

Area Study Prior to Companion Modelling to Integrate Multiple Interests in Upper Watershed Management of Northern Thailand

Cécile BARNAUD^{*}, Guy TRÉBUIL^{**},
Pongchai DUMRONGROJWATTHANA[#] and Jérôme MARIE^{##}

Abstract

Ethnic minorities living in the highlands of northern Thailand have long been accused of degrading the upper watersheds of the country's major basins. In the nineties, the Thai government reinforced his environmental policies and further restricted their access to farm and forest resources. In the meanwhile, the policy framework also favoured decentralization and public participation. This contradiction resulted in an increasing number of conflicts over land-use between local communities and state agencies. This situation underlines the need for adapted participatory methodologies to facilitate the coordination of multiple stakeholders with competing interests. Companion Modelling (ComMod) is one of them. When drawing the lessons from many past participatory projects, several authors highlight their limited impact due to the lack of support at higher institutional levels. Moreover, because of a lack of attention to the local socio-political situations, the less powerful stakeholders were often left behind. This article discusses the usefulness of an area diagnostic study prior to the launch of a ComMod process to avoid such pitfalls and to facilitate genuine communication among stakeholders within and across institutional levels. The article is illustrated by a ComMod experiment conducted in Nan province and is focusing on a conflict between two Yao communities and a recently established national park. We argue that a relatively short but well-structured initial agrarian and institutional analysis to assess the various stakeholders' characteristics, perceptions of the issue to be solved, and interactions is useful to identify the constraints to an equitable outcome of a subsequent participatory process. Such an area diagnosis can also be used to tailor the ComMod process in order to mitigate these constraints. Moreover, an understanding of the initial resource management situation is necessary to be able to monitor changes and to assess the effects of the participatory process.

Keywords : Agrarian diagnosis, institutional analysis, participatory approach, companion modelling, collective learning, land-use conflict, northern Thailand

^{*} CU-Cirad ComMod Project, Chulalongkorn University, Thailand; Department of Geography, Paris X University & CIRAD, UPR GREEN, Montpellier, F-34398 France
e-mail: cecile.barnaud@cirad.fr

^{**} CIRAD, UPR GREEN, Montpellier, F-34398 France; CU-Cirad ComMod Project, Chulalongkorn University, Thailand (Visiting Research Fellow, Center for Southeast Asian Studies, Kyoto University, from August 2006 to February 2007)
e-mail: guy.trebuil@cirad.fr; Corresponding author

[#] Faculty of Science, Chulalongkorn University, Thailand e-mail: dpongchai@yahoo.com

^{##} Department of Geography, Paris X University, France e-mail: jerome.marie@u-paris10.fr

Introduction

Over the last two decades, the growing public concern in Thailand about environmental issues has been a major driving force of new policies related to renewable natural resource management. It reached a peak in 1988 when disastrous flash floods claimed hundreds of lives in the southern part of the country. Following this disaster, environmental policies to prevent further deforestation were reinforced, starting with the declaration of a logging ban in 1989. Ethnic minorities living in the highlands of the northern region have been regularly accused of degrading the upper watersheds of the country's major basins by the more powerful majority of Thai lowlanders [McKinnon and Vienne 1989]. The government further restricted the highlanders' access to farm land through the delimitation of reserved forest areas managed by the Royal Forestry Department (RFD), and the establishment of new national parks, wildlife sanctuaries, etc. [Hirsch 1997]. Among the 91 national parks of Thailand in 2006, more than one third of them were established after 1990. Thirty-three are yet to be gazetted and most of them are located in the northern region. The management of forest resources in these protected areas is still highly centralized [Roth 2004]. In theory, local users are excluded from both local resource use and the management of those areas. This is somehow inconsistent with the policy framework favouring decentralization and public participation that emerged in the nineties and led to the reform of the Tambon (sub-district) Administrative Organizations (TAO) in 1994 and the adoption of the so-called "People Constitution" in 1997 [Arghiros 2001], its advances in the area of public participation were an historical turning point. For example, article 79 provided measures to "promote and encourage public participation in the preservation, maintenance and balanced exploitation of natural resources and biophysical diversity, and in the promotion, maintenance and protection of the quality of the environment" [cited by Rutherford 2002]. However, participation is a rather controversial notion among the various governmental actors and the recent abolishment of the 1997 constitution following the September 2006 coup d'état could augur a setback in this area. Another significant illustration is the never ending debate over the Community Forestry Bill. On this issue, government agencies and the increasingly influential Thai civil society movements are deeply divided. Environmentalists tend to view the villagers living in protected areas as a threat to forest cover and society, while pro-community movements underline the rights and ability of villagers to manage forest resources in a sustainable way. Following the 1988 catastrophic floods in the southern region, the latter initiated the drafting of a Community Forestry Bill¹⁾ proposing new rules and regulations regarding the use of state-owned forests by local communities [Johnson and Forsyth 2002]. However, as a result of internal social strife on this issue, six versions of this bill have been discussed since the first draft produced in 1992, but it has not been ratified yet.

1) The Thailand Community Forestry Bill is a legislation that was proposed in the early 1990s to strengthen the forest access rights of local communities and to encourage them to share the costs of managing and conserving forest areas [Johnson and Forsyth 2002]. Under this bill, local communities interested in establishing community forests in a state-owned forest area would be required to set up a committee responsible for the sustainable and participatory management of the community forest [Sato 2003].

Some of the major points of disagreement deal with the possibility to establish community forests inside protected watershed areas, and the right to gather forest products in these community forests [Sato 2003].

Such controversies among an increasing number of stakeholders result in numerous conflicts over land-use between local communities, civil organizations and state agencies. Such conflicts need to be examined in a social and political perspective as technical and ecological considerations alone are not sufficient to fully understand them and unable to mitigate them because "conflicts over the management of common pool resources are not simply material. They also depend on the perceptions of the protagonists. Policy to improve management often assumes that problems are self-evident, but in fact careful and transparent consideration of the ways different stakeholders understand management problems is essential to effective dialogue" [Adams *et al.* 2003]. Therefore, there is a need to develop innovative and adapted methodologies and tools to facilitate communication and coordination among different stakeholders acting according to different interests and perceptions, and interacting at various levels of governance.

As soon as the late eighties, stakeholder participation became a buzz word in the numerous projects and organizations aiming at the improvement of land management in the northern Thailand highlands [Neef 2005]. Two main lessons dealing respectively with vertical and horizontal social interactions can be drawn from these case studies.

Vertical interactions take place across institutional levels, for example between local communities and state agencies at the district or provincial levels. If top-down approaches have proven ineffective, the alternative bottom-up approaches focusing exclusively on the community level have also shown their limits [Sato 2003]. In northern Thailand, participatory projects were often managed by NGOs considering state agencies as communities' enemies and which barely collaborated with them. In other circumstances, the state agencies themselves were reluctant to join in such participatory processes. Therefore even if they could be locally successful, these projects had limited impact in time and in space due to the lack of support from higher institutional levels. As underlined by several researchers working on participatory natural resource management issues in northern Thailand [Tankimyong 1992; Thomas *et al.* 2002], the establishment of a genuine dialogue across institutional levels is a challenge for participatory and decentralized resource management.

The second lesson learned from past participatory projects deals with horizontal social interactions, i.e. among stakeholders at the same institutional level, for example among villagers within a local community. Many authors argue that because of a lack of attention to power relations in the complex local political contexts in which these participatory projects were embedded, the less powerful stakeholders were often left behind [Lavigne-Delville and Mathieu 2000; Cornwall and Gaventa 2001; Wollenberg *et al.* 2001]. In northern Thailand, some authors named "ethno-romantism" this lack of attention to power inequities within local communities [Neef *et al.* 2006]. There are also considerable power inequities among stakeholders across institutional levels, especially in the traditionally very hierarchical Thai society. These horizontal and vertical social interactions are actually closely interlinked. At their intersection lays the key role of local

representatives who are themselves embedded in power relationships, and whose upwards and downwards accountability is determinant for democratic decentralization [Ribot 2001].

The power issue has drawn a dividing line among scholars working in the field of participatory and multi-stakeholder approaches. Two main attitudes may be distinguished: a "dialogue" vision and a "critical" one [Faysse 2006]. According to the proponents of the dialogue vision, the main obstacles to fruitful coordination stem from a lack of genuine communication among stakeholders. Once this barrier is removed, it is possible to build a common vision and to achieve consensus [Röling and Wagemakers 1998]. On the contrary, proponents of a critical vision argue that because of power differences among stakeholders, communication might not be sufficient. Power relations need to be addressed first to avoid the risk to see the participatory process deepening the existing social inequities [Edmunds and Wollenberg 2001]. These two postures are not necessarily antagonistic. The choice of one of these postures depends mainly on the context. Socially heterogeneous contexts require more attention to issues of social equity. However, if numerous researchers now agree on the fact that participatory approaches need to be careful about power imbalances in the arenas of stakeholders taking part in them, very few of them make concrete propositions on how to take such power imbalances into account. In this paper, we suggest a way to analyze the social context prior to launching a participatory process to identify to what extent and how it will be necessary to address power relations in it. Such preliminary analysis should elucidate the process of socio-economic differentiation among the farming stakeholders, to understand its extent, its origins, and to assess how the current social inequities lead to different interests, farming strategies and perceptions of the common resource management problem to be solved. Beyond the farming community, the stakeholder analysis also needs to be applied to the various institutions involved in the regulation of the villagers' access to the forest resources. We look at this issue in the particular case of participatory gaming and simulation processes relying on the Companion Modelling (ComMod; <http://www.commod.org>) approach.

