to evolve rapidly. Perhaps the two strongest forces driving change at this point in time are grounded in economic and governance processes, and their growing links with change at international and global levels.

### ***Economic change in Ping River Basin provinces***

Economic change has various faces as it passes through the gradient of conditions found along the Ping River Basin.<sup>1</sup> It has brought commercialization, capitalization and industrialization of agriculture in valley lowlands, including significant shifts in crops and cropping practices, which together with opium crop substitution and road programs now reaches even formerly remote mountain areas. Timber stocks in remaining upland natural forests have already been largely logged out and sold. A major tourism industry has emerged in some areas, and rapid growth associated with commerce, industry and service sectors is driving urbanization at strategic river valley locations. Government programs emphasize development of local entrepreneurship (such as OTOP) and local micro-finance mechanisms. This entire system, however, is now faced with questions about how economic activities can best adapt and restructure themselves in response to international free trade agreements, growing competition from neighboring countries with lower production costs, and perceptions of a deteriorating natural resource base.

The growth of these types of activities has left their ‘footprint’ on the land use patterns of Ping Basin provinces. While there has not been dramatic expansion of the total area in recognized farm land holdings during the last 20 years, shifts among components of land use within farm land holdings has been associated with changing demands for water resources. In earlier times, main season rice crops were the primary focus of lowland water demand, and a second crop of rice or other post-rice crops was a ‘luxury’ possible in areas that were particularly well located in terms of water resources. As production has shifted more into year-round intensive multiple cropping systems and perennial orchards, however, a dependable year-round supply of irrigation water moves from being a luxury into becoming a necessity. And especially as perennial fruit tree orchards have expanded into upland rainfed areas around the periphery of irrigated lowland areas, growers have learned that availability of irrigation water at critical times in the fruit production cycle are an extremely important element of the abundance, marketability and profitability of the crops produced. Thus, overall demands in the lowlands and surrounding upland areas for a reliable year-round supply of irrigation water have been growing.

At the same time, year-round water demands are increasing for growing major urban and industrial centers located in the lowlands, as well as demands for water to irrigate golf courses, supply resorts and tourist facilities, and various other types of uses that emerge along with structural shifts in the economy. Moreover, often extremely high land values in expanding riverside urban centers has also brought strong incentives for encroachment into flood plains, drainage channels, canals and river banks, as well as pressure to build roads, bridges and various other structures that can impede water flows. These factors contribute to increased incidence and impacts of flooding during peak flow seasons.

Watershed issues in Northern Thailand, and especially in the Ping River Basin, have long been a focus of concern at national policy levels. The 1959 World Bank report on Thailand associated with the first national development plan recommended protection of forest cover in mountainous

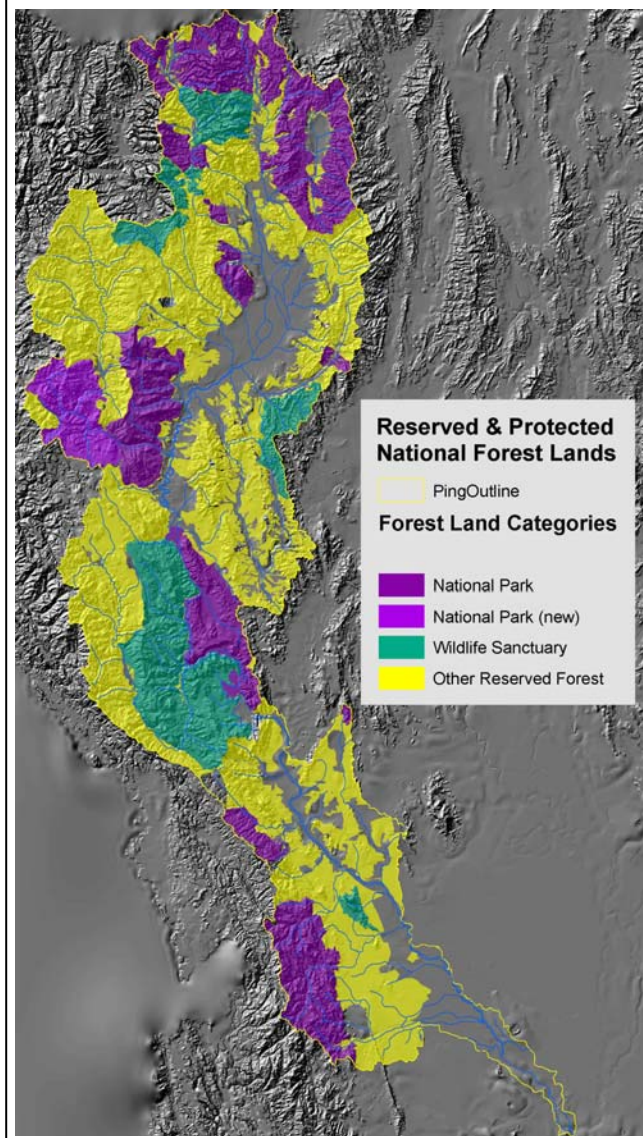
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<sup>1</sup> More detailed discussion and data can be found in the watershed consultant’s final report [Thomas 2005].

