

Community Participation in Integrated Water Resource Management in Northern Thailand

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ABSTRACT

Thai people have been facing both quantitative and qualitative problems of water for decades. The northern region of the country is the main headwater of Thailand where Ping, Wang, Yom, and Nan are the main watersheds. Therefore, the heads of those 4 rivers are extremely important for Thai people. The four communities including Mae La Oop, Mae Chiang Rai Lum, Pha Tang and Dong Phapoon are selected as case studies which are located in the Ping, Wang, Yom and Nan watersheds respectively. Each watershed is located in a different geographic area. Therefore, the respective communities analyzed and solved their own problems by different ways of management. Mae La Oop community, representative of Ping watershed, came across the drought and flood seasonal problems by designing and constructing three-layer check dams. These check dams worked also as “wet firebreak” to limit the forest fire area. Pha Tang community, representative of Yom watershed, has been facing flooding and soil erosion problems in the rainy season. The local people constructed numbers of local material-based check dams to come across those problems with environmental friendly atmosphere. Mae Chiang Rai Lum community from Wang watershed and Dong Phapoon community from Nan watershed have been facing severe logging problems which lead to drought and landslide problems. The local people constructed numbers of low cost and local material check dams along the mountainous slope along with creating and effective forest restoration project. The “highland wet forest” could narrow down the problems. Not only adult activities, but also local teenagers, keep running their activities under the concept of environmental sustainable development.

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1. INTRODUCTION

Thailand is located on South-East Asia Region, in what is known as the Indochina Peninsula. The climate is tropical, with three distinct seasons: a hot season from March to mid-May, a rainy season caused by the southwest monsoon, which generally runs from mid-May to October, and a dry and relatively cool season from November to February, when the north-east monsoon, coming from the Asian continent, prevails. The same as other countries in the tropical zone, Thai people face water-related seasonal problems throughout the year. The six months of rainy season annually damage huge areas of northern, central and southern part of Thailand by flooding, whilst the 3 dry months damage the areas of north-eastern and the northern part of Thailand according to severe drought problems. Thailand is an agriculture country. Approximately 34 % of total Thai population are farmers (agriculturists) ^[1]. Therefore, drought and flooding are the most important national problems for this

sector of society. The geographic information including river length, watershed area and annual precipitation (Table 1) of the 4 watersheds are listed below.

Table 1 Geographic information of Ping, Wang, Yom and Nan watersheds.

	Watershed			
	Ping	Wang	Yom	Nan
Length (Km.)	715	460	735	740
Watershed area (sq.km.)	34,534	10,793	24,047	34,682
Annual precipitation (mm.)	1,132	1,100	1,204	1,287

This project was designed together between university researchers, government organizations, hydro and agro informatics institutes, and members of the local communities. The project aimed to use scientific and technology applications to solve or at least minimize the water-related problems in the 4 areas of northern Thailand that were upstream of the 4 main rivers, the Ping, Wang, Yom and Nan Rivers. In addition, community forest and youth activities were also included in the process of implementation and environmental awareness to keep these outputs of the project sustainably transfer after ending the project.

2. METHODOLOGY

According to the project, the university researchers played an important role as an academic advisor. The main goals of the project were discussed, shaped and designed together along the community members, university researchers and the local government staff. The project procedure was run step by step as followed.

2.1 Community selection criteria

According to the 4 main river basins of Thailand, one active and successful community was selected from each river basin. The main criteria were consisted of 1) located in both drought and flooding problem area 2) located outside the national irrigation area 3) low-income community 4) community members have high concern in environmental aspect.

2.2 Participatory project planning

The meeting along university researchers, Hydro and agro informatics institute researchers and community leaders and committee were conducted at each community locations. The area analysis including Geographic information, water balance (water budget, water demand), forest cover, soil types, agricultural activities and so on, were collected and analyzed for the next step of management.

2.3 Data collection

Man survey and Geographic Information System (GIS) survey were used to obtain the area GIS position and slope. The general information, including agricultural activities, local people's attitudes, history and background of the community were obtained by direct interview. Annual precipitation data was collected from Hydro and Agro Informatics Institute Report ^[2]. Hydrologic data including stream water level, velocity, depth, discharge, stream width and substrate types were collected *in situ* seasonally.

2.4 Implementation

After obtaining all data, the water resources management was designed and constructed. The mountain irrigation pipeline, check dams [3, 4], ponds and water storage were constructed based on the community need, as well as geographical, ecological and hydrological criteria.

The community forest and youth environmental activities were also designed for local community utilization and environmental awareness.

3. RESULTS

After field survey and exhaustive consideration, the four communities were selected as Mae La Oop from Ping Watershed, Mae Chiang Rai Lum from Wang Watershed, Pha Tang from Yom Watershed and Dong Phapoon from Nan Watershed (Figure1).

