

# Initial Diagnostic Analysis for Companion Modelling to Accommodate Multiple Interests in Upper Watershed Management

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## Introduction

Ethnic minorities in the highlands of Northern Thailand have long been accused of degrading the upper watersheds of the country's major basins. During the past three decades, the impressive amount of agronomic research carried out to study ways to control soil erosion in the sloping highlands had limited success. The introduced standard "technological packages" were not adapted to local farming systems, and therefore were not widely adopted (Turkelboom and Trébuil 1998). In the meantime, environmental policies were reinforced. In the 1990s, the government further restricted highlanders' access to farm land through the delimitation of reserved forest areas managed by the Royal Forestry Department, and the establishment of many new National Parks, Wildlife Sanctuaries, etc. (Hirsch 1997). This resulted in an increasing number of conflicts over land-use between local communities and state agencies. The limits of past research and policies in the field of soil and water conservation call for more integrated transdisciplinary and truly participatory approaches to better balance between agro-ecological and social aspects of collective management issues to be examined and mitigated (Sayer and Campbell 2003).

Drawing the lessons from the numerous participatory watershed management projects conducted in the past, more and more authors argue that because of a lack of attention to the complex political contexts in which these projects were embedded, the less powerful stakeholders were often left behind (Wollenberg, Anderson et al. 2001). This issue has drawn a dividing line among scholars. Two main attitudes may be typified: a "dialogue" vision and a "critical" vision (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 critical vision argue that power relations need to be addressed first, otherwise there is a high risk that the participatory process deepens the existing social inequities (Edmunds and Wollenberg 2001).

The question we address in this communication is: how far is a preliminary institutional analysis needed prior to the launch of a collaborative modelling process? This question is addressed drawing on a Companion Modelling (ComMod) experiment being conducted in Nan province, Northern Thailand, about a conflict between two Mien communities and a National Park. The objective of the ComMod approach is to stimulate collective learning and coordination among multiple stakeholders to solve a common problem of renewable resource management (Bousquet, Trébuil et al. 2005). Its principle is to develop simulation models integrating different stakeholders' points of view on the problem at stake, and to use them to explore and discuss collectively various scenarios for the future. The objective of this communication is to demonstrate the importance of an initial institutional analysis prior to the ComMod process per se. We argue that this initial analysis of stakeholders social status, perceptions of the problem at stake, social relations and interactions is needed to: (i) identify

the feasibility and the usefulness of a ComMod process, (ii) identify the constraints towards equitable outcomes of the participatory process (who is likely to benefit?), and provide means to adapt the ComMod process to mitigate them, (iii) get a picture of the initial stakeholders' perceptions and interactions to be used as a baseline to assess the effects of the ComMod process in terms of communication, collective learning and coordination mechanisms.

After a presentation of the conceptual framework used to analyse the situation and its changes, and the ComMod process being implemented, we will present the results of the initial diagnosis and how they were used to tailor the on-going ComMod process. The preliminary results of the ComMod process in terms of accommodation of multiple interests are also presented and discussed. In conclusion, the authors describe how they are used to define the next steps of the collective learning process.

# 1 Conceptual framework of analysis & methodology

## 1.1 Conceptual Framework of analysis

To elaborate our conceptual framework of analysis of the initial situation and its changes along the ComMod process, we combined three main theories (figure 1).

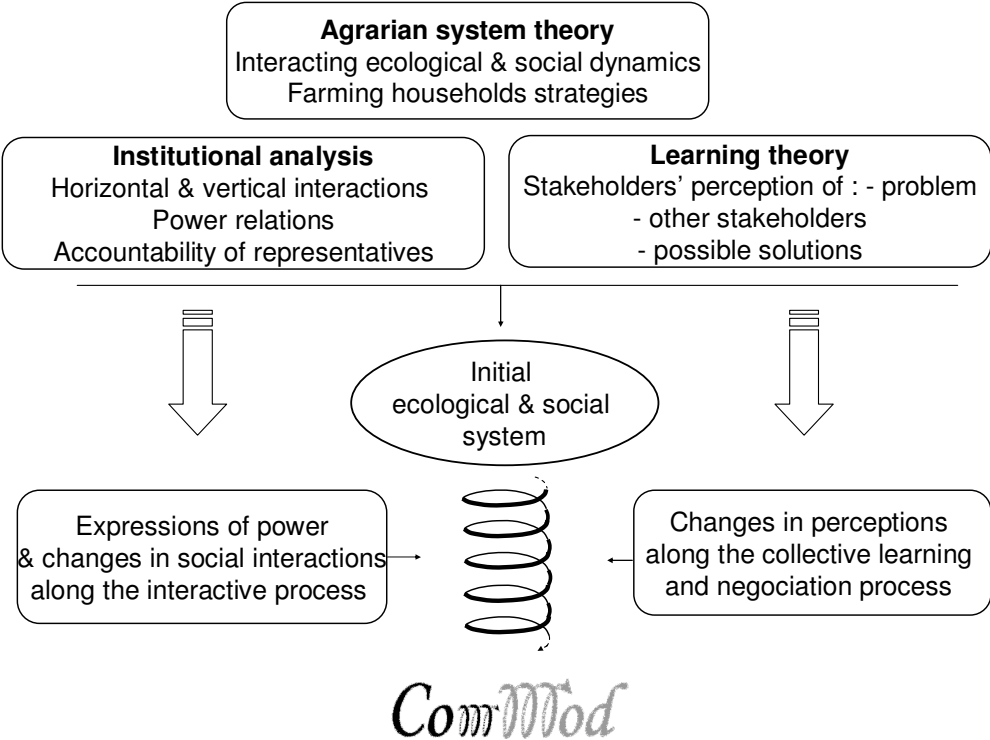


Figure 1. Conceptual framework of analysis used in Nan Province.

First we used the agrarian systems theory to examine the main interacting socio-economic and agro-ecological dynamics of the local system, and to identify the different types of farming households having various agronomic & socio-economic constraints and related strategies (Trébuil and Dufumier 1993).

