

## **CHAPTER XII**

### **ASSESSMENT OF COMPANION MODELLING EFFECTS IN LAM DOME YAI WATERSHED CASE STUDY**

Under the Agriculture et Développement Durable (ADD) ComMod Project (2006-2008), a series of monitoring and evaluation activities to evaluate the diverse effects of ComMod process on participating farmers at Lam Dome Yai was conducted after five successive participatory workshops held in Ban Mak Mai village. This evaluation was mainly carried out by Ms. Manitchara Thongnoi as part of the requirements for her Master degree in Integrated Farming at the Faculty of Agriculture, Ubon Rajathanee University. Three tools were used for data processing: observations, interviews and story telling. The data analysis started at the coding of the transcripts to build families of codes corresponding to different types of effects. Afterwards, the analysis process of effects per type of farm, across farm types and for other categories of stakeholders (TAO, extension worker etc.) was carried out. For more details, see Thongnoi (2009). This activity started on April 2006 after the 2<sup>nd</sup> participatory modelling workshop had been organized in Ban Mak Mai village, Det Udom district, Ubon Ratchathani province. Since then, after each workshop, the monitoring and evaluation activity was executed as successive field investigations to analyze the effects of ComMod on participating farmers.

The quality of transdisciplinary research was also examined, especially: (i) the fit of the ComMod process to the local context, especially its legitimacy, and (ii) the knowledge sharing, and the local ownership of the ComMod process. The analysis of the immediate effects of the ComMod process was carried out to look into effects among the participating stakeholders, mainly different types of local rice growers. ComMod effects on participating farmers are presented in the first section of this chapter, followed by the analysis of ComMod effects across farm types.

#### **12.1. ComMod Direct Effects**

##### **12.1.1. Learning about the Issue Being Examined**

The ComMod activities helped the participants to better understand their interconnectedness in the village. Participating farmers realized that the migration

situation created labour shortage at the household and village level. Public water infrastructure, such as community ponds and irrigation canals, could also cause conflicts among villagers. The ComMod activities motivated participating farmers to share ideas regarding future water resource development and also how to avoid possible water sharing conflicts. One suggested way for minimizing conflicts would be for the villagers to engage actively in water improvement schemes before any contractual commitments were made. Participating farmers were also stimulated to think about how to better manage rice transplanting in relation to variable water availability (in farm ponds and rainfall).

The ComMod process facilitated the sharing of knowledge, and as a consequence, learning of new agricultural practices. During the ComMod process, more experienced farmers (often older ones) transferred their traditional farming knowledge to younger ones while discussing their choices of actions. The ComMod activities helped participants to integrate academic knowledge communicated by the research team into their mental models of RLR farming practices, in particular knowledge about RLR growth and farm pond water levels brought about by variations in rainfall. As a result, the participants now think that they are better prepared to face drought; they have learned how to plan for rice establishment and the use of water from their small ponds more effectively. Moreover, some of them started thinking about actually recording farm expenses, which would help them formulate better plans for their rice production. Regarding labour migration, participants still believe that water improvement schemes alone could not effectively alter their decision to migrate because based on their experience water has never been adequate enough for year round farm production.

#### 12.1.2. Social Learning Effects among Participants

##### *Change in own and other participants' perceptions*

Participants now have heightened aspirations to practice mixed farming and improve water supply. They also aspire to work in different jobs instead of working only on the farm to increase their household income. As a result of the collective learning process, participants have a better understanding of the diverse farming

situations within their community; this includes an understanding of the reasons behind labour migration across farm types.

#### *On individual behaviour*

The step-by-step simulation of the rice production cycle stimulated the participants to think more quickly because a variety of aspects kept evolving continuously during the gaming and simulation sessions forcing the participants to keep up with what was happening. These activities and 'what if' questions asked during the sessions, supported the improvement of the participants' communication skills and critical thinking ability, leading to behavioural changes.

