

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

C. Barnaud*, G. Trébuil**, P. Dumrongrojwatthana***, J. Marie****

** CU-Cirad Commod Project, Chulalongkorn University, Thailand & Department of Geography, Paris X University, France, e-mail: cecile.barnaud@cirad.fr*

*** CSEAS Visiting Research Scholar, Kyoto University & GREEN Research Unit, Cirad, Montpellier, France 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: marie@msh-paris.fr*

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 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, calling for the need for adapted participatory methodologies to facilitate coordination among 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 focusing on a conflict between two Yao communities and a recently established National Park. We suggest 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. It is also used to adapt the ComMod process in order to mitigate these constraints. Moreover, such a picture of the initial situation is necessary to assess the effects of the following participatory process.

Key words

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

Introduction

Over the last two decades, the growing public concern in Thailand for environmental issues was a major driving force of new policies related to renewable 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 Thai people living in the

lowlands [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, 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 were established after 1990. 33 are yet to be gazetted, most of them located in the Northern region. In Thailand, the management of forest resources in these protected areas is 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 which 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 terms of public participation constituted an historical turning point. 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 government actors. The recent abolishment of the 1997 constitution by the new military government is a first illustration of these controversies. Another significant illustration is the debates over the Community Forestry Bill. Government agencies and the increasingly influential Thai civil society movements are divided into two groups on this issue. Environmentalists tend to view the local people living in protected areas as a threat to forests 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 Bill 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 the Bill were discussed since the first draft produced in 1992, but it has not been ratified yet. Some of the major points of disagreement are the possibility to establish community forests inside protected watershed areas, and the right to gather forest products in these community forests [Sato 2003].

These controversies among the various actors at the government level result in an increasing number of conflicts over land-use between local communities 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. "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]. There is a need to develop innovative and adapted methodologies and tools to facilitate communication and coordination among numerous 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 which considered state agencies as communities'

enemies and barely collaborated with them. In other circumstances, state agencies were reluctant to join in such participatory processes. Therefore even if they could be punctually successful, these projects had limited impact in time and in space due to the lack of support from higher institutional levels [Barnaud *et al.* forthcoming]. As underlined by several researchers working on participatory natural resource management issues in Northern Thailand (Tankymiong, 1992, Thomas, 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 2006]. There are also considerable power inequities among stakeholders across institutional levels, especially in the 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 [Ribott 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 contexts in which participatory approaches are conducted, very few suggest how to do to take into account such power imbalances. We suggest in this paper a way to analyze the social context prior to launch a participatory process to identify to what extent and how it is necessary to address power relations in the participatory process. We address this issue for a particular participatory process named the Companion Modelling approach.

Companion modelling (ComMod) is an innovative participatory approach 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, and 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 various scenarios for the future jointly identified by the stakeholders.

This article draws on a ComMod experiment being conducted in Nan province, Northern Thailand, focusing on a forest resource use conflict between two Yao (Mien) communities and a recently established National Park. 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 useful: (i) to identify the feasibility and the 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 get 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 the preliminary results of the ComMod process in terms 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 in the understanding of 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 to adopt a middle path approach based on a few month-long analysis relying on a well-structured and adapted conceptual framework and involving only a few researchers with 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 (figure 1).

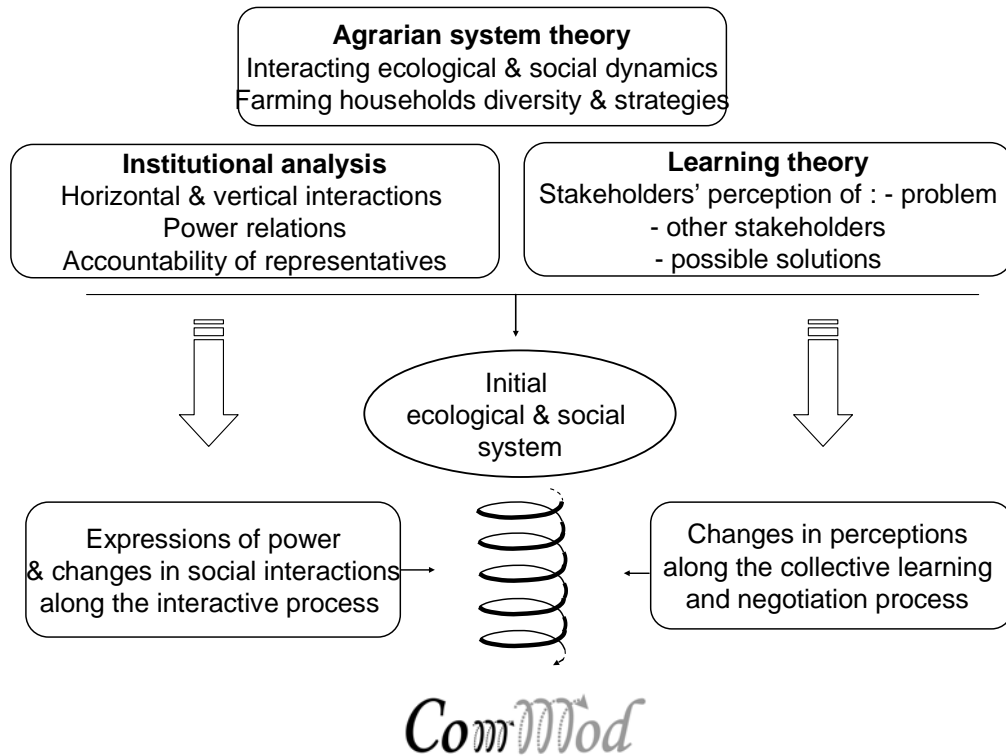


Figure 1. Conceptual analytical framework adopted in Nan Province.