Then we needed an institutional analysis to further elaborate on the political ecology of the water management problem. Institutions are here 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, Gardner et al. 1994). In the context of decentralization, 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 (National Park and Royal Forestry Department). At the intersection of both lays the key role of village leaders and representatives, in particular the village headman and the two elected members of the sub-district (tambon) administrative organization (TAO) whose accountability is determinant for a democratic decentralization (Ribot 2001).

Finally, as our ultimate purpose is to examine how the ComMod process will produce changes in the system, we also used elements of the learning theory focusing on changing perceptions and interactions (Leeuwis and Van Den Ban 2004).

A set of qualitative indicators were analyzed before and along the ComMod process to monitor the effects of the process : (i) stakeholders' perception of the issue at stake (based on their interest & their knowledge), (ii) their perception of other stakeholders, (iii) their interactions with other stakeholders, and (v) their perception of future possible scenarios to mitigate the problem at stake.

## **1.2 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 being as follows: (i) Characterization of the problem, (ii) Modelling, i.e converting knowledge into a formal tool to be used as a simulator; and (iii) Simulations to explore various scenarios of solutions (Bousquet, Trébuil et al. 2005).

Two kinds of simulation tools are used: Agent-Based Models (ABM) and RolePlaying 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. Players can test alternative scenarios, but quickly this 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, Bousquet et al. 2001). Moreover, the RPG allows the players to understand the ABM model, to validate and criticize it, and, later on to easily follow ABM simulations.

The main steps of the ComMod process implemented so far are as follows (figure 2):

1. Initial diagnosis analysis to identify the key problem of resource management, the main stakeholders, and the constraints towards an equitable outcome of the process, and to get a picture of the stakeholders' initial perceptions and interactions related to the identified problem (the National Park issue).
2. Conception of a Role-Playing Game to help stakeholders reflect collectively upon the National Park issue.
3. First participatory workshop with the villagers:
  - a. Day 1: gaming sessions and discussions,
  - b. Day 2: individual interviews to better understand players' behaviour, to assess the model of the game, and its learning effects.
4. Results of the gaming sessions explained to the National Park officers by using an Agent-Based Model simulating the game.
5. Continuous monitoring of the effects of the process through individual interviews.

Only the preliminary steps of a first cycle were implemented so far, and the monitoring of the effects of the process are being used to define next steps of this adaptive experiment. We might need to redefine the problem, to implicate different stakeholders and to adapt the methodology to mitigate new constraints to equity which emerged during the first cycle.

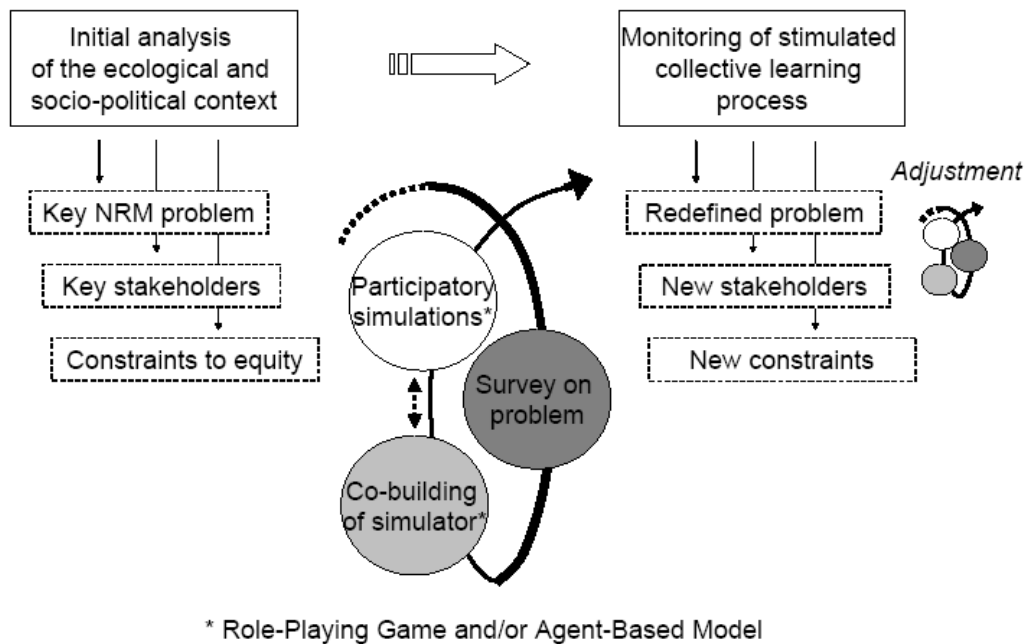


Figure 2. Main steps of the ComMod process implemented in Nan Province.

## 2 Results & discussion

### 2.1 Initial agrarian and institutional context in two Mien villages

#### 2.1.1 History of local agrarian system

Map 1. Land-use in Nan province and location of the two studied villages.

Ban Nam Ki and Ban Nam Paeng are two villages belonging to Mien ethnic minority, located in Thawangpha district, Nan province, Northern Thailand (map 1). These two villages' 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 agriculture based on the cultivation of maize, upland rice and opium poppy, and associated to swine rearing. In the late 1970s the government declared their territory as a "pink" area at risk of falling into the hands of the communist rebellion and forced them to settle in sedentary villages located 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 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 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.

Unlike many other places across north Thailand, there was no open conflict between villagers and the RFD thanks to the efforts made by the local officers to establish a dialogue with villagers. They encouraged villagers to set up community forests with agreed-upon rules at the village level. Most of the time they allowed them to collect Non Timber Forest Products (NTFP) in reserved forest areas, and they employed them to participate in forestry activities (fire-breaks, replantation plots, fire surveillance etc.).

