

Chapter V

Role gaming sessions in Dompola

Two sessions of role-playing games were organized in May and December 2003 in Dompola. As explained in Chapter 3, 12 farmers played both sessions of the game. The results from the game were recorded in Excel spreadsheets and hardcopy (hand records). Following the game sessions, interview of individual players was done which helped in evaluating RPG. As the game proceeded, facilitators maintained record of observation. In this chapter above information are integrated and analyzed.

5.1. Knowledge representation and its validation by the players

The first RPG session in May was conceptualized and designed by researcher based on the understanding gained from field study. The game was tested with researchers and trainees at RNR-RC, Bajo before playing in Dompola. Subsequent to the test, the number of plots and options for sharing water was incorporated in game. The second session of game played in December was basically the same game with provision for sharing water against labor and involvement of development committee members as observers of the game session. The second session was also tested with trainees at NRTI and subsequently played in Dompola.

Majority of the farmers considered that the gaming parameters represented the real situation. One farmer remarked, "It appeared like playing a game but recalling in the evening all appeared precisely real and stimulating." The players adjusted themselves to the gaming environment, after one round of play. The game board was made on a poster paper with rows and columns representing plots. 82% of the respondents confirmed that the game board represented the distribution of their fields. During the intra-village communication mode, definite patterns existed in choosing crops and fields in the first cycle of each crop year. Although it revealed that potato was planted in central plots to facilitate its protection from wild boar damages. Players said that in reality potato fields are numerous and are much scattered. All

accepted the categorization of farmers in terms of access to water and number of fields. But 27% (one each from Thruelpa, Cheep, and Chatro) of them thought that the cash allocation was too high, as farmers may not be in a position to gain access to that amount in reality to start farming.

Water share, water units, and the influence of rainfall on water availability were the main features that players related to reality. Although water exchange depends on the demand from those who need it, kinship played a dominating role in the exchange of water. Whenever there was unused irrigation water, it was first given free of charge to relatives who needed water. It was stated that it is shared on the mutual basis of helping each other in times of need. Only after satisfying the demand of relatives they would exchange with other players wanting it to exchange against labor. In the first gaming session, players introduced exchange of water for cash.

Initially it was assumed that potato cultivation in Limbukha would have effects on access to irrigation water by Dompola farmers. Player said that potato is in fact harvested before the rice transplanting season starts in Dompola. Therefore, occupancy of Limbukha terraces by potato did not influence the water-share for Dompola.

Among the three scenarios, farmers preferred the second scenario as it allowed them to collectively share resources and work together, which do not happen in reality. One participating member stated, "it is more fun and interesting to work together in a community, helping each other to pull along." Players further said that they were of the opinion that the existing water sharing system was sound and two villages could never work together due to the physical distance between them. The second scenario allowed players to exchange water against labor between two villages. Although this exchange of water between the two villages does not exist in reality, 45% of the players responded that water exchange could happen between the two villages. Further, they suggested that, when there is plenty of water at the source, it should be shared. With the increased dependence of Limbukha on farm labor from other villages and other socioeconomic dependence, this should provide a basis for

cooperation and the collective decision-making process in natural resource management, primarily for water.

5.2. Improvements suggested by the players

It became evident from the game and individual interviews during first RPG session that the inclusion of labor in the game as a means for water exchange would improve interactions in the game by making it closer to reality. As farm labor is the most limiting resource in Limbukha farms, inclusion of labor as a variable in the game could produce unique reactions. It was also suggested that the number of plots per farmer category and the initial capital provided to each player might have to be revised. Prior to the start of the gaming session, more elaborate discussion on rules of the game and process with the farmers/player will help in enhancing the relevance of the game. Players also suggested during the first RPG session to include local development committee, officials from District administration and local public institutions as observers in future games.

