

The Emergence of Polycentric Water Governance in Northern Thailand

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Abstract: *Polycentric water governance in northern Thailand is emerging in a complex set of interacting institutional transitions. Conflicts, including upstream-downstream contests over water quantity, water quality, and watershed land-uses, are co-evolving with self-reform processes within local irrigation institutions, diverse communities, government agencies, and civil society organizations. Changes in water governance bridge multiple scales: linking local organizations, convening subbasin forums, and engaging national debates about rights to land and water.*

Tangled Transitions in Water Governance

Access to water has become an increasing source of controversy in northern Thailand, disputed through public, private, and legislative debates; petitions; protests; and road blockades. Water disputes intertwine with conflicts over rights to use land and forests, particularly in upper watershed areas. Underlying the disputes lie not just competing interests but competing visions regarding governance, economic growth, social justice, and environmental sustainability. Attempts to resolve conflicts have often failed to reach agreement, or formulated agreements that turned out to be unworkable. At the same time, the institutional landscape has been rapidly evolving. Organizations, including national bureaucracies, local government bodies, and community groups, have been reforming themselves in response to conflicts over access to water and land resources, decentralization of authority and government budget, and the increasing role of the media, elections, and parliamentary politics.

Thailand's 1997 Constitution mandated that communities be involved in managing local natural resources. While many constitutions had been promulgated by earlier regimes, the 1997 Constitution was the product of extensive public discussion and embodied a range of reforms to institutionalize democracy and good governance. Transitions were underway in Thailand from the earlier centralized “bureaucratic polity” (Riggs 1971) toward democratization, decentralization, industrialization, and urbanization (see Wyatt 1984 for a general introduction to Thai history, and Phongpaichit and Baker 1998 for an overview of more recent developments). The destination for these transitions has been contested. Issues suppressed under previous political regimes emerged with new vigor. Efforts to shift from earlier top-down economic and social development pushed and pulled in different directions. Views clashed about how to pursue goals such as improving the lives of poor people and conserving the environment.

Changes in government policy and practice opened new opportunities for communities to participate in managing local land and water resources. However, the geographic scale of water

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conflicts increasingly extended beyond local groups, and encompassed multiple uses of water in different sectors, not just irrigation but also domestic water supply, industry, environment, and other needs. There was a need to coordinate water use not just with friends and neighbors locally, but with strangers tens or hundreds of kilometers distant. Even for local groups with a history of successfully managing local resources, such as northern Thailand's *muang fai* communal irrigation systems, dealing with shared resources that extend over broader areas posed additional challenges.

Management of water and other natural resources can develop through crafting agreements about new institutional arrangements and operational rules. This can occur at multiple levels, such as restructuring management of individual irrigation systems, improving coordination among neighboring irrigation systems sharing the same stream, establishing institutions for managing larger river basins, or revising national policies regarding rights to land and water. As in northern Thailand now, it may first be necessary to address "constitutional" level issues (E. Ostrom 1990) of who will be involved in decision-making, what forums will be used, and how collective choices will be made.

Existing institutional arrangements may facilitate or obstruct pathways to crafting new institutional arrangements. Changes in government structure and rules, particularly regarding rights to resources such as land and water, affect the incentives and ability of different parties to make credible commitments and negotiate successful agreements (Williamson 1996, North 1990). Such institutional arrangements are important not only in the case of markets and businesses, but also affect whether users of resources, such as land and water, can negotiate agreements to peacefully resolve conflicts.

These changes occurring in water governance in northern Thailand constituted the emergence of more polycentric (V. Ostrom 1997) patterns of governance, in contrast to resource management from a single source of political command or technocratic authority. Water governance was moving away from past bureaucratic centralization toward not just devolution of some environmental governance authority to local communities, but toward a more complex mix of institutions at multiple scales. The process included common property organizations, such as local *muang fai* irrigation groups, which held resource rights based on community norms, (or "local law") as well as state law. From the perspective of polycentric governance, government can play a crucial role in facilitating problem solving to create new institutions, by providing technical information and a legal environment that gives authoritative reinforcement for agreements (Blomquist 1992).

Theoretical and field analysis of polycentric governance (see for example V. Ostrom 1999, McGinnis 1999, E. Ostrom 1999) has pointed out both strengths and weaknesses, particularly where these involve an increased role for local institutions in the provision of public goods, such as water management. Advantages include local knowledge, monitoring by interested stakeholders, the ability to customize rules to local conditions, easier adaptation based on learning from experience, and the potential gains from multiple local "experiments" operating in parallel. However, decision-making dependent on consensus among many stakeholders may be costly and time consuming to achieve, vulnerable to strategic manipulation by parties who "hold out" against agreements, and impeded by

confusion and differences in concepts and values. Polycentric governance patterns can be hard to understand, often appearing messy and chaotic by comparison to hierarchical command and control. For problems with simple clear solutions, or for those who believe that such simple solutions exist, polycentric processes can seem unnecessarily complex and time consuming. Concepts of polycentric governance lead not to an argument for simplistic devolution to “the lowest possible level,” but instead point out the benefits of an evolving mix of levels and institutions.

The emergence of polycentric water governance in northern Thailand has created new opportunities and challenges. The next two sections of this paper introduce the Mae Ping and Mae Yom River Basins and outline how rights to water, land, and forests have been arranged and contested. Subsequent sections discuss local governance, organizational self-reform, ethnicity and environmental governance, economic crisis, networks of non-government organizations, and science in polycentric water governance.

