COMMUNITY DYNAMIC AND COMMUNITY SELF RELIANCE: A CASE STUDY OF MOUNTAIN WATERWORKS MANAGEMENT IN BAN HUA SUAN VILLAGE, KOH SABA SUB-DISTRICT, THEPHA DISTRICT, SONGKHLA PROVINCE, THAILAND

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ABSTRACT: The objectives of this research were to study the community dynamic and community self reliance; a case study of waterworks management in Ban Hua Suan village, Koh Saba sub-district, Thepha district, Songkhla province during 1999-2010. The primary data were obtained from key informants by in-depth interview, observation, photograph recording, VDO recording, voice recording, and field visits, who were involved in mountain waterworks system management of this community. The secondary data were collected from the documents of Koh Saba Sub-district Administrative Organization including water supply, water demand, and accounts of incomes and expenses of waterworks system. The micro data were analyzed by domain analysis and taxonomy. By situation analysis, following the Development Potential-Diffusion Theory and Double-tiered TERMS MODEL of Rural Community Self-Reliance Framework, were also accounted for. The research showed that the enabling factors of community self-reliance related to the problem-solving of mountain waterworks system of Ban Hua Suan village included 5 factors: (1) Natural resources: The prosperous forest resources created the sustainable water resource to produce mountain waterworks system in Ban Hua Suan village. In addition, the prosperous forest was able to sustain the results of social and cultural changes. (2) Human resource: 65 people of workforce were in working age (14-60 years). This age group was useful for development. (3) Social organization: There were several organizations involved in this project including governmental organizations, state enterprises, private stores, saving group, and the Bureau of the Royal Household. (4) Contact: People in this community were in contact and communication with other communities. (5) Experiences: The people in this community gained experiences of mountain waterworks management by observing the real situation and field trips to other communities.

Keywords: Community Dynamic, Community Self-reliance, Mountain Waterworks System, Thailand

INTRODUCTION

Environment and natural resources plays an important role for our life providing food, habitat, medicine, housing, energy, safe life and other facilities [1]. Therefore, environment and natural resources are essential for all living species, especially for humans. Humans consume an excess share of the world's resources, and produce unsustainable amount of pollution to support their life. In the past, environment and natural resources were tremendous. Natural resources dramatically decrease in both quality and quantity in the current days because the world's population has been booming for years. The population is now threatening to reach the stage where there are simply too many people for the planet to support.

Growing human populations leads to a variety of environmental problems that now affect our entire world as globalization continues and the earth's natural processes transform local problems into international issues [2]. Thailand faces the same problems as other countries in the world. Over the past few decades, Thailand's dramatic economic growth has produced new environmental challenges for this once-agrarian society. The country now faces problems with air pollution, water pollution, water scarcity, declining wildlife populations, deforestation, soil erosion, and hazardous waste issues. The new challenge is climate change. Like many countries, Thailand is facing with the

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environmental, social, and economic impacts of floods, droughts, and severe storms due to the climate change.

The new challenge solution of environmental problems and sustainable development is called community participation. It is the key to building community self-reliance. The strategies to enhance community participation include 1) to understand the community culture, 2) to provide people with knowledge of natural and environmental management, 3) to enhance people involvement in the community's activities such as community need assessment, decision making, and action processes, and 4) to allocate resources, authority and responsibility of natural and environmental management to the community [3]. The concept that enhances community participation on environmental management is of worldwide acceptance [4]. Padmasiri De Silva [5] indicated that culture is one of the effective environmental managements.

Mountain waterworks system is the local wisdom that people in the community bring natural mechanisms and local technology to benefit their life. Mountain waterworks system is one of the examples of the community self-reliance and the community innovations related to water supply management due to their own experience. In the other hand, mountain waterworks system helps to conserve the forest because trees are an important part of the system's water source. Trees favorably affect hydrological processes and water quality in many ways. Without trees, there would be no water resource on earth. This study was a long-term study during 1999-2010.