5.3. Learning experiences

As a learning experience from the game, 36% of the players reported that it helped them to understand the benefits of sharing water with neighbors both within and between two villages, to enhance their land-use system, productivity, and income. This was evident from the discussion on the preliminary results before the plenary session in May, 2003 (Figure 20). The game also helped in understanding the valuation of water share for 27% of the respondents. This implied that, given the opportunity, a water market could emerge in the system.

Apart from the economic valuation of water, the game helped to open up new understanding of the social dependence between villages, particularly in terms of labor for water exchanges and other services. The players also believed that the RPG helped them to understand the value of maintaining farm accounts, the problems of a neighboring village, and the importance of completing farm work on time. For Dompola farmers, the game gave them the idea to attempt potato cultivation either in

Dompola or by leasing land in Limbukha where soils are more suitable to grow potato cash crop to increase their incomes.

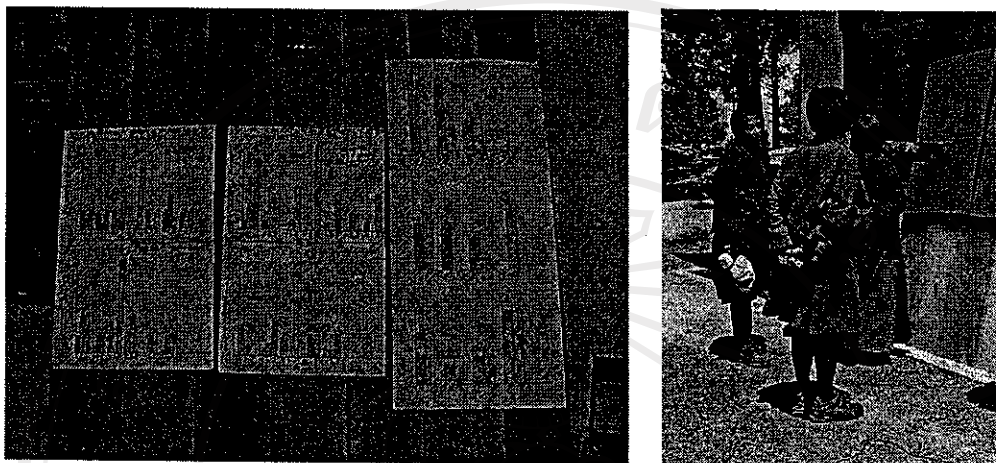


Figure 20. Preliminary results and players discussing the results, May 2003

The comparison of the lessons learned from two gaming sessions held in May and December 2003, indicates that over the period between two sessions of RPG, community members informally discussed and even assessed the impact of their decisions on resource sharing. It was unfortunate that, observations and recording of these discussions could not be done. A player from Limbukha said that they had discussions on water sharing prior to attending the second session of RPG. While there were five lessons learned from first RPG session, player reported only four lessons learned from the second session (Table.16). In both cases, importance of sharing water was the most important lesson for all players. Compared to the lessons learned from May 2003, 90% of the players (70% waters sharing, 10% canal management, and 10% on-farm water management) in December 2003 learned need and benefit of water management and sharing (Figure 21). This shared learning is an important output from RPG and it is expected that it will have dramatic influence in the way players will behave in future.

Table 16. Lesson learned by farmers from two sessions of RPG played in Dompola in May and December, 2003.

First Session of RPG	Second Session of RPG
Benefits of sharing water	Share water
Valuation of water	Canal management
Maintaining farm accounts	On-farm water management
Completion of work on time	Farm account
Water shortage problem of Dompola	