areas, in order to maintain reliable supplies of water for production areas in the Central Plains. A legal basis was later provided for declaring national forest reserves, national parks and wildlife sanctuaries. During the 1960's and 1970's, forest reserve status was declared over most all Ping Basin areas except flat lowlands in major valleys. Various reserved forest areas then began to be declared protected national parks and wildlife sanctuaries. Figure 1-3 displays a depiction of the extent of protected forest areas and remaining reserved forest lands. There are additional protected areas still in the process of being established. Many of these areas included lands where people were living.

One of the implications of this official land status was that these communities and their lands were not eligible for land tenure documents issued under land title programs. Initially, life in these communities was little changed because forest laws were rarely enforced. As conditions changed, however, migrants from elsewhere moved into local areas and claimed local lands. In cases when local communities did not have enough force to maintain their claims, they could not get support from authorities because their lands were not legally recognized. These problems grew worse as infrastructure was established and opened access to remote communities.

Figure 1-3. State forest lands in the Ping Basin

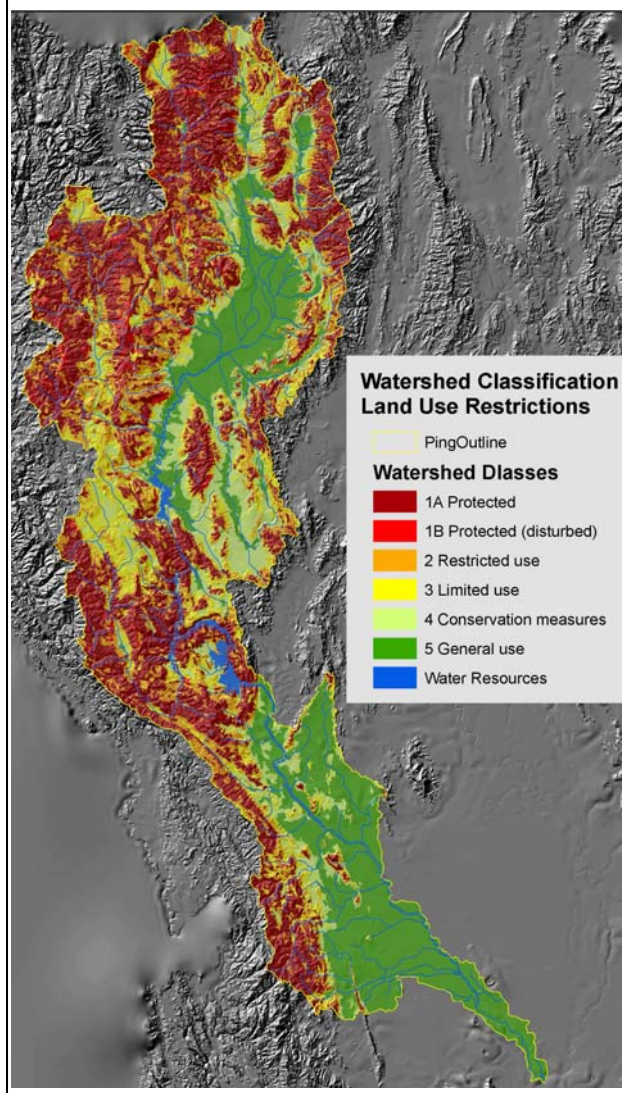


Then the government began seeing long-established communities as 'encroachers' in national forest reserves and protected areas. Since they had no legal right to reside there, and most had no Thai citizenship, they were lumped together with recent migrants into the area under the general banner of *chao khao* (poorly, but popularly translated as 'hilltribes'). They then became targets for programs ranging from well-intentioned efforts to improve medical care, education or livelihood opportunities, to attempts to bring 'civilization' to their world. Conditions have improved during recent years, and most mountain communities in the Ping Basin (except recent migrants from Myanmar) now have citizenship and are being integrated into local administration and governance systems. The lack of any legal recognition of land holdings and local boundaries, however, remains a major obstacle for local land use management.

