Participatory Water Resources Management in Phraek Nam Daeng Community, Samut Songkhram, Thailand

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Abstract
This study was purposed to explore issues concerning water resources management, participatory water resources management and the outcomes of which in Phraek Nam Daeng Subdistrict, Amphawa District, Samut Songkhram, Thailand, through qualitative research methodology, collecting data by interviewing 15 relevant individuals from the public sector and the community. It was found that the issues observed in water resources management of the subdistrict originated from the inappositeness of public water resources management schemes for such areas with three-water ecosystem (saline, brackish, and fresh), and the subdistrict's resolution in response to such problems was derived from community-based participatory adaptation and mitigation under development of problem-solving knowledge through practice of research, amalgamation of local wisdoms, and encouragement of practical execution of problem solving approaches. Recognition and cooperation towards involving public agencies in concern therewith would bring about effectual water resources management, reinforcement, and experience in public water resources management policy to the community.
Keywords: Water Resources Management, Participation, Phraek Nam Daeng Community

Introduction
Since ancient times, water has long been a crucial part in lifestyle and everyday life of Thai people in countless aspects, such as transportation, agriculture, food supply, habitation for aquatic animals, and industrial operations. Management of water resources has thus become a priority. Respectively, Thailand also has many polices and agencies formulated to address such in an efficacious manner for maximum benefits. Still, management of three-water ecosystem, or water resources of saline, brackish, and fresh waters has proven to be far more complex and complicated than that of freshwater or brine water alone, and the procedure and implementation and process thereof have become elemental to its efficiency in view of that. A case of three-water ecosystem management of Phraek Nam Daeng Subdistrict, Amphawa District, Samut Songkhram, Thailand, attracted researcher as the subdistrict is located in the middle of waterway to the ocean, overflowing with canals, distinctively an abundant area with three-water ecosystem in harmony with natural tide where the inhabitants harmoniously reside and engage in agriculture, such as rice cultivation and aquaculture, but following the erection of Srinagarind Dam in Kanchanaburi, Phraek Nam Daeng subdistrict began to face issues of increased flooding and excessive salinity, causing the villagers troubles in their livings. Subsequently, a public agency tried to ameliorate the problems by building floodgates to regulate the flow of saline water into freshwater bodies, causing damages to agricultural crops. However, not only public agency's effort had failed to eliminate the problem, but it also triggered disputes among memebers of Phraek Nam Daeng community, as the floodgates inhibited natural water outflow, casing damages to freshwater crops and marine fisheries, among others. Said issues were prolonged and become chronic for over a

decade until being resolved by participatory management of the public, civil society, academic sectors. Such action did not only tackle the setbacks, but also led to reinforcement of the community and its members against other resource management problems with participatory management. In other words, this knowledge of participatory water resources management of Phraek Nam Daeng community would enable progression into knowledge of management of environment and natural resources, and the findings of this research could also be applied to formulate strategies for management of environment and natural resources in other locales in the time yet to come.

Research Objectives

To examine the issues concerning water resources management, participatory water resources management and the outcomes of which in Phraek Nam Daeng Subdistrict, Amphawa District, Samut Songkhram, Thailand.

Research Methodology

This qualitative research employed literature reviews, fieldwork observations, and in-depth interviews with key informants, divided into two groups, five operators in water resources management, specifically operational and administrative leaders, namely, the lieutenant-governor of Samut Songkhram, chief executive of Samut Songkhram Provincial Administrative Organisation, director of Samut Songkhram Provincial Irrigation Office, chief executive of Phraek Nam Daeng Subdistrict Administrative Organisation, and its headman, and 10 characters of Phraek Nam Daeng community, consisted of its community leaders and general population.

Results

State and Problem of Water Resources Management of Phraek Nam Daeng Community

Geological Features: Key informants residing in the area established in agreement that Phraek Nam Daeng are of mangrove ecosystems in nature. Any public engagement in development promotion involving land occupation and transformation would affect the local ecological system, being an area of three-water ecosystem, lavished with abundant resources of water, aquatic animals, and mangrove forests, fostering variation of natural resources, and replenishment of nutrient-rich soil from upstream during rainy season, becoming major food sources of aquatic animals and fish stocks.

Water Resources Management Policy and Impact on Community: After the construction of Srinagarind Dam in 1978-1980, the flow of freshwater from upstream decreased drastically, causing surges of seawater flooding and severely damaged agricultural lands and rice plantations, impacting the people's livings. And so, the irrigation office has tried to mitigate the issue by building floodgates along canals of Phraek Nam Daeng subdistrict since 1981. Controlled by irrigation officials, the floodgates operate by raising their gates from the canal bed, allowing sediments, wastes, ammonia, and hydrogen sulphide to flow in with the water, contaminating the water downstream. Moreover, the floodgate system has already eliminated any possibility to let the overflow runs its natural course, ruining the cycle of three-water ecosystem as a result.