#### *On communication and networking*

The participants agreed that knowledge shared about the issue at stake in the process was more useful than individual attempts at learning. Several participants declared that these activities made them realize the importance of village level discussions and collaboration to achieve better mutual understanding when dealing with the community affairs. As a result of the ComMod activities, the participants have become more confident when communicating and sharing their ideas with other people. They also became more eager to learn and accept different points of view. However, they pointed out that the ComMod activities were limited to a few people directly involved in the process. Thus, a greater diversity of participants would be needed to provide a broader base of ideas on community situations. In addition, the details of the ComMod process were not easy for the older participants to explain to non-participants; but this was not the case for younger participants who were able to disseminate their ComMod experience within their friendship networks.

#### *On decision-making, actions and practices*

After taking part in several knowledge exchange activities, private water resource improvement and adoption of more rice varieties has been observed among some of ComMod participants. The attempt to use the direct seeding technique instead of transplanting, in an effort to tackle the problems of labour constraints, has also been noticed for a type A farmer once her migrant workers did not return to help producing rice during the prolonged drought 2005-2006 crop year. But change in

decision-making, actions and practices have not yet been observed among the participating farmers who suffer from labour problems as a result of migration.

### **12.2. Capacity Building**

Before the workshops, participants said they would simply copy the farm practices of others; now participants feel that ComMod has taught them to reflect on farm dynamics, anticipate the consequences of possible farm practices, and consciously decide what farm practices are best for their future. At the individual level, participants have learned to think through a greater range of possible farm practices in order to adopt better farm strategies. At the collective level, they have learned 'to exchange experiences and opinions' and 'to consider each others' situations and perceptions when discussing future farm options'. The presentation of the ABM model by representatives of participating farmers to UBU students can indicate the improved capacity to communicate by providing more articulated explanation during discussion (see chapter VIII for more details of this seminar). This presentation also indicated the strong sense of model ownership making the participating farmers comfortable and confident to use it.

### **12.3. The Effects of ComMod across Farm Types**

The ComMod activities had different kinds of effects on the different types of participating farmers, as observed through a series of individual interviews with players conducted just after each main field workshop. Below, only the interview data obtained from a sub-group of seven farmers (from eleven), who were the most at ease during the gaming and computer simulation activities, are shown. Farm types A, B, and C were represented by four, two and one farmers respectively.

#### *Farm type A: Very small rice-based, resource-poor farms*

In the case of type A, resource-poor farmers, new agro-ecological knowledge gained from the collaborative modelling process dealt with the effects of rainfall and water availability on rice production (Table 12.1). Although technical aspects were not explicitly examined in this experiment, the exchanges taking place among the participants seemed to have led to the acquisition of new knowledge in this field as

well; for example, on direct seeding of rice and undertaking vegetable production after rice.

These small farms are often under-employed and look for off-farm and non-farm wage-earning jobs as migrant workers. Therefore, it is not surprising to see that they also found an interest in getting a better understanding of the migratory habits in the village during the ComMod process. This type of participating farmers mentioned two interesting opportunities that emerged from the ComMod learning process. The first one was the possibility to diversify their agricultural production out of RLR into vegetable cash cropping after rice. Another opportunity dealt with the possibility of exploiting underground water to increase the volume of the resource available for farming activities. However, this was not explicitly discussed with the research team during the field workshops but among the participants through informal exchanges during and after these short events. This might be an indication of how the participants<sup>7</sup> have recognised the usefulness of sharing ideas and knowledge among each other to generate such opportunities. Moreover, they wish to better understand the market opportunities for their farm products. Also, they would like to acquire a better understanding of the various commodities they can grow and so be ready to increase and diversify their agricultural production if more water were to be made available.

Table 12.1 Various ComMod effects on type A resource-poor farmers who participated in the collaborative modelling process in the Lam Dome Yai watershed, Ubon Ratchathani province (2006-2008).