The innovative ComMod approach aims to facilitate communication for collective learning and coordination among stakeholders facing a common renewable resource management problem [Bousquet *et al.* 1999; Barreteau *et al.* 2003]. It has been recently applied in many places in the world, including at a dozen sites in Southeast Asia [Bousquet *et al.* 2005]. Its main principle is to develop simulation models integrating the different stakeholders' points of view on the problem at stake, and to use them within communication platforms to explore and discuss possible future scenarios collectively identified by the stakeholders.

This article draws on a ComMod experiment being conducted in Nan province of northern Thailand. It is focusing on a forest resource use conflict between two Yao (Mien) communities and the recently established Nanthaburi National Park (NNP). The objective of the ComMod process is to facilitate communication and coordination among stakeholders across institutional levels, while taking into account the diversity of interests at the grassroots level. The questions addressed are: how far is a preliminary diagnostic analysis of the study area needed prior to the launch of such a ComMod process? And what kind of diagnosis would be appropriate? We suggest that a light but well-structured initial analysis of stakeholders' social status, perceptions of the problem at stake,

and social interactions is very useful: (i) to identify the potential feasibility and usefulness of a ComMod process, (ii) to define the constraints towards equitable outcomes of the participatory process (who is likely to benefit ?) and to guide the adaptation of the ComMod process to mitigate these constraints, (iii) to draw a picture of the initial stakeholders' perceptions and interactions and to use it as a baseline in the assessment of the effects of the ComMod process in terms of communication, collective learning and coordination mechanisms within and across institutional levels.

Following a presentation of the conceptual framework used to analyse the situation and its changes, the implementation of the ComMod process is described. The results of the initial diagnosis and how they were used to tailor the on-going ComMod process follow before an analysis and discussion of its preliminary results in the field of collective learning and integration of multiple interests. In conclusion, we describe how these results are used to define the next steps of this adaptive collective learning process and discuss the specific contribution of an interactive process like ComMod to understand resource management problems in a given area.

Conceptual Analytical Framework and Methodology

Conceptual Analytical Framework

From two day-long workshops conducted by a pair of NGO workers to three year-long research programs involving a dozen of social scientists, a wide range of methodologies have been used to carry out initial diagnostic analysis in area studies prior to development projects. Whereas many authors suggest that the former are rarely sufficient [Lavigne-Delville and Mathieu 2000], the latter are not adapted anymore to current researchers and practitioners' agendas and working conditions. We suggest the adoption of a middle path approach based on a several month-long analysis relying on a well-structured and adapted conceptual framework and involving a few researchers representing different disciplinary perspectives to achieve the necessary understanding of the social context prior to the launch of a ComMod process. To elaborate a conceptual framework of analysis of the initial situation in the study area and to be able to monitor changes along the ComMod process, we combined inputs from three main theories (Fig. 1).

Such a framework is needed to analyze differences among stakeholders at the local level, i.e. the diversity of villagers' interests in the community. The agrarian system theoretical framework was chosen because of its ability to analyze the historical process of socio-economic differentiation among resource users in rural communities and the subsequent differences of socio-economic interests, strategies and practices among them [Mazoyer and Roudart 1997]. The recent evolution of the main interacting socio-economic and agro-ecological dynamics of the local agrarian system and the differentiation process among farming households are examined to identify the current main types of farmers characterized by their specific agronomic and socio-economic constraints and objectives, and the related strategies to achieve them [Trébuil and Dufumier 1993].

An institutional analysis is added to better understand the socio-political context of the resource management problem. Institutions are defined as a set of formal and informal rules that

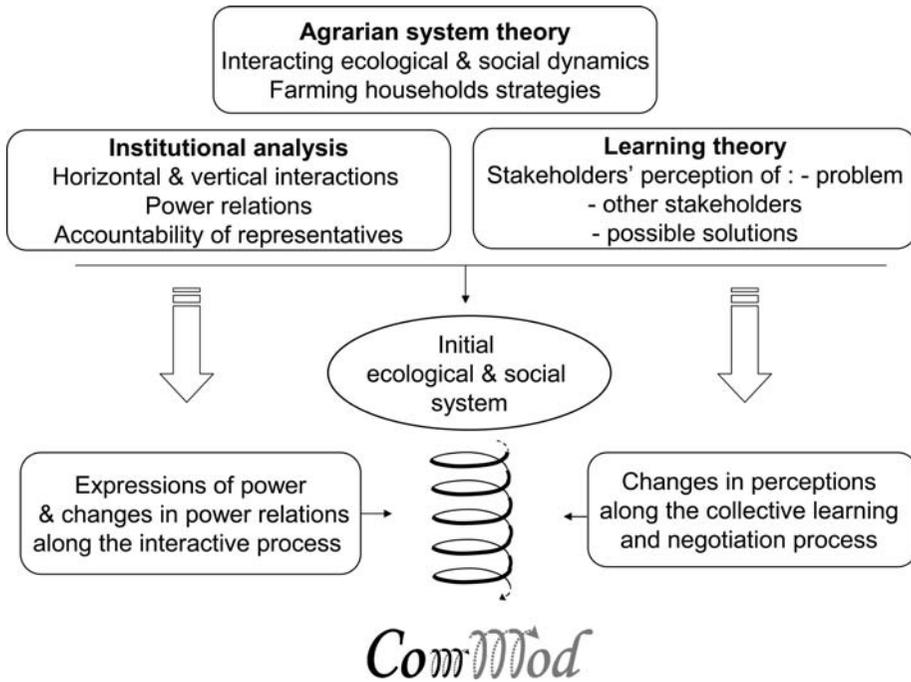


Fig. 1 Conceptual Analytical Framework Adopted in Nan Province

regulate the interactions among people, i.e. "the rules of the game" of a socio-political setting [Ostrom *et al.* 1994]. These interactions and the power relations characterizing them were analyzed according to two dimensions: (i) horizontal interactions among people within the community, and (ii) vertical interactions between villagers and forest officers belonging to the NNP or the RFD. The village headmen and the two elected villagers of the sub-district (*tambon*) administrative organization (TAO) sit at the intersection between these two axes. TAOs have been in charge of the promotion of the participatory decentralization at the grassroots level since 1994 [Puntasen 1997].

Because our ultimate purpose is to examine how the ComMod process will produce changes in the system under study, we also relied on the learning theory focusing on changing perceptions and interactions among stakeholders [Leeuwis and Van Den Ban 2004]. The following set of qualitative indicators was used before and along the ComMod process to monitor its effects: (i) stakeholders' perception of the issue at stake (their positions, interests, and values), (ii) their perception of other stakeholders, (iii) their interactions with them, and (iv) their perception of future possible scenarios to mitigate the problem at stake.

Scholars working in the field of negotiation commonly distinguish between compromise and integration [Follett 1940; Carnevale 2006]. In a compromise, each side gives up something, meeting midway between opening positions. They simply "share the cake" in a zero-sum outcome. On the contrary, in an integrative negotiation process, the stakeholders creatively reframe the problem to "enlarge the cake" and to identify "win-win" solutions. This process implies that both

sides look beyond their initial positions to examine the underlying interests determining them, or even their deeper values. For example, two persons argue because they both want an apple and there is only one. The compromise would be to cut the apple in two pieces. In an integrative process, with a closer look at their underlying interests, they can realize that one is interested in the flesh for cooking, while the other wants the seeds for planting. This is why it is important to examine positions, interests and values to analyze the stakeholders' various perceptions of the common issue at stake.

The Companion Modelling Process

ComMod is an iterative, continuous and evolving modelling process alternating field and laboratory activities in a cyclical way. Its main successive phases are as follows: (i) problem definition and characterization, (ii) participatory modelling, i.e. the conversion of existing knowledge into a formal tool to be used as a simulator; and (iii) participatory simulations to explore various scenarios of solutions [Bousquet *et al.* 2005]. Fig. 2 presents the main phases and the dynamic of the ComMod process implemented in the Nan case study.

Two kinds of simulation tools are used: Agent-Based Models (ABM) and Role-Playing Games (RPG). According to Duke [1974], RPG is an excellent mode of communication to convey complexity as it allows multiple stakeholders to interactively examine the complex systems they are part of. The use of RPG within a ComMod approach has been successfully tested in several situations (many case studies are documented at <http://www.commod.org>). From these experiences we learned that if the players are convinced that the game proposes a relevant representation of their circumstances and the problem to be solved, they play in a gaming session in a way very similar to their actual real

