

Local Wisdom and Social Learning for Sustainable Water Resource Management: A Case Study of Ban Limthong, Amphoe Nang Rong, Changwat Buri Ram¹

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Abstract

Currently water resource management has become one of the major concerns in the world today. Problems continue to worsen and water resource management has become a significant part of many communities. Thailand currently faces increasing problems from flooding and droughts, with damage from flooding averaging over a quarter billion US dollars a year. Agricultural areas are worst hit. These issues directly affect farmers who are already poor.

This research selected Ban Limthong, Amphoe Nang Rong, Changwat Buri Ram for a case study. The village has successfully managed its water resource as a learning center and has passed on its experience of social learning to manage water resources and develop processes in order to establish a social network. This research will report on the

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complexity of local knowledge and how local people can use and adapt such knowledge through their learning experiences in order to improve standards of living, capability to identify problems, and how they manage water resources effectively. The real power of social learning in Ban Limthong is created by local wisdom and the links among community members; moreover, the community collaborates in water resource management with other communities, and the government sector, the private sector, and NGOs. It also passes along new ideas through local specialists and lures more participants and stakeholders to take part in water resource management.

Introduction

Most Northeastern Thailand (Isan) people work in the agricultural sector. This region has the lowest income in the country. Regarding community development in Isan, most of the villages are situated on highland with no irrigation ditches. Most of the villagers are rice farmers whose living relies mainly on uncontrollable natural factors. They are often in debt due to delays in rainfall and drought during the rice growing season. Unproductive cultivation forces some to borrow more and more, which leads to chronic debts.

Compared to other regions, Isan is deprived of water and its people's experience in dealing with drought has led them to find ways to store water for use during the dry season and to share with others in the same community. In Nakhon Ratchasima (Korat basin), for example, the people have learned to dig ditches around their community and, in some places, to create a system of waterways around their village.³ Cultural factors account for the attempts and the success of community development in Isan. The use of cultural mechanisms or local wisdom can solve many social and economic problems in the Isan area.

³ Seri Phongphit and Kevin Hewison, *Thai Village Life Culture and Translation in the Northeast* (Bangkok: Village Foundation, 1990) 6-16.

The objective of this research is to analyze the community's social learning process in achieving sustainability in water resource management by using Ban Limthong, Amphoe Nang Rong, Changwat Buri Ram as a case study.

Background of Ban Limthong

Based on the oral history of Ban Limthong, the first group of migrants chose to settle and cultivate where the soil was rich in nutrients and water. The place chosen as a new village site in 1925 was characterized by two elements: water resource and forest. Ban Limthong was once a rich source of large trees, with a wide variety of plant species. There was a huge clean swamp abundant in aquatic creatures and fish that provided the villagers with adequate supplies of fresh water all year round.

The first groups of people that moved to settle in Ban Nong Thonglim village were two Suay ethnic minorities in 1925, Toe Tongsa-ard and Hoe Sinsuparn, from Tambol Sangkhla in Changwat Surin, who came to the village in search of a plot to cultivate. Ban Limthong Community parted from Ban Nong Thonglim on 1 June 2004, and was given the new name "Ban Limthong", similar to their original hometown.⁴

Ban Limthong is comprised of 117 households, 230 males and 222 females. The major occupations are rice, fruit, and animal farming and manual labor. At present, Ban Limthong is under the Nongboade Administrative Office, Amphoe Nang Rong, Changwat Buri Ram, 69 kilometers northwest of the Buriram city limits. The village is bounded on the north by Ban Srakam, the south by Ban Kokeploung, the east by Ban Choomsang, and the west by Ban Nong Thonglim and Ban Thaithong, respectively. A vast plain of sandy soil dominates the landscape of the village.

Since the community is located close to Lammard and water resources, the forest in the area at the time of settlement was rich and teeming with life with wild animals, such as jaguars, common barking

⁴ Plan Kongboonchart, a former head of the village, Ban Limthong, personal interview, 6 April 2008.

deer, and many types of trees usually found in a mixed forest, such as Siamese *sals*, *ingvins*, and *eng*—common local plants. Several kinds of fish, such as river shark catfish, catfish, snakehead, grey feather back fish and flat head fish, were found in the waters. Houses were built around and close to the pond, although, in the past, the pond was wider and deeper than what it is at the present, taking the shape of a deep pan with a depth of 3 meters.