Effects of population growth and economic change have brought increasing resource scarcity, incentives for commercial activity, and new stakeholder interest groups that profoundly changed the operating environment of mountain communities. While lowland society has long condemned all forms of mountain shifting cultivation (no matter how well managed), it is the expansion of commercial agriculture that is now seen as the source of serious forest and soil degradation in mountain watersheds today. Economic incentives for expansion of upland field crops has driven



Figure 1-4. Ping Basin watershed classes



expansion of lowland agriculture into reserved forest areas in Lower Ping provinces during the 1970's, as well as later expansion of agro-industrial crops (especially maize) into mountain areas. This was further facilitated by programs that forced conversion of mountain systems to fixed field agriculture that required chemicals to replace agronomic and ecological functions of forest fallow. Meanwhile, success of opium crop substitution and expansion of road access brought market forces and commercial crops into highland areas including sprinkler irrigation and use of agricultural chemicals. Expansion of tourism brought incentives to develop resorts, golf courses, vacation homes, and associated facilities. With no legal boundaries to land holdings in reserved or protected forest lands, there are few tools available to manage rising levels of competition for land resources and resulting changes in land use patterns. And some of newer stakeholders are backed by wealthy and powerful investors, who can sometimes use their connections and wealth to 'purchase' land documents not available to local long-term residents.

Authorities responsible for management and maintenance of reserved and protected forest lands responded to these changes during the mid-1980's by classifying all lands in the

country according to watershed zones meant to serve as a basis for restricting land use practices in critically important areas. Figure 1-4 depicts the outcome of this process for the Ping Basin.

Another source of concern relates to the total proportion of land under forest cover. For more than 50 years, Thai foresters (and more recently environmentalists) have claimed that a minimum of 40 to 50 percent forest cover is necessary for environmental sustainability. Since most lowland areas were converted to non-forest land use long ago (as in Lower Ping provinces), large areas of forest cover must be maintained in mountain areas in order to achieve this overall percentage. This percentage approach is enshrined in national policy, and accepted by environmentalists, and many segments of Thai society.

In addition to forest clearing by lowland communities expanding into upland crop production (as in the Lower Ping Basin), most deforestation is widely believed to be caused by shifting cultivation practiced by mountain communities. And in addition to shifting cultivation and conversion of forest to other types of land use, foresters and environmentalists are now emphasizing qualitative degradation that is occurring inside of areas classified as having forest cover.

But environmental concerns about watershed management are not limited to forest cover and quality, and they are not the exclusive domain of environmental activists and foresters. Public environmental awareness and concern about land use in upper watershed areas has been fed by trends, events and perceived risks that can strongly affect people in their everyday lives, such as:

- Flash floods and landslides. There is strong media coverage of incidents involving local flash floods and landslides resulting in serious agricultural and property damage, and sometimes loss of lives. Sites in the Ping River Basin are included, and they are usually located in upper tributary valleys at the foot of steeply sloping small mountain stream valleys.
- Main channel floods. Damage caused by major floods along the main channel of the Ping River and its major tributaries have also been featured in mass media, and there is a general impression that they are increasing in frequency and magnitude. Recent examples include heavy floods in Chiang Mai City during 2005, and other serious floods are expected during 2006. And due to riverside and floodplain development during their damage is very great.
- Dry season agricultural water shortages. Rising demand for reliable year-round water for downstream irrigated agriculture has increased competition for water during the dry season. Thus, many are looking critically at uses of both land and water at upstream locations.
- Inadequate village and urban water supplies. Efforts to improve water supplies for drinking and domestic use in villages and urban areas provide another element of water resource competition, which reaches a peak during dry seasons and during El Nino years.
- Diminishing ground water supplies. A growing number of communities are investing in shallow and deep wells to provide water for agricultural, domestic and even industrial uses. In some areas, receding groundwater tables that are causing increasing alarm.

Another dimension of public concern relates to water quality, and begins making the link between natural resources and public health more directly. Areas of particular concern include:

- Waste water pollution. A growing volume of wastewater is being generated at village, urban and industrial levels. This includes sewage and domestic wastewater, as well as toxic chemicals and other substances in wastes from various types of business. While waste treatment has expanded, the pace has been inadequate to meet the challenges faced.
- Poisoning by agricultural chemicals. Increasing use of agricultural chemicals is perceived as posing two types of public health threats: applicator poisoning and pollution of waterways. Many perceived both as serious and growing threats.
- Effects of industrial pollution. Waste by-products of industrial processes of various types and scales are also a growing concern. Most concern is with disposal of toxic or disease-laden substances into waterways, but air and noise pollution can be locally important.

This latter point introduces two additional important issues that are also growing concerns of communities and general populations within the Ping River Basin:

- Solid waste disposal. Garbage is currently the main issue here. Rising levels of solid waste are associated with processes of economic integration and lifestyle change, and many communities find it difficult to cope with the problem. Waste reduction programs are still in their infancy.
- Air pollution. Emissions from vehicles and industry are primarily an urban-related problem. Emissions from industry and power plants are quite localized, but emissions from burning are more general. Seasonal burning due to land clearing and agriculture can

be very widespread (in both lowland and mountain areas). Government restrictions are emerging, but enforcement will not be easy.

