The proposed Web based Provincial Water Management System in Thailand

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Abstract
Under the rapidly change in world economical and environmental situations, water resource become a fundamental issue in order to maintain and strengthen human livings and socio-economical development. The advancement of IT technology enables the information input to the management system and also gives the possibility for water communication among stakeholders in information exchange, early warning system and water planning.

As the world trend, the governmental administrative system introduces the decentralized policy to level up the local administrative to govern their own resources and budget for their own communities.

The web based provincial water management model is developed to handle with water planning in the province which includes information, plan, and linkage with central governmental unit. The model comprises of three modules, i.e., monitoring and warning, emergency response and planning. The monitoring and warning module provides the water status (use, demand, supply, deficit) in each local administrative unit within the province where the data of rainfall, reservoir storage, water level etc. will be input through the linkage from the concerned authorities. The emergency module provides the information for water distribution in local and inter local based (available water tank, water truck, pond etc.) during drought so that administrators can decide to distribute water to the deficit area effectively and efficiently. The water planning module provides tools for the short and medium planning to mitigate water deficit problem in the province. The data of water plan from central governmental units and local administrative will be collected and shown in GIS based so that the province can investigate and decide for priority and budget allocation to cope with the development plan in the area. The monitoring of the approved water projects will also be shown to see the progress.

It is expected that with the proposed water resources system model, water management in the province will be better conducted and be the basis for discussions among stakeholders and also can respond to the need and development of the province for both short and medium term.

Keywords :   water, planning, web based, province

1. Introduction

Water management is always a critical issue for natural resources management since water is vital for proper life quality now for both urban and rural area. The nature of water management is basically complicated and needed knowledge/consideration from various aspects, i.e., multidisciplinary (needed natural science, economics till social components), multilevel (community till national) and dynamic with time (flood, normal, drought and uncertain periods) [1]. Besides, the world administrative scheme is changing from strong central government towards decentralization to community level and the scheme should also be in good governance. Thailand is not an exceptional for this and the recent regulations decided to allocate about 35 % of the national budget to local administrative to take care their own infrastructures and resources and the province will be a budget unit for planning from 2009. This makes water management more complicated, i.e., need new authority boundary, decision process, stakeholder involvement etc. to make the system work and optimized in the new circumstances. In US, there is a Water Act which enforce each state to plan their own water resources on four year plan and to answer how much we have, how much we use and how much water we will need in the future [2]. States like California State [10] used emerging information technology to help in water planning [8] by utilizing information from central government unit, e.g., USGS to build their own capacity [4, 9, 11].

With the help of new IT technology, the web based provincial water management system is developed to integrate database, mapping and communication technology for water planning into one system. It is hoped that the system can facilitate the planner and stakeholders to discuss on water plan at each level (community, province and basin).

2. New Web based Provincial WR Management System

With the experiences from web based community water management model run in the last two years in our research unit, the web based provincial water management model is developed to handle with water planning in the province which includes information, plan, and linkage with central governmental unit. The system developed comprised of three modules, i.e., monitoring &warning, emergency response and planning. The system can also work in each level, i.e., basin, province and community under the same platform and database system and can interchange information among levels (as shown in Fig 1). The warning module comprises of water demand of users in the area, water supply at present and near future (prediction to next three months) and water deficit indicators at each community (here called administrative unit, see Fig 2). The emergency module provides the information for water distribution in local and inter local based (available water tank, water truck, pond etc.) during drought so that administrators can decide to distribute water to the deficit area effectively and efficiently The emergency response process comprises of status confirmation, resources availability, distribution decision process and action summary. The water planning module provides tools for the short and medium planning to mitigate water deficit problem in the province. The planning process comprises of future water demand estimation based on future target growth of socioeconomics, development constraints, decision support tools to come up with alternatives for water development plan to cope with future demand (see Fig. 3). The data of