### 2.1.2 Characterization of the main types of farming households

In the meanwhile, the enforcement of environmental policies and the integration of agriculture into the market economy accelerated the process of differentiation among farming households. In the current agrarian system, one can identify three main types of farming households. Type A are very precarious landless or near landless households highly dependant on NTFP such as Arenga palm fruits for cash income, and various plants and animals for self-consumption. These forest products and the low daily wages earned in the village or in town are essential to their survival (figure 3a). Type B farming households have sufficient land and funding to earn their main income from agriculture. However, NTFP are an important complementary source of cash to face irregular farm incomes (figure 3b). Type C farming households have enough capital to invest in a rather profitable off-arm activity like selling soymilk on markets, which in return allows them to invest in large irrigated lychee plantations (figure 3c).

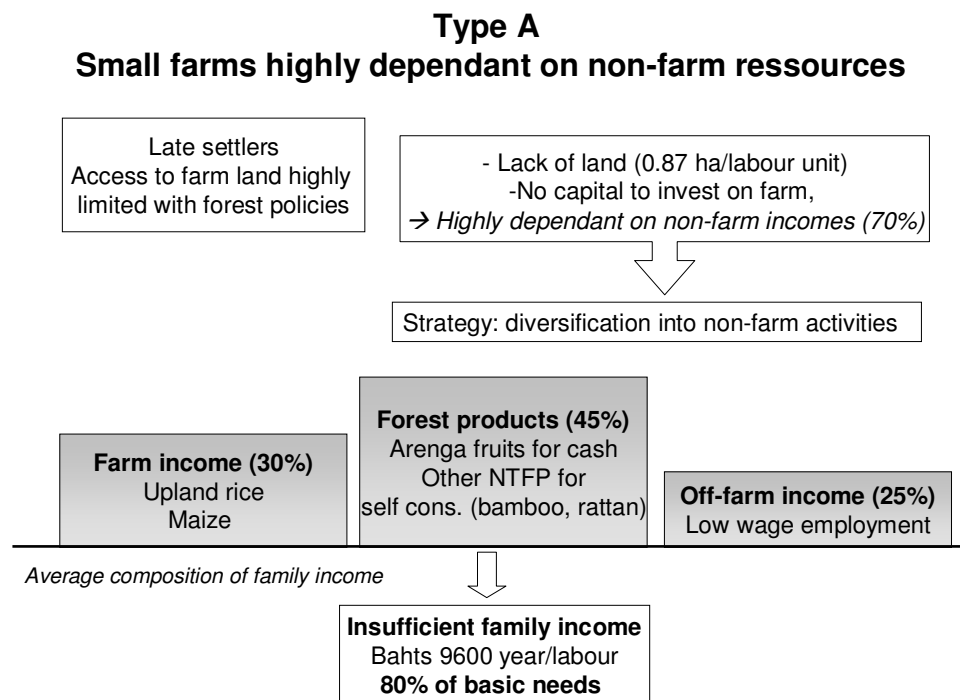


Figure 3a. Diagram illustrating the functioning of type A farming households in two Mien villages, Nan Province, 2006.

## Type B Farming households living mainly from on-farm incomes

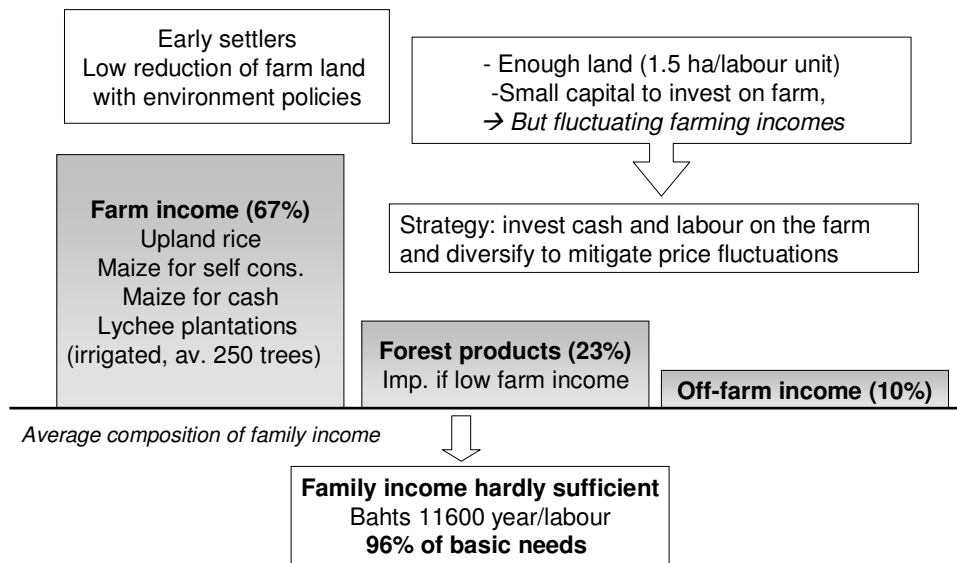


Figure 3b. Diagram illustrating the functioning of type B farming households in two Mien villages, Nan province, 2006.