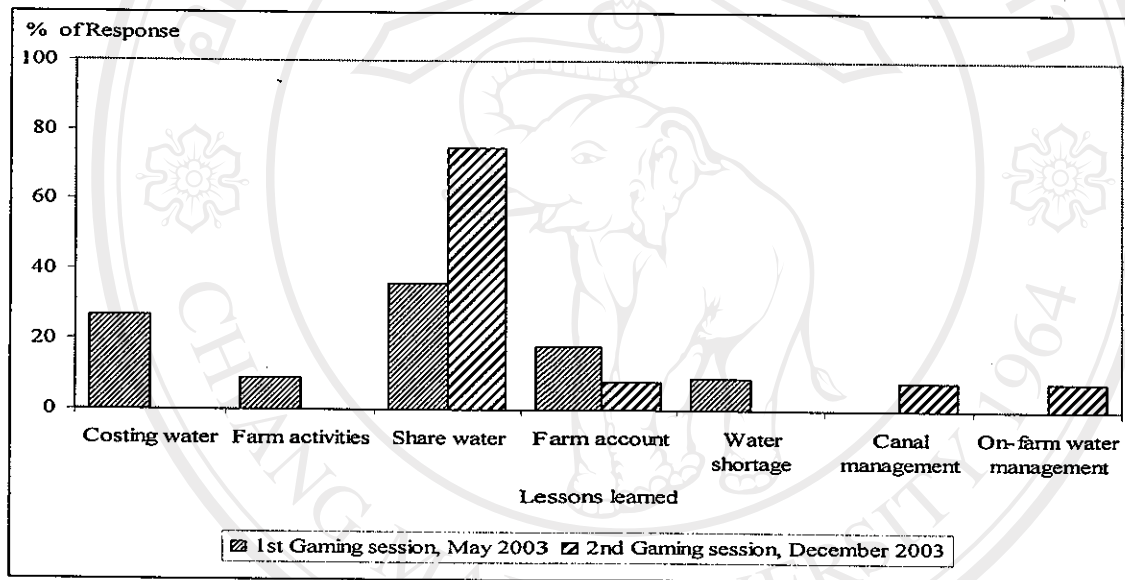


Figure 21. Lessons learned by players from 2 gaming sessions, May and December 2003

The responses of the players in the Dompola RPG on its possible uses indicated that 36% of the players considered its use for crop production problems followed by 27% who thought it useful for promoting community actions. Others thought that RPG could be used for awareness building and collective learning.

5.5. Understanding the decision-making process and its impact on resource use

The impact of the way players decide to use water and capital can be assessed from land use changes and water use dynamics. To capture the process, three different

communication modes: intra-village; inter-village and swapped roles were used in two sessions of RPG. The following sections present the impact of inter-village and intra-village communication mode on land use, water, labor and income.

5.5.1. Intra-village mode of communication

The irrigation system in Lingmuteychu can be classified as a fixed system and such systems are known to be stable requiring little efforts to operate but they are also less flexible. It is the rigidity of the traditional system, which does not permit alternative approaches for managing it. Although water exchange depends on demand, kinship played a dominating role in the exchange of water in the study site. Within each village farmers held water in their fields beyond the crop requirements which deprived other farmers from accessing irrigation water. As reported by Jamtsho (2002), both villages use excess amount of water in rice cultivation which further builds on the pressure.

Land use dynamics

The most critical effect of decision on water use and sharing were land use changes over the crop years. These changes were further influenced by the rainfall pattern. In each year, two rainfall types “normal and low” were used as patterns and used randomly during the gaming session. Result in Figure 22a show that the 36% of plots remained fallow in Limbukha when rainfall pattern was low in both cycles. This validates what farmers told during interview and discussion, that water availability for transplanting rice depends on stream discharge and rainfall. In all rainfall patterns, there are fallow plots, except when both cycles have normal rainfall. It was also observed that rainfall patterns did not have any effect on number of plots planted to potato. It always fluctuated between 15 and 17.

In contrast, 39% of the plots were left fallow in Dompola, which is higher than in Limbukha (Figure 22b). It was also observed that 10% of the fields remained fallow in Dompola when rainfall pattern is either normal-low or low-normal. Similar to Limbukha, it is only during normal-normal rainfall pattern that all plots are planted

to rice. The main difference in proportion of fallow plots between two villages is due to the limited exchange of water that takes places within kinship network.

