

Integrated Water Resources Management in a River Basin Context in Thailand

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Overview of Thailand's Water Resources

Availability of natural water resources

The total land area of Thailand is about 512,000 km². As of 1997, the estimated population was about 60 million with a growth rate of 1.0 percent. The urban population was estimated at about 11 million with high concentration in the capital and the regional centers. The country is still considered an agriculture based country with a total agricultural area of about 265,200 km² and more than 60 percent of the population engage in agriculture, while the agricultural production accounts for only about 12 percent of GDP.

Due to rapid economic development in the past decade, water demand continues to grow and in two of the four regions, namely the Northeast and the Central are experiencing frequent drought while flooding also occurs more frequently due to deforestation. The water resources development budget has been increasing and represents a large portion of the National development budget. However, there are currently environmental constraints for large water resources development projects in the future, which may eventually slow down construction of future projects.

Agricultural sector remains the main user of available water and accounts for 71 percent of total water demand, while industrial use accounts for only 2 percent, domestic use accounts for 5 percent and the remaining 22 percent for ecological balance. However, the trend will change with reduction for agriculture and increase for both industrial and domestic water.

Surface water resources

The country can be divided hydrologically into 25 river basins. The average annual rainfall for all over the country is about 1,573 mm. The total volume of water from the rainfall in all river basins in Thailand is estimated at 800,000 million m³, of which 75 per cent or around 600,000 million m³ is lost through evaporation, evapotranspiration and infiltration and the remaining 25 per cent of 200,000 million m³ constitutes the runoff that flows in rivers and streams. While the population of Thailand is around 60 million. Therefore, the availability of water resources is 3,300 m³ per person each year which is statistically considered to be highly adequate.

Groundwater resources

Groundwater is an important source of water supply in Thailand. Public water supplies for one - fifth of the nation's 220 towns and cities and for half of the 700 municipalities are derived from groundwater. It is estimated that 75 per cent of domestic water is obtained from groundwater sources. Groundwater system in Thailand is mainly recharged by rainfall of about 38,000 million m³ and seepage from the rivers. Some amount of rainfall percolated through the ground to settle in the 101,240 square kilometers of unconsolidated strata which can absorb and retain about 10 percent of annual precipitation.

More than 200,000 groundwater well projects were undertaken by both government and private sectors with total capacity of about 7.55 million m³/day. (2,700 million m³/year). It is estimated that 75 per cent of domestic water is obtained from groundwater sources which can serve approximately 35 million people in villages and urban areas.

Present water demand and water use trends

The average annual rainfall of the whole country is about 1,700 mm. ranging from 1,200 mm annually in the north and central plain up to 2,000 - 2,700 mm. in the western, the southern and the eastern parts of the country. About 29% of the surface runoff, approximately 70,770 mcm. annually, is kept in various sizes of about 650 large and medium scale together with 60,000 small scale water resources development projects all over the kingdom, covering about 31 million rai (4.96 million ha.) irrigated areas.

Although the water resources development programme has been implemented continuously for more than 80 years, but rapid rural development, industrialization, tourist development and income growth raise the water demand for domestic use, agriculture and other purposes drastically. Inefficient use of water by various sectors and deteriorating water quality due to excessive use of fertilizer and pesticides, urban sewage and industrial wastes also create more serious problems to availability and adequacy of water resources. The present water demand for irrigated areas and other uses for the whole country is estimated to be 88,700 mcm./year and expected to be 109,350 mcm./year in 2006.

Water Governance and Its Implication to IWRM, Thailand's Experience

According to the guidelines in the 8th National Plan (1996-2001) the development and management of both surface and groundwater resources will be a systematic river basin approach with regard to economic and social factors as well as environmental impact. The processes of IWRM were properly introduced and practiced in Thailand since 1997 at both national and basin level.

Since there is no comprehensive act on water resources and moreover the existing regulations being used by various government agencies are different, therefore it is essential to create a new water resources act for common practice of all agencies concerned. At present, the process of drafting water resources act is ongoing. It emphasizes stakeholder consultation in collecting issues for formulation of the draft.