RESEARCH METHODOLOGY AND TOOLS

This study was conducted during 1999-2010 to follow the community dynamic and community self reliance. The primary data were obtained from key informants who were involved in mountain waterworks system management of this community such as the abbot (head of temple), leaders, and villagers (water users). The primary data were collected by in-depth interview, observation, photograph recording, VDO recording, voice recording, and field visits. The secondary data were collected from the documents of Koh Saba Sub-district Administrative Organization including water supply, water demand, and accounts of incomes and expenses of waterworks system. The micro data were analyzed by domain analysis and taxonomy. The macro data were analyzed by situation analysis following the Development Potential-Diffusion Theory [6] and Double-tiered TERMS MODEL of Rural Community Self-Reliance Framework [7].

RESULTS AND DISCUSSIONS

Community Context

Ban Hua Suan is one of the villages of Songkhla province, located in Ko Saba, Thepha district, Songkhla province. Ban Hua Suan is 12 km from Thepha district and it is approximately 60 km away from Hat Yai district, the biggest city in Songkha province, 72 km away from Songkhla province. Ban Hua Suan is one of Thailand's violence-ridden southern border areas. It was not affected at first by the recent outbreak of Pattani Separatism, which began in 2004. However, bombs planted in 2005 and 2007 created fear that the insurgence might spread into Songkhla province as well. The districts Thepha bordering Pattani is under martial law since 2005. The village scenery is composed by plateaus, forests and mountains sloping in the central and plain and lowland toward the Gulf of Thailand in the north. Ban Hua Suan has a wet climate due to the double influence of the northeast monsoon blowing from China in winter and the southwest monsoon from the Indian Ocean which brings in moisture all year round. Ban Hua Suan receives less rain than the western coast of the southern region whose rain is dumped when the southwest monsoon hits the Tenasserim hills.

The previous main occupation in Ban Hua Suan was rice cultivation. Subsequently, villagers have changed to plant rubber in the foothills. There is sometimes temporary flooding in this area, the rain water running off from mountains and the hill valleys. The population of Ban Hua Suan was 900 in 2010. Approximately 20% of populations were children (below 14 years) and 15% were elderly (above 60 years). Approximately 65% of population was part of the working group (age 14-59). A variety of ethnic groups live together in Ban Hua Suan such as Thai, Chinese descent, Malay descent, and immigrant Burma workers. Most of them are Buddhists.

Rivers, springs, swamp and streams act as the natural water resources quality filtration system to Ban Hau Suan village. In addition, there are two reservoirs and two weirs built by the government. There are eight water resources to provide untreated water. In the past, villagers dug storage basins for water supply in their households. Subsequently, drilled shafts were installed by the Department of Health, Ministry of Public Health to supply underground water to the village. However, the

underground water was in short to supply all households. Thus, the villagers had to find alternative resources of water supply. In 1999, the mountain waterworks system was constructed by villagers. The Abbot was the leader bringing mountain waterworks system as water supply in this village. All workers who constructed the system were villagers. The first total budget was 250,000 Baht. The mountain waterworks system nowadays is the main water supply in Ban Hua Suan village and is operated under the Royal Project.

Five enabling factors lead to the success of the mountain waterworks system management in Ban Hua Suan, including natural resources self-reliance, human resources, social organization, contact, and experiences. These factors showed the dynamic and self-reliance of the community in Ban Hua Suan village. The details are:

1. Natural resources self-reliance: Everybody knows that the forest is the source of water for all people. The forest provides underground water storage, making the ground moist as a benefit for all people. The result of cutting forest is the destruction of the water source. The forest was also the source of the mountain waterworks system in this village.

"Wongdo", the forest was called by Ban Hua Suan's villagers, to provide source of water. In the past, Wongdo was the tropical rain forest which was a fertile forest. This type of forest was a water source created by large trees, characteristically cool and dense. Wongdo functions like a sponge, absorbing water during the rainy season and with a long period of seepage into stream during the rest of the dry season. Subsequently, there were many cases of illegal forestry concessions in Ban Hua Suan village for trade, for community expansion to make a living, for having inherited land from ancestors and for expansion for good breeds of rubber tree plantation and fruit plantation (Figure 1). Therefore, the forest water source was reduced, creating at the same time water shortages of the mountain waterworks system as well as upland and lowland irrigations.