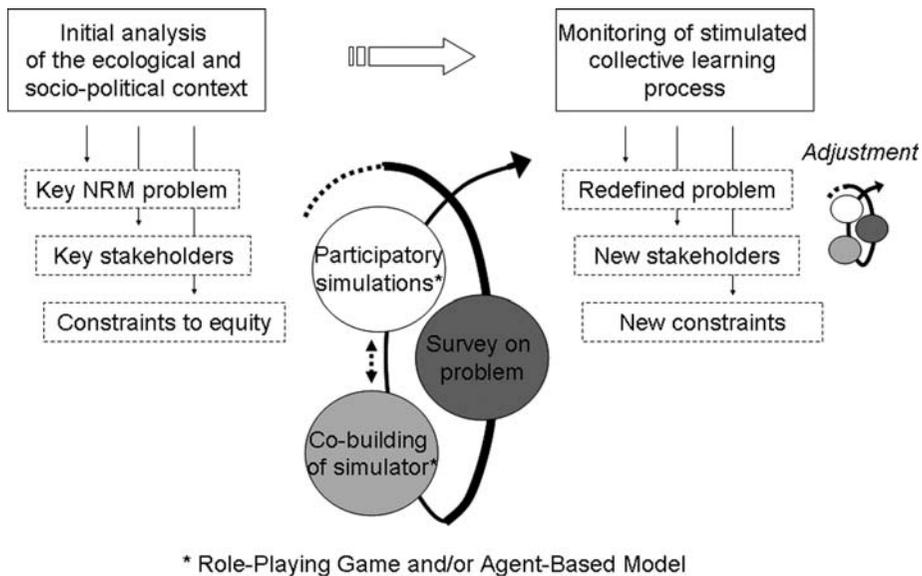


Fig. 2 Main Phases and Dynamic of the Companion Modelling Process Implemented in Nan Province in 2006-07

life behaviour. But here the RPG allows them to look at their situation from a distance and to observe the situations and behaviours of other players. This triggers discussions among them about their common problems and allows the joint identification of possible solutions. In a RPG, players can test alternative scenarios of solutions, but quickly the use of this tool becomes costly and too much time consuming. To remove this constraint, it is possible to build a simple computerized ABM, very similar to the RPG in its features and rules, but which is far more time-efficient to simulate scenarios [Barreteau *et al.* 2001]. Moreover, the RPG allows the players to understand the ABM model playing the same game, to validate and criticize it, i.e. to participate in its construction, and later on to follow ABM simulations and be able to comment their results.

The main steps of the ComMod process implemented in this experiment are described in Box 1.

In agreement with the objective of this article the results of the initial diagnostic analysis presented in the following section focus on the understanding of the local context to facilitate a participatory process. We also show how they were used to tailor the first cycle of this ComMod process. The outcomes of this cycle are also briefly presented to illustrate how they are used to

Initial diagnosis based on secondary data analysis, landscape analysis, and individual semi-structured interviews (more than 40 persons were interviewed, usually twice, in February–May 2006):

- To identify the key renewable resource management problems, the main stakeholders, and the constraints towards an equitable outcome of the process,
- To draw a picture of the stakeholders' initial perceptions and interactions related to this problem, i.e. a conflict between two villages and a national park,

Cycle 1 (June–November 2006)

- Participatory workshops in both villages to help villagers reflect collectively upon the establishment of the national park (June 2006):
 - Day 1: Role-Playing Game (RPG) sessions and group discussions (12 players per village),
 - Day 2: Individual interviews to better understand players' behaviour in the gaming sessions, to assess the game, and to evaluate its learning effects.
- Meeting with the national park officers to present the results of the gaming sessions in the villages by using an Agent-Based Model simulating the game, and to sensitize them to the ComMod approach and the villagers' perspectives (September 2006).
- Participatory simulations in both villages to trigger discussions among all the villagers (November 2006).

Monitoring the effects of the process through individual interviews (September–November 2006).

Cycle 2 (December 2006)

- Participatory workshop with villagers from both villages and the national park officers to achieve a mutual understanding of the problem and to trigger further collaboration in forest management (December 2006):
 - Day 1: RPG sessions and discussions.
 - Day 2: Participatory simulations and collective exploration of scenarios for collaborative management of forest resources.
 - Day 3: Individual interviews to assess the learning effects of the workshop.

Monitoring the effects of the process through individual interviews (January–February 2007).

Box 1 Main Phases of the Whole ComMod Process Implemented in Nan Province, February 2006–February 2007

define the next steps of this adaptive experiment, particularly regarding the redefinition of the problem, the implication of different stakeholders, and the adaptation of the methodology to mitigate new constraints to equity which emerged during this first cycle.

Results and Discussion

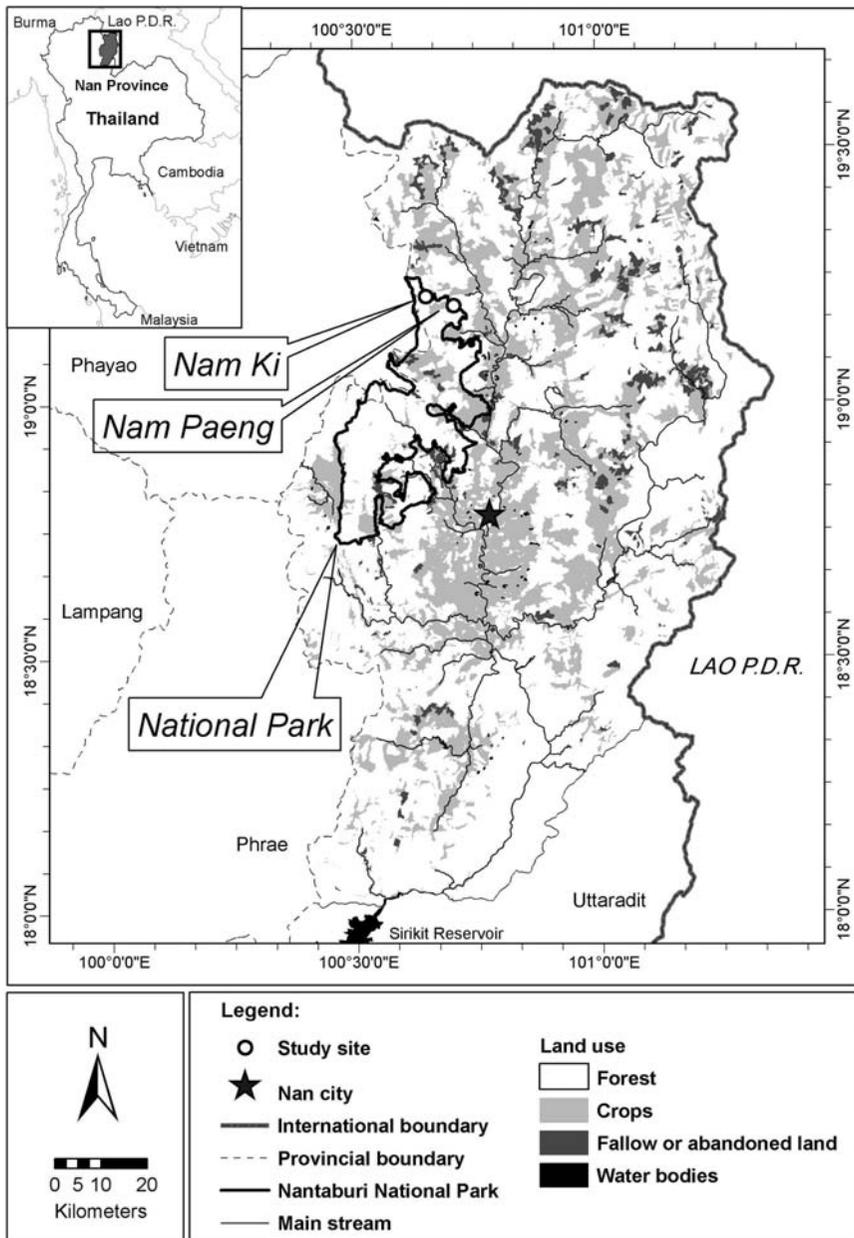
Initial Agrarian and Institutional Context in Two Yao Villages

History of the Local Agrarian System

The Ban Nam Ki and Ban Nam Paeng villages of Thawangpha district in Nan province, are populated by Yao (or Mien) people (Map 1). Their history is characterized by a succession of state interventions and subsequent adaptations of villagers' livelihoods. Until the 1970s, they were living at high elevation, among itinerant clans practising shifting cultivation²⁾ (maize, upland rice and opium poppy) associated to swine rearing. In the late 1970s the government classified their territory as a "pink" area at risk of falling into the hands of the communist rebellion and forced them to resettle in sedentary villages in lower areas. At the same time, logging companies were opening new roads and the government was promoting cash cropping to replace opium poppy cultivation. These changes led to the emergence of a new agrarian system dominated by maize and cotton as main annual field cash crops. Farmers practiced extensive shifting cultivation that, together with logging and accidental forest fires, led to significant deforestation. Then, as a villager said: "after the middlemen, we saw forest officers coming to the village." In the 1990s, the headwater conservation policy of the RFD led to the establishment of the Nam Haen Watershed Unit near those villages. Beside a replantation program, it delimited farm and forest land in each village to prevent further encroachment. As villagers lost most of their fallow areas, they had to shift to permanent cultivation. The subsequent higher need for external chemical inputs to maintain the productive capacity of the land increased production costs and farmers' vulnerability to fluctuating market prices. In spite of the introduction of perennial crops, particularly lychee, farm incomes are still often not sufficient to meet the households' basic needs. Indebtedness is widespread and more and more villagers have to find complementary off-farm employment. Similar agricultural transformations occurred across the northern Thailand highlands [Trébuil *et al.* 1997], but in most of Nan province they were delayed by a decade due its more remote location.

Unlike many other places in this region, there is no more open conflict between villagers and the local RFD unit at the study site thanks to the efforts made by the local officers to establish a fruitful dialogue with the villagers. There is a long tradition of community-based resource management in this province, and active grassroots and pro-community organizations are present. The Upper Nan Watershed Management Project implemented in the study area during 1996–2003

2) The terms "itinerant clans" and "shifting cultivation" do not have any pejorative connotations here. We acknowledge the fact that shifting cultivation (also called "rotational," "itinerant," or "slash-and-burn" agriculture depending on the specific characteristics of the cropping systems) can lead to a sustainable regeneration of forest cover when the demographic pressure is low enough to permit long fallow periods.



