

Small watershed management in Thailand

by Prakob Wirojanagud and Kevin Smith

Thailand has made exemplary progress in its pursuit of the Decade goals. This issue tells some of what Thailand has achieved in the past few years, and illustrates the methods it has used to do so.

Dr Prakob Wirojanagud has coordinated this *Waterlines*. In this first piece he and Kevin Smith discuss the management of small rural watersheds while keeping a balance of natural resources.

WATER AND LAND ARE essential natural resources for community survival and economic development. With increasing population pressure the water demanded for drinking, domestic and agricultural purposes increases, as does the demand for land. In trying to meet these demands, however, changes in the environment occur, which can lead to an imbalance where demands exceed what nature can supply. For this reason, a planned approach to water resource management is essential in order to satisfy the communities' real needs for water, to ensure efficient water use, and still conserve a balance of nature. A water and land resource development plan contains objectives of resource development: details of water demands and supplies; development approaches (such as having villagers participate as much as possible); how water use, farming activities and marketing should be promoted; and the influence of development on the natural resources in the watershed.

Findings from research conducted at the Water Resources and

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Environment Institute (WREI), and experience with the implementation of water resource projects in the north-east region over the past 10 years, agree with studies conducted elsewhere, that four major tools are useful in water resource management:

- water law and water rights;
- decentralized development systems;
- watershed development planning;

- geographic and management information systems

By integrating these tools into the rural development system, the implementation and management of water resources development projects will be more effective. The following section explains how these tools are applied in Thailand.

Traditional water law and water rights

Water rights in rural Thai society can be categorized into two types: the first generated by the social system, the other issued by government agencies. The many studies of water use and water management that have been conducted, show that rural people traditionally arranged water rights according to known social rules. In north-east Thailand, whoever has a planted area adjacent to, and with access to a stream is accepted as being the first 'in right' to divert or use water by whatever method desired (for example, with an earth weir). Only after the farmer meets his/her needs would the water be passed on to others. Where disputes arise between upstream and downstream users or with others 'stealing' water, a request is made to the village headman to arbitrate between the affected parties



Communities need a planned approach to their water resources.

Table 1. Development approach according to watershed zoning

<i>Watershed zone</i>	<i>Development approach</i>
Areas near reservoirs	Irrigation system from reservoir Water use promotion and crop marketing
Areas near large streams or rivers	Pumping from river and distribution system
Lowland near small streams	Small weir or reservoir Stream dredging Groundwater well
Upland and rolling hills	Groundwater well Ponds in paddy fields
Forest brushland, range land, land subject to flooding	Forest plantation and conservation of water source Erosion protection and drainage

with the solution often being a compromise rather than punishment by any laws or regulations. However, the development of communal irrigation management using these types of rights has not yet happened.

In northern Thailand, the formation of community water-rights systems is more institutionalized than in the North-east owing to its history and experience with water management over more than 10 generations. In the case of each watershed and stream, the villages have learned to organize their own committees for water-utilization activities and have formulated regulations to allocate resources equitably, based on social cohesion and commitment. Normally, in addition to the rules which cover water management, the regulations also cover the roles and responsibilities of

the water management committee and members, the mobilization of resources for maintenance activities (manpower and materials), and the punishments in case of violation.

Water rights issued by government agencies can be broadly classified into those that are concerned with specific projects and those that are not. Within project areas, the prerequisite and procedure for farmers to obtain rights depends on the agency responsible for its implementation and differs between agencies. Each agency has its own regulations. Rights outside specific project command areas are covered by the People's Irrigation Statute, which dates from 1939, and are issued by the local district administration office. The understanding and application of this statute, however, is not universal and requires reinforcement.

Regarding the use of water rights for management in small watersheds, the details and overall objectives of the People's Irrigation Statute are consistent with both the physical and social aspects of development. Hence, any revisions made to the Statute should blend the existing strong attributes with current knowledge of water management, to form legislation which will ensure that future water resources development will be more equitable, systematic, sustainable and achievable than today's.