Efforts to exert more control over local resources only began after the richly forested areas around the village was destroyed by logging and shifting cultivators and the villagers began to experience severe water shortages for the mountain waterworks system. Subsequently, the villagers were aware of the problem. They tried to rehabilitate, maintain and protect the destroyed water source forests. The abbot became the leader to protect the forest of this village and used different strategies to preserve the forest. Firstly, he sent the report to Royal Forest



Figure 1 Illegal forestry concessions in Ban Hua Suan village



Figure 2 The abbot and villagers worshiped to one of many trees that was destroyed (Cutting food and water pipe of its trunk)

Department about illegal forestry concessions. The Royal Forest Department then regulated and controlled the illegal forestry concessions as this forest has been declared as a protected national park. It was forbidden to cut down any trees, to protect the forest as a water source for production, use and consumption for the village.

Furthermore, the abbot and villagers used cultural, traditional and belief strategies to preserve their forest such as tree ordination ceremonies (Buat Ton Mai). Those ceremonies were performed by the abbot and leaders in order to raise the awareness and a spiritual commitment among local villagers to conserve the forests and watersheds in Ban Hua Suan village. Tree ordination is the strategy of numerous descriptions, for instance, of religious or spiritual significance being attached to certain plants or animals, which are thereby protected. Figure 2 and 3 show the example of Ban Hua Suan village in March 2001, when the abbot and villagers entered a national park to wrap monks' robes around all the large trees in a rainforest threatened



Figure 3 Monks and villagers worshiped during tree ordination ceremony (Buat Ton Mai)



Figure 4 Adult men was relaxing during reservoir construction

by illegal forest forestry concessions. Most tree ordinations hold place at local areas, and villagers, through their participation in these ceremonies, to demonstrate their acceptance of this adaptation of a Buddhist ritual to sanctify the forest and thereby protecting natural resources. The regulations of the monks established the limited use of the forest by the villagers, forbidding the cutting of any trees or killing of any wildlife.

Lastly, the abbot taught a simple lifestyle, using minimal resources, having just enough to eat and being solidary with nature that would leave the forest, soil and water, surrounding the village, abundant and fertile. Vast humid forests bring rain. Water rain has been absorbed by the forest and slowly released for the community use all year long, forming streams and creeks that flow unhindered into rivers. Thus, the villagers have looked after these kinds of forests as water sources within a community preserve. Natural resources self-reliance in this case was based on law enforcement, psychological self-reliance and social-cultural self-reliance. Social controls have also been developed in this community explicitly to regulate resource use and to ensure that the environment was sustainably managed. The psychological self-reliance and social-cultural self-reliance are not enough for environmental conservation. However, the community needs leaders with strength leadership and good communication for a sustainable environmental management [8] like at Ban Hua Suan village.

2. Human resources: 65 of villagers in Ban Hua Suan were in working of age (14-60 year). This productive and volunteered age group was useful for social and economical development, helping to manage the waterworks system. In the past, there was sometimes shortage of water during summer periods. The abbot and community leaders discussed the problem. Finally, they decided to build the reservoir on the top of mountain to be useful to keep abundant water during the rainy season. Water in the reservoir would provide water supply to mountain waterworks during the rest of the dry season. Adult men were the main labor force to construct the reservoir with their own technology (Figure 4). It took almost one year to finish the construction of the reservoir, adult labors were only able to work after finishing their daily work in rubber cutting or plantation. Once the reservoir was built, there was no problem of water shortage for the mountain waterworks system during the dry season. Nowadays it has been managed by the new working group generation. Based on the Development Potential-Diffusion Theory, there is a more productive age group in the community and a better development in quality of life may be possible for the people [6].

3. Social organization: there were several organizations involved in mountain waterworks system management including governmental organizations, state enterprises, private stores, saving groups, and the Bureau of the Royal Household. The governmental organizations included Koh Saba Sub-district Administrative Organizations and the Royal Irrigation Department who provided the budget for mountain waterworks system construction. The state enterprises included Khok Pho Electrical Power Plant and stores of supplier and material for construction equipment. Khok Pho Electrical Power Plant supported electricity for running the mountain waterworks system while stores supported supplier and furnished material for construction. The saving group was an association run by the villagers formed in this village before the mountain waterworks system has existed. The saving group supported the budget of the mountain waterworks system at the initial stage. The budget of the saving group that supported the mountain waterworks

