

## **Diversity of Water Management Systems: Examples from Hmong and Thai Communities in Mae Sa Watershed, Northern Thailand**

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# Diversity of Water Management Systems

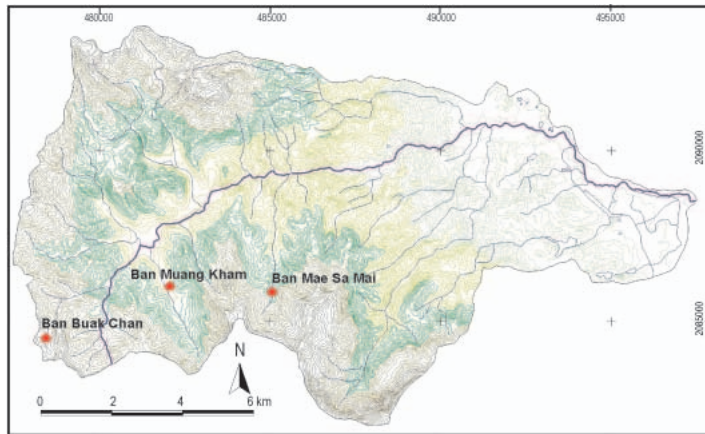
## Examples from Hmong and Thai Communities in Mae Sa Watershed, Northern Thailand

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*In Thailand water is widely perceived as an open access resource. It is also common belief that organization of highland irrigation in northern Thailand is characterized by a relatively simple structure, and that local communities are not able to adjust their management practices to new realities. The existence of diverse forms of control, ownership and rights of use relating to water resources is widely ignored. This goes along with a stereotypical and static picture of highland people—and ethnic minorities in particular—as being environmentally destructive and culturally backward. These*

*misperceptions fail to recognize that economic, institutional and social conditions are rapidly changing in the highlands of northern Thailand. These changes bring about a range of cultural and economic adjustments at the local level, which is also reflected in the management of water resources. The present article argues that cultural identities and social norms in the highlands are fluid, that local communities continuously adapt their water management practices to new circumstances, and that the outcomes of this process are not always beneficial to sustainability and distributional equity.*



**FIGURE 1** Study villages in Mae Sa watershed. (Map by authors)

### Management of irrigation water at the community and farm levels

Water allocation and management systems in two Hmong communities (Mae Sa Mai and Buak Chan) and one Thai village (Muang Kham) in Mae Sa watershed (Figure 1) are presented in what follows. The watershed is located on the outskirts of the northern city of Chiang Mai and is used intensively for market-oriented agriculture. In all villages, open and semi-structured interviews were conducted with key persons (eg, village headmen, government officials, heads of water management committees, and women's groups) from 2002–2004. In cooperation with local experts, we carried out an inventory of water storage and conveyance systems and identified water rights, management, use and conflicts. The location of water

sources was determined by a mobile Global Positioning System and integrated into a Geographic Information System.

### Management of irrigation water in Hmong communities

Under the opium replacement policy of the Thai government, land use in Mae Sa Mai and Buak Chan changed from poppy cultivation and upland rice to corn and coffee production in the 1980s, before changing to the present land use system, consisting mainly of cash crops such as flowers, vegetables and fruit trees. Today, a major proportion of the agricultural fields are irrigated by conventional sprinklers through gravity irrigation.

#### Mae Sa Mai

In Mae Sa Mai, the only settlement in Mae Sa Noi sub-catchment, 3 main water tenure systems have developed over time: (1) individual water use rights, (2) user groups sharing the same pipe or ponds, and (3) user groups sharing the same springs or creeks. The establishment of user groups follows pragmatic economic considerations: farmers sharing the same compartment, pond, or pipe are owners of neighboring orchards and belong to different clans in the village. This is in stark contrast to the traditional social structure of Hmong society, in which cooperation between members of different clans is not very common.