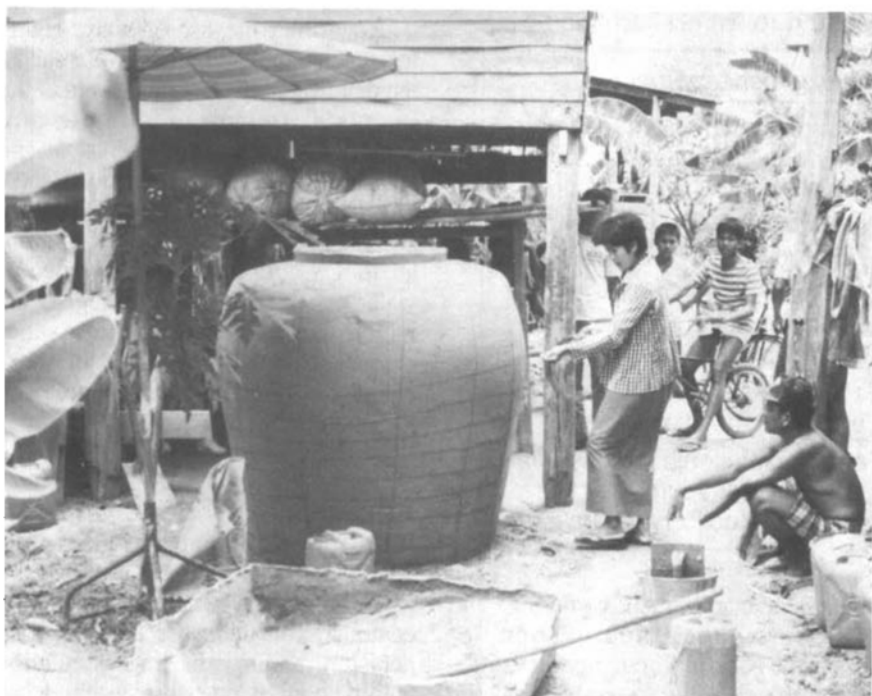
Decentralized development

Rural development in Thailand is administered under the National Rural Development system. This system is centralized in the sense that planning, decision making and implementation is 'top down'. Under this system, local organizations such as village committees and sub-district councils do not take part in the planning and development process at all, but submit project requests, selected from projects being offered by the agencies. After the project has been approved by the government, the agency will carry out the work. Villagers or local organizations do not have any opportunity to make decisions or conduct the work in response to their own needs. They often do not have the chance to gain experience in project management nor to decide how local natural resources should best be managed.

Another type of development



Villages must set their own priorities for water use; this village has chosen a fish pond.



Different water projects—especially the jar-making ones—have solved the water shortage and generated employment.

programme is called the Rural Job Creation Programme which has delegated the administrative power to sub-district councils. This programme should place more emphasis on villager participation in planning and acting together. The government should strengthen the planning and management capability of the sub-district council as well as improving the technical quality of the work.

In order to use water resources effectively, decision making and implementation should be decentralized to the local people and decisions must reflect the local environment. Researchers from Khon Kaen University have studied water resource development systems which emphasize villager participation and the use of technology appropriate for local conditions. Some programmes have been successfully implemented such as the People's Volunteer Water Programme (PVWP), and the People's Well-drilling Programme (PWDP) by the Department of Local Administration (DOLA). Other programmes are still being researched, such as the use of community organizers in the Farmer Participation in Small-scale Irrigation System Project (FPSS).

The development of small-scale water resources using the voluntary labour approach integrates the philosophy of farmer participation and self-reliance with the government's objectives for rural development. Under the PVWP, villagers are responsible for site selection and construction, with the district office providing the construction materials and technical advice. The cost of a

volunteer-built weir is approximately one-fifth of the cost of an agency-built weir. Also under the PVWP the farmers are responsible for managing the project themselves, which means that they make use of the local resources such as labour, expertise and information.

The voluntary labour approach can be used to develop all types of small water resources. The degree of participation will vary between types of construction, but at least farmers should be involved in the decision-making process because villagers know best what is needed locally.

The PWDP is another example of a group which uses appropriate technology in rural development with an emphasis on farmer participation. Most groundwater development programmes currently conducted by government agencies use very large

and expensive drilling rigs; they are too expensive for individual farmers to fund so most of these wells are for community drinking and domestic water supplies. In order to reduce the cost and resolve this problem, the WREI has developed two small rigs: one hand-operated, the other motorized. Drilling and construction techniques have been studied and manuals have been published. The PWDP has also been adopted by DOLA and is being used to promote agricultural activity in areas which have no surface water resources. The Khon Kaen University staff train district and village technicians to enable them to use and maintain the equipment.