Farmer	A1	A2	A3	A4
<b>1. Knowledge acquisition</b>				
<i>Agro-ecological</i>	<ul style="list-style-type: none"> <li>Water availability in relation to location of paddy fields</li> <li>Change of water level in field/pond depending on rainfall</li> </ul>	<ul style="list-style-type: none"> <li>Water availability in relation to location of paddy fields</li> </ul>	<ul style="list-style-type: none"> <li>Impact of rainfall distribution on rice production</li> </ul>	<ul style="list-style-type: none"> <li>Impact of drought on rice production</li> </ul>
<i>Technical</i>	<ul style="list-style-type: none"> <li>Use of direct seeding in very dry year</li> </ul>	<ul style="list-style-type: none"> <li>Different rice-growing practices between upper and lower paddies</li> <li>Use of pond to grow rice</li> </ul>	<ul style="list-style-type: none"> <li>Vegetable production for sale in dry season</li> </ul>	<ul style="list-style-type: none"> <li>Drought mitigation by having more ponds to store water</li> <li>Integrated farming practice</li> </ul>
<i>Economic</i>	<ul style="list-style-type: none"> <li>Benefits of better access to water</li> </ul>	<ul style="list-style-type: none"> <li>How to share land between RD6 (for family consumption) and KDML105 (for sale) rice varieties</li> </ul>		
<i>Social</i>		<ul style="list-style-type: none"> <li>Labour migration situation in the village</li> </ul>		<ul style="list-style-type: none"> <li>Labour migration habits in the village</li> </ul>
<b>2. Change in own perception</b>				
<i>Want to improve</i>	<ul style="list-style-type: none"> <li>Better estimate of farm income</li> <li>Understanding the relationship between farm products and markets</li> </ul>	<ul style="list-style-type: none"> <li>Understanding the relationship between farm products and markets</li> </ul>		<ul style="list-style-type: none"> <li>Want to build a pond</li> </ul>
<i>Capacities</i>	<ul style="list-style-type: none"> <li>Better prepared to face drought</li> <li>Timing of water pumping from ponds for higher benefit</li> </ul>	<ul style="list-style-type: none"> <li>Better plan for rice transplanting</li> <li>Better prepared to face drought</li> </ul>		<ul style="list-style-type: none"> <li>Negotiation is needed to avoid water sharing conflict</li> </ul>
<i>Opportunities</i>	<ul style="list-style-type: none"> <li>Possibility to grow vegetables after rice</li> <li>Underground water more suitable than irrigation canal</li> <li>Sharing my ideas with other farmers</li> </ul>	<ul style="list-style-type: none"> <li>More income could be made during the dry season</li> <li>Sharing knowledge is better than using only own one</li> </ul>	<ul style="list-style-type: none"> <li>Underground water is suitable for my farm</li> </ul>	<ul style="list-style-type: none"> <li>Integrated farming practice</li> <li>Pond and underground water is suitable for my farm</li> </ul>
<b>3. Change in perception of others</b>				
	<ul style="list-style-type: none"> <li>Better social networking in the village</li> </ul>		<ul style="list-style-type: none"> <li>Sharing knowledge and ideas helps to understand other participants' farm management skills</li> </ul>	
<b>4. Change in decision-making</b>				
	<ul style="list-style-type: none"> <li>Retain family labour to work on-farm if more water is available</li> </ul>	<ul style="list-style-type: none"> <li>Will produce more farm commodities if more water is available</li> </ul>	<ul style="list-style-type: none"> <li>More family labour to work on-farm if more water available</li> </ul>	<ul style="list-style-type: none"> <li>Build a new pond or improve the existing one to store more water</li> <li>More family labour to work on-farm if more water is available</li> </ul>
<b>5. Change in behaviour</b>				
	<ul style="list-style-type: none"> <li>More sharing of farming ideas with other farmers</li> </ul>	<ul style="list-style-type: none"> <li>Spend more time to work in paddies</li> </ul>		
<b>6. Change in action (s)</b>				
			<ul style="list-style-type: none"> <li>Returned to rice production instead of leasing the land to neighbours</li> <li>Started to grow vegetables in dry season</li> </ul>	<ul style="list-style-type: none"> <li>Use direct seeding technique for rice production</li> </ul>

*Type B farmers: Medium-sized rice-based with more market oriented farms and mixed farming practices, and type C farmer: large-sized market oriented farms and diversification out of rice or high remittance*

These participating farmers represented the larger holdings which are the most affected by the lack of labour during the peak periods of labour demand in RLR production at transplanting and main harvest of late-maturing varieties. Table 12.2 summarizes the ComMod effects on these two farm types. It was not surprising to hear the more well-off type B and C farmers mentioning mainly economic aspects and especially the effects of a shortage of labourers on the economic results of RLR production as their keen interest in the simulation exercises. Like type A farmers, type B and C farmers have emphasized their wish to better understand the market opportunities for their farm products.