About forty years ago, the forest in this area took up a space of 2,500 rai (or 1,000,000 square meters). Around that time, the Agricultural Land Reform Office divided the land up for farmers to grow their crops. Villagers then believed that if they had left the land allocated to them as a forestry area, the plot would be confiscated and made a reserve. As a result, the forest was destroyed and trees turned into charcoal or used for building houses.

Over the past 20 years the forest has been completely destroyed, leaving the land dry. Villagers can now not find as many wild products as they used to in the past when the forest was still teeming with life and rich in natural resources and villagers are now encouraged to grow commercial crops. Without trees, the land cannot absorb nor retain water from the rain because of poor soil quality. With the villagers' habit of counting on just one rice crop a year during the rainy season, 200 rai worth of land (or 80,000 square metres) could only yield 2,000 litres of rice during the past 20 years of severe drought. Villagers' produce was not even sufficient for household consumption, neither was it enough for sale.

The village's way of life shows that their traditional production system is based entirely on a high level of self-sufficiency living. Water is the most important key to the village's traditional production system. The village has developed efficient schemes to protect and take care of their precious resources.

Community Water Resource Management

Ban Limthong has long had a series of problems caused by water scarcity in the area. The provincial nickname of Buriram Tam Nam Gin (roughly translated as 'local wisdom to get water from

mud') comes from this common problem in the area. The water supply is not enough for both household and for agricultural activities. The primary income is from seasonal rice growing which relies on rainfall only. The cessation of the rain in the cultivating season damages the yield every year. Since earnings from the yield are not enough to cover all the costs, villagers have started to accumulate debts.

Rapid and extensive socio-economic changes, regional prosperity, modernity and the first introduction of facilities, such as roads, electricity, water, and a wide range of technologies introduced to the village have had adverse effects on the casual way of life and rich culture of the villagers. They stopped helping one another in the fields, and started hiring supplementary laborers instead. Without knowing the impact of such changes, the people of Ban Limthong began to face a soaring debt problem.

Ban Limthong is a case study of villagers' cooperation with inside and outside networks in water resource. At the beginning of community water resource management, the community set up regular meetings to figure out how to solve the water supply problems for household consumption and agriculture. In 2005, they started to survey their area to find ways to solve the problems without requesting help from others.

The villagers realized water had been an important issue for many generations since this community has never had sufficient supplies. Community meetings were mostly about road construction and other development. Mrs. Sanit Tipnangrong, or Na Noi, a community leader, brought up the issue in a meeting about how to improve the way of life and how to build a canal for a water supply; this was an important step to lead to a right solution. People in Ban Limthong and nearby communities started working together, bringing their local knowledge together to find a solution for water shortages in the area.

Community Water Consumption

One of the water-related problems in Ban Limthong was water for household consumption, an ancient issue. A previous community water system was constructed by the Department of Mineral

Resources to pump groundwater up to a 25-meter-high tower and forward it to households. However, water supplies were not sufficient because the amount of groundwater was very little and the use of an electric pump was very costly. The water was not of good quality; it was cloudy and contained a lot of sediment.

With this previous community water system, two communities took turns using water. In Ban Nonthonglim, 80 households used the water from 6 am to 6 pm and 60 households in Ban Limthong used the water in the evening from 6 pm to 6 am. However, the pump did not last very long because of low maintenance and heavy use and the tower of the community water system did not meet the needs of the community.

From meetings throughout the year of 2005, the community started to solve their water issues by seeking a better community water system. The villagers suggested a visit to the Community Based Involvement in Rural Development (CBIRD) Center in Puthaisong, as a place to learn about the community water systems. CBIRD Center has helped many villagers to form their own water systems.