## Type C Farming households with profitable off-farm opportunities

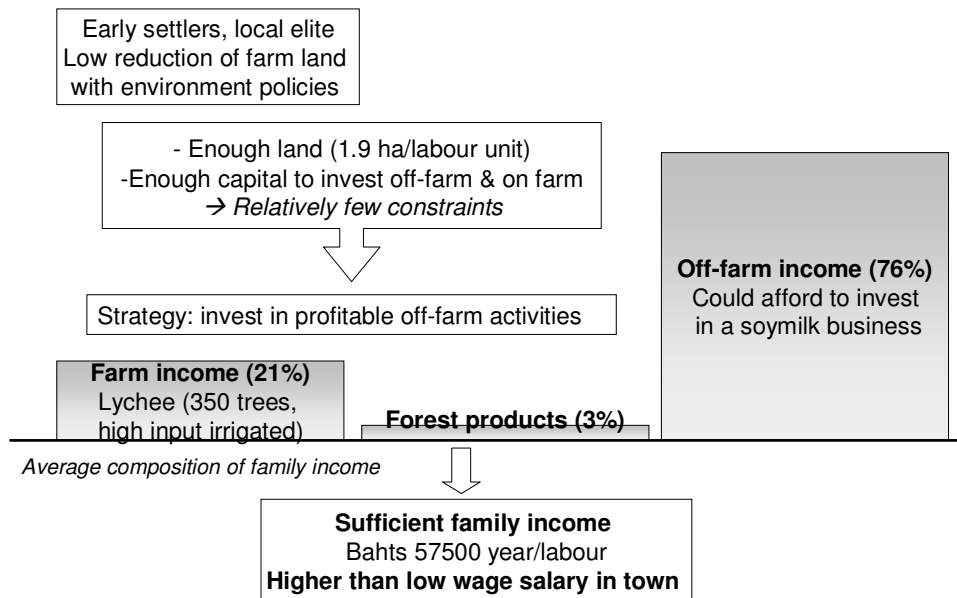


Figure 3c. Diagram illustrating the functioning of type C farming households in two Mien villages, Nan Province, 2006

### 2.1.3 The National Park issue: main stakeholders' perceptions and interactions

The Nantaburi National Park started to settle in 1996 and should be officially declared in 2007. Up to now, there are still neither clear boundaries, nor clear resource management rules yet, in particular regarding rights to gather NTFPs. The two studied villages are located closed

to the park boundary and some of their farm land and the forest areas in which they gather Arenga fruits and other NTFPs risk to be located inside the park. According to the Thai law, no human activity is allowed inside the park, but the chief officer of the National Park, who did not look at the NTFPs issue so far said that “things will have to be discussed again when the National Park will be officially declared”.

Stakeholders can be 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* refers to the power certain stakeholders have 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 settlement of the Nanthaburi National Park.

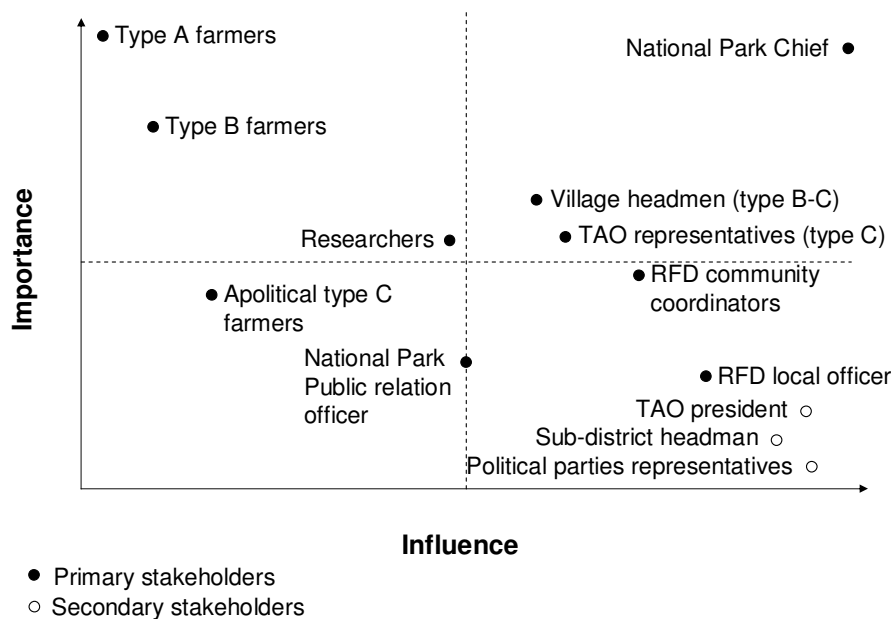


Figure 4. Matrix of stakeholders' relative influence and importance in the National Park issue.

The following section describes the various perceptions and interactions among the primary stakeholders. The National Park would like to enforce the law, but is afraid of possible violent reactions from the villagers. Its chief officer has many prejudices against ethnic minorities, seeing them as forest destroyers “who always want more, and with whom it is impossible to discuss because they don't understand anything”. He had no dialogue with villagers so far, except with the village headman in Ban Nam Paeng. He has therefore very limited knowledge of the villagers current situations. But there are disagreements within the institution: a staff of the National Park in charge of public relations said that according to her, “the main problem came from the chief who doesn't want to speak face to face to villagers”.

RFD officers are in a go-between position. Being a state agency they need to collaborate with the National Park, but unlike the National Park, they tolerate the presence of villagers in the forests. They established good relationships with them in the past, agreed on co-management rules, and they don't want to see the new National Park spoiling the results of all these past efforts. One can distinguish the RFD local officer from the community coordinators, the second ones having less power but feeling more concern by the relationships they established with the villagers.

On the villagers' side, there is a diversity of levels of informations and interests linked to the diversity of farming households social status and strategies. Among the type A farming households, as their participation in local politics is very limited, their level of information is

very low. Their perceptions of the situation are mainly based on fear and assumptions, and not on tangible information, despite they are the ones with the highest interests in this issue. They indeed risk to lose the rights to collect NTFP which are necessary to their survival, such as bamboo shoots and rattan shoots for self-consumption, dead wood for firewood, and Arenga for cash. In their eyes, all villagers are in the same situation.

Type B farming households are slightly more informed about the National Park because they have more interactions with other villagers and assist more frequently to the meetings. They mainly feel concerned by the risk to lose some farm land. As for the forest products, it is not their main interest and they generally hardly believe that there is risk to lose the right to collect them as RFD officers allowed them to collect them in the past.

Type C farmers usually keep more or less informed about the National Park related events, although they have no personal interests in this issue. Among type B and C farmers, some think other villagers will not face much difficulties with the National Park establishment, while some other realize that the villagers who are mainly living from forest products will have problems to survive and risk to protest violently.