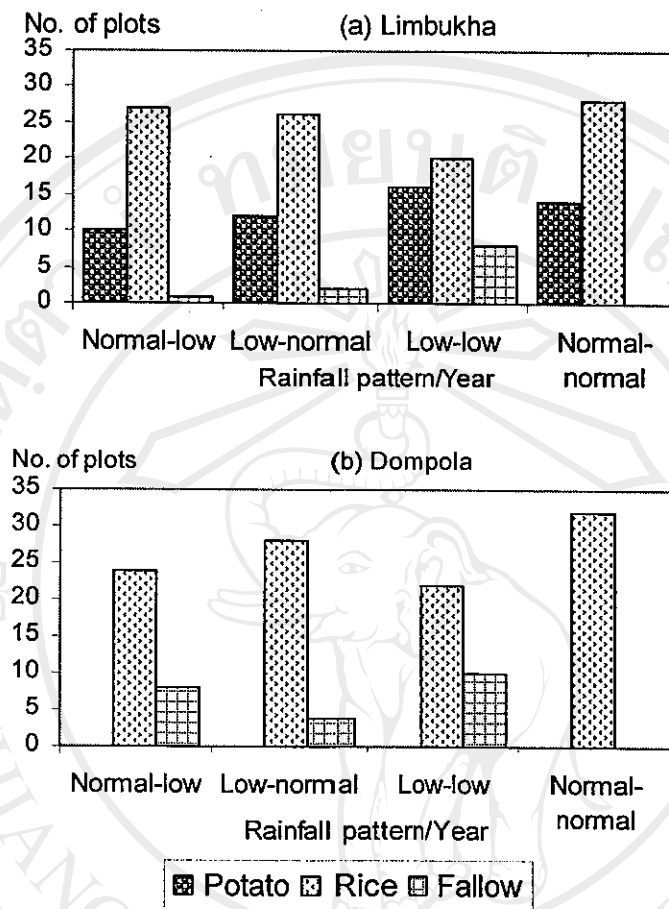


Figure 22. Land use patterns in Limbukha (a) and Dompola (b) during intra-village communication mode, May 2003

Water use dynamics

In Limbukha all 4 water sharing categories of farmers exist. Among them Thruelpa who represent 54% of the village population received full flow of water. In case of Dompola, 86% of the farmers are Cheep and only 14% Thruelpa. Water sharing is more organized and structured in Limbukha village, which could be due to shortage of irrigation water. As Limbukha village is next to source of irrigation water, they always have direct access to stream. It was reported that, Limbukha farmers face acute problem of water only when rainfall is low in both cycles. During interviews it was reported that stealing from others' share is rare in Limbukha. However, stealing of water was reported to be a problem for Dompola. Sharing of water among relatives

is one of the important strategies used by both villages, to cope with shortages among some members of the communities. The kinship network was more prominent in Dompola compared to Limbukha (Table. 17).

Table 17. Kinship structure among players

Village/ Farmers	Village/Farmers											
	Limbukha						Dompola					
	1	2	3	4	5	6	7	8	9	10	11	12
Limbukha	1		s									
	2	b			n							
	3											
	4		a									
	5											
	6											
Dompola	7								b	b		
	8									i	u	
	9						s			b		
	10						s	i	b		i	
	11							np		i		
	12											

b = Brother; s = Sister; a = Aunt; n = Niece; u = Uncle; np = Nephew; i = In-law

Throughout the years played, Limbukha farmers shared on an average 5% of the total water allocated, leaving behind 6% as unused irrigation water (Figure 23a). Although Dompola farmers shared 2% of their water, they were left with only 4% of the water as excess (Figure 23b). Whenever there was unused irrigation water, it was shared within the village. In addition to sharing water according to kinship, sharing was also done by exchanging water against labor. One water turn (12 hours of discharge) was equated to 1 person-day of labor during the rice transplanting season. In the game, the players introduced a cost of US\$ 2 per unit of water (equivalent to one day's wage). As this rule was not initially documented, it was not included in the RPG rules. With the increasing competition and demand for water, the cost of water and labor was raised to US\$ 4 per unit. The tendency to monetize water became an incentive for players to manage it efficiently. It confirms to the behavior what Trawick (2003) stated as when resources are priced, it gives people strong incentives to use them more efficiently, and the idea of a water market is often reported to have strong appeal to economists and bureaucrats.

