Local Administration Journal 14(3) • July – September 2021 • 233-249

Received: July 13, 2021 • Revised: September 5, 2021 • Accepted: September 20, 2021
RESEARCH ARTICLE

Understanding Social Capital Context in Water Resource Management: A Case Study of Nakhon Pa Mak Subdistrict, Bang Krathum District, Phitsanulok Province

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Abstract

This research examines the social capital context of water resource management in Nakhon Pa Mak Subdistrict, Bang Krathum District, Phitsanulok Province. It is a qualitative study that includes the examination of relevant documents as well as focus group discussions. It was found that, because of their community's social capital, the Subdistrict was able to collaborate in water resource management. Traditional and cultural activities in the Subdistrict contribute to the dimension of trust. These events brought the members of the Subdistrict together and fostered trust and togetherness. The community leaders and the Subdistrict Administrative Organization played a significant role in connecting people and developing trust among community members via consultation, resulting in mutual understanding and cooperation. In terms of social norms, most community members share the vision and understanding of the seriousness of the water resource crisis, and it has become a norm to make sacrifices in the best interests of the public. They worked together to uphold the community's guideline of sharing water resources. There is a tangible network in the community, such as the water resource management committee, which is an essential instrument in water resource management in the dimension of a coordination network. Furthermore, external networks were established as a support mechanism to stimulate the advancement of water resource management in the Subdistrict. To promote successful and effective water management at a community level, concrete consensus of social capital in the community should be encouraged.

Keywords

social capital, water resource management, community management

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Introduction

Thailand faces water resource management challenges due to regular floods and droughts. Although there are many major and minor irrigation systems, they are still insufficient in comparison to the water usage requirement, and many rural areas are still outside the irrigated areas. Water supplies are scarce in such areas despite efforts to prepare water reserves, diversion, and the use of subsurface water as the world faces climate change. Despite the rainy season, the amount of rainfall sometimes declines while the length of the drought period rises. The rainfall sometimes exceeds the reservoir capacity. Presently, Thailand's need for water is increasing, particularly in the agricultural and industrial sectors (Prime Minister's Delivery Unit, 2021). The country's water resource management system is thus a key tool for preventing damage in the national economy from the national to the local levels. It is especially crucial in areas prone to flooding and drought. Thailand has significant water supplies, but it has yet to figure out how to store or use it properly. As a result, the nation frequently experiences both drought and flooding. These issues might be avoided with better water resource management, planning, data collection, and analysis.

According to the water resource management master plan covering the years 2018-2037, community water resource management is included as a component of sustainable water resource management. The plan describes the community water resource management strategy that is suited for socioeconomic and environmental development. Furthermore, the plan addresses effective river basin management governance, water allocation systems and mechanisms, the creation of an appropriate form of water resource management system, and the formulation of a plan based on the priority of each region. (Office of the National Water Resources, 2018)

Meanwhile, a key cultural asset in Thailand is the trust-based unity in resource allocation among community members. This is the social capital that enables community members to reap several economic rewards. Community members may form a savings club to serve as a shared resource and then work together to manage community resources such as water, forests, and public property that can be used by alternative farming groups (Treevanchai, 2003). The more diverse the connections between these groups or networks and other external groups, the greater the expansion of their social capital.

Nakhon Pa Mak Subdistrict in Bang Krathum District, is about 50 kilometers from the Phitsanulok downtown area, in the lower north sub-region of Thailand. In 2016, the population of the Subdistrict was 6,492. The total Subdistrict area is 36,637 rai, or approximately 58 square kilometers. Nakhon Pa Mak is predominantly agricultural, with an agricultural area of 31,000 rai. Water resource management is necessary in the Nakhon Pa Mak Subdistrict, where farmers make up the majority of the population and water is one of the most crucial resources for agriculture.