While these problems are widely associated with a variety of natural resource management and public health issues, agency personnel and their programs often underestimate the importance of the livelihood issues with which they are associated. Many of the practices associated with these problems reflect the lack of viable alternative livelihood opportunities available to the people employing them. Moreover, the poorest components of the population are the ones who most frequently encounter constraints on their access to such alternatives. And at the same time, they are also often among those most vulnerable to the negative impacts that they cause.

It has also become quite clear that approaches of the past have been inadequate to effectively deal with most of these issues. It is increasingly recognized that there are serious gaps in resource governance structures and processes located at levels that are intermediate between national and local community levels. More functional arrangements at these levels are necessary in order to analyze and understand problems that emerge at broader landscape levels, to identify and negotiate viable, practical and equitable means for addressing those problems, and to mobilize the range of human and financial resources required to implement such solutions.

#### *Changing approaches to resource governance*

Changes in local governance processes accelerated rapidly after passage of the 1997 national constitution and related reforms. Most all communities in the Ping River Basin now have citizenship and elected local governments at the sub-district (*tambon*) level, even in more remote mountain areas. Tassabans and Tambon Administrative Organizations (TAO) are building their capacity in many areas, including levying and managing local taxes. Mandates are in place for communities and *tambons* to increase their role and participation in natural resource governance, but many *tambon* and *tassaban* governments lack relevant information and skills, and most of their constituents (especially in poorer areas) feel the need to place higher priority for use of scarce funds on providing basic infrastructure and services that are necessary to improve aspects of their livelihoods that are perceived to be of more immediate day-to-day concern. At the same time, many government ministries and their agencies and programs are being reorganized to provide more emphasis at local levels, especially for support of initiatives by local communities. There has also been a surge in efforts by local communities to organize themselves in various forms and formats, including local networks and now alliances at broader levels.

All of these changes are overlaid by growing education, information flow, and public awareness that are increasingly linked with trends at international and global levels. One important dimension of these linkages that is of particular relevance to this project relates to environmental awareness and action. Many environmental problems are now perceived and identified in the Ping River Basin, and local initiatives are being developed and launched to help address them.

- Major problems perceived in lowland areas near main river channels include lack of proper planning, administration and management of fluvial systems, environmentally insensitive river engineering projects, inappropriate development of flood plain areas, pollution of rivers from sewage and agricultural and industrial drainage, encroachment into river corridors and water bodies that narrows rivers and canals and reduces public access, and loss of river landscape quality, aesthetic beauty and cultural legacies. Excessive groundwater extraction is a problem in and around urban areas, as well as in some areas of intensive agriculture.
- In mountain areas, perceived environmental problems focus on deforestation of watershed headlands that is believed to cause loss of biodiversity, accelerated soil erosion, and a range

of impacts on hydrological systems. Highland agriculture and roads are seen as the worst offenders, along with stream pollution by agricultural chemicals, and dry season water use by sprinkler irrigation. Forest fallow agriculture and use of fire are seen as the source of major negative problems in the midlands, along with field crop production expanding into sloping lands above lowland paddies.

Although environmental concerns began to be integrated into agendas of civil society organizations as they emerged in the national political arena 20 years ago, a significant division has taken place during the last decade or so. There still seems to be basic agreement on their opposition to dam construction, logging concessions and large forest plantations, and on issues regarding environmental problems in lowland, urban and industrial areas, and along main river channels. All tend to blame most of these problems on unbridled commercialization, support for export-oriented production, growth of consumerism, and weak planning and regulatory mechanisms easily overridden by the wealthy and powerful. Their division is most apparent, however, in rural, and especially mountain areas:

- On the one hand, ‘deep green’ environmental groups are pushing hard for severe restrictions on midland and highland land use and segregation of local communities from forest lands, including strong efforts to expand national parks and wildlife sanctuaries to cover all class 1 watersheds and remaining natural forest areas in the Kingdom.
- On the other side, ‘populist’ environmental groups are pushing for community management and control of forest lands, based on local traditions, knowledge and practices. They have lobbied hard for passage of community forestry legislation ‘stuck’ in Parliament, and support resistance by communities threatened with displacement by protected area expansion.

Both sides have been very active in the Ping River Basin, and have built alliances that include different factions in academia, government and other sectors of society. Tension has even resulted in open conflict, but few seem to want a repeat of such unproductive and divisive events.

And perhaps most importantly, as local communities are exposed to the arguments and advocacy from both sides, many are listening to both points of view and seeking to identify a ‘middle way’ to improve their overall quality of life and safeguard the legacy of future generations. Many have begun to invest considerable effort to develop ‘peoples organizations’ based largely on informal networks among local communities, and some are developing broader alliances among networks. Astute government agencies and urban-based NGOs have seen the importance of these networks, and have begun seeking ways to support and facilitate their further development.