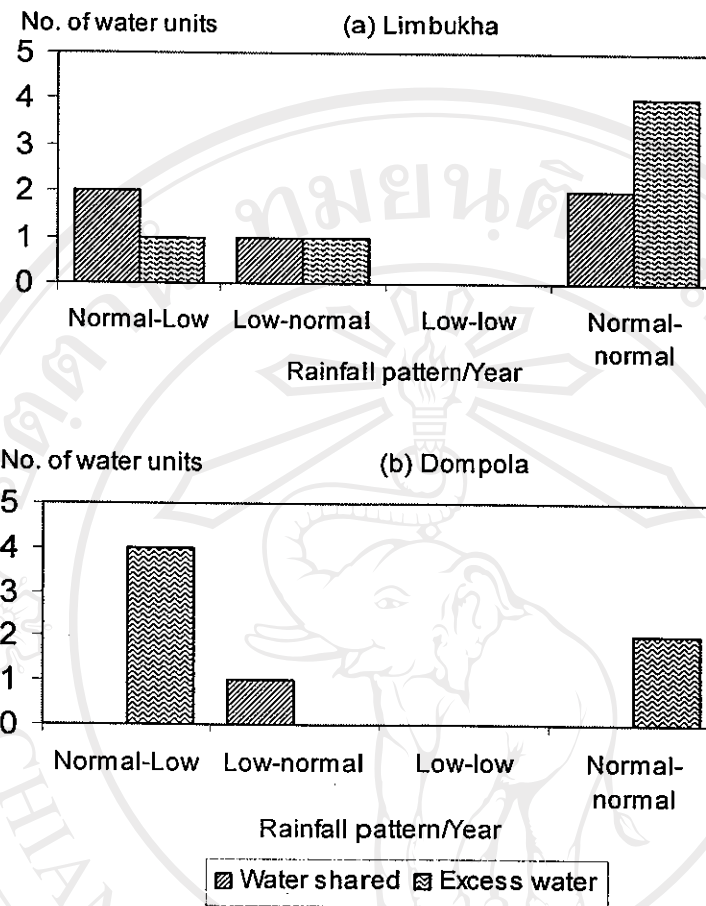


Figure 23. Water use dynamics in Limbukha (a) and Dompola (b) following intra-village communication mode

According to individual interviews, it was reported that more than 36% of the player in first RPG session and 50% in the second session shared water. One day share of water was exchanged with 1 person day of labor during rice transplanting, which was confirmed by 83% of the respondent as a actual practice. However, 75% of them expressed that kinship plays a determining role in exchange of irrigation water. Practically they would first look around if their immediate relatives have fulfilled their water requirements, after that water was exchanged with anyone willing to exchange with labor. In the game, player either paid cash or gave labor against water.

Labor use

In second session of RPG 50% of the respondents were involved in the exchange of labor. There were 42% of the players who did not get labor despite their request. The rejection was mainly because each one had pre-arranged with the ones who had excess of water. It implies that players communicate before the planting starts. As the game progressed, 33% of them did try alternative means to exchange labor either by increasing the labor wage, sacrificing the land and selling the labor or pre-arranging the exchange of water and labor. The highest number of excess labor existed in a year when rainfall pattern was low in both cycles. In the game, while Limbukha faced labor shortage, Dompola farmers were always left with 100-300 person days of excess labor (Figure 24).