We needed a framework to analyze differences among stakeholders at the local level, i.e. the diversity of villagers' interests in the community. The agrarian systems theoretical framework was chosen because of its ability to apprehend in an historical perspective the processes 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. This leads to the identification of the main types of farming households in the present system characterized by specific agronomic and socio-economic constraints and related strategies [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 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 National Park or the Royal Forestry Department. 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 held responsible to promote 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 (v) 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 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 positioning 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 a continuous and iterative modelling process alternating field and laboratory activities in a cyclical way. Its main successive phases are as follows: (i) Characterization of the problem, (ii) Modelling, i.e converting existing knowledge into a formal tool to be used as a simulator; and (iii) Simulations to explore various scenarios of solutions [Bousquet *et al.* 2005] Figure 2 presents the main dynamic of the ComMod process implemented in this case study.

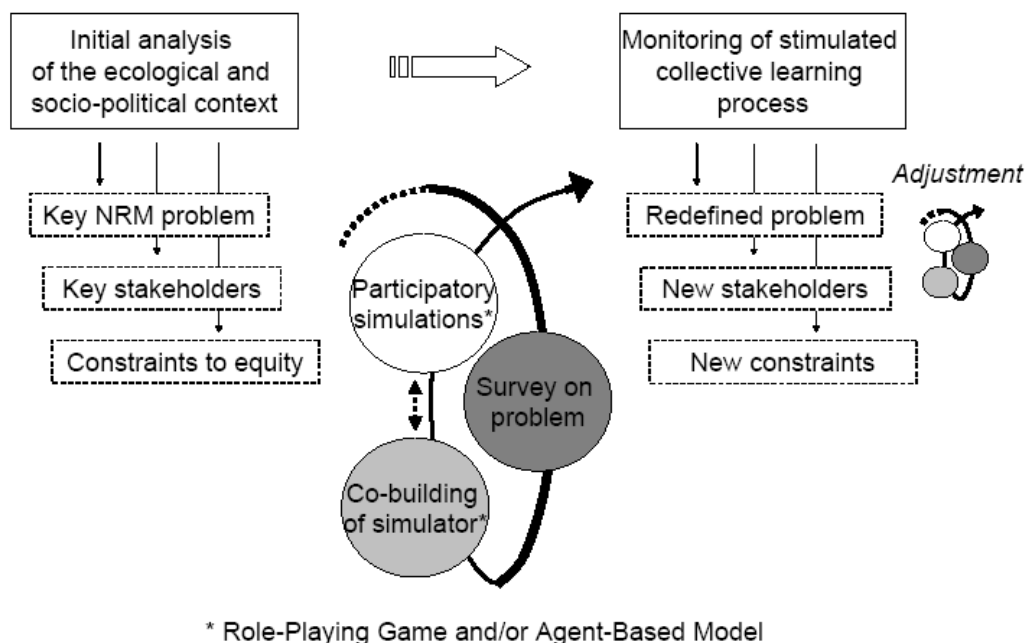


Figure 2. Main steps and dynamic of the Companion modelling process implemented in Nan Province.

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 tested in several situations. We learnt from these experiences that if the players think the game is a

right representation of their circumstances, they play in the game in a way very similar to their behaviours in reality. Then 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 them to discuss about possible solutions. In a RPG, players can test alternative scenarios of solutions, but quickly the use of this tool becomes costly and very 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, which is far more time-efficient to simulate scenarios [Barreteau *et al.* 2001]. Moreover, the RPG allows the players to understand the ABM model, to validate and criticize it, i.e. to participate in its construction, and, later on to easily follow the ABM simulations and be able to comment their results.

The main steps of the ComMod process implemented in this experiment are presented in box 1.

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

- To identify the key renewable resource management problem, the main stakeholders, and the constraints towards an equitable outcome of the process,
- To get 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, to assess the game, and to evaluate its learning effects.
- Meeting with National Park officers to present the results of the gaming sessions in the village 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 the villages to trigger discussions at the village level with 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 steps of the whole ComMod process implemented in Nan province, February 2006 – February 2007.