Moreover, Thailand’s Royal Family have shown exceptional leadership in these issues, and are constantly urging Thai society to develop a common vision of the future that combines improved livelihoods with sustainable natural resource management. This is a very important source of inspiration for efforts seeking unity across government, business, civil society, and local community sectors of society.

It is in this context that river basin management programs and this project have emerged.

## **2. Project structure, approach and activities**

The main objective of the Participatory Watershed Management for the Ping River Basin Project is to improve environmental quality, which will contribute to achieving enhanced livelihood and health outcomes for people in the Ping River Basin, and to replicate experience from project technical assistance, especially participatory models of integrated river basin management to other river basins in the country.

This project was implemented by the Office of Natural Resources and Environmental Policy and Planning (ONEP) under the auspices of the Ministry of Natural Resources and Environment. The ministry received financial assistance from the World Bank under the ASEM II fund to hire technical consultants that included implementation consultants (Panya Consultants Company, Ltd.), persons conducting activities on the participatory watershed management process (Wildlife Fund Thailand), organizers of training to strengthen capacity of local communities in watershed management (Mr. Sanchai Sutipanwihan), and international specialists in watershed management (Dr. David Thomas) and economics (Dr. Dominic Moran), who conducted studies and activities in project areas during February 2005 through August 2006.

The main development objective of this technical assistance team was to be achieved by:

- Developing participatory sub-basin management models providing access to all stakeholders (communities, local governments, non-governmental organizations, and private entrepreneurs) in the decision making process, and demonstrating model implementation;
- Enhancing capacity of stakeholders, especially community groups and local government, to participate in the planning, implementation and monitoring of interventions;
- Strengthening regulatory and incentive mechanism to modify behavior of watershed users;
- Developing a results measurement framework to monitor environmental, health and livelihood outcomes.

The project's activities were conducted in three sub-basins selected for project implementation: the Ping Part 1 Sub-basin (upper Ping) covering part of Chiang Mai province, the Mae Kuang Sub-Basin covering parts of Chiang Mai and Lamphun provinces, and the Ping Part 5 Sub-basin (lower Ping) covering parts of Kamphaengphet and Nakhon Sawan provinces.

In order to achieve its objectives, activities were conducted under four project components, as follows:

### **2.1. Component 1. Developing sub-basin level participatory watershed management**

This component focuses on developing participatory integrated watershed management models related to stakeholders from all sectors in the three pilot sub-basins.

#### **2.1.1. Selecting pilot sub-basins**

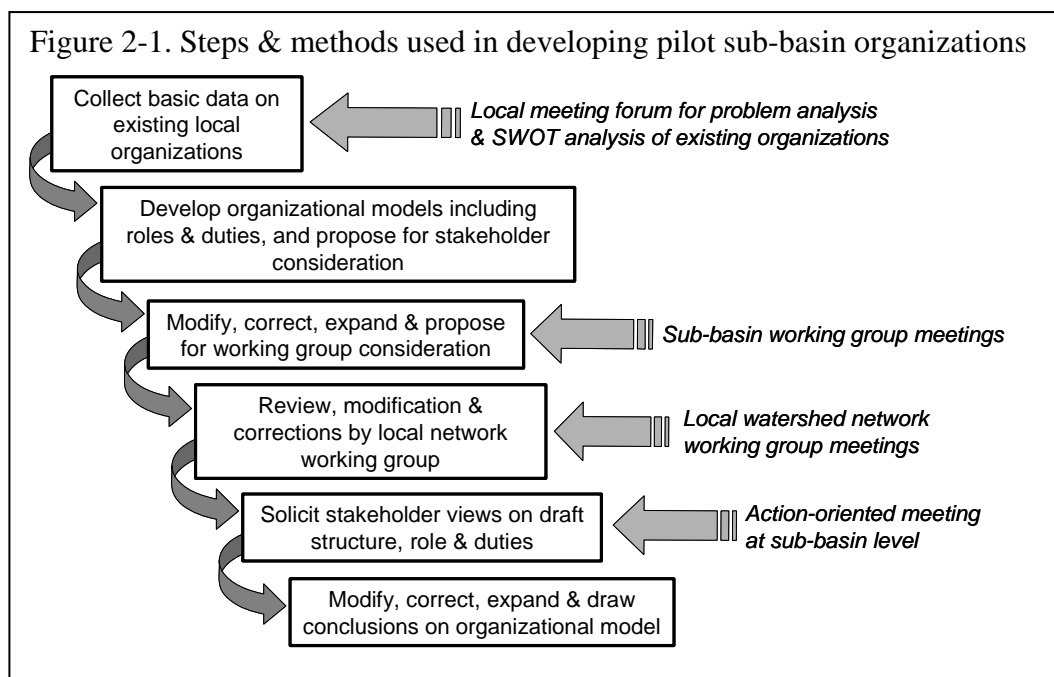
The objective of this project sub-component was to select three pilot sub-basins in which further project activities would be focused. These decisions were to be made using an informed participatory process that considered the range and distribution of conditions in the Ping River Basin, and resulted in selection of a pilot sub-basin to represent conditions found in each of three major sub-divisions: upper Ping sub-basins, middle Ping sub-basins and lower Ping sub-basins. This was intended to sample the range of diversity in major types of conditions found in Ping River sub-basins, in order to increase the potential for application of project results in efforts to

expand support for development of management organizations in other Ping River sub-basins, as well as in other river basins in the country.