The Subdistrict is located outside of irrigated areas and relies primarily on rainwater and canals. Bang Krathum District has seen recurrent droughts and floods. Water from the Wang Thong River, Grong Greng Yai Canal, and Grong Greng Lek Canal flow through Nakhon Pa Mak Subdistrict (*Tambon*) and the water levels rise during the rainy season in several of the rural communities. Despite this, there is not enough water for farming during the dry season as the existing structure for storing and draining water could not be used because there was no maintenance of the water reserve system to ensure efficient performance. The structure of water resources was ignored and canals and marshes were left un-dredged. The upkeep of the water resources management system was delegated to local government agencies. The budget was sometimes insufficient for equipment maintenance combined with a lack of preventive maintenance of structures for storing and draining water. In addition, there was no water resources management plan.

As a result, the problem festered and was exposed, especially in 2011, when severe flooding devastated over 80% of Tambon Nakhon Pa Mak, most of which were agricultural areas such as rice fields, banana orchards, and sugar cane fields. The ensuing famine heightened the awareness of the villagers of the importance of local water resource management. Thus, they initiated the idea of creating a survival space and dependence on vegetables as the primary food source during a crisis. They also became aware of the concept that, to reduce damage to households and property, there would need to be specific areas for a floodway, a map of evacuation routes, the location of temporary sanctuaries, and early warning systems to alert the community about the potential for a flash flood. In 2012, the Japan International Cooperation Agency (JICA) funded a survey of the area in and around Nakhon Pa Mak to learn how people were interacting with water resources and coping during periods of flooding. In 2013, the Utokapat Foundation (under Royal Patronage of H.M. the King) also surveyed the facilities related to water resources and provided suggestions in water management.

In the years since, Tambon Nakhon Pa Mak continued to face a shortage of water for agricultural operations due to its geographical location in which the terrain is prone to flooding and drought. Nonetheless, the community members finally decided to band together to confront the challenge of water resource management to create sustainable well-being. As a first step, the community agreed to cooperate with an outside analysis of social capital in the process of community coordination in Nakhon Pa Mak as a foundation for building upon the existing assets of the community to become stronger and self-sufficient in the long run. The findings of this case study can serve as a model for other participatory cooperation efforts by local community administrations going forward.

Research Objective

The objective of this research was to study and analyze the role of social capital in water resource management of Nakhon Pa Mak Community, Bang Krathum District, Phitsanulok province and propose a set of policy recommendations for future water resource management.

Literature Review

Water Resource Management

Water resource management in a community is a cooperative effort between support agencies and the host community. It is an attempt by the community to identify the issues within their local water system and assess the limitations of community management. This information is then used to identify possible solutions. Some fundamental principles of community water resource management are: 1) Communities own the process of change; 2) Facilitators and local researchers participate in the community endeavor; 3) Increased management capacities are the basis for an improved water system; and 4) Each community develops its own specific management systems (Lammerink et al., 1999). The goal of community water resource management is to improve community administrative capacity and provide a chance for the community to discuss and reflect on its own ability to self-organize. Traditionally, each community has its own distinct water resource management system based on its geographical surroundings and way of living. Furthermore, a variety of other factors may influence the success of water resource management in any given location. In many situations, critical elements may be missed. These elements include societal considerations, the obligation of government officers, and the engagement of stakeholders at all levels (Distanonta et al., 2017).

According to the Hydro-Informatics Institute (Public Organization) (2017), community water resource management should aim to develop a community's capacity to manage its own water resources using science, technology, and an ICT system as a mechanism for management and solving water problems in the locality. This approach encompasses the management of water resources, production, and community revenue. As a result, the community must comprehend the challenge and begin collecting data about their region. That information will be used in the analysis and the development of solutions, then develop communal water resources in accordance with their findings. During this process, community members would participate in the development, restoration, and management of water resources until they could become a model community. Subsequently, the results could be extended to the broader network of water resources management where knowledge can be exchanged and applied in other areas.

It is obvious that communal water resource management is a type of administration in which residents are the stakeholders and leaders of the quest for solutions to water-related problems in the community. This involves connecting with networks, sources of expertise, and associated water management technology, but ensuring a community-led process since the residents are usually more knowledgeable about the challenges and community context than outsiders.