The Mae Ping and Mae Yom River Basins

The Mae Ping and Mae Yom basins cover much of northern Thailand, and resemble other upper sub-basins of the Greater Chao Phraya Basin. Agriculture continues to be the largest user of water and farmers’ livelihoods depend on water. Urban water demands are growing and environmental issues receive increasing attention. Average rainfall for Thailand is 1,560 millimeters per year, of which about 25 percent turns into streamflow. As shown in Table 1, while the length of the two rivers is similar, the Mae Ping Basin is larger and includes about twice as much area categorized as Class 1A watershed based on steep slopes, high elevation, forest cover, and other characteristics.

Table 1. Mae Ping and Mae Yom Basins

	Thailand	Mae Ping Basin	Mae Yom Basin
Catchment Area (km ²)	512,800	35,244	24,466
Upper Watershed (1A) (%)		36	18
Upper Watershed (1B) (%)		2	1
Length (km)		740	735
Provinces	73	5	12
Basins (watersheds)	25		
Sub-basins		(Upper Ping) 15	77
Water use (mcm/year)			
Agriculture		1,315	412.6
Domestic		70.15	34.49
Industry & tourism		3.84	0.48
Irrigation schemes (medium and large scale)		52	24
Water storage (mcm)		14,083	54.7
Irrigated area (rai)		1,272,410	465,000
Land use (% in 1999)			
Conservation forest		69.68%	23.06%
Other (degraded) forest, grassland, and scrub		5.78%	33.79%
Agriculture		23.03%	42.69%
Settlements		0.61%	0.10%
Water resources		0.91%	0.08%

mcm=million m³ Sources: 1) Office of the National Water Resources Committee; 2) Pollution Control Department 1999.

The Mae Ping River Basin contains Chiang Mai, the largest city in northern Thailand, and a center for administration, education, and tourism. The Chiang Mai Valley has been home to over two thousand small *muang fai* or people's irrigation systems, as well as larger government-managed systems. Most irrigation served lowland fields growing wet-season rice and dry-season irrigated crops such as soybeans, garlic, and onions. Over the past few decades, cultivation of vegetables expanded, particularly in some highland areas. Fruit orchards in lowland and hill areas, were often irrigated from canals and groundwater. More specialized crops such as strawberries and orchids appeared. Urban water demands increased, with, for example, the city of Chiang Mai taking a larger share of water from the Mae Taeng Irrigation Canal, and increased diversions from the Mae Ping River into that canal affecting downstream water users. Water quality in the Mae Ping deteriorated in terms of indicators such as biological oxygen demand, pesticides, and sediment.

Beginning in the mid 1970s, in Chomthong District south of Chiang Mai and elsewhere, government projects assisted upland farmers in shifting from opium to cabbages and other vegetables for lowland markets. These crops were irrigated; drawing on the same streams on which those further downstream relied. As discussed in this paper, controversies over water engaged not just local communities but a wide network of contestants.

The Mae Yom River Basin, located to the northeast of the Mae Ping, was still primarily agricultural with fewer water conflicts. Institutional changes could be seen in efforts to improve networking among different people's irrigation systems, and work with the Royal Irrigation Department to develop more transparent procedures for participatory planning. Irrigation projects in Thailand have been increasingly questioned by local communities, non-government organizations, academics, and others. One point of controversy has been the Kaeng Sua Ten Dam proposed near the border between Phayao and Prae Provinces.

In terms of a three-stage categorization of basin development (Sakthivadivel and Molden 2002), water demand in the Mae Yom was well below (locally) available supplies; so most water management issues concerned infrastructure construction. The Mae Ping Basin has been in a transitional phase emphasizing utilization, with less potential for further construction and more concern to make good use of existing infrastructure, although water quantity and water quality issues were still addressed in a non-integrated sectoral manner. The presence of the large storage reservoir at the Bhumipol Dam in Tak Province disconnected management of the upper Ping Basin from increasing demands in the lower Chao Phraya Basin. The Greater Chao Phraya Basin as a whole was "closing," with most of the potentially available water utilized (especially if problems of seawater intrusion, wetland habitats, and other environmental water demands were taken into account), so allocation phase issues came to the fore. However the impacts were primarily felt lower down in the basin, with institutions to link issues of water use upstream with demands downstream still relatively undeveloped.

As in much of monsoon Asia, community irrigation systems in northern Thailand have long experience managing water during seasonal scarcity. *Muang fai* irrigation systems developed institutions for coordinating water allocation within and between irrigation systems, to share dry season base flows and to cope with late monsoons and dry spells during the wet season. Local communities have long played a crucial role in regulating access to water, land, and forest resources. However the concentration of formal authority over water and other natural resources in centralized government agencies has meant that such institutions were inadequately supported or even contradicted by state laws and regulations.

Resource Tenure

Water. According to the thirteenth century Laws of King Mengrai, royal authorities mobilized laborers who alternated ten-day shifts cultivating their own fields and constructing irrigation systems and other public works. Those who built irrigation systems were allocated water and land in accordance with the work they had invested. While then and later nobles played a role in building some schemes near Chiang Mai and other centers of rule, more often schemes were built by groups of farmers joining together to build irrigation systems on their own (Tan-Kim-Yong 1983).