As far as village representatives are concerned, the institutional context differs between the two villages. In Ban Nam Paeng, the village headman (a well-off type C farmer) is very aware of the situation and already met with the National Park to negotiate the village farm land boundary so that all the farming households could keep their farm land. He considers that the problems with the National Park are solved and doesn't feel concerned by the problem of access to NTFP. In Ban Nam Ki, the young and recently-elected village headman (a type B farmer) is not aware at all of the situation as he had hardly ever heard about the National Park when we first met him. The ones who are the most aware of the situation are two well-off type C farmers: a TAO representative and an old informal environmentalist leader. They have no personal economic interest in this issue but they want to retain their community forest and feel betrayed by government institutions which helped them to establish it in the past and now want to take it back.

This institutional analysis conducted with the primary stakeholders revealed an impressive diversity of perceptions reflecting the multiple interests at stake, the lack of clarity of the situation, and the poor communication among stakeholders. A ComMod process stimulating communication and collective learning among stakeholders was considered potentially useful to accompany the collective decision-making process related to the establishment of the National Park. This institutional analysis also revealed that such a ComMod process was feasible, but that there would be constraints towards an equitable outcome of the process.

#### ***2.1.4 Identification of the main constraints towards an equitable process***

We identified five main constraints:

- (1) Unequal access to information about the National Park establishment, with an important lack of information among those who are the most directly concerned by its consequences (type A villagers),
- (2) 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),
- (3) High diversity of interests related to the National Park among the villagers,
- (4) Village leaders and representatives belonging to a local elite and who are not accountable for the village population as a whole (little concern for resource-poor villagers' interests),



- (5) Village leaders and representatives 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),
- (6) Highly “top-down minded” National Park officers (prejudices against ethnic minorities, not prone to dialogue).

## **2.2 The ComMod process in action**

### **2.2.1 *Specific adaptations of the ComMod process to mitigate the constraints towards an equitable process***

To answer to constraints 1 and 5, one of the objectives of the ComMod process was to increase villagers’ awareness of the National Park issue:

- Choice of scenarios to be played in the game: a first gaming session was played according to the current situation in the village, i.e. without National Park, and a second one was played to simulate a scenario with the National Park, to increase villagers’ awareness about it, and to start make them think and discuss together about how they could prepare to this.

Answers to constraint 2 aimed at ensuring that all stakeholders understood the ComMod process and felt free to express themselves at some moment:

- Choice of tools: the game is more easy and attractive to follow than formal discussions, in particular for those with low communication skills,
- Choice of participants: all groups of interests were represented in the game, and no group was represented by single or intimidated players,
- Individual interviews and small homogeneous discussions were conducted beside plenary sessions to allow the less powerful villagers to express themselves not in the presence of the powerful ones.

Answers to constraint 3 and 4 aimed at stimulating exchanges of perceptions about the National Park issue among villagers:

- Game conceived to highlight differences among farming households,
- Use of a “card ranking technique” : all raised problems related to the establishment of the National Park were drawn on small cards which were displayed on a board, and the participants were invited to indicate with post-it of different colors their own rank of importance of the problems. This “card ranking technique” was used to support the discussions to underline the diversity of interests existing in the community without trying to reach consensus.

To answer to constraints 5 and 6, the ComMod process was organized to go step by step towards dialogue and mutual understanding between the National Park and the communities:

- First, a participatory workshop was conducted with villagers to prepare them to a negotiation with the National Park, i.e. to increase their awareness about the potential problems and to make them discuss together about collective solutions in spite of their differences.
- Second, a meeting with the National Park officers to be transparent and inform them about the results of our activities, to sensitize them about the ComMod approach, to make them learn about villagers’ situations, and to allow them to discuss together (among forest officers) about these issues.
- Next step (not implemented yet) should be a gaming session with both villagers and National Park officers.

### 2.2.2 Description of the Role-Playing Game

The objectives of this Role-Playing Game were twofolds: to better understand the situation, and to accompany a collective decision-making process related to the National Park.

1. To better understand the situation
  - a. to confront our understanding of the agrarian situation to the villagers' perceptions (through their assessment of the game),
  - b. to better understand mechanisms of villagers' collective decision-making processes (interactions among villagers about land and forest resources, interactions during a collective decision-making process, power relations, role of village representatives),
  - c. to better understand villagers' problems and preoccupations and to adapt the ComMod process accordingly (to check whether National Park is a relevant problem or not, to precise or redefine the problem).
2. To accompany a collective decision-making process
  - a. to increase villagers awareness of the National Park issue,
  - b. to make them exchange their views on this issue to prepare themselves to an eventual negotiation with the National Park.