The integrated plan on water resources development, water allocation, water conservation, flood mitigation and water quality will be formulated for all 25 river basins. It is planned to set up the uniform measures and analytical methods to assess data and establish a data network system for possible information exchange and dissemination. And the system of assessment in water resources will be introduced at the national level and basin level.

Institutions

National Framework

In the past, there are many government agencies and private parties involved in the development and exploitation of the river basin surface and groundwater resources, but

cooperation and coordination between them is weak. Even when cooperation between operating agencies leads to plans for equitable allocate water, they are often challenged by the various interested parties affected. The result is often a compromise that postpones the problem to a later date. In view of the lack of coordination, the government decided to establish a central agency in water resources management in order to formulate plans, coordinate plan implementation and carry out other works concerning management of water resources.

The National Water Resources Committee (NWRC) was established in 1989 with the intention to serve as an apex body for setting policies and plans for National water resource development. And later the Office of National Water Resources Committee (ONWRC) was established officially in 1996. In 2002, after a bureaucratic restructuring of Thailand, the Department of Water Resources under the Ministry of Natural Resources and Environment was established in order that it will work at national level for management of water resources.

Establishment of River Basin Organization

The NWRC has worked to strengthen the mechanism of IWRM in Thailand since 1997. In 1999, the first two River Basin Committees (RBC) were established in the Ping and Pasak river basin as a pilot project. This recognizes the need for decentralization as an important step in water resources management. Each RBC consists of qualified persons drawn from public and private sectors. The RBC will set policy on water resources planning, development, operation of facilities, and water allocation, and it will oversee all water-related activities in the river basin including the resolution of water conflicts between various users. The lessons and experiences from the pilot project have been thoroughly studied and the RBCs are expanded to another 23 river basins. At present, the RBCs have been established in the whole 25 river basins of the country.

While the national level agency is in charge of policy matters and supervision of water management as a whole, the RBCs will be responsible for the actual management of river basins and the implementation of associated projects and activities. The national agency will also provide technical, research information, and financial support to the RBCs. The RBC will be responsible for developing basin-specific programs in close consultation with basin stakeholders to incorporate their particular needs and concerns.

Review and refinement of water policies

ONWRC in collaboration with GWP SEATAC organized a series of national consultation meeting on “National Vision on Water in Thailand”. Through the elaboration of the group, a national vision statement was concluded and read “By the year 2025, Thailand will have sufficient water of good quality for all users through an efficient management, organizational and legal system that would ensure equitable and sustainable utilization of its water resources with due consideration on the quality of life and participation of all stakeholders”.

Thailand also formulates “National Water Policy” where IWRM is stressed at the national and river basin levels. However, many aspects in water resources management have to be refined. This will include consideration of a water fund, shifting toward demand management, strengthening law enforcement, enhancement of water law and private sector involvement etc.

Case Study of the River Basin in Thailand

The Bang Pakong River Basin

The Bang Pakong River Basin comprises a catchment area of 18,500 sq. km. discharging into the Gulf of Thailand. Tidal influence is pronounced, with brackish water reaching 120 km upstream during the dry season when freshwater runoff is minimal. The basin contains a mixture of land uses ranging from wet and dry season rice, annual and perennial crops, rubber plantations, to tropical forests, and wetlands; and settled areas comprising villages with home gardens and mixed orchards. The irrigated area within the basin is estimated at 388,000 ha. The basin’s fishery resources are valuable and include both freshwater and marine catches as well as pond-raised fish, oysters, mussels and prawns.

Given its proximity to the Bangkok Metropolitan Area and the Eastern Seaboard, the basin has been the target of considerable economic investment. Government has emphasised supply management and engineering solutions for the region’s water needs. A diversion dam constructed 70 kilometers from the Gulf of Thailand was completed in 2000 to supply water for municipal and irrigation users. The dam was briefly operated by the Royal Irrigation Department (RID) before severe environmental problems forced suspension of operations. Downstream of the dam, tidal fluctuations caused overbank flood which damaged properties

and eroded river banks. Upstream, the operation of dam gates prevented tidal flushing of the river waters laden with sewage, agricultural drainage and effluent from pig farms and aquaculture ponds, with a consequent worsening of water quality. Dam operation reduced tidal flows reaching those upstream fishery enterprises that require brackish water. Furthermore, the dam gates, if closed, would represent a barrier to fish migration.