Local irrigation governance in Chomthong District south of Chiang Mai included a complex set of rules for shared investment responsibilities and shared rights for access to water by different local irrigation groups. Farmers contributed labor, tools, materials, technical expertise, reporting, and information (Tan-Kim-Yong 1995). Taking part in construction established rights to use water and irrigation infrastructure. Rights were maintained by contributing to annual repairs, Agreements about rights and responsibilities were often unwritten local custom. However some agreements were written and signed by all those involved, sometimes with explicit covenants committing the signatories to protect forests in headwaters catchments (Sirivongs 1983). As part of pre-season repairs, leaders would walk through the system, checking whether outlets were properly located and sized in proportion to equitable water shares (Tan-Kim-Yong 1983). The People's Irrigation Act of 1938 recognized the role of irrigation schemes built and managed by local communities.

Large irrigation systems in the Mae Ping Basin often overlaid existing farmer-built schemes. While formal management authority lay with the Royal Irrigation Department (RID), most internal management, including canal cleaning and water distribution, remained with locally self-governing groups (Potter 1976). Government-managed schemes derived their formal rights to water from RID authority over water allocation. This was embodied in technical specifications concerning irrigation system design and water abstraction plans. There was no legal requirement to notify existing users about new irrigation construction; so downstream farmers usually lacked any opportunity to express their concerns about impacts. Neither the agency units administering irrigation systems, nor irrigators' organizations were issued any formal water license or permit.

Land. Thailand's agricultural history has been one of converting forests to fields (Moerman 1968, Hirsch 1990). While the government declared that most forestland was state property, farmers

established their claims by clearing land and paying taxes. Over time, de facto locally recognized rights were usually transformed into formally recognized rights. During the 1980s and 1990s, Thailand simplified and accelerated land registration, relying on air photos and local consultation. The new process represented an example of relatively efficient procedures to document and formalize local property rights (de Soto 2000). However even where local people saw possible advantages to land titling, it could still complicate inheritance, create new vulnerabilities to losing land, and otherwise change local institutions (Ganjanapan 2000).

In the 1990s Thailand also reduced regulations on planting and cutting trees on private land, revising one regulatory disincentive that had promoted deforestation. Farmers were allowed and encouraged, with some restrictions, to plant private groves of teak and other trees. However, in many areas still claimed by government as reserve forest or parkland, particularly upper watershed areas, rights to land and forests remained more complex and contested.

Highland forests. In northern Thailand, some farming systems, such as those commonly used by ethnic Karen villages, exemplified sustainable patterns of land use. Pilot projects, such as the Doi Sam Meun Project, demonstrated how participatory land use planning could integrate local knowledge and scientific knowledge to formulate local land use plans based on appropriate, sustainable land uses (Tan-Kim-Yong 1987). New policies instituted within the Royal Forestry Department sought to spread such arrangements. In highland areas, where most land was formally classified as part of parks, wildlife sanctuaries, or watershed conservation areas, such access was allowed or tolerated using administrative discretion, but was not embodied in formal permits or use rights.

Some environmental groups questioned the sustainability of such arrangements and their impacts on headwaters forests, “*ba ton nam*.” They argued that such land use threatened water supplies to lowland areas, and endangered environmental values such as biodiversity. By contrast, “people can live with forests!” was one of the rallying cries of those advocating greater access by households and communities to “forest” land that the government claimed as its own. They argued that communities could at least protect forests better than the government had in the past.

During the 1980s and 1990s, government agencies carried out many projects in uplands areas aimed at rural development, suppression of opium cultivation and resource conservation. They also strengthened enforcement of regulations regarding parks, logging and other forest use, but were still troubled by recurrent scandals over illegal logging and construction of private homes and resorts on forestland. In the context of the multiple transitions occurring in community land use and agency practices, all sides in the debate could point to evidence supporting their positions on the feasibility and problems of local control of land use in upland areas.

Local Governance

For centuries, nobles, *chao muang*, ruled local areas, often maintaining political and commercial contacts with multiple centers in shifting networks of influence. Beginning in the late nineteenth century, the central Thai kingdom installed bureaucratic institutions (adapted from colonial Malaya

and Java), to strengthen central control (Bunnag 1977). Elite families retained land and influence, while their children were recruited into the bureaucracy, (though sent to serve elsewhere and rotated to new locations every few years). Villages were placed into an administrative hierarchy within subdistricts (*tambon*), districts (*amphur*) and provinces. An earlier, more polycentric pattern was replaced with a centralized structure.

Figure 1. Timeline

Bangkok Kingdom	1767-	<i>Rattanakosin Dynasty succeeded earlier Ayutthaya Dynasty. Gradual increase in central control over local principalities</i>
Thesapiban reforms	1890s-1910s	<i>Administrative reorganization establishing centralized bureaucratic control</i>
Constitutional monarchy	1932	<i>Established forms of constitutional monarchy and parliamentary democracy. Later governments strongly influenced by military and often replaced through coups.</i>
	1973-1976	<i>After overthrow of military dictatorship, democratically elected governments initiated funds for local infrastructure projects determined by tambon councils</i>
	1980s	<i>Political opening. Economic growth accelerated. Civil society groups expanded</i>
Tambon law	1994	<i>Established Tambon Administrative Organizations (TAO) with staff, budgets, offices, and increased legal authority</i>
Constitution of 1997	1997	<i>Prepared with extensive civil society input and public consultation. Mandated community involvement in management of local resources.</i>
Ministerial restructuring	2002	<i>Established Ministry of Natural Resources and Environment with regulatory responsibilities for water resources and upland forests.</i>

This centralized administrative structure persisted through the transition to a constitutional monarchy in the 1930s and subsequent governments in which military leaders usually played a major role (see Figure 1). National agencies built roads and irrigation, extended primary education and health services and otherwise promoted “national development.” During the “democratic period” in the middle seventies, elected civilian governments allocated modest funds to subdistrict councils for rural public works including irrigation, and similar programs expanded through the eighties (Bruns 1991). However councils had little authority and remained under close tutelage from district officials.