Map 1 Land-use in Nan Province, Northern Thailand, and Location of the Two Studied Villages and the Nantaburi National Park

significantly contributed to the establishment of constructive relationships between the RFD officers and local communities. Implemented by the RFD, with financial support from the Danish International Development Assistance (DANIDA), its objective was to achieve sustainable management of the natural resources by government agencies and local communities [Hoare *et al.*

2001]. Besides employing villagers to participate in forestry activities (fire-break making, reforestation, fire surveillance, etc.), the RFD established informal agreements with villagers to allow the gathering of Non Timber Forest Products (NTFPs) in protected areas (reserved areas for conservation purposes). In these unofficial community forests, villagers set up agreed-upon rules to regulate the access to NTFPs.

Characterization of the Main Types of Farming Households

The gradual integration of agriculture into the market economy and the enforcement of environmental policies accelerated the process of socioeconomic differentiation among the local farming households. This process was driven by several specific factors. First, the families' order of arrival when the communities were re-established in the present area, after the end of the communist insurgency period, influenced the process of appropriation of land and forest resources. Land appropriation occurred on an individual basis, whereas the appropriation of forest resources was collectively managed. The current hamlets were established during successive waves of re-settlement. A patch of forest was attributed to each hamlet with specific rules and regulations attached to it. During the shifting cultivation period, another main factor of differentiation was the size of the family labour force. Each family could encroach and cultivate areas in proportion to the family labour available. Later on, the process of market integration of agriculture deepened the differences among farming households as only well-off families could take the risk to invest in the most profitable high value and high external input cash crops. This differentiation process was even reinforced by the enforcement of environmental policies. Well-off families who made the local elite of leaders and representatives communicated more easily with the middlemen and administrative officers and were more aware of the implications of these policies. Consequently, they often managed to keep more land than other households when forest officers came to delimit reserved forest areas. Nowadays, another important factor of socioeconomic differentiation among households is related to the access to off-farm employment opportunities. In particular, those who can afford to invest in a soymilk business on urban markets benefit from this most profitable activity.

In the current agrarian system, one can identify three main types of farming households characterized by different constraints, interests, and strategies. This typology was built to underline the differences of interests related to the national park issue, so one of its main criteria is the farming households' dependence over forest and land resources. This criterion is directly linked to the above-mentioned historical process of differentiated access to land resources.

Fig. 3 displays the characteristics and functioning of the three main types of farming households identified in these two Yao villages. To assess the household's dependence on NTFPs, the value of self-consumed NTFPs was calculated with the villagers based on the market price when the product was found locally, or the market value of an equivalent product. The logic behind this is that if the villagers did not have access to these NTFPs for family consumption, they would have to buy equivalent amounts of vegetables at the market. After comparing this method of evaluation with another one based on the time needed to collect the products in a Karen

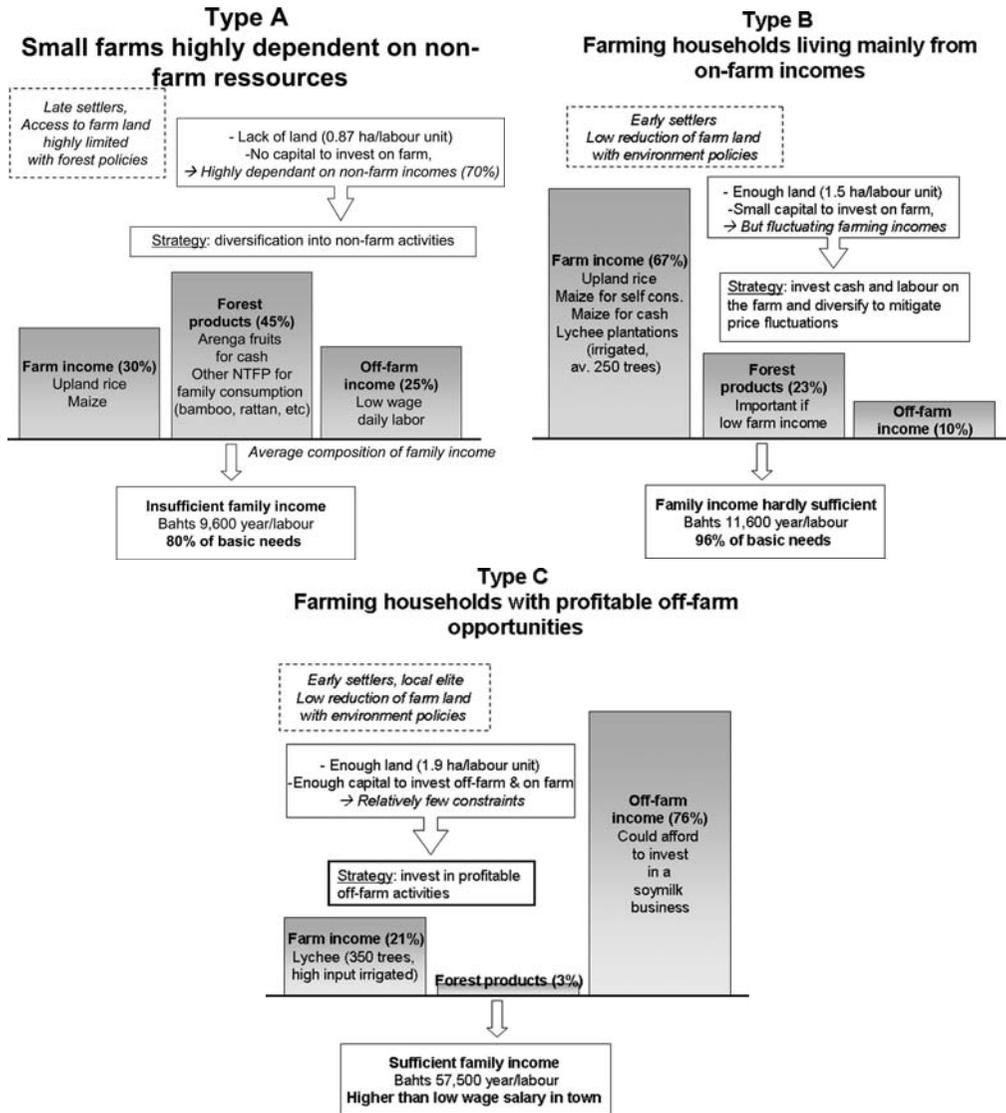


Fig. 3 Typology of the Three Main Types of Farming Households in Two Yao Villages of Nan Province, 2006

Note: These results were obtained by using economic data from a sample of 33 households representing the diversity of farming households' strategies in the two villages. The sample was made of 12, 8 and 13 households belonging to type A, B and C respectively. An additional larger sample description survey at the village level would be necessary to know whether this represents the real proportions of the various categories of farms in the villages. However, given the objectives of our diagnostic, it was not necessary to know such proportions as we consider that the interests of all groups should be taken into account, whatever their sizes in the village communities.

community of northern Thailand, Delang [2006] confirmed the pertinence of the first one, as well as the economic importance of these edible forest products.

Type A are very vulnerable landless or nearly landless households who are highly dependent on the collection of NTFPs, such as Arenga palm fruits, for the generation of cash income, and various plants and animals for family consumption. These forest products and the low daily wages earned in the village or in town are essential to their survival. Type B farming households have enough land and funding to earn their main income from agriculture. However, NTFPs are an important complementary source of cash to compensate for fluctuating farm incomes. Type C farming households have enough capital to invest in a rather profitable off-arm activity, like selling soymilk on urban markets, which in return allows them to invest in large irrigated lychee plantations.

The National Park Issue: Main Stakeholders' Perceptions and Interactions

The NNP was first established in 1996 but it should be officially declared in 2007 only. At the time of the area study (February–May 2006), neither clear park boundaries nor precise resource management rules were known, particularly regarding the villagers rights to gather NTFPs. The two villages under study are located next to the future park boundary and some of their farm land and forest areas where they gather Arenga fruits and other NTFPs could be located inside the park. According to the Thai law, no human activity is allowed inside a national park, but the local chief officer of the park, who had until then overlooked the NTFPs issue and let the villagers gather NTFPs, vaguely said that "things would have to be discussed again when the national park would be officially declared."

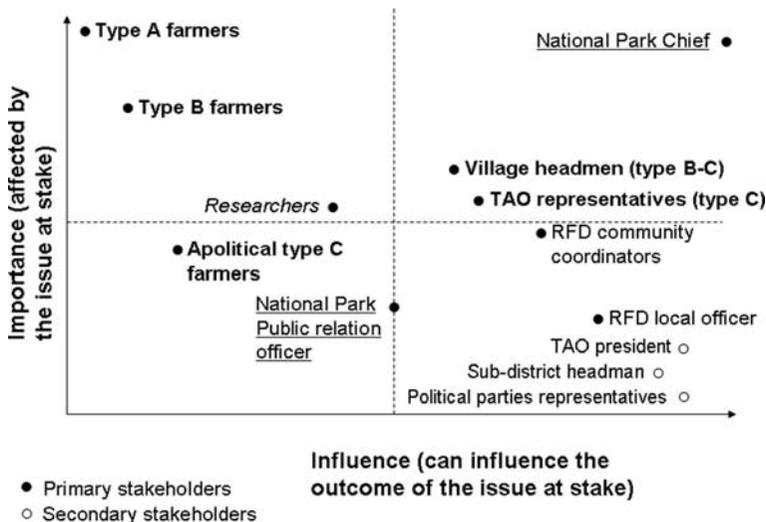


Fig. 4 Matrix Showing the Stakeholders' Relative Importance and Influence regarding the Nanthaburi National Park Issue in Nan Province

Note: RFD stands for Royal Forestry Department, TAO for Tambon Administration Organization.

