

Surface water shortage has led many local communities to pump groundwater for agriculture both from private and collective groundwater holes. This research aimed to study collective groundwater management for agricultural purpose by a lowland community in Northern Thailand which has previous experiences in *muang-fai* irrigation management before groundwater use. The objectives were as follow : 1) to study how local water resource management was institutionally transformed from *muang-fai* irrigation system to groundwater system, and how user groups adapted previous management experiences; and 2) to study the interaction between water management and land use change.

This qualitative research was based on the concepts of moral economy, land use intensity and the analysis of institutional management of common property resources. Both qualitative and quantitative data were collected by in-depth interviews, questionnaires, field observation and aerial photo interpretation.

It was found that the use of groundwater for agriculture was a strategy to cope with water shortage problem. This community used to cooperate with other communities to manage *muang-fai* irrigation system. Experiences and knowledge from *muang-fai* management were modified to suit the nature of groundwater resource. Farmers collectively designed organizational structure,

labor recruitment, users' rights and responsibilities, rules and regulations, and resolution of conflicts which might occur among water user groups. Such adaptation was crucial as groundwater harvesting required high level of capital and technology input.

One aspect of important adaptation was access to water. In *muang-fai* irrigation system, users gained right to water by participating in activities under collective rules and regulations. By contrast, ground water users gained water rights by purchasing "groundwater stocks and shares." Such modification reflected that the community adopted market system in allocating groundwater rights among water users.

Besides the institutional aspect of water management, it was also found that groundwater use for agriculture led to land use change in the village. Farmers used land intensively to grow rice, shallot, garlic and chilli. Some farmers cultivated tomato and potato under contract farming arrangements. Moreover, some paddy land was converted to longan orchards. The use of groundwater for agriculture since 1981 made multiple cropping possible all year round. This was in contrast to the period before groundwater utilization when land was left fallow for 7-8 months after rice harvest. Groundwater use not only led to intensive land use, but also change in community economic structure, higher income and higher standard of living. Moreover, there was change in agricultural production relations. Farm labor exchange gave way to waged labor. Such change not only occurred with groundwater use, but also with penetration of state and market into the community.

This is the study of collective groundwater management system done by only one community, whereas the use of groundwater for agriculture are prevalent. Further study should be made. On other community-based groundwater management systems in different contexts. Since groundwater is also used in urban, industrial and service sectors, thus, the planning and use of groundwater for different purposes should be integrated for sustainability of the natural resource that has very slow replacement rate in order to prevent ground water depletion in the future.