In addition, variation in livelihood of members factors difference in water resources requirement, that is, freshwater areas are usually elevated and the people tend to farm rice, vegetables, and freshwater fish with utility of freshwater irrigation, barring saltwater and flooding from rising sea-level, saltwater areas are low-elevation, the people tend to engage in coastal farming, which needs clean and uncontaminated freshwater from local canals where natural flow of water merges freshwater, saltwater, and brackish water together. The alteration to water resources management produced by those floodgates has thus considerably produced impacts in many aspects.

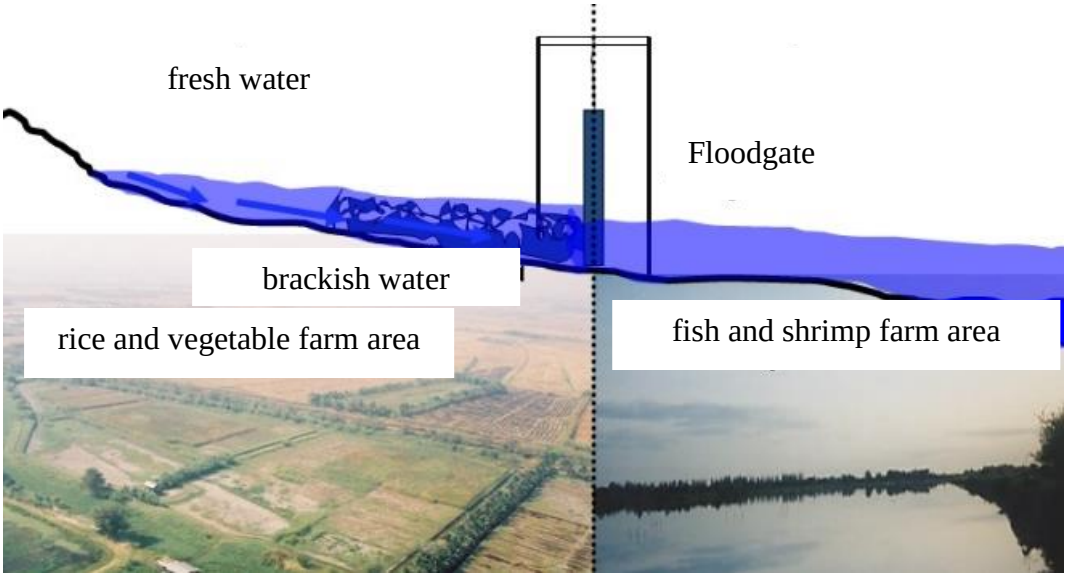

Figure 1 Water Consumption in Saltwater and Freshwater Areas
Source: Phraek Nam Daeng Community (2014)

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Owing to the floodgates, people in freshwater areas have changed their cultivation cycle from once to twice a year, using both transplanting and direct seeding, prompting a requisite to drain water from rice fields, otherwise the rice would rot and become infested with apple snails. So, all 15 gates must be opened, damaging saltwater areas with the excessive water outlet in turns. The amount of freshwater and sediment from canal beds would affect aquatic farms, contaminating, and reducing salinity of the water, killing sizable livestock. Contrariwise, if the saltwater communes oppose such operation of floodgates, the freshwater communes would be distressed from rotten rice. The operation of floodgates thus presents a dilemma, causing disputes between freshwater and saltwater communes concerning water management, potentially posing a challenge to social structure and integrity of family institution.

Participatory Water Resources Management of Phraek Nam Daeng Community

Participation of the Community: In order to solve the issue, the public has tried to find a solution by holding a meeting to discuss the date and time to open the floodgates, but to little or no avail. Hence, the people began to face the problem themselves. Panya Tokethong, a villager from saltwater neighborhood, derived potential solutions from community-based researches of academics from Mahidol University and brought up for discussion among other saltwater communes, so as to devise a research on water management approaches for canals in Phraek Nam Daeng Subdistrict, Amphawa District, Samut Songkhram Province, Thailand, and attain a practical solution to the problem. The research was applied for funding under regional arrangement from Thailand Research Fund)TRF(, an organisation purposes to support community-based researches with emphasis on participation of local stakeholders, covering

dimensions of community development, a sound framework and being a learning process for locals.