In institutional analysis, stakeholders are commonly categorised according to their relative influence and importance. Importance refers to those whose needs and interests are prioritized in the issue at stake, while influence deals with the power of certain stakeholders over the outcome of this issue [Grimble and Wellard 1997]. Fig. 4 displays the relative influence and importance of the primary and secondary stakeholders involved in the NNP issue.

The following section describes the initial primary stakeholders' perceptions of the situation (positions, interests, and values), their perceptions of other stakeholders, and their interactions with them.

When the national park officers and the villagers express their respective positions in the conflict, both sides focus on the park boundary issue. The chief of the NNP wants to see the park being as large as possible, while the villagers want to see the park boundary located as far as possible from their village. However, focusing on the boundary necessarily leads to a non-creative confrontation in which both sides bargain over the way to "share the cake," a process in which the villagers will have very limited power compared to the NNP officials. To achieve a more integrative negotiation process, it is necessary to look at the stakeholders' underlying interests and values.

The chief officer of the NNP wants to enforce the law on national parks, but is afraid of possible violent reactions from the villagers. His underlying main concern is to maintain a forest cover in the upper watersheds of the country. He cherishes the idea of a dense rain forest free from human degradation. He has strong prejudices against ethnic minorities and see them as destroyers of the forests "who always want more, and with whom it is impossible to discuss because they do not understand anything." When the initial diagnostic analysis was conducted, he did not have any dialogue with the villagers yet, except with Ban Nam Paeng headman. Therefore his knowledge of their situations and perceptions was very limited. But disagreements exist within the NNP office and a staff member declared during an interview that "the main problem comes from the chief who does not want to speak face to face with the villagers."

RFD officers are not directly involved in the NNP issue and are in a go-between position. Being a state agency they have to collaborate with the park, but unlike the NNP, they tolerate the presence of villagers in the forest areas under their management. They established good relationships with them in the past, agreed on co-management rules, and they do not want to see the new park damaging the results of all their past efforts. One could distinguish the RFD local officer from the local community coordinators, the latter have less decision-making power but give more importance to the relationships established with the villagers.

As a result of the existing socio-economic diversity among the farming households, their status and strategies, there is an unequal access to information related to the NNP issue among the villagers and highly different interests among them about this issue. Because their participation in local politics is very limited, the level of information among type A farming households was initially very low. Their perception of the situation was mainly based on fear and assumptions but not on tangible information. This is in spite of the fact that they have the highest interest in this issue as they risk to lose both access to farm land and the rights to collect NTFPs which are key to their

survival (they collect leaves and shoots for self-consumption, dead wood for firewood, and Arenga palm fruits for sale). Beyond the economic importance of the NTFPs, their cultural value is also crucial. As their ancestors have always lived in the forest, Yao people traditional way of life, food habits and worshiping practices are strongly related to the forest.

Type B farming households were slightly more informed about the NNP because they have more interactions with other villagers and take part more frequently in meetings. They mainly felt concerned by the risk to lose some farm land. Forest products are important to them, but not as essential to their survival as for type A farmers. Although they had no clear information about the national park intentions, many of them did not believe that there was a risk to lose their rights to collect NTFPs.

Type C farmers were usually more or less informed about the national park related events, although they had no personal interest in this issue. Some of them considered that the other villagers would not face much difficulty following the official establishment of the NNP. But others realized that the villagers "who are mainly living from forest products would have problems to survive and could protest violently."

As far as village representatives were concerned, the institutional context differed between the two villages. In Ban Nam Paeng, the village headman (a well-off type C farmer) was very aware of the situation and already met with the NNP officers to negotiate the delineation of the park boundary on his village territory so that all its farming households could retain their farm land. He considered that all the problems with the NNP were solved and did not feel concerned by the villagers' access to NTFPs in the future. In Ban Nam Ki, the young and recently-elected village headman (a type B farmer) was not aware of the situation at all. Only two well-off type C farmers knew about it: a TAO representative and an old informal conservationist leader. They have no personal economic interest in this issue, but they want to retain their community forest and feel betrayed by government institutions that helped them to settle in the past and now want to take the land back from them.

Identification of the Main Constraints towards an Equitable Process

The initial agrarian and institutional analysis led to the identification of six main constraints towards equity in the mediation process (Fig. 5).

Four of these constraints (H1, H2, H3 and H4) are related to horizontal social interactions:

H1: Unequal access to information about the NNP establishment, with an important lack of information among the type A farmers who are most directly concerned by its implications on their livelihood system.

H2: High diversity of ability to participate in collective decision-making processes among the villagers, and in particular a low ability among type A farmers because of their low level of participation in the village meetings, low communication skills, and few interactions with the village representatives.

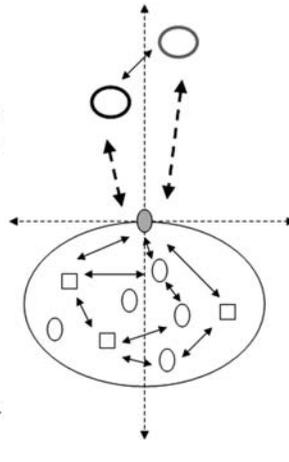
H3: High diversity of interests related to the NNP issue among the villagers directly related to the various farming households' socio-economic strategies, and in particular their level of

GENERAL FRAMEWORK OF ANALYSIS

Vertical interactions between community members and stakeholders at higher institutional levels

Horizontal interactions among various community members

At the intersection the community leaders



CONSTRAINTS TOWARDS EQUITABLE PROCESS

Vertical constraints:

V1: Community leaders not aware of their role in a bottom-up process

V2: Highly « top-down » minded National Park officers

Horizontal constraints:

H1: Unequal access to information

H2: Unequal opportunity to participate to decision-making

H3: High diversity of interests

H4: Lack of downwards accountability of community leaders

Fig. 5 Identified Constraints towards Equity in the Multi-stakeholder Process about the Nanthaburi National Park Issue in Nan Province

dependency on forest products.

H4: Village leaders and representatives belong to the local elite and are not always accountable to the whole village population, in particular, they show little concern for the interests of resource-poor villagers.

The two remaining constraints (V1 and V2) are more specifically related to vertical social interactions:

V1: Village leaders and representatives were not always aware of the role they could play in the negotiation with the national park officers, and therefore not prepared for it, especially in Ban Nam Ki.

V2: Highly "top-down minded" NNP officers, with strong prejudices against ethnic minorities, and not prone to dialogue constitute a second kind of constraint in this category.

Without specific attention to the existing diversity of stakeholders at the different organizational levels and their various interests, perceptions and interactions, such constraints could have been easily overlooked. Rapid interviews with a few key stakeholders such as village representatives and forest officers might have given a very different picture of the situation. Concerning the first two horizontal constraints, a rapid glimpse might give the impression that, thanks to monthly village meetings, all villagers have equal access to information and equal ability to participate in collective decision-making. In reality, during very busy periods of the agricultural calendar, many farmers do not have time to attend these meetings, and between those periods of high labour demand, the poorest ones have to look for daily low wage earning employment out of the

village. Moreover, important information is often transmitted out of the meetings within networks of acquaintances that exclude the clans that do not belong to the local elite. It is precisely this unequal access to information among villagers that contributed to deepen social inequities when the RFD delimited farm land and forest areas in these villages before.³⁾

Another example dealing with the two other horizontal constraints illustrates how this initial agrarian and institutional diagnosis allowed to reach a deeper understanding of the playing field and to identify constraints towards an equitable outcome of the ComMod process to be launched at a later stage. Village headmen and forest officers say routinely that the NNP is not a problem for the villagers because they do not need forest products anymore. "All young people go and sell soymilk in town now, only old people and children stay in the village," a village headman said. This kind of statement might seem true if one does not look closely at the agrarian differentiation in these communities, and particularly does not wait for the poor farmers to come back from the forest or from their fields to have a chance to talk to them at night and get their perception of the current situation.

From the Initial Diagnosis to the ComMod Process in Action

Adaptation of the ComMod Process to Mitigate Constraints towards Equitable Outcomes

In response to the problem of unequal access to information (H1 constraint), the first steps of the ComMod process were tailored to increase the villagers' awareness of the NNP issue. For example certain scenarios played in the initial RPG gaming sessions were selected to circulate key information about the issue. A first gaming session was played according to the current situation in the village, i.e. without the NNP, and a second one was played a bit later to simulate a scenario with the NNP already established to stimulate villagers thinking on this issue and its collective discussion to prepare a possible negotiation with the chief officer of the NNP.

To mitigate constraint H2 about the uneven participation into village meetings and decision-making, we had to make sure that all stakeholders understood the ComMod process and would feel free to express themselves at any moment. The following decisions were made:

- Choice of tools: the usual use of RPG in ComMod is important because this tool is more attractive than formal discussions, more integrative but easier to understand, in particular for stakeholders with low educational levels and public communication skills. The results of recent participatory monitoring and evaluation of ComMod processes in Thailand confirm this strong point of ComMod RPGs.
- Choice of participants: all the different interests in the issue at stake were represented in the gaming sessions, and no opinion was represented by a single or intimidated player (for example, a shy person might feel much more at ease to participate and express herself if one of his friends or relatives is participating too).
- Individual interviews and discussions in small and socially homogeneous groups (such as among

3) At that time, farmers were practising rotational cultivation. When forest officers asked them to locate their farm land, poorly informed villagers mentioned only the cultivated fields during that year and not the fallow areas that were part of their swiddening rotations.

farmers belonging to the same socio-economic category) were conducted beside plenary sessions to give a chance to the less powerful villagers to express themselves in the absence of more outspoken fellow villagers.