However, the prototype of the community water system in Puthaisong was not right for the situation in Ban Limthong because there was insufficient groundwater in the area. This issue was brought up in a meeting with Hydro and Agro Informatics Institute (HAIL) who were involved in the initial survey. A solution was that, since Ban Nong Thonglim Pond was an ancient water resource of the community and the pond has never been empty, it could be used as the main resource of the new water system. The new system was connected to the existing pipe to forward water to households.⁵

CBIRD Center provided suggestions in the construction and the Coca-Cola Foundation Thailand contributed financial support. In July, 2006, staff from CBIRD Center visited Ban Limthong to help plan the construction and the process was started on 28 July and completed on 14 August 2006 by over 100 villagers from the two communities. This

⁵ Sanit Thipnarong, a leader of Community Water Resource Management Committee, Ban Limthong, personal interview, 10 February 2008.

represented the success of collaboration, as well as formed the sense of ownership of the water system.

Since then, the system has been serving the two communities of 180 households. They changed from taking turns to use water, to having access to clean water 24 hours a day. Every household was responsible to pay for the utility: 6 baht per unit, which was used for system maintenance.

Community Agricultural Water

The first valuable lesson of the community water system strengthened the sense of ownership within the community, so they started to survey the area to find water for agriculture. The community set up a meeting to discuss the issue of water scarcity for agriculture. In October 2005, the plan was started when a first team started a survey of the ancient waterway as told to then by the elders of the community.

The young and their adult leaders used Global Positioning System (GPS) receivers to specify locations and compared the data with satellite images of Tambol Nongboade and applied the knowledge provided by HAI to their plans. The Klong Pak Pla was one possibility, but it was too far from Ban Limthong. It would require a large water pump to forward water supplies to Ban Limthong, which would be too costly. Another possibility was to forward water from the canal in Ban Saloa, but this could have led to a dispute between Ban Limthong and Ban Saloa.

The team reviewed the plans and consulted with others in the community. The news reached the Tambol Administrative Office (TAO), and the chief of TAO suggested the villagers to forward water supplies from Klong Palai to another location and connect to the ancient waterway. The Chumsang TAO was going to renovate the river banks and put in a pipe to forward water to Klong Pak Pla Karp and water would be out into Klong Ban Saloa. With several surveys and meetings, a first plan was concluded, including each idea and making sure that they all shared the same understanding of the plan. The community shared their ideas in meetings and worked together

toward the plan from ideas, to letters, to images, to actions; sharing was a key to successful management.

However, the villagers struggled to integrate data they received from the survey into the plans, thus, a fourth survey involving HAIL was implemented to resolve the questions they had with the data. The villagers of Ban Limthong showed HAIL their plans, maps, drawing, and IKONOS satellite images and explained how they combined their field data with the knowledge in Information Communication Technology (ICT) provided by HAIL. HAIL helped the villagers realize strategies they could apply to start water resource management. The villagers surveyed the area again and they learned how the area of Ban Limthong was different from other communities with sufficient water supplies.

The villagers started asking themselves these questions: where was the water, how to reach the resource, how to manage the supplies, how to connect the water ways, how much water could they gain, how long would the supplies last, and how were the others impacted by these methods. They were in the process of learning how to find water, how to reserve it for the future use, and how to use the supplies appropriately. Since they realized what they were looking for, they should find a right answer in an effective way.⁶

Community Water Resource Management Plan

A water committee board was formed to follow up on the water resource management plans. Through several meetings on Analysis of Solutions to Community Water Scarcity Problems, the data of water demand and solutions was reviewed. The final report made the following conclusions:

1. Add more water retentions, called Monkey Cheeks, following the King's initiatives;
2. Construct a canal to forward water from Lammard to the community, a distance of 3.637 kilometers;

⁶ *The Learning of Ban Limthong Water Resource Management*, Hydro and Agro Informatics Institute, (Bangkok: Hydro and Agro Informatics Institute, 2007) 22-34.

3. Renovate water passages in the area; and
4. Form a cooperative for community water resource management.

The report was submitted to the Royal Irrigation Department (RID), Changwat Korat, on 13 July 2006. The director of the irrigation office accepted the report for consideration, as well, he provided good advice regarding the plan. The RID forwarded the plan to Nongboade Administrative Office to survey the water path to Ban Limthong. On 23-24 August 2006, construction staff from the RID surveyed the area along with the water committees of Ban Limthong. Villagers who owned the land in the way of the canal construction granted permission to use their lands for the new water passage.