Achieving Mutual Understanding of the Problem: Considering the first general assembly intended to gather all members of the subdistrict into discussion, but to no avail, as the difficulty in communication grew with the number of people, the conduct of affairs has been adjusted, dividing into six separate units at neighbourhood level, which proved to be effective in bringing about understandings across the communities extensively with ease. The group of community-based researchers had to hold community forums with both saltwater and freshwater communes on several occasions, with guidance of mentors from Thailand Research Fund in some aspects, such as polishing research title, making research question clearer, adjusting composition of the research group to involve all parties, including saltwater and freshwater parties. The data from forums were analysed and verified. Relationship across communities were constantly promoted until learning behaviours occurred and joint understandings were achieved. Using the facts and information to form a clear research question, it was discovered that the problem came from the floodgates' attribute of being shut tight.

Developing Solution with Local Wisdom and Participation: The researcher group consulted village elders for wisdom in water drainage and blockage and found that people of Phraek Nam Daeng in the past had made a certain kind of wood panel floodgate, putting panels in place one by one and removing the topmost when water rose to drain, which would not cause any problem among saltwater and freshwater communes.

Figure 2 Floodgate from Wisdom of Early Phraek Nam Daeng People
Source: Thailand Research Fund (2014)

The conversation and analysis of facts and information led to integration of aged wisdom and become a body of knowledge, which could be applied in formulation of problem solving approaches and other collaborations among community members, resulted in a development of a hinged flap gate, an integration of earlier local wisdom in floodgate building with modern irrigation technology. That is, when freshwater or saltwater overflows, the gate would allow one-way flow of excess through pressure-dependent flaps. Not only allow excess water to drain passively without human input, this floodgate also generates flow of water around it, which reduces sediment deposition

Figure 3 Hinged Flap Gate

Policy Proposal from the Community: To drive such concept into implementation, the community of Phraek Nam Daeng adopted participatory approaches, that is, community leaders in working group of the research project would act as policy entrepreneurs at the community level so as to push policy proposal to policy entrepreneurs at the public sector level who play a major role of supporting associates, such as when the vice governor participated in fieldwork to find a solution to the water problem of the community at policy level, or when the deputy director of Irrigation Department led a group of officials to survey Phraek Nam Daeng community in order to address issues in general, to obtain cooperation, comprehension, and recognition from relevant agencies such as subdistrict administrative organisations, provincial administrative organisations, public-private steering committees, and the Royal Irrigation Department, facilitating joint assembly between communities and relevant public agencies. The flap gate was put to trial, and data were gathered from public and private sectors to evaluate the performance of this gate type. The results were satisfying and the rest of floodgates in the community were subsequently changed into this type.

Success Factors in Participatory Water Resources Management

Community Strength: In natural resources and environmental management such as the case of water resources management of Phraek Nam Daeng community, community strength, especially such that came from a fundamental element of kinship, was vital in managements of water resources and drainage. In other words, at heart, the people of Phraek Nam Daeng, whether from freshwater or saltwater areas, were all kinsfolks living interdependently. Despite the conflict caused by water drainage approach of the Irrigation between people of freshwater and saltwater areas, the sense of kinship was proven to be a significant social capital in seeking cooperation and setting differences aside in order to reach a collective solution, which derived from a conduct of participatory action research on canal water management in Phraek Nam Daeng Subdristrict, Amphawa District, Samut Songkhram, by a group of researchers consisted of communes from freshwater and saltwater areas and co-researchers of five representatives per village. The research has already been concluded and put into practice.

Community Culture: Concerning the values, conscience, and traditions of giving significance to natural resources of the locals at present, it could be said that capitalistic developments and decentralisations have lessened the conscious of collective responsibility for the protection of natural resources, and importance in one's own occupation. Conservation of natural resources has been pushed to be a responsibility of public sector and local administrative organisations who have the authorities to do so. Still, the social capital of community strength from sense of kinship has kindled the conscience, values, and traditions of the community in communally preserving water resources.

Community Leadership: In context of community leaders who were not authority figures in affairs of pursuing and advocating suitable approaches to water management to implement, it was observed that leaders from both freshwater and saltwater areas played significant roles in pursuing and advocating suitable water drainage approaches into practice, with a focus on building participatory atmosphere and clearing the existing conflict, creating a climate of trust and faith among the community and the people in the affairs. Regarding roles of community leadership, Panya Tokethong, a saltwater community leader, and Somboon Daengarun, a freshwater community leader, both strived for solutions to ameliorate difficulties and conflicts in the community and approaches to build understanding among community members in order to gain support and cooperation in conducting affairs, on the sense of kinship and bond within. Understandably, such leadership did not require authority nor legal rights, but formed on collective mind of the community to address the issue. Qualities and abilities in communication, creative problem-solving, negotiation, and relationship building with public agencies and communities to establish participatory atmosphere where all parties collectively aspired to solve the problem ultimately led to the replacement of Irrigation's floodgates into flap gates.