Districts had no representative body, while provincial councils were weak. Power remained with governors appointed by the Ministry of Interior, and other central agency officials. Political opening in the 1980s, followed by transition in the nineties to governments led by elected civilian prime ministers, brought increasing demands for democratization and decentralization. Businessmen also shifted from working indirectly through alliances with military and bureaucratic leaders, toward more direct personal involvement in local and national politics. They offered increased financial support (legitimate and otherwise) for Members of Parliament and other elected officials and for the shifting coalitions of parties that controlled the national government (Hewison 1997, McVey 2000).

A 1994 law transformed subdistrict councils into tambon administrative organizations (TAOs), with staff, budget and increased authority. It was generally expected that local involvement in natural resource management, in accordance with the 1997 Constitution, would take place through TAOs. Agencies such as the Royal Irrigation Department began to channel substantial budgets through TAOs. These changes increased local democratic control over natural resource management. They also reinforced the nexus for collusion and corruption between local leaders and construction contractors, heightening issues of how representative and accountable local government would be in practice.

In some pilot activities for water and land management, the responsible agencies engaged TAOs in co-management of parks for conservation and tourism, and transferred management of small-scale irrigation. TAOs received some budget support based on local tax collections, but largely depended on discretionary funding from the central government. They lacked capacity to prepare their own proposals for additional funding from ministries concerned with natural resource management.

Neither forests nor watersheds matched the administrative boundaries of subdistricts and villages. This impeded progress in implementing the Constitutional mandate for local participation in resource management. TAOs were busy with many activities, and lacked the concentrated interest in water management of a *muang fai* organization. Similarly, much of the discussion about community forestry has focused on TAOs and villages as management units, even though they have diffuse, widespread interests, rather than allocation of rights to smaller groups that might have clearer incentives and capabilities for common property resource management. In the case of irrigation, availability of subsidies led subdistrict and village leaders to take a larger role, displacing resource mobilization by more autonomous farmer groups. Nevertheless, through TAOs and other means, communities have gained increasing legitimacy, voice, and resources in influencing the governance of water and other natural resources.

Self-Reforming Process of Local and National and Organizations

Participation in Basin Management. For the Upper Ping, including the Mae Klang subbasin in Chomthong, *muang fai* organizations have two decades of history working with many NGOs and university research groups, taking part in public forums organized by NGOs, RID and other agencies. During the 1980s and 1990s university researchers, including at Chiang Mai University, became more engaged in efforts to work with government, NGOs and people's organizations. Researchers documented the continuing vigor of *muang fai* irrigation communities (Surarerks 1986, Tan-Kim-Yong 1983, 1987) and action research demonstrated feasibility of participatory management of water and land resources (Tan-Kim-Yong 1987, 1989, 1992). More broadly in Thailand, local networks have evolved through which communities and NGOs gained a stronger voice in national debates (Narintarakul na Ayuthaya 1997).

Many *muang fai* adapted their internal management and technology successfully to sustain triple and double cropping in the Upper Ping. They represented their agenda in public forums, established

close semi-formal linkages with TAOs and District Offices, joined the leadership of river basin committees, and federated themselves to represent larger zones (Tan-Kim-Yong 1995). They supported political parties, and sometimes replaced local government leadership with their own leaders and candidates.

Chomthong *muang fai* claimed customary rights and rules to share and conserve water, and to maintain sustainable use of forest and land in upstream watersheds. They built external alliances with NGOs, media, universities, and the private sector. They gained financial and technical support from government and NGO's, publicized their agenda, updated information and communication with agencies and local governments, and organized demonstrations over forestry and water issues.

Local irrigation groups in parts of the Mae Yom Basin formed a public forum for consultation and making decisions about water problems. They established more active communication with RID and TAOs. Better information and frequent discussion forums expanded farmers' knowledge about the irrigation agency and availability of development funds. Based on this, *muang fai* groups could better monitor RID and TAOs. Although *muang fai* organizations in the Mae Yom were not yet actively involved in the river basin committee, the groups were concerned about participating in management of upstream and downstream water issues, and related watershed management issues.

For almost two decades, RID has undergone a slow and continuing process of internal contests concerning views and agenda between a few progressive leaders and conservative top leaders. Some reasonable success was reported from the People Participation Irrigation Projects (PIP) supported by IFAD and World Bank in four Northern provinces from 1985-1990. Many projects around the country organized water user groups and associations, but, despite various pilot initiatives, participatory planning and implementation were not systematically institutionalized in RID. As a large complex organization with a big annual budget, RID sought to sustain central control over management decisions and water services. Structurally, a small group of a few officials under the Office of Hydrology was usually proposed to be sufficient for changing RID roles to work with farmers. RID preferred to have all participation and irrigation management transfer duties be primary handled by their own regular personnel.

The National Water Resources Committee (NWRC) provided national forum for water issues, supported by a small secretariat office (ONWRC), based in the Prime Minister's Office. During the 1990s, World Bank and Australian technical assistance helped formulate proposals to establish a Chao Phraya Basin management organization. While the NWRC assented to the principle of establishing a basin organization, it decided to first develop water management committees in basins and sub-basins. Public forums were held to discuss basin water management issues and ways in which the public could be involved.