Concept of Social Capital

Social capital is a form of essential capital that has accumulated over time, directly contributes to the well-being of members at the community level, and spurs growth of the nation's economy and security at the macro level. Social capital helps to maintain the effectiveness of the economic sector's service and production processes, alleviates the severity of the socio-economic crises, and addresses issues that transcend the limits of natural resources and economic capital. The restoration of a community to pre-crisis levels necessitates social capital (Intria, 2017).

Social capital is defined in various ways. In the context of this study, social capital is considered as a concept that explains the social interaction, social involvement, social trust, civil norms, social networks, social support, community participation, and democratic governance of the target area. There are two levels of benefit to be derived from social capital: Individual and community or group levels. At the individual level, the concern is how people use the available social capital. For example, a person may use an existing social network to gain access to resources that would help them achieve their goals. As a result, social capital, like human capital, benefits the individual as an investment which is expected to yield something tangible in return. (Lin, 2000)

According to Putnam (1993), the components of social capital include trust, norms, and networks that can increase societal efficiency through mutual support and coordination. Putnam went on to describe how social capital arises when individuals of a community share the same belief system and values. As a result, social capital in the form of a network could achieve the following: 1) Increase the capacity and lower the cost of work better rather than working individually; 2) Initiate customs about mutual dependency or reciprocation that empower and strengthen the local organization; 3) Build trust among network members to ensure fast communication and information systems; and 4) Leverage past success for future success.

At the community or group level, there are various forms of social capital in the Thai rural setting. This includes social capital in the household, community, and external environment such as institutions and organizations. Social capital leads to a social network of mutual support, increased trust, and coordination in local development. External social capital is the mechanism that encourages the participation of people and the local administrative organization, ensures

expression of opinion that reflects the needs of the community and enhances coordination, unity, brainstorming, and mutual decision-making based on trust and shared local development goals (Wongsiri, 2018).

Social capital originates from interaction and coordinating activities. The more social capital, the more benefits there are in terms of learning, awareness, and transmission of information, resulting in some value that is created through mutual acceptance, which could be spent in the development of society and community. This study applied the concept of social capital according to Putnam's definition of trust, norms, and networks as the framework for analysis.

Methodology

This research is a mixed-method research study that focuses on the use of social capital in the context of water resource management in Nakhon Pa Mak Subdistrict, Bang Krathum District, Phitsanulok Province. The researchers began with documentary research, which led to the development of a conceptual framework. The author reviewed concepts, theories, research reports, provincial strategies, community water resource management strategies, academic articles, and related documents in the field of water resource management. The author also collected primary data from local key informants.

Next, quantitative data were collected using a structured questionnaire which can be divided in three parts. Part One asks about general information related to water resource management of Nakhon Pa Mak Subdistrict, the general situation of the social capital of the community, background, problems, and the existing form of community water resource management. Part Two explores social capital such as local resources, traditions, culture, norms, trust, social networks, and social relationships. Part Three solicits issues, recommendations, and development guidelines for water resource management. The protocol for the research was approved by the Research Ethics Committee of Srinakharinwirot University, with clearance number SWUEC-497/2563E.

Following the literature review and personal interviews, a focus group discussion was organized with a sub-group of key informants. The focus group discussion was conducted on April 7, 2021, at Nakhon Pa Mak Subdistrict Administrative Organization (SAO). Participants in the focus group discussion were selected with the purposive sampling approach. Twelve persons were selected from various sectors as key informants in water resource management. The informants included local stakeholders such as representatives from the SAO, villager leaders, and community representatives who were knowledgeable about the research objectives and could provide relevant response. The author also conducted an in-depth interview with the village leader to gain supplementary information.

Data analysis involved documentary analysis and content analysis by studying the content themes and synthesizing the results with the quantitative data. Content was structured to depict the relationship of social capital and water resource management in order to arrive at lessons learned.