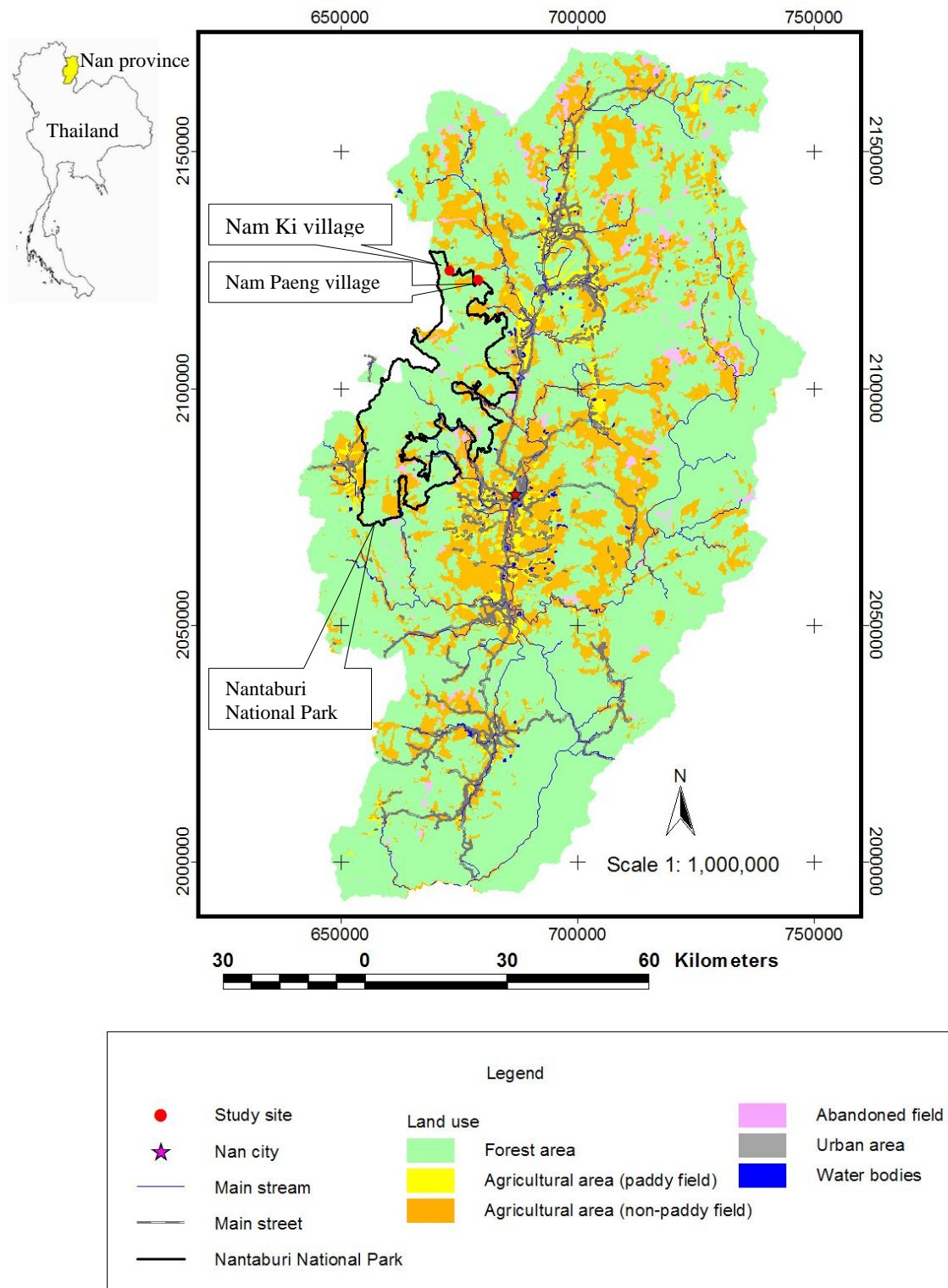
In agreement with the objective of this article the results of the initial diagnostic analysis presented in the following section focus on the understanding of the local context to facilitate a participatory process. We also show how they were used to tailor the first cycle of this ComMod process. The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

they are used to 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 & discussion

Initial agrarian and institutional context in two Yao villages

History of the local agrarian system



Map 1. Land-use in Nan province, northern Thailand, and location of the two studied villages and the Nantaburi National Park.

The Ban Nam Ki and Ban Nam Paeng villages of Thawangpha district in Nan province, Northern Thailand, 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 agriculture¹ (cultivation of 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 initiated the emergence of a new agrarian system dominated by maize and cotton as main annual cash crops. Farmers practiced extensive shifting cultivation that, together with logging and accidental forest fires, led to deforestation. Then, as a villager said: "after the middlemen, we saw forest officers coming to the village". In the 1990s, the headwaters conservation policy led to the establishment of the Nam Haen Watershed Unit as a local office of the Royal Forestry Department (RFD). 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 chemical inputs to maintain the productive capacity of the soil increased the production costs and farmers' vulnerability to fluctuating market prices. In spite of the introduction of perennial crops such as lychee, farm incomes are still often insufficient to meet families' basic needs. Indebtedness is widespread and more and more villagers have to find complementary off-farm employment. Similar agricultural transformations occurred at other places in the Northern Thailand highlands [Trébuil et al. 1997] but in Nan province they were delayed by a decade due to the remoteness of this corner of the region.

But unlike many other places across Northern Thailand, there is no more open conflict between villagers and the RFD at the study site thanks to the efforts made by the local officers to establish a dialogue with villagers, the long tradition of community-based resource management in this province, and the presence of active grassroots and pro-community organizations. The Upper Nan Watershed Management Project conducted in the study area between 1996-2003 significantly contributed to the establishment of relationships between RFD officers and communities. Implemented by the RFD with financial support provided by 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. 2002). Besides employing villagers to participate in forestry activities (for 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 NTFP.

Characterization of the main types of farming households

In the meanwhile, the integration of agriculture into the market economy and the enforcement of environmental policies accelerated the process of socioeconomic differentiation among the farming households. This process was driven by several specific factors. First, the families' order of arrival of the families when the communities were re-established in the area after the communist insurgency influenced the process of appropriation of land and forest resources. Land appropriation was on a individual basis, whereas the appropriation of forest resources

¹¹ The terms "itinerant clans" and "shifting agriculture" are here used with no pejorative connotation. We acknowledge the fact that shifting agriculture (also named "rotational", "itinerant", or "slash-and-burn" agriculture) can lead to a sustainable regeneration of forest cover when demographic pressure is sufficiently low to allow rotations with long fallow periods.

was collectively managed. The different existing hamlets were established during successive waves of migration. A patch of forest was attributed to each hamlet with its specific rules and regulations. 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 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 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 criterion is the farming household's dependence over forest and land resources. This criterion is directly linked to the above-mentioned historical process of differentiated access to land resources.