Table 12.2 Various ComMod effects on medium sized type B and large type C participating in the collaborative modelling process in the Lam Dome Yai watershed, Ubon Ratchathani province (2006-2008).

Farmer	B1	B2	C
<b>1. Knowledge acquisition</b>			
<i>Agro-ecological</i>	<ul style="list-style-type: none"> <li>Relationship between rainfall and water level in field and pond</li> <li>Scheduling of rice growing cycle in relation to water availability</li> </ul>	<ul style="list-style-type: none"> <li>Difference between sandy and clayey soils in relation to water availability in paddy fields</li> </ul>	
<i>Technical</i>		<ul style="list-style-type: none"> <li>Rice transplanting practice in relation to field location</li> <li>Usefulness of having ponds and time to use water from them</li> </ul>	<ul style="list-style-type: none"> <li>Rice production in relation to water dynamics in paddy field and pond depending on rainfall</li> </ul>
<i>Economic</i>	<ul style="list-style-type: none"> <li>Low production because of lack of labour to look after rice</li> </ul>	<ul style="list-style-type: none"> <li>Impact of labour shortage on farm production</li> </ul>	
<i>Social</i>	<ul style="list-style-type: none"> <li>Labour migration patterns in the village</li> </ul>		
<b>2. Change in own perception</b>			
<i>Want to improve</i>	<ul style="list-style-type: none"> <li>Better estimate farm income and investment</li> <li>Understanding the relationship between farm products and markets</li> </ul>	<ul style="list-style-type: none"> <li>Want to understand rice trading system</li> </ul>	<ul style="list-style-type: none"> <li>Understanding the relationship between farm products and markets</li> </ul>
<i>Capacities</i>	<ul style="list-style-type: none"> <li>Timing of water pumping from ponds for higher benefit</li> </ul>	<ul style="list-style-type: none"> <li>Make annual farm operation plan</li> </ul>	
<i>Opportunities</i>	<ul style="list-style-type: none"> <li>Learn to merge academic agricultural knowledge with own experience</li> </ul>		
<b>3. Change in perception of others</b>			
<i>Capacities</i>		<ul style="list-style-type: none"> <li>Negotiation process regarding water sharing</li> </ul>	
<i>Opportunities</i>			<ul style="list-style-type: none"> <li>Observe and analyze the actions of other farmers whose means of production are similar</li> </ul>
<b>4. Change in decision-making</b>			
		<ul style="list-style-type: none"> <li>More family labour to work on-farm if more water is available</li> </ul>	

The participating farmers said that the ComMod approach enabled them to discover the dynamics of the farm system (regarding time, water, labour management) and to think more intensively about their farming activities. This proved that farmers with only basic primary education can understand and learn from the gaming and simulation modelling approach, which is often perceived to be too complicated for local farmers.

It must also say that this is valid for the research team too; its members learned a lot from these exchanges, especially about farmer decision-making processes related to the adaptation of RLR production practices under varying rainfall distribution, and the management of the labour force on the different types of farming households. Through its evolving, iterative, collaborative modelling, the ComMod process has enhanced my understanding regarding the interaction between land & water use and labour migration at the study site.

But not all the representatives from the eleven farming households could be active participants, feeling comfortable in the simulation workshops. While the gaming sessions were more inclusive, the participatory simulation sessions were obviously more difficult to follow for some of the older, both male and female, farmers. More attention should be given to the participant selection process, especially in this type of community with many "skipped" families.

Even at this stage, some farmers mention limited changes in their decision-making, behaviour and farming practices as a result of their participation in the ComMod activities. Nevertheless, ComMod activities did generate a variety of effects on participants of this experiment, confirming the hypothesis that such an interactive collaborative modelling process can trigger both individual and collective learning through the intensive exchanges facilitated and stimulated by the evolutionary gaming and simulation models used throughout the process. Based on these findings and in agreement with the evolving and continuous characteristics of the ComMod approach, it can be said that new ComMod activities focusing on the commercial diversification of farm production in relation to water availability would certainly meet the interest of these collaborative farmers.



The conclusion is drawn in the next chapter. The outcomes of this ComMod process and its tools used are discussed. Some recommendations to improve the process and the future prospective research are also made.