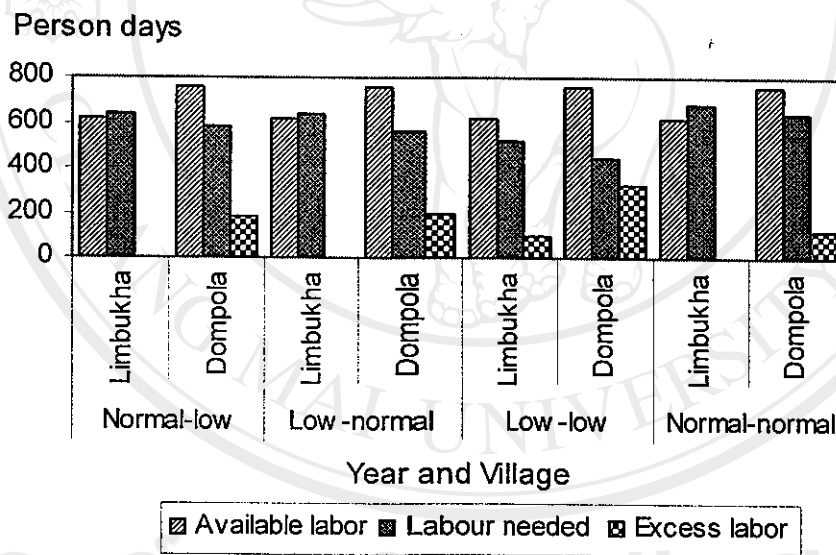


Figure 24. Farm labor use in Limbukha and Dompola during Intra-village game, December 2003

5.5.2. RPG based on communication at the inter-village level

The two communities have been in constant conflict regarding sharing water. The past attempts to bring them together to discuss and negotiate have not yielded any meaningful outcome/directions. Even in the RPG, when both villages were grouped for collective discussion on decision-making regarding water use, farmers initially

flocked to their individual village cluster and exhibited unreceptive expressions. This was the initial response, but it gradually turned into a very congenial environment featured by lots of exchange of views, water sharing, and discussions on cropping and other aspects of livelihood among the villages.

Land use dynamics

There was no influence of the communication mode on land-use in Limbukha. The average percentage of plots planted to rice and fallowed were 91% and 9%, respectively, in both communication modes in Limbukha. However, in Dompola, there was a 4% increase in plots planted to rice under the collective communication mode (Figure 25a and b). This implies that when farmers communicate collectively, the Dompola farmers seem to share water more efficiently. In first RPG session, players introduced water sharing between the two villages, which benefited Dompola farmers.

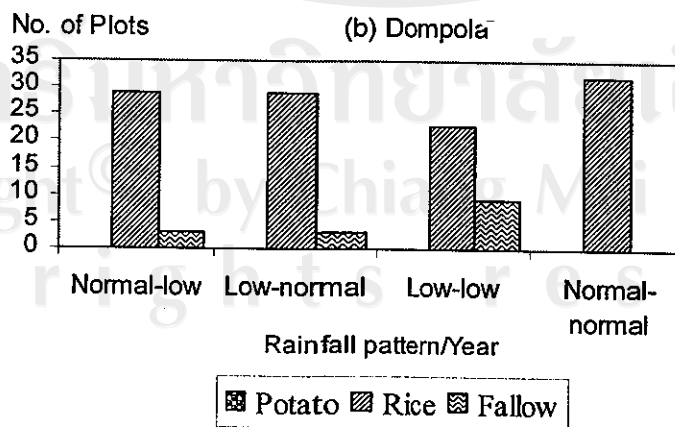
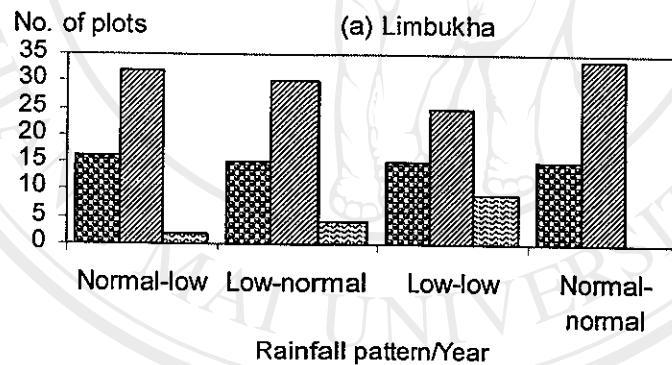