Results

Background

The Nakhon Pa Mak Subdistrict was aware of communal water resource management. The Subdistrict dug a floodway to ensure maximum efficiency in reducing flooding of its agricultural area. The Subdistrict used a two-pronged strategy of collecting rainwater and harnessing the water from seasonal flooding. Instead of letting water flow through the area, the Subdistrict dug a reservoir to store flood water for use during the dry season. At the same time, the Subdistrict used information and communications technology (ICT) such as GPS to precisely define the problematic floodways. They produced a flood map for 2006 and 2011 with overlays onto land-use and contour maps to help devise solutions for flood and draught problems in a more systematic way (ThaNakhon Thongpraphai, personal communication, April 7, 2021). During a recent water crisis, the Nakhon Pa Mak Subdistrict demonstrated its improved ability in crisis management by implementing its flood preparedness plan which mitigated the impact. As a result of the early warning system and evacuation map, the Subdistrict is better prepared for a natural disaster. Furthermore, water resources are increasingly managed to reduce the risk of flooding and drought. According to the focus group discussion, villagers believed that Nakhon Pa Mak could manage the water crisis better than those neighboring communities that are less prepared.

As mentioned above, Nakhon Pa Mak could coordinate its communal water resource management and, therefore, represents an interesting case study which could be analyzed according to the concept of social capital. Firstly, external actors emerged because of overlapping coordination between external organizations and the recruitment of a support network by Nakhon Pa Mak itself. Usually, in a top-down scenario, national-level agencies responsible for supporting Thailand's water management will survey the country's major river basins and enlist the support of communities with the potential to be models of communal water resource management. By contrast, Nakhon Pa Mak mobilized its own coordination mechanisms for flood control from the ground up. This initiative started with the Subdistrict's readiness and capacity for water resource management. Then, to improve the efficiency of its water management system, the Subdistrict enlisted the support of national-level agencies and external organizations to provide technology and budget for the community plan.

The Dimension of Trust

As an initial step, community leaders and the Nakhon Pa Mak SAO played a critical role in connecting people, developing trust among community members, and generating understanding and cooperation in water resource management. The community leaders and SAO could be relied on to request funds from the central Department of Water Resources as well as provincial and district agencies involved in water resource management.

The Nakhon Pa Mak's water resource management team knew that they could not neglect culture and customs, which are a foundation of community trust. An important ceremony in some communities is a candle-bearing procession to mark the beginning of Buddhist lent. Wat Sam Reun Buddhist monastery in Village #1 1 is an important location in Nakhon Pa Mak Subdistrict because it is the focus of traditional activities such as the water-pouring ceremony to seek a blessing from revered elders during the annual Thai Songkran festival. This event is perhaps the most sacred for the Thai people and is attended by community leaders and venerable elders. Wat Sam Reun Monastery is also the site for a unique ceremony which involves lobbing packets of coins wrapped in kaffir lime leaves as a show of reverence for Phra Kru Rangsee Dharm Prapote, or Luang Por Rang, a famed Buddhist abbot of Phitsanulok Province. This ceremony is held every year on January 29th, and it is the only one of its kind in Thailand. The monks collect the packets to receive the donations and replace the coins with a piece of paper with a random number inside the kaffir lime leaf packet. Worshippers can then draw for a packet and exchange the number for a token of appreciation. Another popular tradition promotes community solidarity and trust, and which is also directly related to communal water resource management is the annual Loi Krathong festival. In November of each year, people would gather to seek forgiveness for past misdeeds from the river spirits.

There is also the "Khlong Pattana" (canal development) activity, which is the continuous development of smaller canals within the Subdistrict. This event is traditionally held in May, which is the beginning of the rainy season. The Nakhon Pa Mak villagers inspect each canal and reservoir to ensure that there are no obstructions in the floodway and to ensure that water can flow through easily. There is also a boat racing tradition in Grong Greng Canal. This festival is related to water management since it requires clearing out the water hyacinth that grows prodigiously and can clog canals or even small rivers. Therefore, this event also serves the function of maintenance of water resources, as epitomized by the community leader's statement:

> "We must observe the condition of water before using it as part of the blessed event. We must also maintain the water level during the Loi Krathong festival in order to facilitate the floating of candle-lit containers."