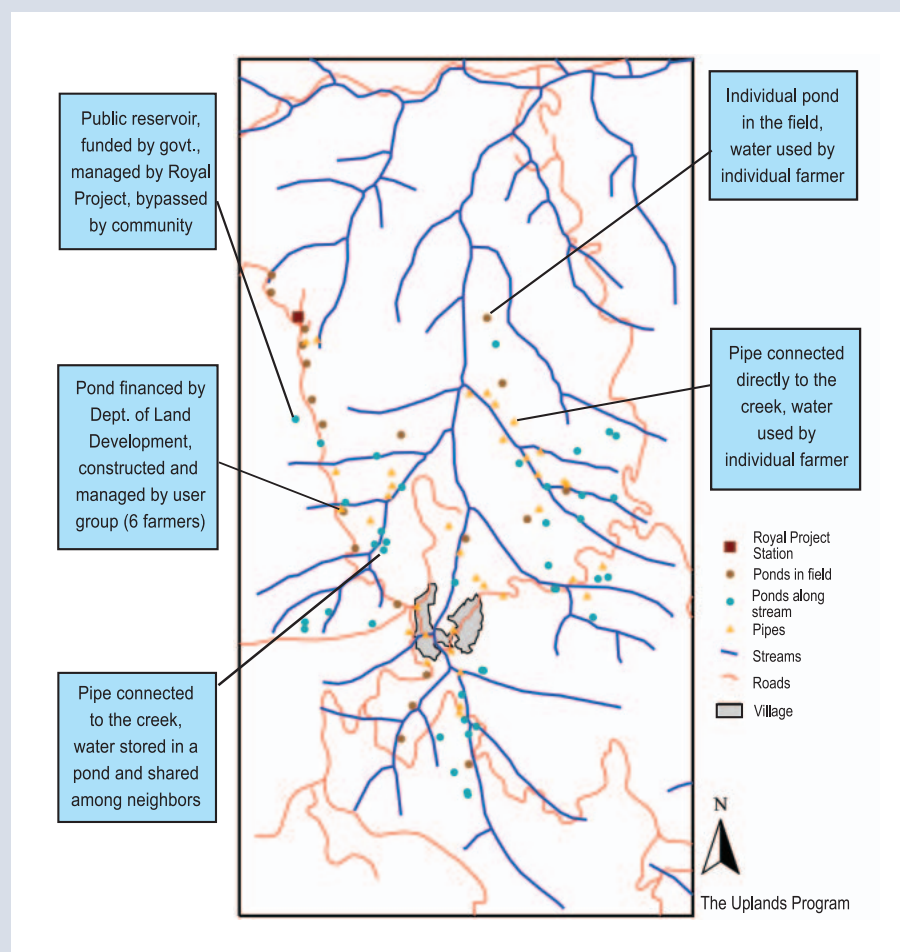
Water rights are part of a complex and pluralistic resource tenure system

adapted to social, cultural, economic, technical and geographic conditions (Figure 2). Farmers who were the first to build reservoirs and pipes have first priority in water use, leading to unequal allocation of water. Hence, water use rights strongly reflect local power relations, with members of local elites controlling the water conveyance systems by tapping water directly from the source and claiming a bigger share than others, since the less powerful do not dare to interfere. Powerful farmers also have the opportunity to extract water from different sources, and are thus able to use the legal pluralism in the community for their own benefit and to diversify risk in a rapidly changing institutional environment.

After a series of water conflicts among villagers, a water committee was established in 1996 composed of one representative from each of the 5 clans in the villages, in order to ensure objectivity and transparency for all users. However, the committee's decision to allow a maximum pipe diameter of one inch in order to equalize water allocation was undermined by several farmers of high social status, who continue to use pipes with bigger diameters. Likewise, an attempt by government agencies and a Royal Project to improve water availability through the construction of a public reservoir in 2002 has been impeded by the village headman and other influential people, who use plastic pipes to bypass the reservoir, which in turn is drying up (Figure 2).