The order of the Prime Minister authorizing the ONWRC provided for involvement of water user representatives on basin and sub-basin management committees. They were to be chosen in meetings of stakeholder groups, joining other committee members invited and appointed by the government.

However at this early stage and without an explicit basis in a water law, the powers of the committees were not specified. This left them as advisory bodies rather than empowered to make decisions. *Muang fai* leaders often did not yet see the benefits of such participation.

The river basin committee for the Lower Ping made some progress in formulating consensus among farmers' groups about their representation and co-management plans with RID. This was a significant step to reform their leadership and networks in the transition toward decentralized decision-making. In one irrigation system, having decided to share costs of irrigation canal development, the assembly of farmers' organizations and more than seventy leaders signed an agreement with RID and ONWRC in which the farmers' organization would be responsible for the land transaction cost, land compensation, and maintenance. The government agencies would provide information and technical training, facilitate the forum, and respond to requests for irrigation services. This constituted an important precedent for new forms of cooperation between government and farmers.

Newly established River Basin Committees (RBC) had initial tasks to compile information, integrate water sector development, integrate local agendas into project planning, campaign for local participation in water resource management, and support agencies in resolving conflicts. ONWRC worked with Mae Ping RBCs to formulate a master plan for water resource management and development. Involvement of RBCs in a participatory planning process was expected to result in strengthening and rearranging their representation and functions. ONWRC gained financial support from the government, through Asian Development Bank (ADB) assistance for capacity building, for activities to establish and strengthen RBCs. Strong political support at all levels to empower RBCs was still needed to construct a formal decentralized structure working with the reformed organizations and ministries involved in water resource management. This approach required ONWRC to restructure its organization and continue capacity building at all levels, especially, those working directly with RBCs.

At the national level, for almost a decade, a draft water law was discussed to reform institutions for basin water management. However the political conditions to pass such legislation through Parliament were not present. Some non-government organizations (NGOs), academics, and others became increasingly critical of changes they feared would hurt the interests of poor farmers. Controversy swirled around ideas about "water pricing" and other issues. While earlier drafts of the Water Law described water as state property, later drafts responded to criticism by describing water as a "common right of all people." However, it was not clear whether or how formal water rights for irrigators might be arranged under the proposed law. Water disputants still lacked a clear legal foundation regarding their formal rights to water, while institutions for conflict resolution at the basin level were still in embryonic form.

Community Forestry. During the 1980s and 1990s, the Royal Forestry Department (RFD) initiated participatory forest management projects under three different offices within the Department:

community forestry; watershed conservation and management; and training. Since the achievements in the Sam Muen Project in 1990, the Community Forest Office was pro-active in supporting establishment of an education program at Kasetsart University, drafting a Community Forest Law, and seeking close collaboration with the Regional Community Forestry Training Center (RECOFTC). A few progressive foresters initially developed ideas for a Community Forest Law.

One of the innovations in Thailand's 1997 Constitution allowed laws initiated by popular petition. Civil society groups, including local groups, NGOs, academics and others took action to organize joint forums with RFD. Subsequently they organized a series of public forums to prepare a petition containing more than seventy thousand signatures, to propose a draft Community Forest Law, substantially different from earlier government-sponsored drafts. In this process civil society organizations employed the social capital of their existing networks of relationships to create political capital for revising resource governance (Birner and Wittmer 2003).

In 2002 Parliament considered the draft Community Forest Bill. During deliberation, the Thai Senate revised the draft bill so that community forests could not be established in parks, wildlife sanctuaries, and headwaters conservation areas, in response to various factors including lobbying by conservation-oriented NGOs. The upper and lower houses of Parliament were unable to come to agreement and the legislation did not pass. These debates illustrated how resource governance went beyond a simple contrast between centralized administration and simple devolution to local control, and instead was linked to more complex issues of conflicting interests, the scope of devolution, the role of government regulatory oversight, and the feasibility of local self-governance.

Even if a Community Forestry Law is eventually passed, important contests and opportunities could arise in negotiations about reclassifying watershed areas as part of implementation, for example options for distinguishing highly protected special zones in national parks and wildlife sanctuaries from community forest arrangements in other areas. In the interim, state agencies still held the upper hand. Rights vis-à-vis the government were defined by what agencies were willing to recognize or tolerate using their administrative discretion. Conversely, this meant that for water and forests, local rights continued to be arranged in ways that often varied substantially from those acknowledged by the state, and state regulations were often considered illegitimate, irrelevant, unenforceable, or unacceptable.

In October 2002, a new structure for government ministries assigned regulatory responsibilities for water resources and upper watershed forests in the new Ministry of Environment and Natural Resources. The roles of government bureaucracies were shifting from resource extraction to management, from putting water and forests to economically productive use to management and regulation to conserve and sustain land and water resources. Growing public concern about deforestation, flooding, and corruption helped to discredit earlier management approaches and increase demand for change. Some key conditions stimulating changes in RID and the RFD included formation of political groups of progressive mid-level leaders within RFD and RID, access to

information, public forums, pilot project success, and NGO coalition with universities for a common agenda on natural resource management and environment (Tan-Kim-Yong 2001).