In the focus group discussion, a local official stated that one obstacle to communal water resource management is local politics. There is also the truism that communities can achieve more success by collective action than when they follow their selfish interests and act individually. However, the perennial problem is the "tragedy of the commons," coined by the British economist William Forster LLoid, in which a few people in a community overconsume a shared resource to gain a "free ride" to the extent that everyone suffers when the resource is depleted. The classical solution to this problem has been the formation of a state with the authority to control selfish interests so that everyone will be better off despite the limit to individual self-interest (Siamwalla, 1999). However, the focus group participants all agreed that Nakhon Pa Mak Subdistrict is unique in terms of trust among the community members and that members often exchange ideas and discuss of how to solve problems collectively.

In sum, tradition and culture is essential in water resource management as it helps maintains community solidarity and trust, which are the backbone of collective action for the common good. If done properly, all members of the community will feel as if they are part of an extended family. In addition, the community leader has a key role as an organizer of discussion for community members who want to solve problems together while engaging in a vigorous exchange of views. As a result, there is trust among the community members which carries over to overcoming other challenges which the community may face.

The Dimension of Norms

Regarding social norms, Nakhon Pa Mak Subdistrict has an agreement about water usage which is generally accepted in Villages 6, 7, and 13. For example, there are total of 11 gauges allocated to all localities for measuring water level and track trends in the water situation. This information is then used to create real-time maps of the areas with flood risk. One agreement is that if the water level falls below 1.5 m., all three of the above villages will strictly control water use in the dry season. This is because these three villages are located in the upstream basin of the Khlong Grong Greng Yai canal, which is the main waterway of the greater Nakhon Pa Mak Subdistrict, and their water resources are more abundant than those in the downstream villages. As a result, sacrifice and acceptance of norms are required to limit water usage in the upstream region to ensure that water is available for other villages during periods of drought. Meanwhile, other villages have adopted the water usage standard as agreed upon by the local Water Resource Management Committee.

Other norms in Nakhon Pa Mak include the permission for a second round of in-season rice and off-season rice. Community members must understand the rules of water usage and prioritize conservation of environment and biodiversity within the shared reservoir. Furthermore, communal water usage is monitored, and water-saving rules are enforced. If any structure blocks the waterway or interferes with the flow of water, the Water Management Committee may issue

a warning and hold a discussion to find a solution under the authority of the SAO. However, it should be noted that norm enforcement in Pa Mak Subdistrict is not exactly the exercise of power by the community authority, but rather a request for coordination, with some informal sanctions applied. For example, an individual's refusal to comply with community public norms could be discussed by the Committee, but there are usually no serious consequences since persuasion and majority consensus is considered to be a more durable approach. According to the participants in the focus group discussion, the local villagers appear to cooperate well in following the rules and in notifying local agencies or community leaders when a problem arises.

Moreover, most community members share a common vision in solving problems about communal water. As the members of the focus group discussion agreed:

> "There must be both water and roads in order to enhance the well-being of rural people. While other areas might choose economic progress through expanded road and transportation, the Nakhon Pa Mak Tambon focuses on local water resource management as the path to prosperity."

Regarding the maintenance of canals and water resources, villagers in Nakhon Pa Mak have been persuaded to contribute their land as the part of the canal. That approach is more effective than trying to establish a law (by eminent domain) to appropriate land for the canal without the willingness of the landowner. A representative from the SAO expressed the following:

> " For example, when a canal which is 45 meters wide must include 10 meters of land from an adjacent rice farm, we could request usage of the land from the farm owner the for the good of the entire community. When we dig the canal to get the soil to fill the road for transportation of people or agricultural produce, we could also request private land as needed. In other Subdistricts, sometimes the villagers want the canals and roads, but are not willing to donate part of their land to achieve that. So, the development process goes nowhere. However, in the case of Nakhon Pa Mak, when the SAO needs to use part of famers' land to widen the road so that it is two-lane, we receive excellent cooperation from the landowners. Without their contribution of land, we could not do it."