### Buak Chan

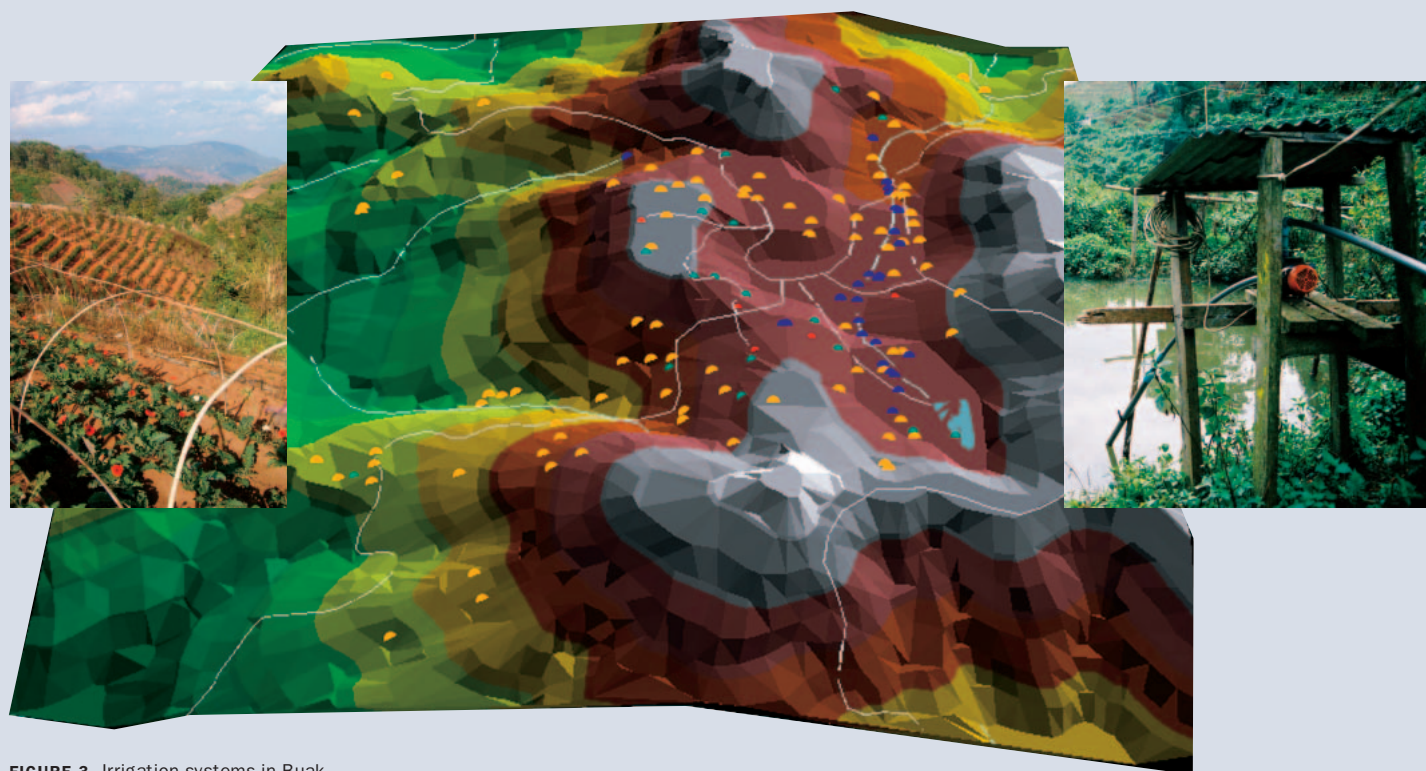
In Buak Chan, the main sources of irrigation water are communal and private ponds in a narrow valley below the village settlement (Figure 3). All the ponds are fed by springs or stream water and have been dug into the ground. Ponds established by individual farmers on public land are recognized as private property. As all fields are located at a higher altitude and most of them are even on the other side of mountain ridges, farmers need pumps to transport the water via pipes to their flower and vegetable plots. Hence, in Buak Chan, water and land use rights, which have traditionally been closely connected with each other, are today completely segregated.



Private ponds are used either by individual farmers or by close relatives in a shared arrangement. The 4 communal ponds can be used by any villager who has enough capital to install a pump and connect it through a plastic pipe to a private storage facility in his or her field. Thus, a common-pool resource is being gradually transformed into an individual commodity. Water-saving irrigation technologies are rapidly expanding in the village, with the introduction of hydroponic sweet pepper and tomato production. The individualization of access to water did not cause a high level of inequality among the villagers, however. The major reason for this is that most farmers have successfully engaged in profitable and diversified cash crop production, while protecting their land and water resources against outside investors and speculators and maintaining a cohesive social structure.

**FIGURE 2** Legal pluralism of water use rights in Mae Sa Mai. (Map by authors)





**FIGURE 3** Irrigation systems in Buak Chan. Photo left (by Andreas Neef): small-scale cut flower production. Map center (by authors): public and private ponds in the valley (blue) for irrigation of fruit, vegetable and flower fields on the slopes (orange). Photo right (by Anne Bollen): electric pump at a private pond.