Under this system farmers who require wells can request assistance from the district DOLA office, but must pay for the materials, technician labour, and operational costs such as fuel. Total well costs are kept down. Research into the appropriate levels of farmer participation in water allocation and management of both groundwater and surface water is still being carried out at WREI.

Small watershed planning

A small watershed is a natural unit for water and soil resources evaluation. The appropriate size of the watershed adopted depends on whether it is a district, provincial or national plan. A small watershed with an area between 100 to 400 square kilometres is suitable for district planning as village-level assessment can be achieved. A watershed of this size will be home to 30 to 60 villages with streams suitable for small weirs such as PVWP weirs. Typically there are one to four watersheds in each district.

A watershed plan enables the

Two components necessary for watershed planning	
Geographic Information System	Management Information System
<ul style="list-style-type: none"> • Stream and watershed map • Topographic map • Stream networks and orders • Rainfall and streamflow characteristics • Existing and potential land use map • Crop suitability soil map • Map of administrative boundaries and village locations • Locations of existing water resource facilities 	<ul style="list-style-type: none"> • Village-based information • Existing water resource facilities • Existing water utilization • Potential water utilization from existing water facilities • Potential for water resources from existing facilities • Potential for water resources development

district to co-ordinate the activities of other agencies. The development of the larger watersheds with larger rivers should be the responsibility of the national construction agencies such as the public works department, the Office of Accelerated Rural Development and the Royal Irrigation Department. The district can integrate their watershed plans with the overall district and provincial plans. The approach of water resources development as shown in Table 1 can be used for small watershed planning. For example, from the plan we can determine the state of development, the desired development, the budget required and the deadline to be met. Promotional requirements of extension, marketing and environmental activities can also be determined.

The specifics of each small watershed plan vary according to the local environment and community development. The district might start the plan with limited information and review it annually as more knowledge becomes available and implementation proceeds, or confidently plan five years in advance. The box gives an outline of the contents of the Huay Khaw San Watershed Plan, Warinchamrad district. Assistance with this plan was given by the Thai-NZ Small Watershed Development Project.

The two components will be updated and maintained with revisions to the stored data as necessary. For example, current research on hydrology will give us guidelines as to the quantities of water in the watershed, the reliability of the supply and the development potential.

Planning information check-list

1. System and agencies responsible for small water resources development
2. Description of Huay Khaw San Watershed
3. Water resources
 - Rainfall
 - Streamflow
 - Water resources
 - Water use
4. Soils resources
 - Physical characteristics
 - Land use
5. Need and potential for water resources development
6. Problems and development approach
7. Budget requirements
8. Monitoring and evaluation

Marketing research will help farmers to plan their crops more confidently. The WREI is assisting with the dissemination of the information along with guidelines for its use as the information systems are being developed. It is co-ordinating its activities with central DOLA, the provinces and districts for the whole of the North-east to do this task.

Decentralization and planning

Improved water and soil resources management will be achieved when the responsibility for rural development devolves to the local organizations. This will result in decisions being made which reflect the needs of the individual rural communities, promote a better standard of living and conserve the balance with nature. Farmers must play a greater role in planning development within the framework of sound government legislation with guidance from sub-district, district and provincial staff. Good local information must be used together with technologies appropriate to the needs of the rural community in proportion to the country's rural population.

The major constraint in planning faced by government agencies is either a lack of information, or information which, if available, is not usable. For this reason there was a need for a planning information system. The information system has two parts, a management information system at each provincial office (PMIS), and a

Coming in the April issue

The next issue of *Waterlines* will explore the theme of environmentally sound water and sanitation projects. The contributions will be international and co-ordinated by *Waterlines*' own Technical Editor, Charles Kerr. The articles will include:

- An editorial piece to do with the topic in a wide sense including irrigation projects, recycling and protection of water resources, environmental degradation and pollution and resource depletion.
- A World Bank piece to outline their new environmental policy especially to do with dam and reservoir projects.
- An article dealing with groundwater pollution control and water quality monitoring.

Among the non-theme pieces will be one from Malawi which will examine the efficacy of using Moringa seeds for coagulation.

geographic information system (GIS) at the regional data centres (Khon Kaen University is one).

The PMIS consists of the village data gathered from the National Rural Development and other surveys. The GIS currently being developed for the North-east displays this data in map form. The computer-based information system enables planners to evaluate the existing water and land resources, current water usage, and the need and potential for development. ■



Technologies appropriate to the needs and population of the rural communities must be chosen. This community needs another handpump.