Although the construction plan had to remain on hold until the next budget year, the hope was still high. The villagers kept following up on the process and sought new knowledge about community water resource management by visiting sites with successful water resource management. On 10 June 2007, the construction began and a canal 3.637 kilometers long and 3 meters deep, with a budget of 1.96 million baht, was built, which brought Ban Limthong Community and other surrounding communities advantages, including water to 3,800 rai of cultivated areas and 1,038 households in 3 tambols or 11 villages.

The canal was finished in the cultivated season, providing a water supply of 121,000 cubic meters. The supply from the canal was very helpful for the community because they could grow vegetables in the dry season to earn more income. In the rainy season, the canal was used as water retention to collect excessive water, preventing the cultivated areas from flooding, with the excess water kept as a supply for use in the future. In addition, the canal served not only one group of people, but was expanded to those who lived far from the canal.

The water committee planned to establish a community water system by increasing water storage linked to one another in a network called Monkey Cheek Ponds (water retention initiated by His Majesty King Bhumibol Adulyadej) and Small Monkey Cheek Ponds (farm ponds). In March 2007, the Development Cooperation Foundation

introduced two local intellectuals on farm ponds and New Theory Agriculture (agricultural process initiated by His Majesty King Bhumibol Adulyadej) to the Ban Limthong leaders. The first intellectual was Mr. Thongkum Yimrum, a village chief of Ban Non Kwang in Buriram Province, and a second one was Mr. Jantee Prathoomma from Ban Non Rang in Nakhorn Ratchasima Province. The two intellectuals were invited to Ban Limthong to share their experience and local wisdom on how to manage water supplies and plan cultivation to fit the available water supplies throughout the year. In the meeting they discussed finding a conclusion adapted to fit conditions in Ban Limthong. The plan was to add more Mother Monkey Cheek Ponds and Small Monkey Cheek Ponds connected to the canal, with villagers contributing their lands to be dredged up for the water storage and areas around the storage for agriculture. Monkey Cheek Ponds stored water from the canal and forwarded the water through small water passages to farm ponds in the cultivated areas to serve the community as a whole. The areas around the canal, the Monkey Cheek Ponds, and farm ponds were used as pilot plots of the New Theory Agriculture and Vetiver Grass. The grass would be planted on the river banks to prevent erosion and moisture evaporation, with approximately 500,000 bunches of Vetiver Grass planned to be planted.

Before the Monkey Cheek Ponds were dredged, the villagers went out to survey the areas again on 28 March 2007. The villagers used IKONOS satellite images and GPS receivers to find the right positions for the Monkey Cheek Ponds. A conclusion was to dredge up seven Monkey Cheek Ponds covering an area of fourteen rai with the capacity of 65,700 cubic meters. The plan was brought up in the community meeting and the objectives of the Monkey Cheek Ponds were summed up as follows:

1. To store water for cultivation during the periods of water scarcity;
2. To promote land and water resource management in a sustainable way with the New Theory Agriculture in order

- to be able to farm all year long, make more income, and have a better standard of living; and
3. To promote planning and water resource management at the community level.

Seven land owners signed an agreement to contribute their lands for public use. The land owners would be the group leaders of the ponds on their land and they included five members in each group. The group worked as a team to do agriculture planning, collect data about productivity, share experiences, and make a deal for their products. After the team got the work done, they then shared their experience with other teams, thus strengthening the community learning and development following Self-Sufficiency Economy (His Majesty King Bhumibol Adulyadej's initiative).

The water committee and seven leaders of the Monkey Cheek Ponds created the structure of the Monkey Cheek Ponds and Small Monkey Cheek Ponds and submitted the ideas to their network agencies. The Coca-Cola Foundation Thailand supported the community water resource management by sponsoring the community water system for household consumption in the first phase of Community Water Resource Management and the Monkey Cheek Network for agriculture in the second phase.