Constraints H3 and H4 regarding the diversity of interests and the lack of downwards accountability of the leaders in these communities were addressed by stimulating exchanges of perceptions about the NNP issue among villagers in the following way:

- The RPG was conceived to highlight differences among farming households (see Box 1).
- Use of a "card ranking technique": all the problems related to the establishment of the NNP raised by the participants were visualized on small cards displayed on a board, and the participants were invited to rank them by using coloured post-it stickers. This technique aimed at underlining the diversity of existing interests in the community to support discussions without trying to reach a rapid and forcefully superficial consensus.

Attention was paid to vertical constraints V1 and V2 by planning a ComMod process comprising a series of phases to strengthen dialogue and mutual understanding between the NNP officials and the village communities:

- First, a participatory workshop was conducted with the villagers to give them the possibility to prepare themselves to a possible subsequent negotiation with the NNP, i.e. to increase their awareness about the problem and its potential consequences, and to allow them to discuss and to negotiate among them a set of adapted solutions taking into account their different interests.
- Secondly, a meeting with the NNP officers was organized to inform them about the results of our activities with the villagers, to sensitize them about the ComMod approach, to increase their understanding of the villagers' situations, and to allow them to discuss the issue at stake among forest management officers.
- Thirdly, a second participatory workshop was planned with both the villagers and the NNP officers. This subsequent activity is not described here as it is out of the scope of this article.

Description of the Role-Playing Game

The first objective of this RPG was to better understand the situation :

- To confront the researchers' understanding of the agrarian situation to the villagers' own perceptions in an interactive way allowing the observation of their behaviour, decision-making processes, and their assessment of the gaming sessions. This was supposed to lead to an enriched and validated appraisal of the initial situation by the stakeholders.
- To better understand the mechanisms of villagers' collective decision-making by looking at the interactions among villagers about the use of the land and forest resources and during collective decision-making processes, taking into account the importance of power relations, differences of interests, and the roles of village representatives.
- To better understand villagers' problems and preoccupations and to adapt the ComMod process accordingly: relative importance of the NNP issue to different stakeholders and the need for a more precise definition of the problem to be mitigated.

The second objective of this RPG was to accompany the collective decision-making process

related to the NNP issue by:

- Increasing the villagers' awareness about this issue.
- Stimulating exchanges of points of view on this issue among stakeholders to prepare them for a possible negotiation with the NNP officers at a later stage.

Fig. 6 displays the spatial interface of the game and its main principles are described in Box 2. The ecological dynamics dealing with the regeneration of the forest products were represented by simple rules based on hypotheses made after interviews with the villagers (Fig. 7). In this game,

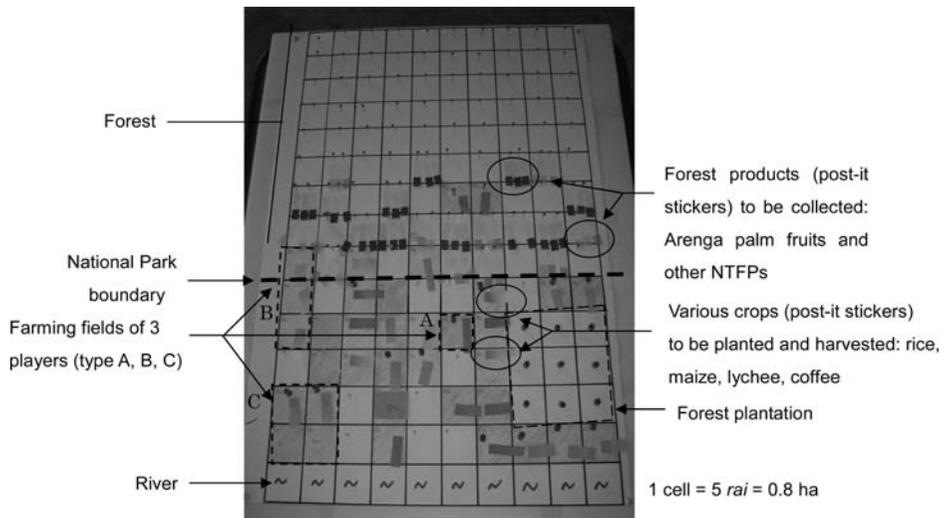


Fig. 6 The Gaming Board Used in the Village of Ban Nam Ki of Nan Province in June 2006

The 12 participating villagers play the role of farming households managing their farms to meet their household basic needs. They are given various amounts of land resources, family labour and financial means according to the actual farming conditions of the three main socio-economic types of households in the village (types A, B and C for poor, medium, and well-off farms respectively). In the game, they belong to the same socio-economic category than in reality. National park officers were not invited to take part in this game but their presence was indicated by a fictive stakeholder (made of paper). In each year, the players make the following successive actions:

- Decide whether to send family labour to work in town (low wage employment or soymilk seller).
- Individually assign a given crop to each of their fields after paying for input costs (and taking into account their respective labour management constraints),
- Collectively gather Arenga palm fruits and other forest products for self consumption (no imposed rule, players decided by themselves the access rules to these resources),
- Harvest their crops and go to the market desk to sell their products and pay for household expenses,
- If the household basic needs are met, draw an "exceptional expense card" (wedding, purchase of household appliances, etc).

Two scenarios were played, with and without a national park. In the second one, a fictitious national park boundary was drawn and farming and gathering activities were forbidden beyond it.

Box 2 Main Principles of the Role Playing Game Used in Two Mien Villages of Nan Province in June 2006

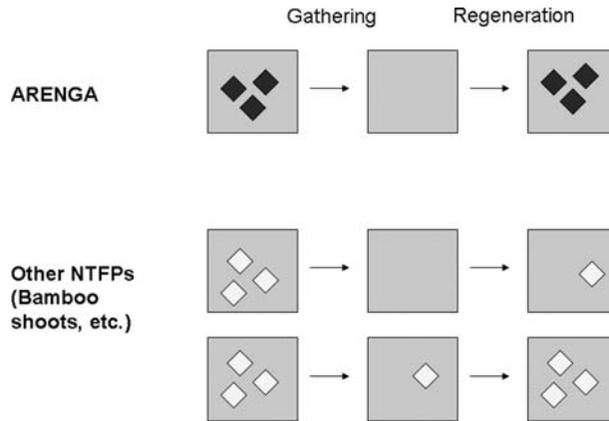


Fig. 7 Rules for the Regeneration of Forest Products (Arenga Palm Fruits and Other NTFPs) in the Role-Playing Game Conducted in Two Mien Villages of Nan Province in June 2006

the quantity of Arenga palm fruits gathered every year has no effect on the regeneration dynamic. We consider that fruits are disseminated by animals before they are harvested. Concerning other NTFPs, such as bamboo shoots, rattan shoots, mushrooms or small animals, we consider that there is a risk of depletion of these products in case of over-harvesting.

Two versions of this RPG were used in the two Yao villages. The main principles remained the same, but the spatial interface and the calibration differed as to fit with the specific situation of each village.⁴⁾

What Happened during the Gaming Sessions and Debriefings ?

The gaming sessions and collective discussions were organized as follows:

- The scenario corresponding to the current situation (no national park yet) was played (Fig. 8a),
- A short debriefing took place to assess the game with the players,
- Then the scenario "what if the NNP is set up and enforces strictly the law without any negotiation" was played,
- Another debriefing about this second scenario was organized to look at the problems encountered and their possible solutions. This time sub-group discussions among farmers-players belonging to the same socio-economic type (Fig. 8b) were held, followed by a plenary discussion using the card ranking technique. Two days after the RPG sessions, individual interviews with the participants were conducted in the two villages.

In both villages, the players were rapidly at ease with the features and the rules of the game,

4) The main difference was the location of the community forest. In Ban Nam Ki, the community forest where villagers collect Arenga palm fruits and other NTFPs risks to be included into the NNP. While in Ban Nam Paeng village, if the forest area where villagers collect Arenga fruits is also inside the NNP, they also have access to a community forest to gather other NTFPs which will remain outside of the limits of the park.



Fig. 8a Gaming Session: Villagers-players gather forest products on the gaming board.



Fig. 8b Sub-group Discussion: Type A farmers debate their preoccupations linked to the new national park.

and this resulted in a playful atmosphere. As expected, most of the players chose the same crops and off-farm activities like in reality according to their socio-economic type. In both villages, when the NNP was established, all type A and most of type B players could not meet their family basic needs anymore because of a sharp decrease in their incomes from NTFPs. All indebted players decided to send one household member to the city to look for low wage employment. As expected, type C players were hardly affected by the introduction of the NNP.⁵⁾

The suggestions made during the small group discussions underlined the need to:

- Negotiate with the NNP to retain the right to collect forest products,
- Reflect and agree upon sustainable ways to collect forest products, and
- Ask for compensations in case the NNP does not agree to let them gather forest products anymore.

During the plenary discussion, the card ranking exercise highlighted differences of interests among villagers. The atmosphere became particularly tense and lively in Ban Nam Ki when the relative importance of Arenga palm fruits and other NTFPs was discussed. This revealed sharp differences of interest among the three hamlets of this village where the first settlers belonging to the central hamlet have access to more Arenga palms than the two other ones. While the representatives of the former hamlet underlined the primary importance of Arenga palm fruits, those from the latter ones put more value on the other kinds of NTFPs. There were also tensions within each hamlet. For example, some type A farmers from the central hamlet, who first underlined the crucial importance of forest products for subsistence, did not dare to express their view anymore in the presence of their official representatives.