water plan from central governmental units and local administrative will be collected and shown in GIS based so that the province can investigate and decide for priority and budget allocation to cope with the development plan in the area. The monitoring of the approved water projects will also be shown to see the progress. The database module comprises of water demand, water supply estimation, water infrastructure, water operation rules, water operation constraints, past records/ experiences in the area to back up the decision process.
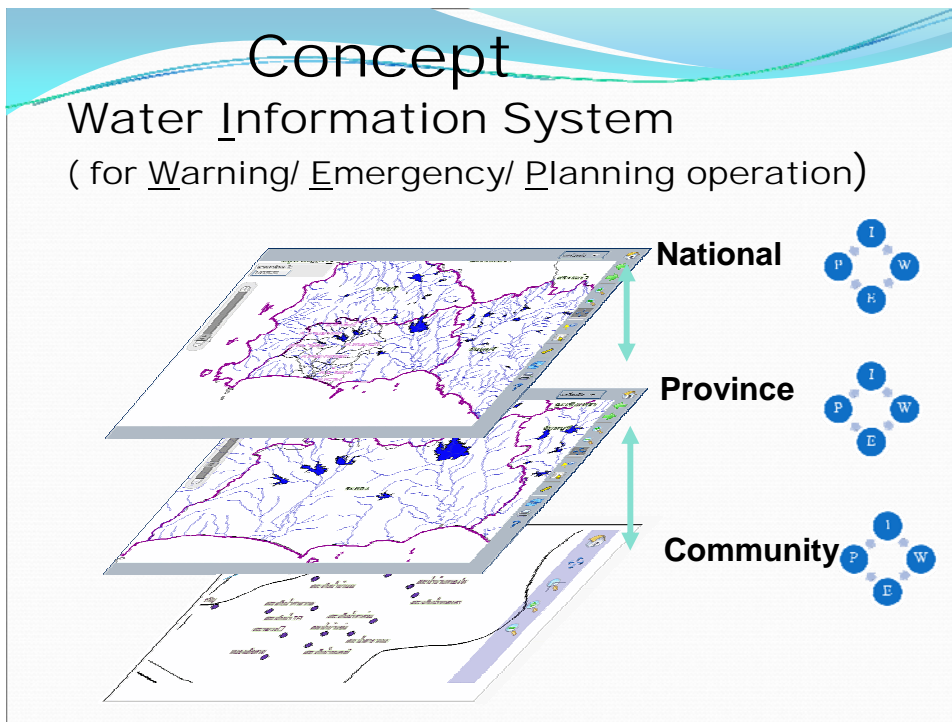