Figure 3 illustrates the 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 commonly 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 community of Northern Thailand, Delang [2006] concluded on the pertinence of the first one, and on the high economic importance of these edible forest products.

Type A are very vulnerable landless or near landless households who are highly dependent on 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 fluctuating farm incomes. Type C farming households have enough capital to invest in a rather profitable off-farm activity, like selling soymilk on markets, which in return allows them to invest in large irrigated lychee plantations.

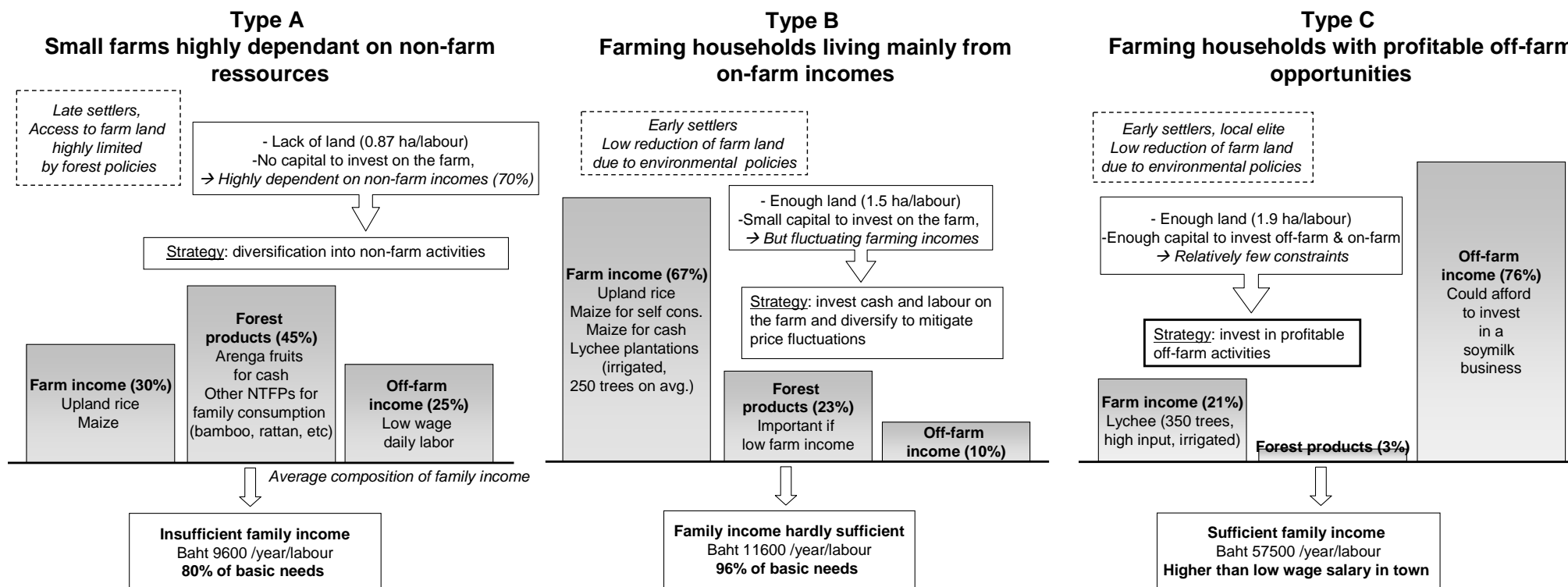


Figure 3. Typology of the three main types of farming households in two Yao villages of Nan Province, 2006².

² These results were obtained by using economic data from a sample of 33 households in which the diversity of farming households strategies in the two villages are represented. The sample contained 12, 8 and 13 households of type A, B and C respectively. Surveys at the village level would be necessary to know whether this represents the real proportions of the various categories in the villages. However, given the objectives of our diagnostic, it was not necessary to know the exact proportions. We consider that the interests of all groups should be taken into account, whatever the size of this group.

The National Park issue: main stakeholders' perceptions and interactions

The Nantaburi National Park was established in 1996 and should be officially declared in 2007. At the time of the area study in February-May 2006, neither clear 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”.

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

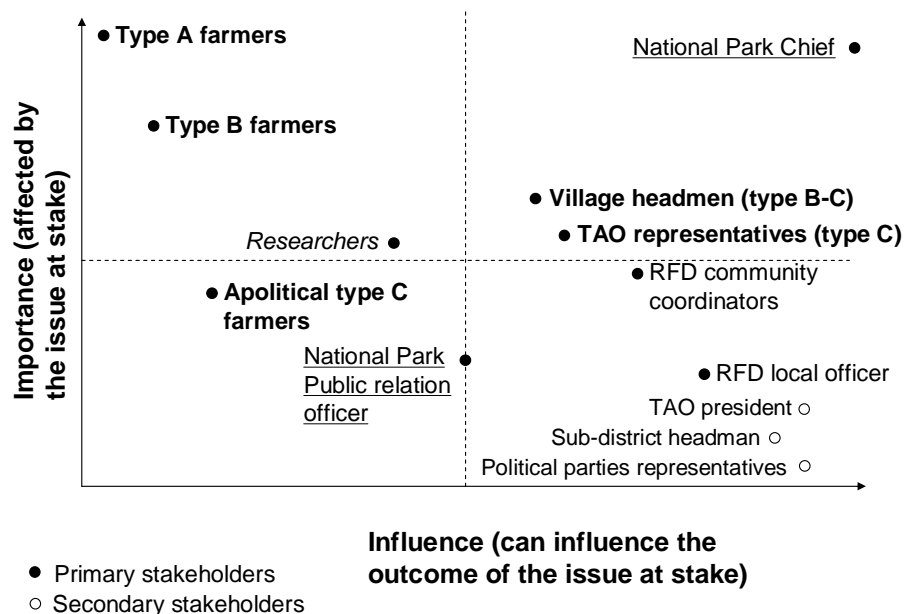


Figure 4. Matrix showing the stakeholders' relative influence and importance in the Nantaburi National Park issue in Nan province.