### Management of irrigation water in a Thai community

Traditionally, water in Muang Kham was managed on a communal basis as long as paddy rice was the most important crop. Water for cultivation of the paddy fields came through the *muang-fai* system, which diverts water from the Mae Sa and Mae La Ngun rivers through an elaborate system of weirs (*fai*) and small canals (*muang*). Members of the *muang-fai* system would elect a so-called *gae muang*, responsible for allocating water in an equitable way, enforcing the regulation of water use, organizing the communal maintenance work, and performing the ceremony for the weir spirit. In the past, there were 4 main irrigation canals operating in Muang Kham, of which 3 are still in use, though only one remains under the supervision of a *gae muang*. As farmers have gradually shifted their cropping system from paddy to vegetables and flowers since the mid-1980s, they now draw water from the common weir through individual plastic pipes (see the adapted system in Figure 4). This practice makes sense because today—unlike in paddy cultivation with its fixed

schedule for preparation, planting, irrigation and harvesting—each farmer grows a variety of crops in different seasons, which requires flexible access to water. Notwithstanding the individualization of the allocation system, access to the water source remains tied to the former *muang-fai* system.

In sloping areas, farmers would use water directly from the creeks, either by installing pipes leading towards their fields or by constructing small earthen or concrete basins/ponds, funded privately or by the government. These ponds can be located by the stream or directly next to the farmers' fields, with pipes leading towards the plantations. Water allocation facilities are usually shared among family members, and only in a few cases are they used jointly by independent parties across family boundaries. Different farmers using the same creek form water user groups, which in some cases have elaborated a detailed list of rules and regulations concerning water use.

The commercialization of agriculture and land has induced a shift towards more individualized systems of water conveyance and irrigation. The trend towards

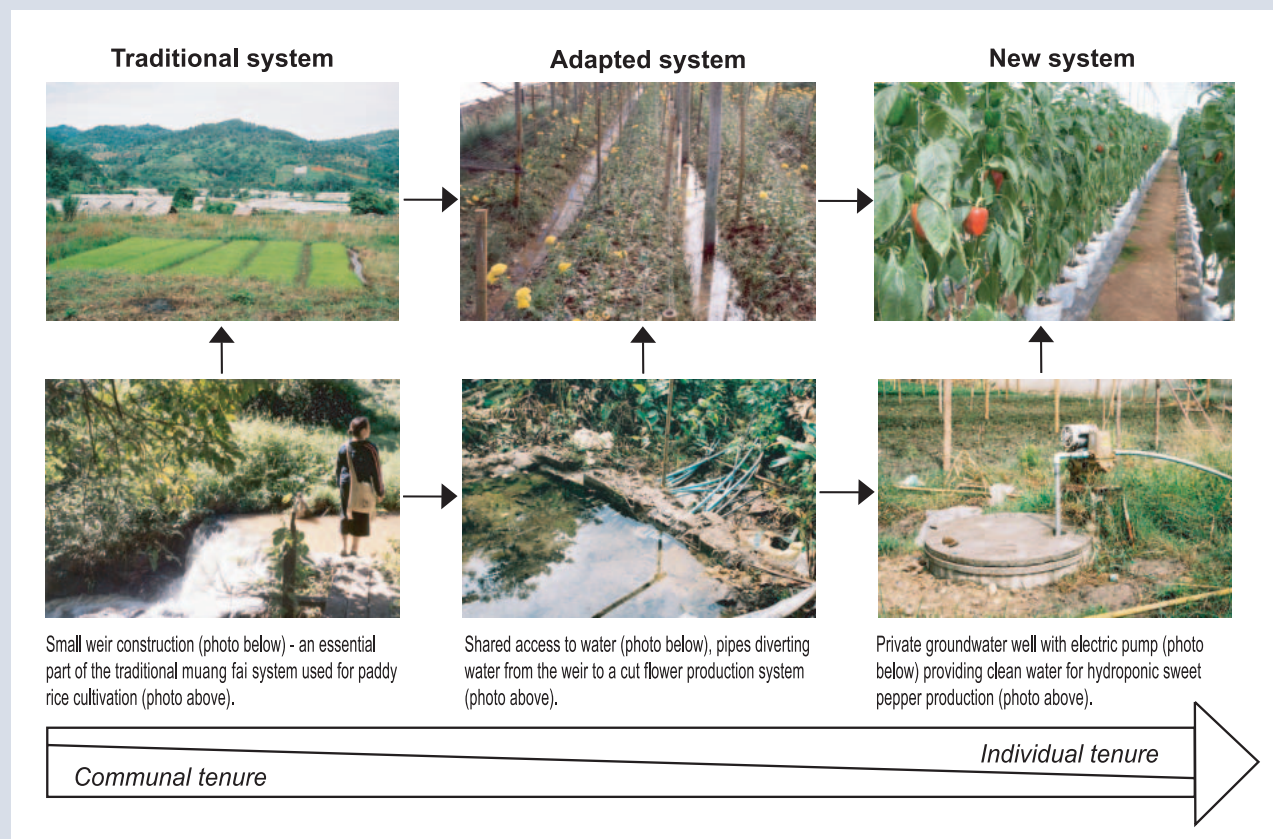
individualized water management strategies was accelerated by the introduction of strawberries in 1992/93, as farmers started to construct private wells in order to ensure a sufficient supply of clean water. Since 1998, more private wells have been built by contract-farmers growing sweet peppers under hydroponic conditions for a foreign company.