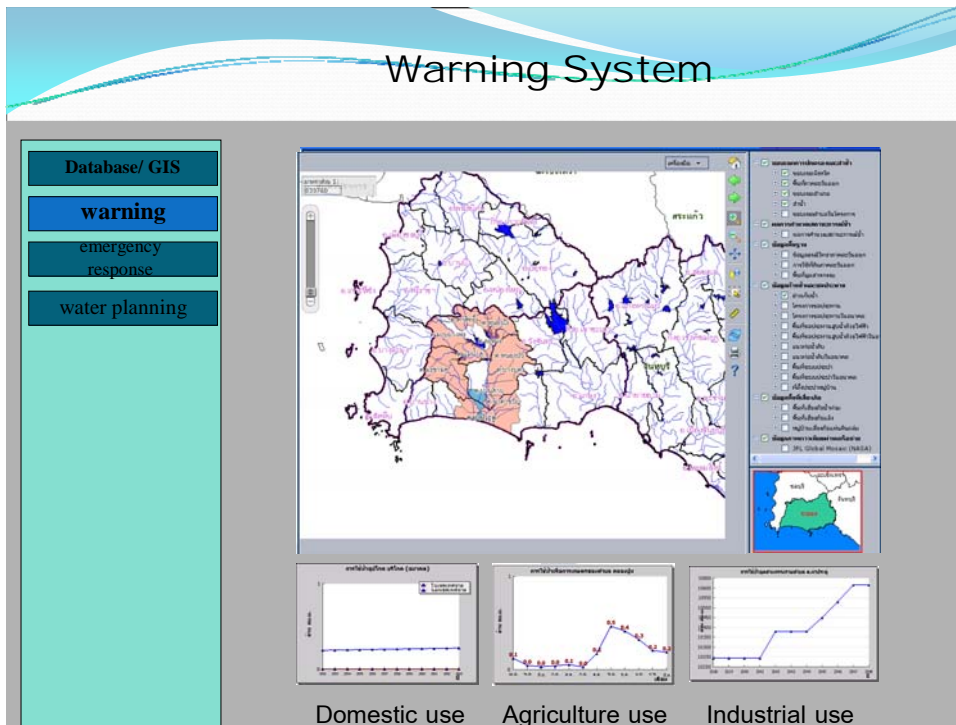Fig. 1 New Web based WR System linkage

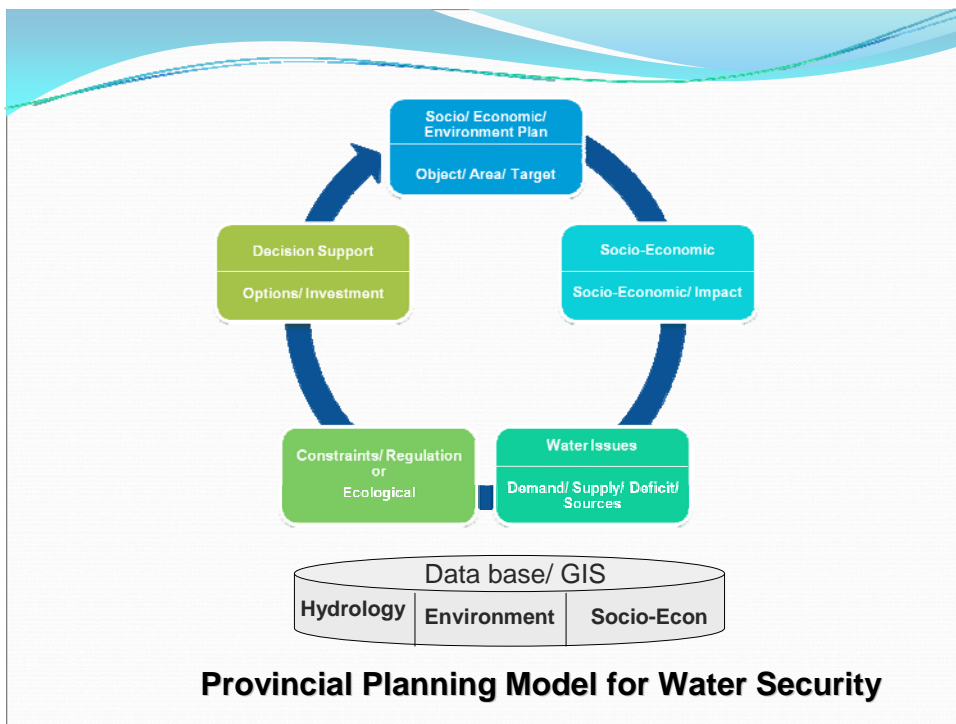Fig　2　Sample of Water Deficit Warning System display

Fig. 3　Provincial Water Planning Process

3. Feedback from leaders

The system proposed had been tested by meetings with Governors and local administrative agency (LAG) from the selected locations to listen to their demand and comments. The system, used in the phase 1 in a province [3, 5, 6, 7], can demonstrate on how the web based system show water status, water warning and water solving. The meetings agreed on the benefits from the system to cope with water problem in the area and gave remarks on the data required by the system and the way to update the information. Besides, the training and experiences on the system usage are needed to maintain the system.

Fig. 4   Discussions with Governors and LAU

4. Expected outcomes

The developed system is expected to systemize water management information and plan in the province area and can mitigate water problem solving at each level via information. The system is the integration of data, mapping and communication which can show the most updated information and water status (even by mobile phone, if extended), though, the usage of the system still needs training, knowledge and experiences to share among users for a certain time before the system can be matured.

5. Concluding remarks

With the help of new IT technology, the new web based provincial water management system will be developed to integrate database, mapping and communication technology for water planning into one system. It is hoped that the system can facilitate the planner and stakeholders to discuss on water plan at each level (community, province and basin). From the visit with leaders in each

level, the benefits from the system are clearly defined though system training is required to get used to the system and knowledge/experiences sharing platform is needed to sustain the system usage in the long term.

6. Acknowledgement

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