(NB: RFD stands for Royal Forestry Department, TAO for Tambon Administration Organization).

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 boundary issue. The chief of the National Park 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 National Park. To achieve a more integrative negotiation process, it is necessary to look at the stakeholders' underlying interests and values.

The chief officer of the National Park wants to enforce the law on the 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 forest destroyers “who always want more, and with whom it is impossible to discuss because they don’t 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 are existing within the National Park office and a staff member in charge of public relations declared during an interview that “the main problem comes from the chief who does not want to speak face to face to the villagers”.

RFD officers are not directly involved in the National Park issue and are in a go-between position. Being a state agency they have to collaborate with the park, but unlike the National Park, 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 National Park spoiling the results of all these past efforts. One could distinguish the RFD local officer from the local community coordinators, the latter have less decision-making power but feel more concerned by the relationships established with the villagers.

As a result of the existing diversity among the farming households social status and strategies, there is an unequal access to information related to the National Park 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, in spite of the fact that they have the highest interest in this issue. 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 for cash). Beyond the economic importance of the NTFP, 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 National Park because they have more interactions with other villagers and take part more frequently in the 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 that there was a risk to loose the right 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 National Park. 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 National Park 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 National Park were solved and did not feel concerned by the problem of access to NTFPs. 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.

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 (Figure 5).

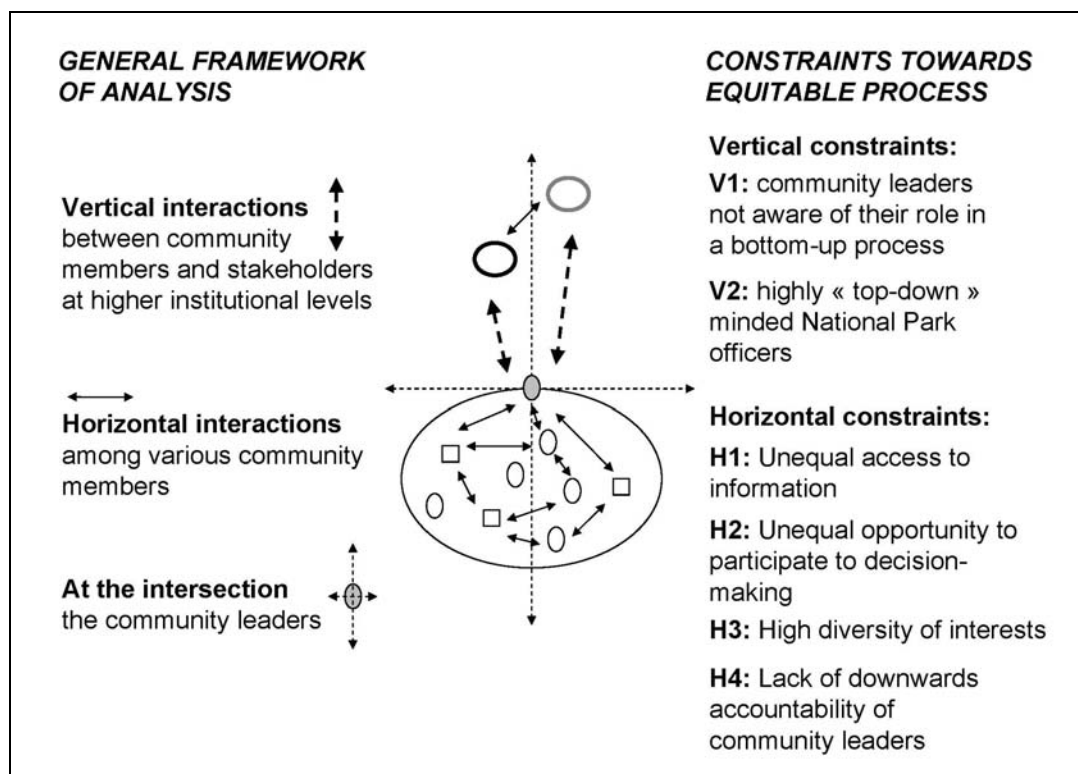


Figure 5. Identified constraints towards equity in the multi-stakeholder process about the Nanthaburi National Park issue in Nan province.

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

H1: Unequal access to information about the National Park establishment, with an important lack of information among those (type A villagers) who were the most directly concerned by its consequences.

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

H3: High diversity of interests related to the National Park issue among the villagers (linked to the various farming households' socio-economic strategies, and in particular their level of dependency on forest products).

H4: Village leaders and representatives belonging to a local elite and not always accountable to the whole village population (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, and therefore not prepared for it, especially in Ban Nam Ki.

V2: Highly “top-down minded” National Park officers, with strong prejudices against ethnic minorities, and not prone to dialogue.

Without a specific attention to the existing diversity of stakeholders at the different organization 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 another picture of the situation. Concerning the first two horizontal constraints, a first 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 search 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 which do not belong to the local elite. It is precisely this unequal access to information among villagers that deepened existing social inequities when the RFD delimited farm land and forest areas in these villages³.

Another example which concerns the two other horizontal constraints illustrates how this initial agrarian and institutional diagnosis allowed to reach a deeper understanding 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 National Park 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 situation, and particularly does not wait for the poor farmers to come back from the forest or from their fields at night.