Figure 25. Land use patterns in Limbukha and Dompola under the inter-village communication mode, May 2003

Water use dynamics

In the collective mode of communication players exchanged water between two villages, thus introducing the new protocols to exchange water. Limbukha farmers found that in the collaborative mode they could sell or exchange the unused irrigation water with Dompola farmers and earn more income. Compared to intra-village communication mode, Limbukha player shared most of the water and were left with no unused irrigation water, except during normal-normal rainfall pattern (Figure 26a).

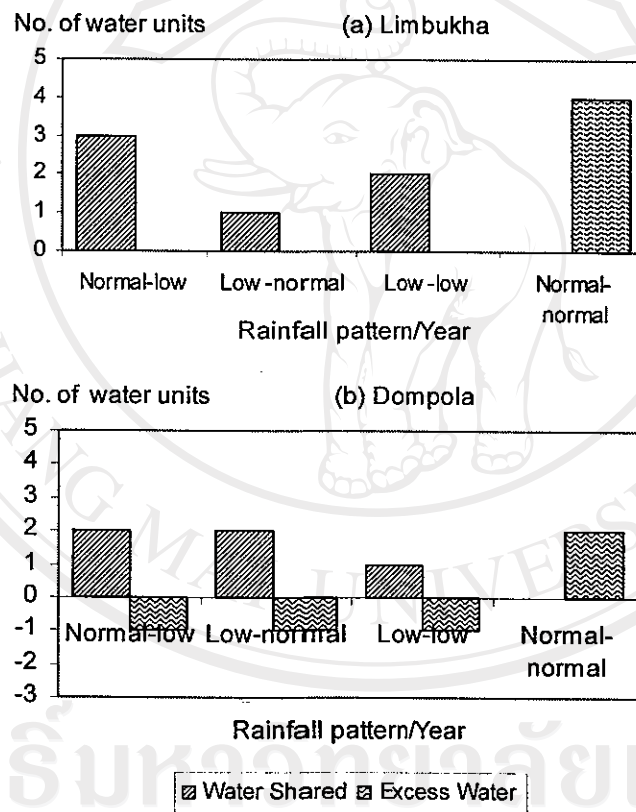


Figure 26. Water use dynamics in Limbukha (a) and Dompola (b) following inter-village mode of communications, December 2003

In the collective mode, Dompola farmers seem to benefit the most in terms of access to water. In all the years played under collective mode of communication, Dompola players received water from Limbukha. Therefore, the percentage of fallow plots declined from 16% in the intra-village mode to 11% in the inter-village mode in

Dompola. In year 1 (NL) and year 3 (LL), Dompola farmers even received water from Limbukha farmers, an example of inter-village exchange (Figure 26b). Particularly in the low-low rainfall pattern, the number of fallow plots decreased from 10 in the intra-village communication mode to 8 in the inter-village mode. It is evident that the number of fallow plots declines substantially in the collective mode. One of the reasons for this reduction is increased access to water.

Labor use

In real situation, Limbukha hire in labor from Nabche (One of the villages in watershed) to work during rice season. But in the game they could exchange with Dompola against unused irrigation water. It was designed to enhance interaction among players and see if new norms in exchange would emerge. In the game, Dompola players had excess labor in all years. In contrast Limbukha players ran short of labor during normal-normal and normal-low rainfall pattern. The negative labor in Figure 27 against Limbukha implies labor received from Dompola. It also represents that two villages readily exchanged labor against water and cash.