The diversion dam's troubled operation has shed light on the need for better basin planning, which would take into account competing resource uses and also the need for real participation of various stakeholders groups of the basin in making their own decisions.

Towards Water Resources Management

Many steps have been taken to promote water resources management in the basin. In July 2001 a Bang Pakong River Basin Committee was established including forty-four members representing stakeholders groups. While those efforts point in the right direction, additional support would be required to promote meaningful stakeholder participation and to increase cross-sectoral involvement. In particular, the concerns of local government administration and non-governmental actors must be brought to bear in water allocation procedures and basin-wide decision-making.

The Bang Pakong possesses a special character. In one of its upstream tributaries, dry season water shortages are a common occurrence while downstream, before the dam construction, the populations near the Gulf of Thailand had learnt to take advantage of the brackish water regime and used it in their economic activities. Water quality in the river basin is a threat in some areas especially for downstream people who usually suffer from low quality of water. At the estuary of the Bang Pakong river itself, the major problem is low dissolved oxygen and high organic matter which is mostly caused by effluents from livestock and fisheries (pig and prawn farms).

The Bang Pakong is a part of the Eastern coast confronting the Gulf of Thailand and contains an important estuarine ecosystem with remarkable biological diversity. Mangrove forest in the basin covers an area of 16,650 ha., which has slightly increased in the last ten years. Fish species in the river are rich and diverse.

Water accounting calculations in the Bang Pakong show that gross inflow in the wet season is larger than depleted water, but is less than depleted water in the dry season. Water shortages seem to be a serious problem in the near future and this will be aggravated by pollution of the water sources. Therefore, a wide range of measures for water resources management is needed, ranging from improving water quality, decreasing non intended water use or increase efficient use of water to modifying crop schedules or cropping patterns.

The Department of Water Resources (DWR) has developed a series of important tools for water management in the context of the Bang Pakong river basin. As mentioned earlier, a local water management body, the River Basin Committee (RBC), has been created, contributing to the implementation of the decentralization policy of the country. The formulation of an integrated plan for water resources management is under way. The process of formulating the plan is changed from the past: elements of people's participation have been introduced in the planning. However, DWR intends to go beyond these initial steps, realizing the importance of involving people more naturally and independently, on their own initiative and with their own enthusiasm. For this purpose, the Bang Pakong has been selected for a River Basin Dialogue initiative.

The Bang Pakong Dialogue

The Bang Pakong Dialogue aims at developing and using a consultation platform for solving problems and addressing issues of concern of the basin. At the same time, linkages with and supportive actions for the Bang Pakong River Basin Committee (BP-RBC) will be established in order to increase the competency of the BP-RBC. In doing so, stakeholders identification is an important step.

With an initial support of FAO, UNEP and the Secretariat of the Global Dialogue on Water, Food and Environment's, DWR has initiated the Bang Pakong Dialogue in May 2003. The first step was a presentation of the project to related government agencies, asking for their comments and support. Next, a forum was held for two days for stakeholders from the four provinces in the basin to introduce the initiative to them the project, obtain their viewpoints and their support and commitment to participate in the project. After these two introductory sessions, 32 stakeholders from the basin were invited to participate in a meeting held by DWR in order to develop a roadmap to pursue the project's objective.

Lessons Learned from the Bang Pakong Dialogue

What has been done?

The Dialogue wants to create a network of people who will share their experiences among themselves each other and facilitate their working together on water related issues, with a support from DWR. The selection of stakeholders was a crucial step of the initial stage after the introductory forum, because these people will be a catalistic group for stimulating and incorporating water resources management into their communities' activities and expanding the Dialogue into other communities through networking. Small group discussions were held to provide some recommendations on strategies for drawing people's attention on water resources management. It was agreed that the selection of the key stakeholders from the four provinces who would be invited to participate would be made on the basis that they already actively support an environmental work in their communities or they are already involved in some kind of networking in different areas. It was also agreed that the meeting should be conducted in a very informal manner without a rigid agenda.