Meeting with the NNP Officers: Computer Simulations to Present the Gaming Sessions

During the individual interviews conducted after the game, all the participants said that the research team should show the results of the gaming sessions to the NNP officers for them to know

5) In Ban Nam Paeng, the players decided to break the game rules in the second year, whereas in Ban Nam Ki, no one did so because a TAO representative had said "we cannot steal, we have to negotiate."

better about the villagers' livelihoods and the problems they would face if the park management rules would be strictly enforced. An agent-based model completely similar to the game was built to "replay" rapidly the gaming sessions in the two villages *in silico*. The officers from the NNP and the RFD who were invited to the meeting could easily follow the simulations and this technique was found to be a simple and lively way to explain what happened in the participatory simulation workshops held in both villages.

This phase of the ComMod process also illustrates the role of go-between that researchers involved in action research could play among stakeholders at the request of local communities eager to find ways to communicate their views to institutions at higher levels in the system hierarchy.

Monitoring the Effects of the Process: Lessons for the Following Steps

The objective of this section is to highlight some of the preliminary effects of this on-going ComMod process and their use to fine tune its next steps. A continuous attention to social inequity is indeed required all along the ComMod process.

What Did Researchers Learn ?

They could validate their understanding of the agrarian situation and improve their knowledge of the existing mechanisms for collective decision-making in these villages. The RPG proved to be an effective way to reveal individual and collective behaviours that are not easy to diagnose with less interactive tools, such as individual interviews, due to the difference between what people say about their behaviour and what they actually do. For example, we could better understand the existing tensions among the most powerful clans in both communities. The game also revealed the paternalistic influence of representatives over the villagers belonging to their clan, and their lack of legitimacy outside their own clan.

What Did Participants Learn ?

During the individual interviews conducted after the gaming sessions, 85% of the participants said that the game increased their awareness of the NNP issue. Table 1 illustrates the various types and levels of stimulated awareness among the 22 participating villagers. The workshop also generated a feeling of urgency and interdependency among the villagers in the preparation for a possible negotiation with the NNP in the near future. A participant said that "the game made me think that we have to discuss together before we meet the national park." Similar statements were made by 40% of the participants. The game allowed the players to exchange their points of view, and in particular their differing interests regarding the national park issue: "during the workshop I realized that we all have different ways of thinking" said a participant. Several others mentioned the necessity to coordinate their actions not only in the case of the NNP issue, but also regarding the community rules to access forest products. Moreover, the game was seen by some participants as a way to increase their leaders' accountability. "The village headman and the TAO representatives should join every game because they have to know how villagers think, what they want" said a female participant.

Table 1 Participants' Answers to the Question "What Did You Learn about the Situation regarding the National Park" during Individual Interviews Conducted after the Simulation and Gaming Workshop Held in Nan Province, June 2006

Answers of participating villagers to the question: What did you learn about the situation regarding the national park ?	Number of participants (n = 22)
Increased awareness of the national park issue in general, had hardly heard about it before.	6
Increased awareness of the consequences for the villagers if the national park decides to strictly enforce the law.	6
Increased awareness of the fact that villagers should ask the national park the right to collect forest products without destroying the forest.	3
Increased awareness about the national park's duty, i.e. to protect the forest.	3
Realized that if the national park enforces the existing law, some villagers might break it.	1
Did not learn anything really new because the chief officer of the national park did not join the workshop.	2
Do not know.	1

As for the NNP and RFD officers, they found that the simulations allowed them to better understand the villagers' circumstances. When asked whether they would join a meeting with the villagers, the chief officer of the NNP looked reluctant at first, but a few days later, he decided to meet the villagers by himself,⁶⁾ and one month later, he said he wanted to join the next participatory workshop with the villagers because he found it necessary to establish a good relationships with them.⁷⁾

Constraints towards Equity and Corresponding Adjustments

By monitoring the effects of this ComMod process, we identified four emerging constraints towards equity. First, in one of the villages, some female participants did not understand well who we were and the purpose of this simulation and gaming workshop. They seemed slightly worried and suspicious. Therefore, greater efforts were made later on to clearly explain the very nature and principles of the ComMod process to reinforce trust. Secondly, many participants highlighted that the main limitation of the game was the small number of players while the issue at stake and its discussion concerned all the villagers. To mitigate this problem, we organized a meeting with all the villagers in which the agent-based model was used to replay the gaming sessions in a time efficient way and to create a forum for discussion at the village level. Thirdly, in one of the two villages, the conflicts between the hamlets and their various representatives belonging to different powerful clans were identified as a major constraint to the fruitful implementation of the process. As two representatives of this village said, the process itself might help to mitigate them because the game could help to increase the village unity. Fourth, the chief of the NNP said that he could

6) Although this meeting was very tense and conducted in a climate of reciprocal mistrust, it can be seen as a first step towards the establishment of a dialogue between both parties.

7) If there is an effect of the ComMod process in this change of behaviour, it is probably related to the presence of the RFD officers at the meeting where they had the opportunity to say how much they value their dialogues with the villagers.

not make any formal agreement with the villagers allowing them to gather forest products as this kind of decision must be taken at a higher institutional level. This illustrates the limits of the decentralization of resource management in Thailand and this statement could lead to a standstill while leaving villagers in a very uncertain situation. We adjusted the objectives of the next phases of the ComMod process accordingly to stimulate further communication, to support further collective learning and mutual understanding and to facilitate the emergence of co-management rules between the NNP and these communities. This might help to perpetuate informal agreements.

Conclusion

From a methodological point of view, this case study illustrates the usefulness of spending several months to carry out an initial agrarian and institutional diagnosis prior to the launch of a participatory process of natural resource management. This initial analysis of the various stakeholders' characteristics, perceptions of the issue to be solved, and interactions was very useful to examine the feasibility and degree of usefulness of a ComMod process. It was also instrumental in the identification of a series of key constraints towards an equitable outcome of such a process. This allowed to adapt the ComMod methodology accordingly in a timely manner and to mitigate these constraints to social equity to a certain extent. Moreover, the picture of the initial stakeholders' perceptions and interactions generated by the preliminary area study is necessary to be able to assess the effects of the participatory process in terms of communication, collective learning, behaviour change, and coordination mechanisms.

However, the integration of stakeholders' multiple interests is a long and enduring process. Therefore, in the initial analysis of the socio-political context, it is not sufficient to focus one's attention to power heterogeneity and relationships, but this effort should be maintained all along the ComMod process. In return, this process helps to further understand the socio-political context and to observe its evolution. The continuous and critical analysis of this context and the monitoring of the effects of the on-going process are required to adjust its implementation to mitigate the constraints towards equity identified on the way.

The analysis presented in this article shows that in forest management issues, the opposition between local communities and state agencies are important, but conflicts of interests among the villagers and the downwards accountability of community leaders are also key dimensions to take into account to reach a relevant understanding of the problem. The historical process of socio-economic differentiation among villagers leads to a diversity of farming households characterized by different amounts of means of production, constraints, interests and related strategies, but also by different abilities to participate in collective decision-making. Because of such power imbalances within communities, past negotiations with the RFD to delimit agricultural and reserved forest areas actually increased social inequities in the communities. If power imbalances within communities are not taken into account, the current establishment of new national park could end with the same kind of negative results. Several researchers and practitioners working on forest

management issues in northern Thailand also highlighted the importance of such issues [Tankimyong 1992; Thomas *et al.* 2002].

This study also highlights the importance of perceptions in forest management conflicts. The analysis of the underlying interests of the various stakeholders indicates that, technically, their interests are not necessarily competing. However, no collaboration is achieved because their perceptions are dominated by a long history of prejudices and mutual mistrust. This reinforces the claim that dialogue and mutual understanding are essential elements for sustainable management of forests in the northern Thailand highlands.

This paper focused on the initial diagnosis conducted prior to a ComMod process to facilitate dialogue between two communities and a new national park. Although this process succeeded in contributing to a certain extent to further mutual understanding among villagers and between the villagers and the national park officers so far, this process has its own limits. First, its expected concrete impact for local stakeholders is rather limited. The directors of local national parks have very little room for manoeuvre. They are officially accountable only to their supervisors in Bangkok, and they can be transferred to less desirable positions if they do not perform in accordance with the expectations of their bosses. Moreover, agreements between the NNP and the communities could only be informal because there is no legal basis to support them. Therefore, the future of such informal agreements would be uncertain because they can be reversed when a new NNP director is nominated.

The second limit of the process presented in this case study is related to its scale. Many communities face the same kinds of problems across the northern Thailand region. How to implement similar processes beyond a few village case studies? This problem is faced by many participatory interventions, most of them remaining isolated success stories. There is an urgent need to train a new generation of young lecturers-researchers, government officers and development workers in this kind of participatory approaches. ComMod processes conceived and managed by Thai colleagues could also be more legitimate than the pilot experience described in this article. The key problem of the cost of such approaches would be minimized if government officers used these approaches to replace classical meetings and "seminars." To be applicable in many places, such participatory approaches should be highly flexible, but the main tools used in their conception are adapted to that.