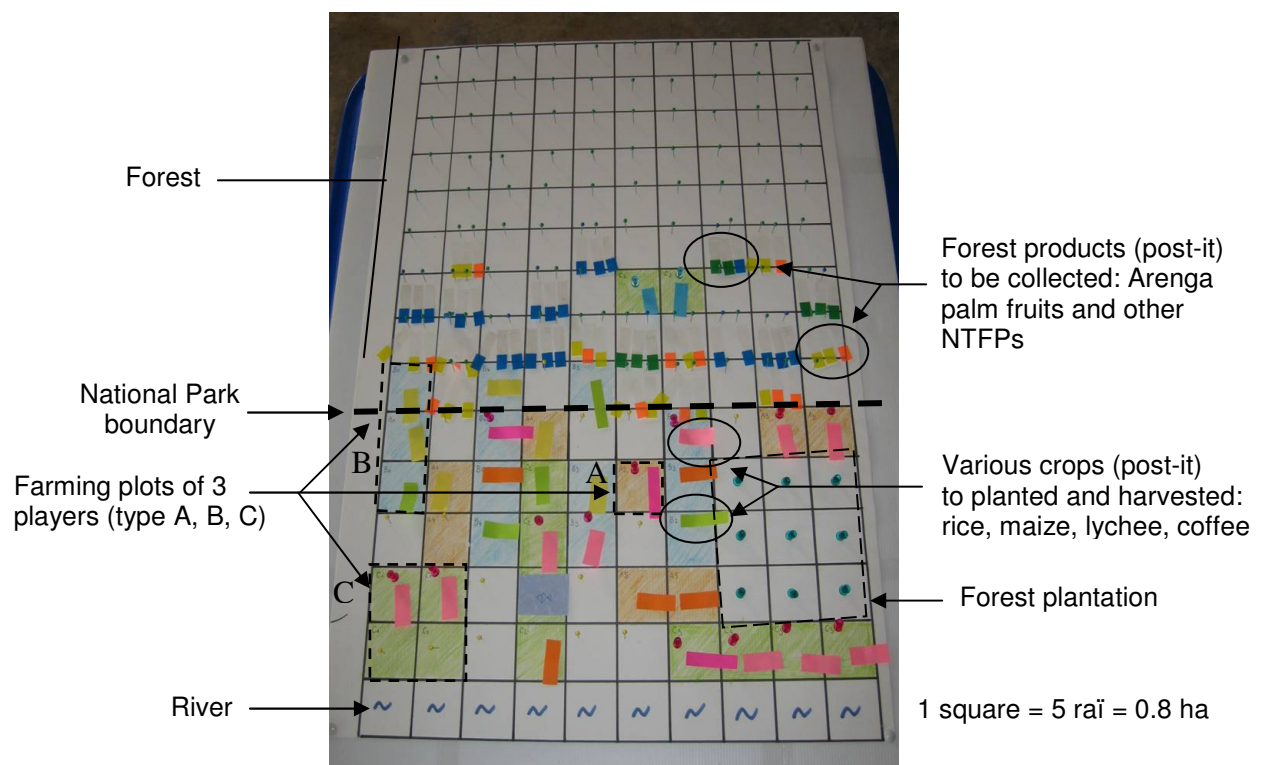


Figure 5. The gaming board used in the village of Ban Nam Ki, Nan Province, June 2006.

Figure 5 presents the spatial interface of the game, i.e. the gaming board, and box 1 the main principles of this game. As for the ecological dynamics, we used simple rules of regeneration of forest products (figure 6). Concerning Arenga, as villagers only collect the fruits without cutting the palm (as they did in the past), gathering has no effect on the regeneration dynamic. Concerning other NTFPs, as bamboo shoots and rattan shoots are the main ones, there is a risk of decrease in resource 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 labours 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). They belong to the same socio-economic category in the game and in reality. National Park officers were not invited to this game but their presence was indicated by a fictive stakeholder made of paper. Each year, the players successively:

- decide whether to send family labour 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 the labour constraint),
- All together, gather Arenga and other forest products for self consumption (no imposed rule, players decided themselves the rules of access to 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 "exceptionnal expense card" (wedding, fridge, TV, etc.)

Two scenarios were played, with and without National Park. In the second one, a fictive National Park boundary was drawn and farming and gathering activities were forbidden inside the area.

Box 1. Main principles of the Role Playing Game in the ComMod experiment conducted in two Mien villages, Nan Province, June 2006.

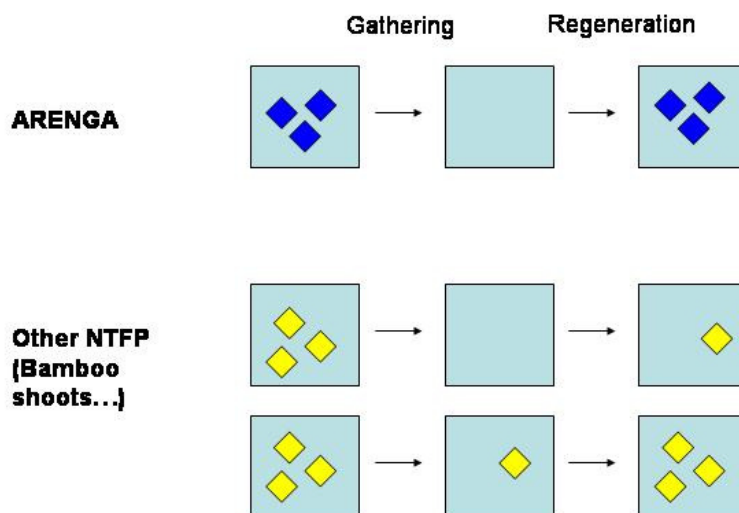


Figure 6. Rules of regeneration of forest products (Arenga fruits and other NTFP) in the Role-Playing Game conducted in two Mien villages, Nan Province, June 2006.

Two versions of this Role-Playing Game were conducted in the two villages. The principles remained the same, only the spatial interface and the calibration differed. The main difference was the location of the community forest. In Ban Nam Ki, the community forest in which villagers collect Arenga and other NTFP risks to be inside 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 NTFP which will not be inside the National Park.

### 2.2.3 What happened during the gaming sessions and discussions?

The gaming sessions and collective discussions were organized as follows:

- (i) Scenario corresponding to the current situation (no National Park yet),

- (ii) Short debriefing to assess collectively the game,
- (iii) Scenario “what if the National Park came and strictly applied the law without any negotiation”,
- (iv) Debriefing about this scenario (problems encountered and possible solutions): sub-group discussions among farmers belonging to the same socio-economic type, followed by a plenary session discussion using the card ranking technique. Individual interviews with participants were conducted successively in the two villages two days after each Role Playing Game.