The Monkey Cheek Ponds Network helped the community help themselves. Ban Limthong applied local wisdom and IT skills to solve their problems and this could be a prototype of effective water resource management at the community level, a foundation of the national community water resource.⁷

The Monkey Cheek Ponds System management was as follows:

1. Release water from the upper area along the new canal leading to Ban Limthong. The canal was connected to 7 Mother Monkey Cheek Ponds, covering 14 rai, 3 meters deep, with a capacity of 67,000 cubic meters; the total capacity of 188,000 cubic meters;

⁷ Sanit Thipnarong, 10 May 2008.

2. If the water level in Lammard is lower than the new canal to Ban Limthong, the water will release from the new canal by gravity flow;
3. Pump water from the Monkey Cheek Ponds to release water to relieve flood problems;
4. If the water level in Lammard is higher than the new canal, the water gate will be shut to keep the one-way flow; and
5. The Monkey Cheek System works as an irrigation system to store water and prevent flooding. The capacity of 188,000 cubic meters serves the community in agriculture.

The Monkey Cheek Ponds consist of 4,800 cubic meters capacity in each pond, 40 meters wide, 40 meter long, and 3 meters deep. The earth embankment is 10 meters wide and 1.5 meters high. Total area is 3,600 cubic meters or 2.25 rai.

Their initial plan and first success was the community water system with the cooperation of the Hydro and Agro Informatics Institute, the Coca-Cola Foundation and the Population and Development Association. Ban Limthong Community had faced the problem of a scarcity of clean fresh water for a long time. The problem was solved with the Tank Farm system made up of tanks, water treatment, and piping. People in those communities have access to clean water 24 hours a day. This community water system has been able to serve people not only in the area of Ban Limthong Community, but also its neighborhood. The earnings from this water system are enough to maintain the system, plus extra to support other community activities. The community water system has served 160 households, and the success of the watercourse improvement covers three sub-districts, five communities, and 1,038 households.

For the second plan, the community water committee used GPS and Satellite Image Maps to collect data on sub and main canals, agricultural areas, and farm ponds in order to set a better plan for water allocation and increase the number of water storage areas by linking different canals into a systematic pattern. The community has also gathered other data, such as living areas, community forests, and groundwater ponds, to put on the community website.

The outcome from the application of technology is a map of watercourses in the area on the community website, which is good for water management and agricultural activities. People have also used the map and have come up with a clear plan of water resources in the area. The plan was submitted to the Local Royal Irrigation Department asking for collaboration in improving the watercourses and was subsequently granted.⁸

Later, the community water committee came up with a plan to improve canals and watercourses in the area and submitted it to the local irrigation office. The local irrigation office then explored the area and included the plan in their annual budget for 2007. Moreover, there was further development of water storage, Monkey Cheek Ponds in Tambol Nongbode, Changwat Buriram. The Monkey Cheek Ponds construction received full collaboration from community leaders and people in the area. Besides the Monkey Cheek Ponds, there is a plan to grow Vetiver Grass and shading plants on riverbanks for holding soil moisture, preventing landslides, and lessening moisture evaporation.

The Development Cooperation Foundation supported the community to dredge up their farm ponds connected to the Monkey Cheek Ponds. The foundation set up a fund of 500,000 baht called "Water and Hearts for the King". Recipients of the funds had to follow the regulations and pay back the money so it could be lent to other households to dredge up more ponds. The fund would help the community to develop water resources and people were eligible to share their ideas and wisdom on water resource management to receive the money. The fund "Water and Hearts for the King", called "Truthful Saving Fund" by the villagers of Ban Limthong Community, supervised the selected committees to form the regulations for money saving, interest rates, and loan payments. The plan was to dredge up 10 ponds a year, 20,000 baht for each pond, 4-year loan for 1 participant, 7,800 baht per year or 650 baht a month, and more details such as the following:

⁸ Paveena Thipnarong, 11 May 2008.

1. The membership fee is 50 baht per person;
2. The participants were required to attend training or study visits to learn about farm ponds and their advantages as well as the New Theory Agriculture;
3. Loans were for farm pond construction or other related issues covering the objectives of the proposed plan only;
4. Loans for agricultural purposes with a low interest rate were available to reach the potential of farm ponds and incomes; and
5. The benefits from the fund would be used only to support the members of the fund, other public interests, and the learning of the New Theory Agriculture.