Within an increasingly polycentric process, local groups and government bureaucracies had significant scope to act flexibly as agents pursuing their own initiatives and interests. In the processes of self-reform, local farmer groups networked among themselves and with NGO's, academics, politicians and others. Agencies undertook various initiatives to open up their activities to greater cooperation and co-management with villages, subdistricts and farmer groups. Demonstrations, media coverage, and parliamentary deliberation took on a major role in the process of debating both specific problems and more fundamental changes regarding control over water and land resources. While new laws on community forestry and water were proposed, these did not come to fruition, so reforms that did occur were carried out largely employing the administrative authority and flexibility agencies had under existing laws, backed by both new constitutional mandates and by cabinet resolutions concerning land use rights in upland areas. Economic growth, and changes in agricultural technology, contributed to transforming the context and constellation of interests affecting irrigation.

Economic transitions: Boom, crisis, and conditionality

In the 1980s, Thailand joined Asia's "Tiger" economies, growing some seven percent per year. Land prices rose rapidly. Village labor was drawn into the cities to work in factories and construction. Agricultural mechanization, employing tractors, pumps and other equipment, was accelerated by the scarcity and rising cost of labor. Civil works in irrigation became increasingly reliant on machines and money, with funding coming more and more from the government rather than farmers.

Around cities and towns, such as Chiang Mai, much farmland was purchased for building homes, and in hopes of speculative gains. This sometimes complicated irrigation management, as for example when earthen fill for homes and roads blocked canals and interfered with water distribution and drainage. Usually farmers lacked legal knowledge and capacity to protest adverse impacts of such local land use changes. Farmers also invested in land development, leveling and reshaping irrigated fields and putting in fruit orchards. Water, pumped from canals or aquifers, irrigated orchards, delivered by hoses, pipes, sprinklers, and, more rarely, drip irrigation. Orchards were also an easy way for speculators to earn some income while waiting to sell land. Within villages, more land came to be owned by outsiders, or by villagers living and working elsewhere. Agriculture itself became relatively less important, unable to compete with the profits available in other sectors, at least for those with the skills and flexibility to change occupation and location.

The Asian Financial Crisis of 1997 burst the speculative property bubble. The Royal Irrigation Department however obtained increased budgets during the crisis, intended to support agriculture and assist rural areas, including people who had returned from the cities. The Asian Development Bank and the World Bank used their renewed financial leverage to demand agreement to policy reforms for irrigation management transfer, establishment of basin water management institutions, and

privatization of some water supply and wastewater treatment works. However transforming policy commitments into substantive changes in agency practices turned into a prolonged process.

As the crisis subsided, it appeared that reforms had limited support within RID and other agencies, and were questioned and challenged by other groups. With loan funds committed and being disbursed, the balance of negotiating power shifted, weakening the effectiveness of loan conditionality despite the apparent initial power of international agencies, (a process that Raymond Vernon 1977 referred to as “obsolescing bargains” in the context of investments by transnational companies). International development agencies were at most one of many actors in a polycentric process of formulating new institutions for water governance. Further reform seemed likely to depend much more in internal factors within Thailand, and likely to take forms that would differ significantly from the international “best practices” exhorted by lending agencies in earlier policy dialogue and technical assistance. Institutional reforms did continue, including some in donor-funded projects, but in a rather gradual and exploratory form.

The impacts of rapid economic growth and subsequent international financial crisis showed the increasing linkages with the larger regional and global economy. Government policies and programs in irrigation and water resources management responded to influences from international development banks and other sources, but still demonstrated considerable autonomy in determining policies in irrigation and water management. Even during economic turmoil, the pace and approach to implementing reform revealed the continuing strength of the Royal Irrigation Department and other government agencies, protecting their own interests, responding to new constitutional mandates, and adapting to changes in the political and economic environment. While there were changes in irrigation technologies and crops, and dramatic ups and downs in the larger economy, irrigated agriculture continued to be a major occupation in the river basins of northern Thailand, with farmers concerned to defend their access to water.

Ethnicity and Environmental Governance

Historically, northern Thailand and neighboring areas in Burma, Laos, and Yunnan were sites of interaction between Tai ethnic groups, usually living in the lowlands and politically dominant, with a variety of ethnic groups living in upland areas (Coward 2001). Upland groups typically collected forest products, and grew some upland rice on sloping fields, but also imported rice from lowland areas. Highlanders tended to specialize in economic activities and ecological niches that complemented those of lowlanders, perpetuating patterns of exchange.

Recent conflicts between highland and lowland water users have often been framed in ethnic terms. In areas such as Chomthong District, a combination of government policies and sanctions, combined with inducements from development projects, pushed a shift from opium to vegetables and other cash crops. Opium had yielded a high value from a small area, while cabbages and other crops needed a much larger area to generate income. The resulting farming practices in upland areas were criticized

for causing deforestation and erosion. As upland irrigation expanded, lowlanders argued that their water supplies were being reduced, and polluted by pesticides and fertilizers.

Earlier nation-building sought to impose a single “Thai” identity, and such ideas were still a prominent part of debate, with those living in the uplands sometimes labeled and considered as not being “Thai,” rather than accepted as part of a diverse and pluralist society. Many ethnic minority people lacked Thai identity cards needed for access to schools and bureaucratic services. In addition to those not considered eligible for such cards, others were denied cards due to lack of supporting documents, or had their identity documents confiscated and destroyed. Hmong and other ethnic minorities were attacked as not being “Thai,” based on the argument that they or their recent ancestors migrated from outside the borders of contemporary Thailand.

Hmong, Akha, Lisu and other groups were often referred to as “hill tribes” and criticized for their “slash and burn” agricultural practices. Such critiques ignored the sustainability of many swidden agricultural systems and the multiple causes of deforestation processes in which lowland Thai were heavily involved. The activities of Hmong were particularly criticized, perhaps because while other ethnic groups tended to be more subsistence oriented, many Hmong were vigorously entrepreneurial.