It is obvious that the community that manages water well must also have good social relationships, unity of purpose, and shared community norms. This was the consensus from the focus group discussion where all participants deemed that without such cooperation or without the respected norms based on mutual agreement, collective water resource management would

not be possible. Therefore, cooperation, readiness to provide support, and community policy are the essential factors that drive the success of communal water resource management.

The Dimension of Networks

A network is an element of social capital that can increase success for both the individual and the community. Good relationships can help a community to connect and coordinate while efficiently mobilizing resources from each organization for mutual benefit.

Information from the focus group discussion revealed that solving community problems of flood and drought led to the actual coordination network, which is embodied in the Nakhon Pa Mak Water Resource Management Committee. Currently the group is registered as "Nakhon Pa Mak Tambon Enterprise of Water Users for Agricultural Activities," which is a network comprised of the chief executive of the SAO, the village headmen, and villagers from Villages 1 to 13. The Committee members have rules about their responsibilities, such as the maintenance of water resources, canals, streams, and reservoirs within Nakhon Pa Mak Subdistrict. In particular, the Committee is responsible for water resource management to mitigate flood and drought in the Subdistrict. The Committee must also monitor the water level in 11 communities where the gauges were installed to prepare for a possible flood situation, monitor water usage for agricultural activities, and track consumption. Finally, the Committee must maintain the quality of communal water and environment, which is essential for the further development of water resources.

Initially, the Nakhon Pa Mak Communal Water Resource Management Network arose from a gathering of SAO leaders, community leaders, and villagers in the form of an informal water resource management group. Mr. ThaNakhon Thongpraphai was the local key actor who encouraged the group to establish a water resource management network, which later evolved into the formal local *Water Resource Management Committee.* Following that, they registered as a community enterprise of agricultural water users in Nakhon Pa Mak. The community enterprise committee is made up of seven members who were chosen from among the elected representatives of the villages in Nakhon Pa Mak. The Nakhon Pa Mak Subdistrict Water Resource Network meets the 6th of every month in order to discuss water resource management and current problems. Leaders of each village are well-informed about their local situation. For example, they know the months when water will be scarce or which location should be developed as reservoir in dry season. This meeting is therefore a forum to present opinions and solutions to potential and actual problems.

The strength of Nakhon Pa Mak Subdistrict Administration stems from its community members. However, the network is not completely self-sufficient. Thus, the network has links with external factors such as the Bang Krathum District office, which provides support along with other SAO and provincial level entities. For example, the Phitsanulok Provincial Administrative

Organization (PAO) takes care of the annual marking of territory. The headquarters of the 3rd Division of the Thai Army (which is responsible for the northern region) is in Phitsanulok City, and the Division mobilizes labor for digging, dredging, and maintenance of water resources within Pa Mak Subdistrict.

Nevertheless, Bang Krathum District still lacks water development plans for specific areas, even though there is an overall plan for the district. Therefore, the networking requires the SAO and village headmen to authorize the opening of floodways and the mitigation of flood or drought problems, as well as the enumeration of disaster victims to forward the information to the district and provincial agencies.

Moreover, the network with external actors in other regions is expanding as other regions observe the progress of Nakhon Pa Mak in developing strategic water resource management. The Subdistrict contains the flood basin where water is collected prior to flowing into the Naan River. It is also having the lowest terrain in Bang Krathum district, which is the main reason the Utokapat Foundation decided to provide support for Nakhon Pa Mak water resource management. In addition, the network trains the local communities to grow plants which require small amounts of water to support the water usage plan. The network mentors' local youth to ensure they understand and adopt the values of water resource management and respect the natural water resources. Furthermore, JICA helped promote mobile agricultural areas so that villagers could have a sanctuary when natural disaster strikes.

It is evident that networks emerge according to the dimension of the operating area and the problem issues. Networks that focus on communal water resource management emerged within the Subdistrict and expanded towards connecting with external networks such as the provincial- and national-level networks. As a result, Nakhon Pa Mak Subdistrict has become more well-known through coordination with various networks, and this helps them to mobilize external support for water resource management and other development challenges.