When a participant is approved for a loan and becomes a member of the fund, other members will coach the newcomer on how to improve cultivation with farm ponds for at least six months. The member starts paying back the loan in the seventh month. The fund will have 20,000 baht of interest annually. This benefit will be used to arrange for training for at least 10-15 members a year. The committees of the Truthful Saving Fund look after the fund and report to The Development Cooperation Foundation every year.

The first ten farm ponds were finished in June 2007. The members were eager to follow the King's initiative in the New Theory Agriculture. They started to grow vegetables such as bananas, coconut, morning glory, straw mushrooms, Chinese pears, onions, galangal, lemongrass, string beans, chilies, limes, and pumpkins.

Analysis of Community Water Resource Management

The community successfully manages its water resource as a learning center and has passed on its experience of how to manage water resources and develop processes in order to establish a social network. The community collaborates in water resource management with other communities, the government sector, the private sector, and NGOs. It also passes along new ideas through local specialists and

lures more participants and stakeholders to take part in water resource management.

Adaptation is a continuous process and villagers have to make an effort to analyze their situation in order to make appropriate decisions. Modern society tends to disaggregate community life and individualism prevails and the fact that villagers have worked together as much as possible can be seen as an effort at adaptation to this new situation. They realize they must organize themselves if they are to live with the wisdom of their ancestors. In terms of community development, villagers can find new approaches to learning and thinking which leads to the development of wisdom valuable for solving social and economic problems, making plans, and enhancing the establishment of sustainable community development.

Cooperation and cultural adaptation among people in a community is the key factor or major force in assisting individuals and communities to meet their ultimate goals and to create a sense of full responsibility for the care, development and solution of problems. The identity and unity of people leads to better understanding and learning. The villagers can help each other to find new approaches to learning and cultural adaptation, thus leading to the development of wisdom valuable for solving problems, making plans or new inventions, and enhancing the development of a strong community at last.

The results of community water resource management through social learning are the following:

1. Transform an abstract plan into reality.
2. Show the realistic indications, which in turn lead to the analysis of problems and finding solutions.
3. Enhance effective decision-making and suitable career planning and apply to the natural resources available.
4. Modify and apply the gathered useful information, the acquired knowledge, and experiences derived from the learning to making a living.

Ban Limthong community has shown the capability to identify problems, locate water resources, and use them efficiently.

Community members maintain a network in order to provide members with access to water resources. In this case, the amount of agricultural produce has increased substantially with a significant impact on social development, such as income growth, better standards of living, and sustainability of water reserves. Social management has an impact on management philosophy, degree of sharing, and the process of developing sustainable community water resource management.

Conclusion

In Isan, most of the areas suffer from drought and lack of water for agriculture. However, certain lower Isan villages have solved their problems with drought since they have learned how to manage agricultural water resource and water consumption. This research focused on studying Ban Limthong, particularly their practical solutions and their social learning process for water resource management that affects the overall situation in terms of sustainable development.

The results for this research are as follows:

1. The greater the collaboration, social learning, and local wisdom, the more sustainable it will be in managing community water resources;
2. The greater the sense of belonging to the community, the more sustainable it will be in managing community water resource; and
3. The more support from the government, private sector, and NGOs, the more sustainable it will be in managing community water resources.

The remarkable success of Ban Limthong's learning from 1988 to 2008 owed much to community support, financial, intellectual and technical assistance given by the allied partners, as well as collaborative efforts of young adults and the concerned Limthong villagers, all of whom promoted learning in community.

To understand how some communities can build a sustainable water resource management program while many cannot do the same, we must be clear on the varieties of paradigms that provide more affluent views of the phenomenon, and then use these findings as a lesson learnt which can be applied to other drought areas with the same conditions throughout the regions.

Such findings have confirmed that the success of community development here is influenced by local wisdom and social learning factors which include preservation, adaptation, renewal, and innovation. Thus, each case has its own unique style of community water resource management.

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