system showed the economic self-reliance in Ban Hua Suan village [7]. The Bureau of the Royal Household increased the potential of mountain waterworks system by constructing big tanks to keep large amounts of water. Big and tall water tanks increased powerful water currents distributed to villagers' household in lowland and upland. The case of the mountain waterworks system in Ban Hua Suan village, is one example of people's participation in rural development. Over the past two decades, many governments, developmental agencies and non-governmental organizations have recognized that the "top-down" approach characteristic of traditional development strategies has largely failed to reach and benefit community [9]. As example, the underground water system runs by Department of Health, Ministry of Public Health. This system did not suit with Ban Hua Suan community. The basic fault in the underground water system was that the community was not consulted in developmental planning and had no active role in the developmental activities. Therefore, the system was abandoned. For the mountain waterworks system in Ban Hua Suan, the local community formulated their own plans and activities and supports were supplied from several external agents, such as governmental organizations and state enterprises. In the case of social network of Ban Hau Suan, it shows the form of organization of human activities and good communication, the key success of sustainable development [10].

4. Contact: Ban Hua Suan village was the open community**.** The villagers were in contact with external agency by trading, sharing knowledge, cultural exchange, and communication. For the mountain waterworks system in Ban Hua Suan village, the abbot and villagers have learnt the function of mountain waterworks systems from other villages and gained experience. Ban Hua Suan villagers and village leaders involved in mountain waterworks system management were able to provide a forum for blending local knowledge with externally supplied technical information. In addition, the system mobilized local villagers together with outsiders in a process that enables them to adapt technical standards for planning and monitoring mountain waterworks system to meet local needs. Thus, in the case of Ban Hua Suan village, the sharing knowledge from experienced community reduced uncertainty about technical information of mountain waterworks management. Based on the Development Potential-Diffusion Theory, the contact with the outside is one of the key for community developments [6].

5. Experiences: For the mountain waterworks system, Ban Hua Suan villagers and village leaders gained experience by observing the real situation and by field trips to external communities. Therefore, this insight from external knowledge encouraged the village committees, providing external supplied technical information. These experiences considerably relaxed the rigor technical information was usually outayed in the planning process. This in order to define type and location for mountain waterworks system intervention that Ban Hua Suan villagers found acceptable.

CONCLUSIONS

This study is a case study of mountain waterworks system during 1999-2010, a dynamic process of Ban Hau Suan village. The enabling factors of community self-reliance related to the problem-solving of mountain waterworks system include: (1) Natural resources: The prosperous forest resources created the sustainable water resource for mountain waterworks system in this community. In addition, the prosperous forest was able to sustain as a results of psychological self-reliance and social-cultural self-reliance. (2) Human resource: 65 of workforce in working age (14-60 years). This age group was highly useful for development. (3) Social organization: There were several organizations involved in this mountain waterworks system including governmental organizations, state enterprises, private stores, saving group, and the Bureau of the Royal Household. (4) Contact: The people in Ban Hua Suan village contacted and communicated with external communities. (5) Experiences: the People in Ban Hua Suan village gained experiences by observing real situation and from field trip to the external communities.

REFERENCES

1. Cunningham WP, Cunningham MA. Environmental science: a global concern. 11th ed. New York: McGraw-Hill Companies; 2010.
2. Enger ED, Smith BF. Environmental science. 8th ed. New York: McGraw Hill; 2002.
3. Lary LJ. Community development as a process. Columbia: University of Missouri Press; 1976.
4. Avner D. The environment between theory and practice. New York: Oxford University Press; 2000.
5. Silva PD. Environmental philosophy and ethics in Buddhism. London: Antony Rowe; 1998.
6. Sunyawiwat S. Development theory and strategy. 8th ed. Bangkok: Chulalongkorn University; 2008. [in Thai]
7. Sunyawiwat S. Sociology theory: creating, evaluation, and utilization. 4th ed. Bangkok: Chulalongkorn University; 1999. [in Thai]
8. Barrow CJ. Environmental management for sustainable

development. 2nd ed. London: Routledge; 2006.
9. Capra F. The hidden connections. London: Flaming; 2003.
10. Buck RC, Ploch LA. Factor related to changes in social participation in rural Pennsylvania community. Pennsylvania; 1958.