Policy Solutions with Shared Benefits: The formulation of policy solutions that resulted in shared benefits was significant in the management of water resources, as water resources were publicly available for all parties to utilise. Problems with water resources in terms of water quality, deterioration, blockage, and drainage would impact all parties, and possibly affect adjacent areas. Seeing that the previous water management approach was a win-lose strategy, every party admitted the water management issue would continue to be a source of conflicts that could accumulate and evolve into a chronic situation in time unless a better solution was realised. Therefore, the advocate for participation in the community to pursue a win-win solution accentuated the atmosphere of participation toward a collective goal, and intensified the degree of cooperation accordingly.

Results of Participatory Problem-Solving

Participatory problem-solving practices derived the approaches to solve the problem:

1) Choosing Suitable Solution to the Problem and Requirement of the Community: Through community-based research, such participatory problem-solving practices brought about a conclusion on the needs and ideas for the solution, which manifested as a creation of a proper type of water gate for three-water ecosystem, which must allow natural water flow, along with man-made water flow, from the topside, but prevent a flow in reverse.

2) Peaceful Community Conflict Resolution: Peaceful conflict resolution can be achieved through knowledge and participatory approaches on a strong community foundation, forming mutual understanding and apprehension of the conflicting problem and requirement of the other party without grudges, as reflected in Tokethong (interview, 5 August 2014), "I am breeding snakeskin gourami, studied freshwater and understood freshwater ecosystem. I have grasped saltwater ecosystem in the past, and began to study and understand two-water ecosystem. I tend to see problems as antagonist, not the individuals, while most people would consider opposing people as enemies. With some understanding, and involvement of Thailand Research Fund…", similarly to Somboon Daengarun (interview, 10 August 2014), stated "Whenever the need for drainage arises, we have to confer with saltwater people, as farmers are suffering from the overflow. They cannot make a living when the water is in excess, so the saltwater people would understand when we open the floodgates, thus lessened the conflict".

3) Establishing Participatory Democracy in the Administration of State Affairs in a form of an amalgam of top-down and bottom-up approaches to achieve efficiency and efficacy in the Administration of State Affairs and addressing the needs of the general public.

Discussion

From the findings, participatory approach of Phraek Nam Daeng community played a major role in the success of solving the water resources management issue through relationship building in harmony at individual, community, and relevant public agency levels. Brainstorming for solutions, local wisdom was adopted in formulation of procedure through concrete implementation process of participation in public policy cycle, corresponding to the findings in other case studies that reflected the strength of popular sector and its practical functions in Thailand's public policy, such as the participation in environmental impact assessment of Power Plant Project of Hinkrut in Prachuap Khiri Khan, which became anti-power plant movements in due course (Chompunth & Chomphan, 2012), and the participation in the planning of community conservation and restoration in Amphawa District, Samut Songkhram, which was successfully executed and became a conceptual model for conservation and restoration of other communities (Peerapun, 2012). Such findings highlight the significance of concepts of participatory democracy in the administration of state affairs, as Denhardt and Denhardt (2011) emphasise "citizenship" should come with rights, duties, and responsibilities, and compel public officials to serve their citizens. Formulation of objectives and framework to attain public benefits must involve citizens in discussion and implementation of democratic accountability. Hence, administration of state affairs has no longer been the responsibly of the public sector alone, but a collaboration between the state and citizens, or "governance system or democratic governance", where, in visions and functions of public staff, the people should be considered as "citizens", not just voters, service recipients, nor clienteles, and allocated with their authority and responsibility (King & Stivers, 1998). Therefore, actors in public policy process are not limited to authority figures, but the main players being the people and local communities at the receiving end of a policy, as well as any other stakeholders. Community participation is potentially sensible and practical, and the benefits thereof are also perceivable by the locals (Bachrach & Botwinick,1993) who possess knowledge, interests, and enthusiasms for the opportunity to participate. Policy advocacy should be of a bottom-up characteristic, where community leaders can function as policy entrepreneurs with efficiency, as observable in the assessment of efficient policy entrepreneur qualities in perspective of Kingdon (1995: 180-181). In case of participatory water resources management of Phraek Nam Daeng community, community leaders acting as policy entrepreneurs displayed attributes of efficient policy entrepreneurship, that is, being individuals with knowledge and expertise, ability to advocate for others, leadership of interest groups, local political connections, charisma, and experience in policy advocacy. Additionally, the pursue of peaceful conflict resolution through body of knowledge reflected Gandhi's vision of conflict resolution (Paige, 1993), that is, in search of truth, one must rely on faith and science. Any conflict emerged would warrant a pursuit of body of knowledge that could lead to resolution, self-awareness and circumstance, or in this case, the comprehension of water resources and ecosystems in the community, which filled the community members' void of unawareness of the very environment they resided in, and potentially laid a foundation of collective understanding for problem-solving approach in the future.

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