Discussion

Because of climate change and global warming, the level of rainfall is fluctuating more wildly and presents a national risk in water resource usage. Other factors were found to affect water resource management, such as natural disasters or human action such in trespassing into the upstream forest and encroachment on the public water resource. There are also problems from the increased population and expansion of urban areas. Too many farmers still grow crops that are unsuitable to the soil or water conditions, while others build obstructions in floodways. All these factors have a negative effect on water resources.

Nakhon Pa Mak Subdistrict is an example of an amalgamation of villages that is mitigating the effects of climate change, natural disasters, and human-made disruptions by mobilizing residents to solve water-related problems. Apart from preparing evacuation routes and

sanctuaries when disaster strikes, the Subdistrict is modifying agricultural areas and installing water monitoring instruments to ensure preparedness and advance warning. The Subdistrict uses three-dimensional mapping that shows the geographical contours, location of households, and important places as the basis for analysis and evaluation of situations and prioritization of localities by degree of vulnerability. There is also the systematic planning of water resource management during the dry season, such as water usage rules for agricultural activities, pushing for dry-season reservoir preparation, and constant maintenance of communal water resources. These actions reflect the community's awareness of the need to be self-sufficient in water resource management. As a result, they continue to learn about various approaches and the latest ICT technology which can be applied in communal water resource management in the Subdistrict, as well as other areas of local development.

The important factors contributing to the success of water resource management in Nakhon Pa Mak Subdistrict are the social capital of trust, norms, and networks. Although the existing social capital might be intangible, it is valuable as "virtual capital," which can attract and sustain the coordination and cooperation of community members toward solving shared problems. Therefore, any community enterprise for prevention and management of water resource problems are more likely to be efficient and sustainable. This finding confirms the concept of Coleman (1988) that all three dimensions of social capital are related and mutually supportive. The social network is important to the social capital as the social relationship facilitates joint action and empowers the community in the process. Together with trust and relationships that unite community members who participate in traditional and cultural activities, the faith and values reinforce the social norms. Also important is the ability to connect and request coordination within and among the groups according to the capacity of the community.

The comparison of social capital with other Thai communities suggest that Nakhon Pa Mak was able to tap into the existing social capital to handle water management, even though they did not have an unusually high level of social capital. The difference is that water management is the top priority in Nakhon Pa Mak, and they are making better use of their social capital toward this priority compared to other Subdistricts in the province.

Regarding trust, it was found that residents of Nakhon Pa Mak Subdistrict shared mutual trust in their social relationship. They are united and have very few disputes. They talk with their neighbors and friends frequently about solving community problems. To that end, the community feels like an extended family. Members of Nakhon Pa Mak Subdistrict are also bonded through cultural and traditional activities such as the annual Songkran and Loi Krathong festivals, the unique kaffir lime merit-making event, the Khlong Pattana activity, and boat racing in Grong Greng Canal. Such traditions reinforce and solidify relationships and social trust among community members and that feeds into a desire to contribute to the public good. Uthai Adulyahasem and Anek Nakabutra (1998) pointed out that communities that want to be self-

reliant must nurture and embrace culture, tradition, ceremony, faith, and local wisdom in solving problems. Communities need to share a spiritual bond, acquire a sense of unity, and practice reciprocity. That way, the community can control and manage local problems across many dimensions while being relatively immune from negative external influences. Another finding is that community leaders play a critical role in organizing discussion among the members to allow full participation of anyone in the community. This corresponds to a study by Mitree Intria (2017) regarding the dimension of trust in social capital, that trust facilitates coordination and cooperation for mutual benefit, friendship, and structure of social relationships. Trust is therefore an important element of social capital that reinforces unity. Relationships are based on believing in and caring for one another.