Since communal forms of water allocation continue to exist (although they are much less important), water management has become far more complex. Today, three main types of access to water can be observed in the village: (1) direct access to natural water sources, (2) access through the *muang-fai* system, and (3) private groundwater wells, the last becoming increasingly important (Figure 4).

In sum, the individualization process of water management in Muang Kham has seriously undermined traditional forms of collective action among community mem-

bers, usually referred to in Thai as *chuai kan* (literally, “help each other”). The culture of mutual assistance and communal resource management at the village level has disintegrated into sub-cultures of (1) cooperation based on family ties, (2) collaboration within small water user groups, and (3) individual maximization of resource extraction, both at the expense of other villagers and—in the case of groundwater wells—of future generations.

Today, water distribution among users is characterized by great inequalities because it depends on factors such as the distance between the resource and the fields, the time of settlement (those who came first will have long-established and therefore more secure access rights), location of the field (“first come, first served”; upstream users are in a better position) and the financial situation of the farmer (need for investment to build a conveyance system).



**FIGURE 4** Development towards individualized water tenure systems in Muang Kham. (Photos—clockwise from top left—by Peter Elstner, Liane Chamsai, Anne Bollen, Peter Elstner, Peter Elstner, Liane Chamsai)

## Conclusions: cultural diversity and sustainability of water use

The results of the case studies show that the perception of water in the highland watersheds of northern Thailand as an open access resource is largely inaccurate. Instead, control and use of water resources are subject to different tenure regimes, rights, and obligations that reflect a high degree of cultural diversity and strong external dynamics. The lack of unifying institutional conditions beyond the local level makes it possible for water management systems to remain very different from one sub-catchment to the other. With an increase in the importance of water used for irrigation, water rights tend to become more complex and contested. Social norms of sharing access to resources and managing water in a communal way are weakened in one location, while being strengthened in another. In some villages, community-based rules and regulations are not always respected by all villagers, and local elites tend to use their social or economic status to increase their share in the control of water resources. This is in contrast to the romanticized picture that some NGOs and human rights advocates tend to draw of local communi-

ties as harmonious and peaceful entities working towards a common goal of sustainable resource management and acting according to local rules.

While external intervention in water resource management by government agencies might be necessary to avoid distributional inequities within highland villages to reduce resource competition between upstream and downstream users, this needs to be based on a thorough evaluation of existing power relations and the historic genesis of water rights. As the village case studies suggest, water management in highland areas depends on a complex interplay of geographical, cultural, technical, economic, institutional, and social factors. Conclusions on resource use patterns based on general cultural categorizations of highland people into a Thai majority population and different ethnic minority groups tend to disregard the dynamics of cultural identities, and the emergence of different sub-cultures within highland communities. In order to achieve sustainable water resource management, policy-makers and development practitioners would be well advised to acknowledge the need to work with this cultural diversity instead of controlling or—even worse—ignoring it.

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