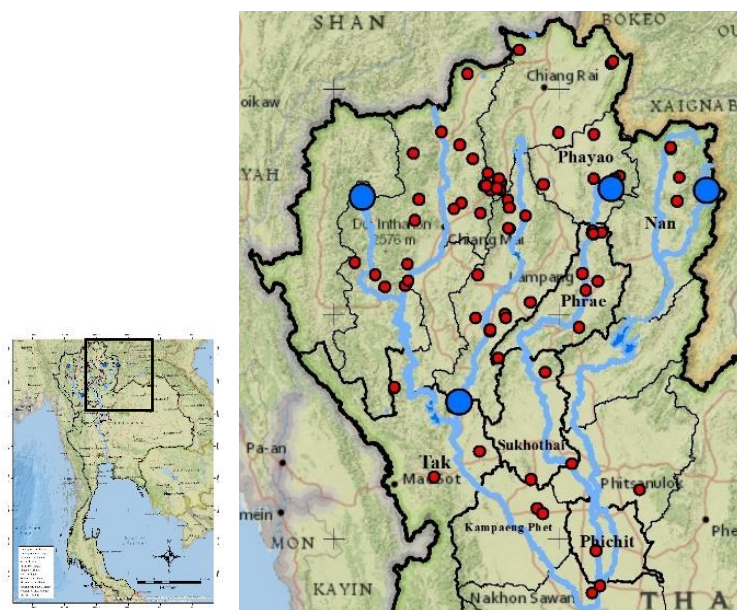


Figure 1 Thailand map with the selected communities in Ping, Wang, Yom and Nan Watersheds (indicated in larger circles)

The 4 selected communities have been facing problems of annual drought in the dry season and floods in some year as shown in Table 2.

Table 2 Annual water problems occurring in the four selected communities

Mae La Oop	Mae Chiang Rai Lum	Pha Tang	Dong Phapoon
Drought and flooding without water storage	Drought and soil erosion with sandy substrate	Flooding in rainy season with soil erosion	Drought without water storage

According to the geographic, ecological and hydrological data analysis, the integrated water resource management was discussed and designed how to solve the problems based on area data and community benefit.

Mae La Oop Community, Ping Watershed: eight rock check dams were participatively constructed along the stream. In addition, the connecting pipelines were laid to connect the irrigation pond to newly constructed concrete storage units (Figure 2). These systems are used for agricultural and household purposes. 1,230 residents have been receiving benefit from the project. There is enough water for household use.



Figure 2 Concrete water storage

Mae Chiang Rai Lum Community, Wang Watershed: ten rock-bamboo check dams (Figure 3) were constructed along upstream area of stream tributaries according to increase the humidity to riparian areas of the stream, whilst three concrete-bamboo check dams were constructed downstream for water storage in stream. The storage water was used for agriculture purposes. 1,200 residents in 293 houses have been receiving benefit from this project. In addition, more water and higher humidity was increased in huge forest area which resulting higher biodiversity.



Figure 3 Rock-bamboo check dam

Pha Tang Community, Yom Watershed, five onsite material check dams were constructed by local people with friendly help from the officers of Doi Phu Nang National Park. These check dams are used for community forest and agriculture purposes. The collaboration between residents, university researchers and national park officers created very friendly relationship with green and moisture forest output.

Dong Pha Poon Community, Nan Watershed, two old concrete check dams and two old rock check dams were re-constructed and 3 new rock check dams were constructed. In addition, 5 concrete water tanks were also constructed. These water supply systems are used for agriculture and household purposes. After the project, the residents could come across the drought problem with higher humidity of their community forest.

Environmental Awareness from Youth Activities

The younger generation members of each community discussed with the adult residents and university researchers for planning on environmental/ecological activities. The University researchers and national park staff created ecological/biodiversity workshops which aimed to educate and train local youths and adults to create their own project for natural streams and forest. Most youths from each community planned and started the forest restoration project. Thousands of seedlings of native trees have been prepared for planting in the forest where the water resource management adult projects were conducted. Long term water and tree growth monitoring projects have been carried on with local adults, youths and local government.

4. DISCUSSION

According to the activities of the project, the communities earned financial support from local government by academic support from university staff. The water problems were solved or at least minimized by the project. Not all community members earned benefit. The local people learn how to management the natural resources and the limited fund. In addition, university researchers also learn how importance of the communication. The different way of living, different academic level and different speaking language were problems of the project. But those problems could be solved by sincerity and trust. Then, the project can go on.

5. CONCLUSION

The key successes of this participatory integrated watershed management are the continuous collaboration between local communities (adult and youth residents), government organization (Hydro and Agro Informatics Institute, National parks and local government) and University researchers. This collaboration sincerely runs by ecological, science and technology and indigenous living concept.

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