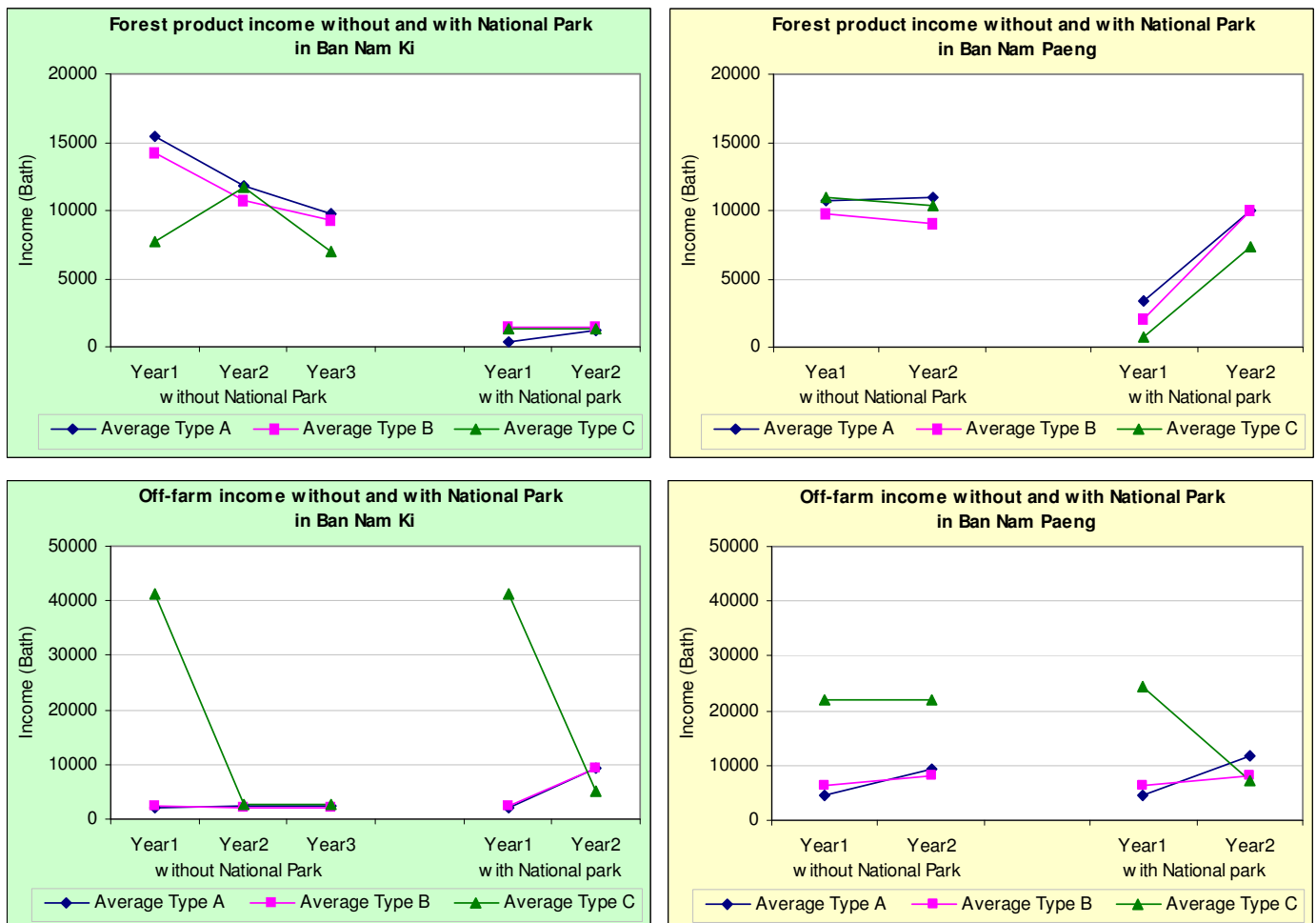


Figure 7. Players’ incomes from forest resources and off-farm activities during the gaming sessions, scenarios with and without the National Park, in Ban Nam Ki and Ban Nam Paeng, Nan Province, June 2006.

In the two villages, the players were very fast at ease with the rules of the game, and the general atmosphere playful. Most of the players chose the same crops and off-farm activities like in reality, according to their socio-economic type. But some players also tested new strategies to improve themselves or by curiosity. Concerning the collect of NTFP, no rule was imposed by the facilitating team, the players had to decide them themselves. In Ban Nam Ki, some players tried to initiate discussion to set up a collective gathering strategy, but before they have time to finish, all the players rush to gather the forest products. So the rule was “every one for himself”, and the resources in products other than Arenga (bamboo shoots, rattan shoots, etc.) decreased year after year because of over-harvesting. In Ban Nam Paeng, the villagers agreed on a common rule stipulating not to collect more than two “post-it” per

player. In the two villages, when the National Park established, all type A and most of type B players could not meet their family basic needs any more because of a sharp decrease in their forest incomes (figure 7). All indebted players decided to send one labour working in town in low wage employment. Type C players were hardly not affected by the National Park. In Ban Nam Paeng, the players decided to break the rule the second year, whereas in Ban Nam Ki, no one did because a TAO representative said “we cannot steal, we have to negotiate”.

During the small group discussions, farmers belonging to the same socio-economic category could discuss together about encountered problems and possible solutions. The suggestions made fell into three themes: the need to negotiate with the National Park to keep the right to collect forest products in a sustainable way, the need to reflect upon and agree on such sustainable ways to collect forest products, and the need to ask for compensations in case the National Park did not agree to let them gather forest products.

During the plenary session discussions, the card ranking techniques allowed to highlight differences of interests among villagers, but the discussions were particularly tense and lively in Ban Nam Ki when discussing about the relative importance of Arenga and other NTFPs, revealing sharp differences of interests and tensions between the three hamlets of this village. First settlers belong to the central hamlet. They have access to more Arenga palms than other hamlets, so their representatives claim the priority importance of Arenga, while other hamlets value more other NTFPs. There were also tensions within each hamlet: for example, some type A farmers from this central hamlet who first claimed the priority importance of forest products for subsistence did not dare anymore express their view in the presence of their representatives.