The history of how the Hmong were treated reveals mutual suspicion, a willingness of the Thai government authorities to resort to force, and a reluctance to accord Hmong and other “hill tribes” full rights as citizens and to allow them to stay in the highland areas where they preferred to live and work. Local groups lacked confidence about when and how local resource governance might be accepted within formal legal practice. Differences in culture and language, combined with a difficult history, complicated attempts to agree on rights regarding water, land, and forest resources.

In Chomthong, a number of attempts were made to draft agreements regarding land and water use and other issues. On several occasions, Hmong leaders said during meetings that they would agree, but later decided not to follow through after further discussion with NGOs and academics who framed at their situation in terms of human rights and social justice, holding out for more fundamental changes rather than making locally pragmatic compromises. Inequities, human rights violations, and other problems experienced by highland groups were raised as issues not only within Thailand but also at international forums such as academic conferences. Issues of local land use were thus linked with larger national and international debates about indigenous peoples and human rights.

Attempts to manage natural resources according to a dichotomy of lowland fields and upland forests clashed with the complexity of land-use and ethnicity northern Thailand, and the need to better accommodate diversity in culture and ecological management. Access to land, water, and forest resources became increasingly contested, with increased resistance to changes that might restrict locally-claimed rights. State institutions had limited success in either imposing state sovereignty, or recognizing and facilitating local resource governance.

NGOs, Networks and Alternative Development

With political liberalization in Thailand during the 1980s, non-governmental organizations began to flourish. They worked with communities, both directly in local economic and social development as well as in strengthening the ability of communities to protect their interests and seek redress for past injuries. They gained increased funding, much of it from bilateral and multilateral international development agencies. Over time various NGOs that initially worked largely at the local level increased their coordination, locally, regionally, nationally, and internationally, sharing ideas and experience. They joined together to lobby government and networked to strengthen alternative approaches to development.

A major cause for protests was damage to environment and livelihoods, including that blamed on earlier dam construction. This brought intense skepticism about proposals for further large-scale water projects, such as the Kok-Ing-Nan transbasin diversion project which was proposed move water across parts of the Mae Yom Basin, shifting it from streams draining into the Mekong Basin into tributaries of the Nan River flowing into the Chao Phraya.

Many farmers, NGO workers, academics, and others pursued visions of alternative development emphasizing local self-reliance and ecologically sustainable agriculture. Some NGOs and academics were particularly concerned about rural poverty, often attributed to the disruption of local economies and institutions by government and market intervention. Human rights became an increasingly important part of development discourse (and the agendas of donor agencies), as did environmental issues. Buddhist monks, NGOs and community groups sought to invoke religious values to protect trees and the environment, for example well-publicized activities to “ordain” trees as a way of preventing them from being cut down by Buddhist loggers. Dialogue between NGOs and government on water and other issues was complicated by many factors, including the legacy of suppression of civil society activism during the second half of the 1970s, pursuit of alternatives to capitalist development models, and fear that government overtures were only meant to “co-opt” and legitimize continuing government control over water and other natural resources.

Water conflicts illustrated the involvement of such civil society groups in local struggles and have revealed divergent views among NGOs, and among university scholars. One coalition of environmental NGOs sought to protect upper watershed areas in parts of the Mae Ping Basin. This included proposals to have Hmong villagers relocate to places outside government-designated parks and headwaters conservation areas.

Other NGOs, much more concerned with poverty and human rights, criticized such conservation proposals as part of a continuing government oppression of poor people, especially ethnic minorities. They saw proposed restrictions on access to forests and highland areas as yet another attempt by the government to monopolize natural resources, denying communities the opportunity to manage local resources. These issues were raised in forums within Thailand, and internationally. Conflicts among different groups and networks became increasingly polarized.

At least in the short run, the increased involvement of outside parties may have hindered rather than facilitated attempts to formulate solutions to problems in the management of water and other natural resources. In particular, upland communities using land that was officially part of state forests and parks, were encouraged to struggle to legitimate their existing resource use, and not to compromise. Issues were debated in the media, as well as Parliament and the Cabinet. Cabinet resolutions that first expanded and later restricted the granting of rights to use forest land in headwaters and park areas marked battle lines in the debate.

The polycentric dimensions of water management in northern Thailand included not only the physical linkages to areas downstream, but also the ways in which local conflicts became caught up in larger national, and sometimes even international, discourse about community roles in resource management, human rights, and alternative models of development. The challenge was not just a matter of enhancing co-management between communities and central government agencies, nor of simply devolving power to local entities, but of also responding to a growing range of participants, forums and issues emerging in an increasingly vigorous civil society.

Science and Polycentricity in Watershed Management

Polycentric patterns of governance contrast with technocratic modes that prioritize expert analysis, scientific knowledge, and centralized bureaucratic management. Even for those interested in expanding the role of local communities in natural resource management, a common critique of community-based management is that local resource users may lack scientific knowledge (Baland and Plateau 1996). To put it more positively, the argument is that resources may be better managed where there are ways to draw on and integrate scientific knowledge. Communities may be ignorant of, or misunderstand the dynamics of the resources that need to be managed. Limitations in local knowledge may be even more of an issue where resource dynamics, such as watershed hydrology, encompass wide areas and many communities, with complex sets of interacting factors, and substantial lags between causes and effects. However a closer look at the gaps between scientific findings and the assumptions commonly used to frame debates and disputes about watershed management indicates some of the limitations in scientific knowledge and technocratic remedies, and some potential advantages of more polycentric patterns.