From the initial diagnosis to the ComMod process in action

Adaptation of the ComMod process to mitigate constraints towards an equitable process

In response to the H1 constraint, the first steps of the ComMod process were tailored to increase the villagers’ awareness of the National Park issue, for example through the choice of scenarios to be played in the initial RPG. A first gaming session was played according to the current situation in the village, i.e. without a National Park, and a second one was played to simulate a scenario with the National Park in order to stimulate villagers thinking on this issue and its collective discussion to prepare an eventual negotiation with the chief officer of the National Park.

To mitigate constraint H2, we had to ensure 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 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.

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 on that year and not the fallow areas that were part of their swiddening rotations.

- Choice of participants: all the different interests in the issue at stake were represented in the game, 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 farmers belonging to the same socio-economic category) were conducted beside plenary sessions to help the less powerful villagers express themselves not in the absence of more dominating ones.

Constraints H3 and H4 were addressed by stimulating exchanges of perceptions about the National Park issue among villagers in the following way:

- The game 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 National Park raised by the participants were visualized on small cards which were 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 consensus.

Attention was paid to constraints V1 and V2 by planning a ComMod process comprising a series of steps to build dialogue and mutual understanding between the National Park and the village communities:

- First, a participatory workshop was conducted with villagers to prepare them to an eventual negotiation with the National Park, i.e. to increase their awareness about the potential problems, and to allow them to discuss and negotiate among themselves adapted solutions integrating their different interests.
- Secondly, a meeting with the National Park 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 villagers’ situations, and to allow them to discuss the issue at stake among forest officers.
- Thirdly, a participatory workshop was planned with both villagers and National Park 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, enrich and validate the researchers’ understanding of the agrarian situation to the villagers’ own perceptions in an interactive way through observations of their behaviour, decisions, and their assessment of the gaming sessions.
- To better understand the mechanisms of villagers’ collective decision-making: interactions among villagers about the use of land and forest resources and during collective decision-making processes, importance of power relations, differences of interests, and roles of village representatives.
- To better understand villagers’ problems and preoccupations and to adapt the ComMod process accordingly: relative importance of the National Park issue and more precise definition of the problem.

The second objective of this RPG was to accompany the collective decision-making process related to the National Park issue by:

- Increasing the villagers’ awareness of the National Park issue.
- Stimulating exchanges of points of view on this issue among stakeholders to prepare them for an eventual negotiation with the National Park officers.

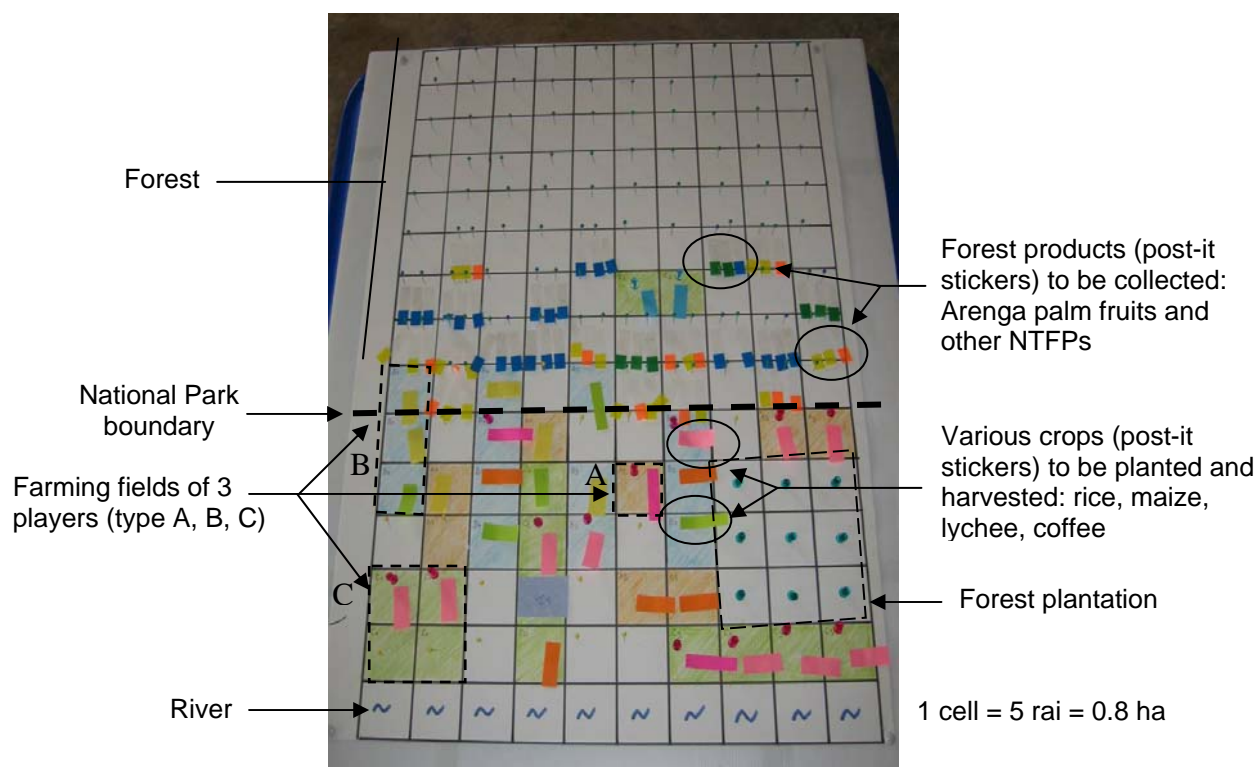


Figure 6. The gaming board used in the village of Ban Nam Ki, Nan Province, June 2006.