#### ***2.2.4 Use of computer simulation for a restitution to the National Park***

During the individual interviews conducted after the game, all the participants said we should show to the National Park the results of the gaming sessions, so that the officers would know better about villagers' livelihoods and the problems they would face if the rules were strictly applied. An agent-based model entirely similar to the game was built to “replay” the gaming sessions in the two villages. The officers of the National Park and the Royal Forestry Department who were invited to the meeting could easily follow the simulations, which was a simple and lively way to explain them what happened. They said it allowed them to better understand villagers' circumstances, but when asked whether they would join a meeting with villagers, the chief officer of the National Park was still reluctant. However, a few days later, the same man decided to organize a meeting with all villagers in Ban Nam Ki. From what villagers told us, this meeting was very tense, in a climate of reciprocal mistrust, but both parties finally started to agree on compromises. If there is an effect of the ComMod process in the decision of the chief officer to finally go and discuss with villagers, it is probably related to the presence of the officers of the Royal Forestry Department to the meeting as they value dialogue with villagers.

### **2.3 Preliminary assessment of the effects of the ComMod process**

#### ***2.3.1 What did researchers learn?***

First, we could validate our general understanding of the situation. The participants found the game very realistic, highlighting the realism of features such as the differences of wealth among villagers, the riskiness of agricultural activities, the different regeneration dynamics of Arenga and other NTFP, etc.

Second, we could improve our understanding of the mechanisms of collective decision making processes in the villages. The game is a good way to reveal individual and collective behaviours which are not easy to catch with classical interviews, due to the differences in the

way people say they behave and the way they actually behave. As seen in the previous section, the game revealed important tensions between the three hamlets in Ban Nam Ki, what is a key point as they will have to find an agreement at the village level when negotiating with the National Park. The game also revealed that in spite of community rules which were established in the past about ways to gather forest products, as these rules faded away year after year, coordination among them was not self-evident and needs to be reinforced. We could also better understand key elements related to power relations and the role of village leaders: the tensions and the lack of communication among the various representatives (heads of the powerful clans), the paternalistic influence of representatives over the villagers belonging to their clan, the lack of legitimacy of informal old leaders vis-à-vis the new generation, and the lack of self-confidence of most villagers in their ability to participate to local politics (in particular the women).

### ***2.3.2 What did participants learn?***

Individual interviews revealed that the game increased significantly the players' awareness of the National Park issue. They realized what might be the consequences of its establishment for their livelihoods. And more importantly, it introduced a feeling of urgency among them to adapt to this new situation, and to prepare themselves to an eventual negotiation with the National Park. It also increased their feeling of interdependency: most of them said they realized they had to prepare themselves collectively, and they had indeed more formal and informal discussions about it after the game. It also increased some players' awareness of the need to reinforce collective rules for sustainable use of forest resources. Moreover, the game allowed to exchange their views on the situation: some participants said the game made them realize the diversity of interests existing within the community, and therefore the necessity to coordinate. Two village representatives in Ban Nam Ki saw the game as a useful tool "to create unity in the village, to increase villagers' sense of belonging to the community". The game was also seen by some participants as a way to increase 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. In Ban Nam Ki, for example, the day after the game, the village headman (who did not feel concern about the National Park issue before the game) asked many villagers about their own opinion concerning the main problems they would face with the National Park.

If several suggestions of solutions were made by the participants, no agreement concerning these solutions was achieved during this first workshop. The facilitating team did not insist to make them reach any consensus as we considered it was necessary for the participants to know more about the situation and to understand each other's differences first. Moreover, key information related to the National Park's intentions were obviously missing. However the workshop facilitated steps to prepare villagers to the coming negotiations with the National Park. During the workshop, they agreed on the need to talk among themselves first, to identify some representatives, and to call if needed key stakeholders at higher levels of organization to support them.

## **Conclusion & perspectives**

This communication illustrated the usefulness to conduct an initial diagnosis prior to any participatory process. This initial analysis of the various stakeholders' perceptions and interactions was useful to identify the feasibility and the usefulness of a ComMod process, as well as the constraints towards an equitable outcome of such a process. This allowed us to adapt the ComMod methodology accordingly and to mitigate them to a certain extent. Moreover, such a picture of the initial stakeholders' perceptions and interactions is necessary to assess the effects of the participatory process in terms of communication, collective

learning and coordination mechanisms. However, accommodation of multiple interests is a long and enduring process, and it is not sufficient to focus one's attention to power heterogeneities in the initial socio-political context, this effort should be maintained all along the process. A continuous and critical monitoring of the effects of the on-going process and its constant adaptation to mitigate the identified constraints towards equity are required.

In this ComMod process, four constraints emerged during the first steps. First, in Ban Nam Ki, two participants did not understand well who we were and what was the purpose of the game, and felt slightly worried and suspicious. This is because they were not interviewed before (they replaced two missing participants), and they did not understand well Thai language. To adapt to this situation, greater efforts should be made to re-build the missing trust relationship, and in all the coming meetings, there should be a constant translation Thai-Mien. Second, many participants highlighted that a main limit of the game was the small number of players, as discussions concerned all villagers. We are planning to organize a meeting with all villagers using the agent-based model replaying the gaming sessions to mitigate this problem and to create a forum of discussions at the village level. Third, the conflicts between the three hamlets and between the various representatives belonging to different powerful clans is a major constraint for the process. As two representatives of this village said, the process itself might help to mitigate it as the game could help increase the unity in the village. Fourth, the chief of the National Park said he could not make any formal agreement with villagers allowing them to gather forest products as these decisions are taken at the government level. Beside the illustration of the limits of decentralization in Thailand, this risks to put discussions to a standstill while leaving villagers in a very insecure situation. We will then have to adjust the objectives of the ComMod process: to stimulate communication, collective learning and mutual understanding to favour the emergence of co-management rules in which both the National Park and the communities find their place and have a role to play. At the local level, this might help to perpetuate informal agreements, and at a higher level, it might serve as an (other) example illustrating the need to change the existing regulations towards a legal recognition of a plurality of institutions in the management of natural resources. The Community Forestry Bill which has been debated in the Thai parliament for more than ten years is an attempt to make a step in this direction.

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