In order to help achieve this objective, assessments were made of data from secondary sources, and two systems of technical indicators were developed and merged to provide examples of data analysis that could help inform the decision making process. Selection itself centered on “Water Forum” workshops where representatives from all Ping River sub-basins met to consider the technical assessments and determine the actual selection of pilot sub-basins to represent lower, middle and upper sub-basins of the Ping River Basin.

### 2.1.2. Developing sub-basin level management organizations

Initial sub-basin working groups were established to guide project implementation in each pilot sub-basin. One major line of activity conducted by these working groups was to consider development of a long-term sub-basin management organization appropriate for the conditions in their sub-basin. Steps in this process (Figure 2-1) included:



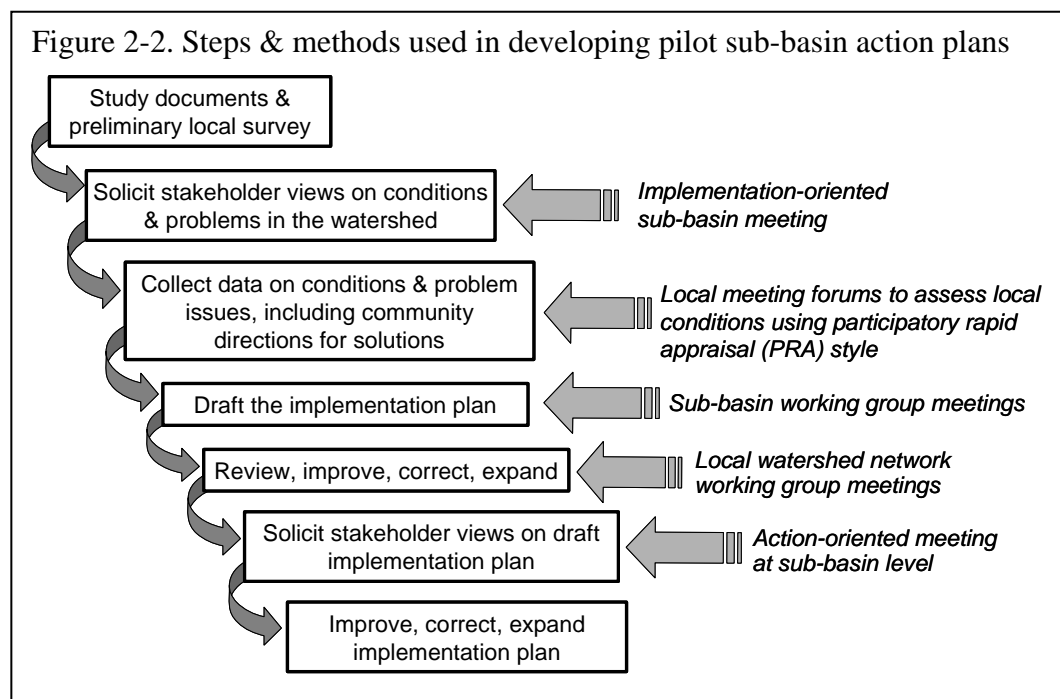
1. As part of project activities in pilot sub-basins, project implementation consultants assisted sub-basin working groups in collecting basic data on existing local organizations in their sub-basin. Information on these organizations was then assessed using SWOT (strengths, weaknesses, opportunities, threats) analysis techniques in association with meetings focused on analysis of problems in each sub-basin.
2. At the same time, the participatory watershed management consultant conducted a review of literature on experience with river basin management organizations, both internationally and within Thailand. This was used as a basis for determining structural considerations that need to be made in configuring sub-basin organizations, and in constructing a set of alternative organizational models for long-term river sub-basin management organizations. This was combined with development of a proposed process through which any of the selected models could be further adapted and developed over the long term
3. Information on existing organizations was combined with information on proposed alternative models of sub-basin organization for consideration by sub-basin working

groups. Project implementation consultants proposed organizational arrangements for each sub-basin based on their assessments of available information. These arrangements were then corrected and modified by sub-basin working groups, resulting in a draft configuration for long-term river sub-basin organizations for each pilot sub-basin.