Thirty-two stakeholders, eight per province, were thus selected to attend the meeting which was held in a very cosy and friendly environment. In the meeting, the facilitator asked the participants to convey their attitudes and opinions on water resources in an open manner. Apart from the problems and requirements of the basin, it emerged that an important topic that most participants wanted to discuss was a basin network on water resources. Many practical ideas for networking were floated at the meeting. An example of unsustainable network was discussed and many recommendations to avoid such kind of experiences were made. A good network has to be open, with clear and distinct goals, addressing mutual interests, but should not be tied to strict regulations in order to allow flexibility. The network should generate its own revenue, which will lead toward its own managerial and sustainable. Information should be shared in the network. What should be avoided is a network established by a government agency with some money allocated to set it up and support some activities: this type of network becomes inactive shortly after its creation and ultimately disappears.

Other issues raised in the meeting varied from capacity building for local government units and others, awareness raising and dissemination of information in order to promote

transparency. Many activities were recommended, in particular aiming at improving water quality. This denotes their familiarity with activities of pollution control which have been introduced to them by government agencies for nearly ten years and which they commonly practice and the severity of the water pollution problem for them. Many of the recommended activities can be considered as land-based activities which are also related with water and thus integrated by natural processes. For example, some participants recommended an expansion of chemical-free agriculture which is water-friendly and is successfully implemented in some areas of Sra Kaew Province in the upstream reaches of the basin.

What should be done next?

Further analysis is needed on the grouping of problems, requirements, and stakeholders by using the outputs from the forum and the meeting and other secondary sources such as the many available basin. However, existing studies should be analyzed not only for the purpose of being a source of information for identifying problems, requirements, and stakeholders but also for their dissemination to the people in the basin. The dissemination of knowledge is one of the requirements identified in the meeting.

Considering IWRM, water resources management of the basin should embrace all aspects of water management and other related issues: water allocation, prevention/alleviation of problems occurring from freshwater and brackish water uses and water shortages, efficient uses of water, controlling and managing polluted water including land-based activities which are its causes, upstream watershed management, and coastal zone management etc. These things can be managed at the unifying scales of the basin/ sub-basins and within specific areas. Some matters for further investigations will be further identified during the project time. And all these knowledges will be disseminated among stakeholders of the basin.

Stakeholders concerned are various and include, to name a few, natural leaders of the communities, members of local government units, members of the communities, and members of the RBC. Different groups of problems and requirements will be identified and Dialogues will be held separately for different categories of stakeholders involved: after the grouping of problems, requirements, and stakeholders then thematic consultations will be organized in order to include the people at the level of the smallest possible units into the process. After a series of such consultations, one or two basin-wide forums will be organized

to seek consensus on common issues that will gradually emerge from the thematic consultations.

The group of thirty-two participants of the meeting that has already been held will be the Dialogue's resources persons and networking between them in the field of water management will be promoted, through such means as keeping them regularly contacted, their training to be coordinators for water resources management of the basin, budget permitting, and study tours to other river basins. Local research will be promoted and a decision support system or tool for the evaluation water allocation scenarios at basin level will be developed in close cooperation with them. It is hoped that, with all these activities, the Dialogue will be an effective tool for conflict prevention.

The Dialogue will help the BP-RBC in identifying problems, requirements, and stakeholders as seen by the people in the basin. It will help the BP-RBC in working out its duty in water resources management. The Dialogue will be a good platform for consensus building and this agenda will be raised in the BP-RBC meetings for further consideration and endorsement. It is therefore essential that the BP-RBC should be kept continuously informed of the Dialogue's work.

Conclusion and Proposed NARBO Action Plan

An important part of IWRM is exchanging experiences and learning from each other. This should be continuously stimulated and in doing so it needs facilitators and promoters. NARBO can act these duties and help promoting IWRM by selecting IWRM themes and collaborate with its member countries in organizing the workshop for each theme. Each workshop can be a learning platform for the IWRM theme and after the workshop there should be the follow-up activities by some means that will be done in an economical method.