A growing body of scientific research has contradicted or qualified many of the concepts commonly used in framing debates, in Thailand and elsewhere, about the relationship between forests and water, both generally and for tropical forests in particular (Hamilton 1983; Bruijnzeel 1990; Calder 1999). These general findings, and more specific research results in northern Thailand, suggest that deforestation may have much less impact than commonly assumed, and that the problem may be largely one of growing water demand in lowland areas (Walker 2002a, 2002b). In particular, research conclusions indicate that:

- Forests are not sponges. Depending on patterns of leaf growth and groundcover, forests may even accelerate runoff compared to other land use patterns.

- Forests do not attract rain. Even where local evapotranspiration contributes to rainfall this is often relatively small in quantity, with little net impact on groundwater and stream outflows.
- Deforestation may not reduce groundwater availability. Groundwater levels and springflows may actually rise if less water is lost to transpiration by trees.
- In theory, well-managed agroforestry or even grasslands could yield the same or higher levels of water availability than original natural forests.
- Reforestation may not increase water availability, if it increases transpiration losses from trees.
- Erosion rates in landscape mosaics that trap erosion downslope may be much lower than indicated by small research plots. Roads, especially if poorly built and maintained, can cause far more erosion than cutting trees and other land use changes.
- Recent ecological research emphasizes the importance of shocks, disequilibrium, complexity, and continuing dynamic adjustments in ecological communities, rather than the stable equilibrium models of climax forests and fragile vulnerability that characterized earlier ecological science and still frame much contemporary environmental discourse, including discussion of uplands in the river basins of northern Thailand.

Scientific findings exposed the scope for debate, invalid assumptions, and misunderstanding that could confuse attempts to change institutions for resource governance. There were serious limitations in the extent to which expert analysis could guide decisions. Many questions could not be resolved in the time frame within which management decisions had to be made. The consequences of changes in land-use and water flows were likely to be less predictable and more dependent on specific local conditions than often assumed.

During the 1980s, when researchers were asked to assess changes in the flow of the Mae Klang River, they found the available data too limited to draw any strong conclusions about changes in flow patterns. Water tests detected pesticide residues, but not at levels considered dangerous according to international standards. This left different participants in disputes able to draw conclusions favoring their views, either about the limited extent of problems, or the inability of scientific analysis to confirm problems that seemed apparent from local experience.

Within an uncertain and complex framework, crafting local solutions through polycentric governance and incremental trial-and-error might be more appropriate than imposition of macro scale measures that assume scientific certainty about the origins of problems and the impacts of interventions (E. Ostrom 1999). Rather than being able to hand problems over for expert analysis and technocratic solutions, stakeholders would need to come to grips themselves with the uncertainties and need for local adaptation and creativity in crafting solutions. Thus the ongoing transitions to more polycentric patterns of governance could increase the chances of finding workable solutions to the challenges of managing land and water resources in northern Thailand.

Challenges of Polycentric Governance

Water governance in Thailand generally, and the Mae Ping and Mae Yom Basins in particular, has been in transition from earlier patterns of centralized bureaucratic control. Attempts have begun to implement the mandate of Thailand's 1997 Constitution to involve communities in managing local natural resources. However the ways this would work out were still highly contested and under debate. The transition was not simply a matter of devolution to local control, but instead led to a pattern of resource governance involving many more participants at multiple levels, working in multiple forums and guided by diverse ideas, i.e. the emergence of more polycentric governance.

New patterns of governance were emerging from increased interconnections, physical and social, among water users. New crops and technologies transformed options for irrigated agriculture and economic growth increased water demand from other sectors, but water use was constrained by limited supplies and the impacts of upstream water use on water quantity and quality downstream. Development projects, political opening, rural-urban migration and other social changes increased the density and complexity of social networks among farmers, non-government organizations, government agencies, and other participants in water governance. Contests over resource control were no longer suppressed, nor confined only to the administrative procedures of bureaucratic agencies, but also played out in mass media, public protests, parliamentary politics, and efforts to constitute institutions for basin governance.

Polycentric water governance in northern Thailand faced a constellation of challenges. The scale and scope of water conflicts grew to encompass not just local *muang fai* irrigation communities and other water users in cities and towns in basins and subbasins, but also national government agencies; provincial, district and subdistrict governments (TAO); civil society networks; and parliamentary politicians. Resource tenure for land and water was disputed and uncertain, especially in upland areas. Institutions for basin scale governance were new and weak. Perceptions and visions of development diverged dramatically. Decision processes were vulnerable to withholding of agreement to consensus. Understanding of relationships between land use and water availability was limited, and a significant body of scientific findings contradicted the assumptions within which much debate was framed. The debates about highland-lowland water conflicts, upland watershed conservation and community forests showed the entry of wider considerations beyond just decentralization. At least in the short to medium term these made it harder to resolve conflicts and forge workable agreements, either about water management within local sub-basins or nationally about new legislation regulating land use in upper watershed areas. The passage of a Community Forestry Law had the potential to not only clarify issues affecting access to "forest" land, but also set relevant precedents for future legislation on water rights. Whatever the specific outcomes for laws regulating resource tenure, it appears likely multiple levels of government will continue to be involved, as well as civil society organizations, with national and international media as prominent forums for debate. Local communities, government

agencies, NGOs, academics and others were grappling with the challenges of a complex, contested process of constituting polycentric water governance.

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