4. Proposed draft sub-basin management organizations were then submitted for further review, modification and correction by a broader group of local network leaders in each pilot sub-basin.
5. The review was then further expanded through larger meetings of stakeholders convened by local network leaders in each sub-basin to review the structure, roles and duties for the long-term sub-basin management organization.
6. Synthesis of these views provided a basis for further revising and improving proposed organizational arrangements, resulting in conclusions about organizational arrangements seen as most appropriate for each pilot sub-basin.

### 2.1.3. Developing the action planning process

The second major line of activity conducted by sub-basin working groups was to develop initial action plans for managing natural resources and environment in each pilot sub-basin, including aspects related to livelihoods and public health. This steps involved in this process (Figure 2-2) included:



1. Collection and study of existing planning documents from various sources, and a preliminary rapid survey of local conditions conducted by the project implementation consultant team;
2. Convening an initial implementation-oriented meeting in each pilot sub-basin to solicit stakeholder views on conditions and problems in their sub-basin;
3. Collecting further data in each sub-basin on conditions and problem issues, as well as views on local community directions for solutions to problems, through a series of local meetings with key people using rapid appraisal-type techniques;

4. A series of meetings of sub-basin working groups to review available information as a basis for drafting initial sub-basin action plans for each pilot sub-basin:
5. Initial draft sub-basin action plans were then submitted for further review, modification and improvement by groups convened by local network leaders in each pilot sub-basin.
6. The review was then further expanded through larger meetings of stakeholders convened by local network leaders in each sub-basin to solicit views on revised draft action plans.
7. Synthesis of these views provided a basis for further revising and improving sub-basin implementation plans for each pilot sub-basin.

#### 2.1.4. Creating implementation handbooks

The final sub-component focused on developing implementation handbooks that would be useful in helping further develop capacity of local communities related to sub-basin management. Three types of handbooks were developed to provide information that is easy understand and apply related to: (1) technical aspects of natural resource and environmental management; (2) organizational and planning aspects related to sub-basin management; and (3) methods to help further build consciousness and participation in sub-basin management activities.

## 2.2. Component 2: Enhancing the capacity of communities in pilot watersheds

The objective of this component was to place emphasis on building capacity of sub-basin stakeholders, especially local governments and community groups. The aim was to provide capacity to participate in action planning processes, including translating plans into action and monitoring their implementation. The process used to achieve this objective had four steps:

### 2.2.1. Selecting sub-basin facilitators, community facilitators and community members

The project had four main target groups for project capacity building activities:

- **Sub-basin facilitators.** Five local people with interest, knowledge and experience related to natural resource and environmental management issues and activities were selected to become sub-basin facilitators in each pilot under the project. It is anticipated that they will be leaders of activities under future sub-basin management organization programs.
- **Community facilitators.** Fifteen interested and experienced local people were selected to become community facilitators in each sub-basin. They are seen as potential future leaders and resources for implementing sub-basin management activities at more local levels.
- **Community members.** Sub-basin facilitators and community facilitators in each sub-basin selected up to 150 people from major stakeholder groups in the sub-basin to participate in a field study tour-oriented training session conducted for each sub-basin. This experience hopes to encourage participants to be active in sub-basin management activities and programs.
- **Local government leaders.** Since leaders of local governments [tambon administration organizations (TAO) and municipalities (*tessaban*)] are stakeholders that will play a very important role in sub-basin management of natural resources and the environment, the project also provided them with overview training on management of natural resources and the environment at the sub-basin level..

### 2.2.2. Analyzing community training needs and developing training curricula

Training needs of communities in pilot sub-basins were determined from information derived from several project activities, including: (1) preliminary assessments of Ping Basin conditions;



(2) pilot sub-basin selection workshop; (3) rapid assessments of pilot sub-basin conditions; (4) the first round of sub-basin action planning workshops; (5) mapping of pollution sources in pilot sub-basins; and (6) a special training needs assessment conducted using focus groups.

Development of training curricula began with summarizing identified training needs into three topic areas: (1) subjects related to conducting activities at the level of communities or local sub-watersheds; (2) subjects related to activities that cover wide areas in sub-basins or groups of local sub-watersheds; (3) subjects that emphasize integrated watershed management. Separate curricula for training of each type of target group were then developed according to the characteristics and roles of each group.

### 2.2.3. Conducting training and strengthening knowledge

Training was organized according to the perceived leadership relationships among the three main target groups for project capacity building activities:

*Sub-basin facilitators* were considered to be local leaders in sub-basin management activities, so their training was more diverse and detailed than other groups, and was conducted by project consultants and resource persons.

*Community facilitators* were considered to have enough knowledge and experience that they could provide support for local leaders, collaborate in conducting project activities, and have the capacity to become leaders themselves. Their training at an intermediate level was conducted by sub-basin facilitators with assistance from consultants and resource persons.