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

The 12 participating villagers play the role of farming households managing their farms to meet their family 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 farming 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 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 work to 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 the labour constraint),
- Collectively gather Arenga 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 family expenses,
- If family 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, June 2006.

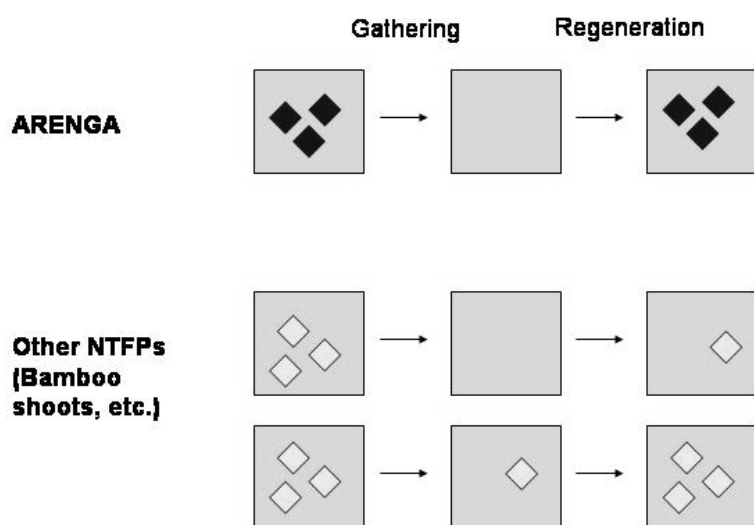


Figure 7. Rules for the regeneration of forest products (Arenga fruits and other NTFPs) in the Role-Playing Game conducted in two Mien villages of Nan Province, June 2006.

Two versions of this RPG were used in the two Yao villages. The principles remained the same, but the spatial interface and the calibration differed as to fit with the specific situation of each village⁴.

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 (Figure 8.a),
- A short debriefing took place to assess collectively the game,
- The scenario “what if the National Park is set up and applies strictly the law without any negotiation” was played,
- Another debriefing about this scenario (problems encountered and possible solutions) was organized with sub-group discussions among farmers belonging to the same socio-economic type (Figure 8.b), followed by a plenary discussion using the card ranking technique. Individual interviews with the participants were conducted in the two villages two days after the RPG sessions had taken place.

⁴ The main difference was the location of the community forest. In Ban Nam Ki, the community forest where villagers collect Arenga and other NTFPs risks to be included in the National Park. In Ban Nam Paeng, the forest area where villagers collect Arenga is also inside the National Park, but they also have a community forest in which they gather other NTFPs which will remain outside of the park.



Figure 8. a. Gaming session: villagers gathering forest products on the gaming board.



Figure 8. b. Sub-group discussion: type A farmers debating their preoccupations linked to the National Park.

In both villages, the players were very quickly at ease with the features and the rules of the game, 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 National Park 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 get low wage employment. Type C players were hardly affected by the introduction of the National Park⁵.

During the small group discussions, farmers belonging to the same socio-economic category could discuss about the problems they encountered and their possible solutions. The suggestions made underlined the need to:

- Negotiate with the National Park 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 National Park did 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 and other NTFPs was discussed. This revealed sharp differences of interests among the three hamlets of this village. The first settlers belonging to the central hamlet have access to more Arenga palms than the two other ones, so while the representatives of the former hamlet underlined the primary importance of Arenga, 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 claimed 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 National Park: 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 National Park officers for them to know better about the villagers' livelihoods and the problems they would face if the park management rules would be strictly applied. An agent-based model totally similar to the

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".

game was built to “replay” the gaming sessions in the two villages *in silico*. The officers from the National Park and the Royal Forestry Department 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.

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 in less interactive classical interviews due to the difference between the way people say they behave and their actual behaviour. 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 in a way their awareness of the National Park issue. Table 1 illustrates the various types and levels of stimulated awareness among the 22 participating villagers. The workshop generated a sentiment of urgency and interdependency among the villagers in the preparation of an eventual negotiation with the National Park. A participant said “the game made me think that we have to discuss together before we meet the National Park”. Such statements were made by 40 % of the participants. The game allowed them 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 National Park issue, but also regarding the community rules for the access to 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.

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 apply 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 applies 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
--------------	---

Table 1. Summary of the participants' answers to the question "what did you learn about the situation regarding the National Park" during the individual interviews conducted after the game in Nan province, June 2006.

As for the National Park and forest 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 National Park looked reluctant at first, but a few days later, he decided to meet the villagers by himself⁶, 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 them⁷.

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 what was the purpose of the game, and 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 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 of 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 major constraints 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 National Park said that he could 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 insecure situation. We adjusted the objectives of the next steps of the ComMod process accordingly to stimulate further communication, support further collective learning and mutual understanding to favour the emergence of co-management rules between the National Park and the communities. This might help to perpetuate informal agreements.