Regarding norms, residents of Nakhon Pa Mak Subdistrict share the same vision of the importance of solving communal water resource problems together. Villagers are willing to sacrifice personal benefits for the best interest of the public in water resource management. The community members follow the same plans and practices, share opinions, and agree on the rules of water usage together, which reflects the norms of community in water resource management. The residents also act together toward the community's goal of self-sufficiency. Furthermore, the community leaders and executives of the SAO were effective leaders in motivating the committee members and local villagers to prioritize water resource management. Titaya Suvanajata (2001) stated that norms could be divided into two types. The first type is institutionalized, such as laws that punish violators. The second type is non-institutionalized, which is enforced in the form of folkways. In this type, social sanctions are applied, ranging from high to low level according to the severity of the offense. Those who commit wrongdoings will be punished by society, not the legal system. When considering the norms in constructing the shared agreements of Nakhon Pa Mak Subdistrict in water resource management, it is obvious that such norms are not as strict as laws, but rather the norms are mutually accepted by the villagers.

Regarding the dimension of networks, the most important network of Nakhon Pa Mak Subdistrict is the internal network in the form of the Water Resource Management Committee. The committee is an essential mechanism in the communal water resource management system. There are also the external networks such as the district and provincial networks, which can even coordinate with the national-level agencies in water resource management. These agencies include Utokapat Foundation, JICA, Hydro-Informatics Institute (Public Organization), and Phitsanulok Province branches of universities, among others. The external agencies provide support in knowledge, funding, and new technology. It is also noteworthy that the success of the Nakhon Pa Mak Subdistrict in networking with national-level agencies led to the participation from Subdistricts in the upstream areas such as Tha Tan and Mae Raga Subdistricts. As a result, the network of water resource management from Nakhon Pa Mak Subdistrict is beginning to expand and become more well-known. This success reflects the fact that all partners could be an

important mechanism towards sustainable development. However, it should be noted that the network emerged organically from the initiation of citizens who are aware of the problems and united to meet the challenge. Therefore, civil society is at the core of a viable network, while the government sector is only the background supporter that facilitates the establishment of the network. In stimulating the local people's awareness of problems in their community, civil society organizations act with higher autonomy in decision-making while the roles of the government sector are smaller compared to a network founded or initiated by the state (Hongchayangkun & Thiangchanya, 2020).

In terms of the Nakhon Pa Mak Subdistrict's social capital, it can be concluded that social capital produces community coordination, which encourages actors to participate in water management. As a result, coordination of water management becomes possible. Community residents are more public-conscious and respectful of norms based on trust in neighbors when they have social capital. These pre-existing levels of social capital are critical factors in effective community coordination. During the focus group discussion, community leaders stated that Nakhon Pa Mak's social capital allows for simple operations related to communal water resource management, especially when compared to other communities that lack trust and respect for social norms and lack both internal and external coordination mechanisms.

The social capital of Nakhon Pa Mak is high in the context of the community, which is a relatively small community in a rural area where villagers are close and frequently interact. According to Besser and Miller (2015), social capital is negatively related to community population size because private interaction can occur more frequently and conveniently on a smaller scale. As a result, small rural or urban communities tend to be stronger due to their foundation of social capital.

Given its social capital in support of norms, the case of Nakhon Pa Mak Subdistrict in solving communal water problems could be regarded as a model that can be replicated in other locations of similar size and conditions. The lessons from Nakhon Pa Mak can be applied to preparedness among the people in community-led water resource management, rather than waiting or requesting action from the government. Therefore, grassroots entities should be supported to nurture and maintain strong social capital, which provides critical immunity against natural disasters and as a building block for national development.

Recommendations

The government sector and related agencies in water resource management should support the mobilization of social capital to enable networking for communal water resource management. Social capital should be translated into concrete activities that build upon the existing bond of people to manage water resources at the local level or through the creation of a campaign which connects the local culture and tradition with water resource development.

The connection of upstream and downstream regions requires cooperation from all sectors. Government and related agencies should support setting up networks for the systematic and integrated development of water resource management. The committees that oversee such networks should be clearly and legally authorized to manage the basin region.

The public sector should prioritize the devolution of authority to the local sector in managing its own public land and water resource management during an emergency. There should be laws that support the authority of local agencies in management during a crisis or designation of public areas to support communal water resources management.

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