*Community members* were people from stakeholder groups in the general population who have knowledge and experience with real conditions in local areas. Their training was more general, emphasizing study tours and interaction among participants. It was conducted by sub-basin and community facilitators, together with knowledgeable people at study tour sites and specialists.

Training for *local government leaders* was more focused on roles for local governments in sub-basin organization and management, and was conducted by more senior resource persons.

## 2.3. Component 3: Strengthening regulatory and incentive measures for improved behavior of users in pilot watersheds

The objectives of this project component were: (1) to develop and adapt appropriate incentive mechanisms through participation of pollution source groups to find solutions to pollution in the Ping River Basin; and (2) to reduce impacts due to water pollution on health and water resource conditions of poor people. Project activities are groups under four sub-components:

### 2.3.1. Classifying and selecting pollution sources

The project initially specified focus on pollution sources in pilot sub-basins as: (1) agricultural pollution sources would be the focus in the upper pilot sub-basin; (2) industrial pollution would be the focus in the middle pilot sub-basin; and (3) pollution from municipalities and communities would be the focus in the lower pilot sub-basin. Based on assessments of pollution sources in the three pilot sub-basins, however, this structure was modified to better reflect actual conditions and major concerns in each sub-basin, and to allow for some cross-sub-basin comparisons.

Initial assessments of pollution sources were based on (1) secondary data on natural resources, socio-economic conditions and pollution; (2) rapid assessments of natural resource and environment conditions conducted by the implementation consultant team; (3) study of pollution in sub-basins through field observation and discussion with local people and relevant agency officials; (4) analysis and evaluation of pollution situations in pilot sub-basins; and (5) collection

of qualitative and quantitative data on pollutants from both secondary sources and field interviews with polluters in pilot sub-basins.

Selection of 20-25 representative pollution sources in each sub-basin was conducted through a process that included: (1) preparation of land use maps for each pilot sub-basin; (2) preliminary checking of pollution sources and their map locations; (3) developing criteria for selecting polluters according to the type of source (municipal/community, industrial, agricultural, livestock); (4) selection based on criteria and operating guidelines; and (5) field examination of selected representative polluters, including location checks, interviews, and requesting their participation in the project.

### 2.3.2. Reviewing economic incentive measures

Development of incentive mechanisms began by reviewing existing incentive measures for pollution management in Thailand and other countries. This included an overview of the various types of incentive measures, as well as experience with economic incentive measures classified according to their use in relation to municipal, industrial or agricultural wastewaters.

### 2.3.3. Participatory development of incentive measures

Based on identification of pollution sources in pilot sub-basins and the review of experience with economic incentive measures, a set of economic incentive measures with potential for application in addressing problems found in pilot sub-basins was constructed.

A participatory approach was then employed to help assess the potential for application of these measures in pilot sub-basins. First potential economic measures were matched with types of pollution source sites selected as case studies in each sub-basin. A series of dialogues was then conducted **with** representatives of each category of polluters in the pilot sub-basins. This resulted in information on their views on the importance of, attitudes toward, and feedback about, measures with potential for use in managing water quality in their sub-basins. Recommendations and comments on incentive measures were also collected from academics and relevant agencies.

### 2.3.4. Implementing incentive measures

Information from the above activities was used to help refine assessments of economic incentive measures, and formulate recommendations on next steps toward implementing priority activities in each sub-basin. This included recommendations about roles of government agencies, development of indicators to monitor and evaluate their use, and guidelines for application of incentive measures in pilot sub-basins.

Although requirements for implementing most of the recommended measures were too complex to allow their establishment and testing during implementation of this project, efforts were made to assist with initial steps toward establishing selected high priority measures. Focus of these efforts was on providing initial training related to high priority incentive measures for major target groups in all three sub-basins. Training was organized and coordinated by staff of the Office of Natural Resources and Environmental Policy and Planning, in collaboration with staff from other key agencies and universities.

## **2.4. Component 4: Project coordination, results measurement and dissemination**

### 2.4.1. Results measurement framework

This focus of this project sub-component was on developing a results measurement framework to monitor environment, health and livelihood outcomes of sub-basin management programs.

The status of outcome indicators in sub-basin action plans was assessed, and steps proposed for improving outcome indicators, and allocating responsibilities among community groups, local government and external institutions for implementing a results measurement approach.

#### 2.4.2. Training in use of the results measurement framework

This sub-component provides a guidance note on capacity building requirements for the various relevant partners to be involved with further developing and applying the results management framework in association with sub-basin management programs.

#### 2.4.3. Dissemination of project results

Project publications and workshops convened at regional and national levels are the main formal modes for the dissemination of project results to those concerned with developing management organizations elsewhere in the Ping River Basin and other river basins in the country.