Both limits suggest the need to give more autonomy to government agencies dealing with local communities (national parks, but also RFD, TAO, etc.), to promote participation within these agencies and to recognize the legitimacy of a plurality of institutions in the management of renewable natural resources at the local level. Unfortunately, the very recent debate about the new constitution seemed to question more than to reinforce the participation and decentralization principles. And yet, the numerous success stories of participation in northern Thailand, although they remained isolated because of a lack of support from higher institutional levels, show that dialogue and cooperation between communities and government agencies are possible and can lead to more sustainable forest management based on mutual trust and understanding.

Acknowledgements

This paper was prepared during the second author's stay at the Center for Southeast Asian Studies (CSEAS) of Kyoto University in the second semester of 2006. He wishes to thank CSEAS for its hospitality and for creating an inspiring research atmosphere. The authors gratefully thank the Challenge Program Water and Food of the CGIAR, the Asia IT & C Initiative of the European Union and the Thai-French Bilateral Scientific Cooperation Programme for their financial support.

References

- Adams, W.A.; Brockington, D.; and Dyson, J. 2003. Managing Tragedies: Understanding Conflict over Common Pool Resources. *Science* 302: 1915-1916.
- Arghiros, D. 2001. *Democracy, Development and Decentralization in Provincial Thailand*. Richmond, Surrey: Curzon & Nordic Institute of Asian Studies.
- Barnaud, C.; Promburom, T.; Trébuil, G.; and Bousquet, F. 2007. Evolving Simulation and Gaming to Support Collective Watershed Management in Mountainous Northern Thailand. *Simulation and Gaming* 38: 398-420.
- Barreteau, O.; Bousquet, F.; and Attonaty, J. 2001. Role-playing Games for Opening the Black Box of Multi-agent Systems: Method and Lessons of Its Application to Senegal River Valley Irrigated Systems. *Journal of Artificial Societies and Social Simulation* 4.
- Barreteau, O. et al. 2003. Our Companion Modelling Approach. *Journal of Artificial Societies and Social Simulation* 6.
- Bousquet, F.; Barreteau, O.; Le Page, C.; Mullon, C.; and Weber, J. 1999. An Environmental Modelling Approach. The Use of Multi-agents Simulations. In *Advances in Environmental and Ecological Modelling*, edited by F. Blasco and A. Weill, pp. 113-122. Paris: Elsevier.
- Bousquet, F.; Trébuil, G.; and Hardy, B.E. 2005. *Companion Modeling and Multi-Agent Systems for Integrated Natural Resource Management in Asia*. Los Baños, Laguna, Philippines: International Rice Research Institute and CIRAD. 360p.
- Carnevale, J.P. 2006. Creativity in the Outcomes of Conflict. In *Handbook of Conflict Resolution: Theory and Practice*, edited by M.Deutsch, P.T. Coleman and E.C.Marcus, pp. 414-435. Jossey-Bass.
- ComMod <http://www.commod.org>
- Cornwall, A.; and Gaventa, J. 2001. Bridging the Gap: Citizenship, Participation and Accountability. *PLA Notes* February 2001: 32-36.
- Delang, C.O. 2006. Not just Minor Forest Products: The Economic Rationale for the Consumption of Wild Food Plants by Subsistence Farmers. *Ecological Economics* 59: 64-73.
- Duke, R.D. 1974. *Gaming: the Future's Language*. New York: SAGE Publications, Halsted Press.
- Edmunds, D.; and Wollenberg, E. 2001. A Strategic Approach to Multistakeholder Negotiations. *Development and Change* 32: 231-253.
- Faysse, N. 2006. Troubles on the Way: An Analysis of the Challenges Faced by Multi-stakeholder Platforms. *Natural Resources Forum* 30: 219-229.
- Follett, M.P. 1940. Constructive Conflict. In *Dynamic Administration: The Collected Papers of Mary Parker Follett*, edited by H.C. Metcalf and L.Urwick. New York: Harper.
- Grimble, R.; and Wellard, K. 1997. Stakeholder Methodologies in Natural Resource Management: A Review of Principles, Contexts, Experiences and Opportunities. *Agricultural Systems* 55 (2): 173-193.
- Hoare, P.; Maneeratana B.; Songwadhana W.; Suwanmanee A.; and Sricharoen Y. 2001. Relief Models, a Multipurpose Tool for Improved Natural Resource Management. The Experience of the Upper Nan Watershed Management Project in Thailand. *ASEAN Biodiversity*, October 2001-March 2002: 11-16.
- Hirsch, P.E. 1997. *Seeing Forest for Trees: Environment and Environmentalism in Thailand*. Chiang Mai: Silkworm Books.
- Johnson, C.; and Forsyth, T. 2002. In the Eyes of the State: Negotiating a "Rights-Based Approach" to Forest Conservation in Thailand. *World Development* 30: 1591-1605.
- Lavigne-Delville, P.; and Mathieu, M. 2000. Diagnostic participatif, enjeu de pouvoir et processus social. In *Les*

- enquêtes participatives en débat: Ambitions, pratiques et enjeux*, edited by P. Lavigne-Delville, N.E. Selamna and M. Mathieu. Paris: GRET-Karthala-ICRA. 543 p.
- Leeuwis, C.; and Van Den Ban, A.W. 2004. *Communication for Rural Innovation. Rethinking Agricultural Extension*. Oxford: Blackwell publishing Ltd.
- Mazoyer, M.; and Roudart, L. 1997. *Histoire des agricultures du monde: du néolithique à la crise contemporaine*. Paris: Éditions du Seuil.
- McKinnon, J.; and Vienne, B. 1989. *Hill Tribes Today*. Bangkok: White Lotus-Orstom.
- Neef, A., ed. 2005. *Participatory Approaches for Sustainable Land Use in Southeast Asia*. Bangkok: White-Lotus.
- Neef, A.; Chamsai, L.; and Sangkapitux, C. 2006. Water Tenure in Highland Watersheds of Northern Thailand: Managing Legal Pluralism and Stakeholder Complexity. In *Institutional Dynamics and Status: How Crisis Alter the Way Common Pool Resources Are Perceived, Used and Governed in Asia*, edited by Louis Lebel, Xu Jianchu and Antonio Contreras. Chiang Mai: Regional Center for Social Science and Sustainable Development.
- Ostrom, E.; Gardner, R.; and Walker, J. 1994. *Rules, Games & Common-pool Resources*. Michigan, USA: University of Michigan Press.
- Puntasen, A. 1997. Tambon Councils and Community Forest Management. In *Seeing Forests for Trees: Environment and Environmentalism in Thailand*, edited by P. Hirsch, pp. 72-88. Chiang Mai: Silkworm Books.
- Ribot, J.C. 2001. Integral Local Development: "Accommodating Multiple Interests" through Entrustment and Accountable Representation. *Int. J. Agricultural Resources, Governance and Ecology* 1(3/4): 327-350.
- Röling, N.G.; and Wagemakers, M.A. 1998. A New Practise: Facilitating Sustainable Agriculture. In *Facilitating Sustainable Agriculture: Participatory Learning and Adaptive Management in Times of Environmental Uncertainty*, edited by N.G. Röling and M.A. Wagemakers, pp. 3-22. Cambridge: Cambridge University Press.
- Roth, R. 2004. On the Colonial Margins and in the Global Hotspots: Park-people Conflicts in Highland Thailand. *Asia Pacific Viewpoint* 45: 13-32.
- Rutherford, J. 2002. Institutions, Impacts and Responses in the Agrarian Transformation of the Mountains of Northern Thailand. In *Landscapes of Diversity: Proceedings of the 3rd International Conference on Montane Mainland Southeast Asia*, edited by X. Jianchu and S. Mikesell, pp. 55-78. Lijiang, China: Yunnan Science and Technology Press.
- Sato, J. 2003. Public Land for the People: The Institutional Basis of Community Forestry in Thailand. *Journal of Southeast Asian Studies* 34: 329-346.
- Tankimyong, U. 1992. Participatory Land Use Planning for Natural Resource Management in Northern Thailand, Resource Management and Development Center, Chiang Mai University, Thailand. http://www.iapad.org/publications/ppgis/participatory_land_use_planning_in_northern_thailand.pdf
- Thomas, D.E.; Weyerhaeuser H. *et al.* 2002. Improved Tools for Managing Agroforestry Landscapes in Northern Thailand: Pilot Application of Spatial Analysis and Negotiation Support Systems. In *Landscapes of Diversity: Proceedings of the 3rd International Conference on Montane Mainland Southeast Asia*. Lijiang, Yunnan, China: Yunnan Science and Technology Press.
- Trébuil, G.; and Dufumier, M. 1993. Regional Agrarian Systems and Sustainability of Agricultural Production Systems in Thailand. *J. Asian Farm. Syst. Assoc.* 1(4): 557-568.
- Trébuil, G.; Kam, S.P.; Turkelboom, F.; and Shinawatra, B. 1997. Diagnoses at Field, Farm and Watershed Levels in Diversifying Upland Agroecosystems: Towards Comprehensive Solutions to Farmers' Problems. In *Systems Approaches for Sustainable Agricultural Development: Applications of Systems Approaches at the Farm and Regional Levels*, edited by M. J. Kropff, P.S. Teng, P.K. Aggarwal, J. Bouma, B.A.M. Bouman, J.W. Jones and H.H.v. Laar, pp. 99-114. Kluwer Academic Publishers, IRRI.
- Wollenberg, E.; Anderson, J.; and Edmunds, D. 2001. Pluralism and the Less Powerful: Accommodating Multiple Interests in Local Forest Management. *Agricultural Resources, Governance and Ecology* 1(3/4): 199-222.