Conclusions

From a methodological point of view, this case study illustrates the usefulness of a few month long initial agrarian and institutional diagnosis prior to the launch of a participatory process. This initial analysis of the various stakeholders' characteristics, perceptions of the issue to be solved, and interactions was 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 them to a certain extent. Moreover, the picture of the initial stakeholders' perceptions and interactions generated by the preliminary area study is necessary to assess the effects of the participatory process in terms

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 mind, 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 dialogue with the villagers.

of communication, collective learning, and coordination mechanisms. However, integration of multiple interests is a long and enduring process. Therefore, it is not sufficient to focus one's attention on power heterogeneity and relations in the initial analysis of the socio-political context, 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 illustrates that in forest management issues, the opposition between the local communities and the state agencies are important, but conflicts of interests among the villagers and downwards accountability of community leaders are also key dimensions to take into account for a relevant understanding of this problem. The historical processes of socio-economic differentiation among villagers led to a diversity of farming households characterized by different amounts of means of production, constraints, and interests, but also by different abilities to participate in collective decision-making processes. 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, and if power imbalances within communities are not taken into account, the current establishment of new National Parks 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 (see for example Tankimyong, 1992, Thomas, 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 Northern Thailand.

This paper focused on the initial diagnosis conducted prior to a ComMod process aiming at facilitating dialogue between two communities and a 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, this process has its own limits. First, its expected concrete impact for local stakeholders is rather limited. National Park directors have very little room for manoeuvre. They are officially accountable only to their seniors in Bangkok, and they can be transferred to less desirable positions if they do not perform in accordance with the expectations of their seniors. Moreover, agreements between the National Park and the communities can only be informal because there is no legal basis to make them official. The future of such informal agreements is very uncertain because they can be reversed when a new director is assigned. The second limit of the process presented in this case study is related to its scale. Many communities face the same kinds of problems in northern Thailand. How to go beyond a few villages case study? This problem is faced by many participatory processes which remain isolated success stories. This calls the need to train a new generation of government officers to this kind of participatory approaches. The key problem of the cost of such approaches would be minimized if government officers used these approaches to replace their classical working meetings. To be applicable in many places, such participatory approaches should be highly flexible.

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 natural resources. Unfortunately, the very recent constitution established by

the military government is more questioning than reinforcing 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 Centre 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., 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. Curzon & Nordic Institute of Asian Studies, Richmond, Surrey.
- Barnaud, C., Promburom, T., Trébuil, G., 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., Weber, J., 1999. An environmental modelling approach. The use of multi-agents simulations. . In: Blasco, F., Weill, A. (Eds.), *Advances in Environmental and Ecological Modelling*. Elsevier, Paris, pp. 113-122.
- 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. 360 p.
- Carnevale, J.P., 2006. Creativity in the outcomes of conflict. In: Deutsch, M., Coleman, P.T., Marcus, E.C. (Eds.), *Handbook of conflict resolution: theory and practice*, Jossey-Bass, 414-435.
- Cornwall, A., 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, 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: Metcalf, H.C., Urwick, L. (Eds.), *Dynamic administration: The Collected Papers of Mary Parker Follett*. Harper, New York.
- 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., 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: Silkwood Books.
- Johnson, C., 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., Mathieu, M., 2000. Diagnostic participatif, enjeu de pouvoir et processus social. In: Lavigne-Delville, P., Selamna, N.E., Mathieu, M. (Eds.), *Les enquêtes participatives en débat. Ambitions, pratiques et enjeux*. GRET-Karthala-ICRA, Paris, p. 543.
- Leeuwis, C. and Van Den Ban, A. W. 2004. *Communication for rural innovation. Rethinking agricultural extension*. Oxford: Blackwell publishing Ltd.
- Mazoyer, M., Roudart, L., 1997. *Histoire des agricultures du monde: du néolithique à la crise contemporaine*. Éditions du Seuil, Paris, France.
- McKinnon, J., Vienne, B., 1989. *Hill tribes today*. White Lotus-Orstom, Bangkok.
- Neef, A. (ed) 2005. *Participatory approaches for sustainable land use in Southeast Asia*. Bangkok: White-Lotus.
- Neef, A., Chamsai, L., Sangkapitux, C. 2006. Water tenure in highland watersheds of Northern Thailand: managing legal pluralism and stakeholder complexity. In *Institutional Dynamics and Stasis: 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.
- 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 Röling, N. G. and Wagemakers, M. A. (Eds.) *Facilitating Sustainable Agriculture: Participatory learning and adaptive management in times of environmental uncertainty*, 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, pp13-32.
- Rutherford, J., 2002. Institutions, Impacts and responses in the agrarian transformation of the mountains of northern Thailand. In: Jianchu, X., Mikesell, S. (Eds.), *Landscapes of diversity. Proceedings of the 3rd International Conference on Montane Mainland Southeast Asia (MMSEA 3)* Yunnan Science and Technology Press, Lijiang, China, pp. 55-78.
- 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., H. Weyerhaeuser, et al. (2002). Improved tools for managing agroforestry landscapes in Northern Thailand : pilot application of spatial analysis and negotiation support systems. *Lanscapes of diversity. Proceedings of the 3rd International Conference on Montane Mainland Southeast Asia (MMSEA 3)* Lijiang, Yunnan, China, Yunnan Science and Technology Press, China.
- 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., Shinawatra, B., 1997. Diagnoses at Field, Farm and Watershed Levels in Diversifying Upland Agroecosystems: Towards Comprehensive Solutions to Farmers' Problems. In: Kropff, M.J., Teng, P.S., Aggarwal, P.K., Bouma, J., Bouman, B.A.M., Jones, J.W., Laar, H.H.v. (Eds.), *Systems Approaches for Sustainable Agricultural Development: Applications of Systems Approaches at the Farm and Regional Levels*. Kluwer Academic Publishers, IRRI. 99-114.
- Wollenberg, E., Anderson, J. and Edmunds, D. 2001. Pluralism and the less powerful: accomodating multiple interests in local forest management. *Agricultural Resources, Governance and Ecology*, 1 (3/4), 199-222.