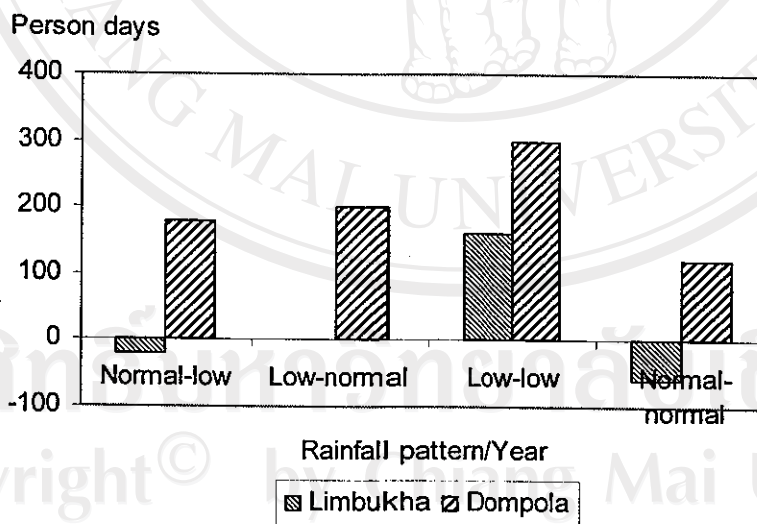


Figure 27. Excess labor in Limbukha and Dompola during inter-village communication mode, December 2003

Income

In both sessions of RPG, income was calculated and paid to the players after every time step (year of play). All the players considered income as an indicator of

their success and impact of their decisions on water and land-use. This was evident as all players, after every year of play, spent some time to assess the amount of accumulated income. Income analysis showed that, overall farmers' income was 19% higher in the intra-village communication mode (Figure 28). This could be due to cultivation of potato in Limbukha that generate lots of income. Importantly, it can be seen that income is comparatively uniform in the collective communication mode than in the intra-village communication mode. When assessing the performance of different farmer categories, all categories except Lhangchu have more stable income over the years. It is also visible that, variation of income is more prominent among Limbukha farmers than in Dompola, this can also be related to choice of crop in Limbukha.

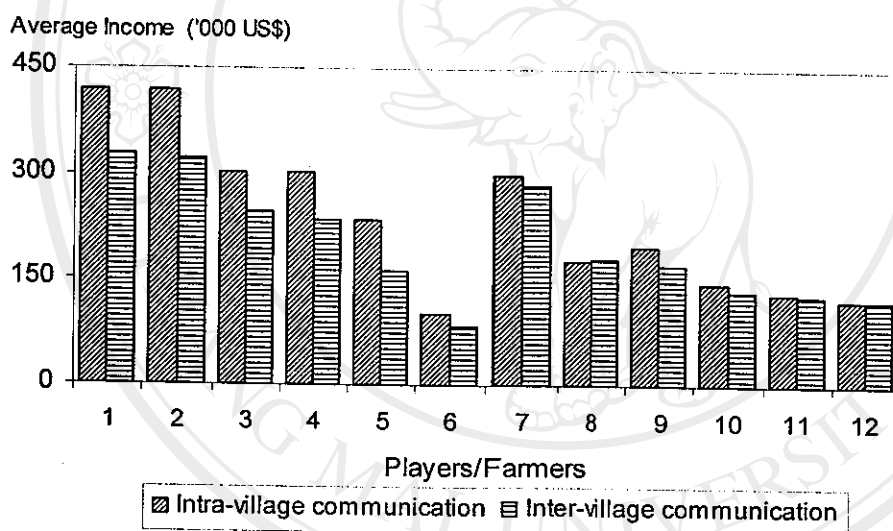


Figure 28. Income variation among farmer categories according to two modes of communication, December 2003

This implies that collective communication results a more uniform distribution of income, based on the effective sharing of resources. It also indicates that sharing of water beyond the village boundary with other villagers provides an opportunity for the villagers to sustain their production and income.

5.5.4 Swapped role between two villages

As a third scenario in the role-playing game, the role of each player was swapped with that of another village. It was swapped in the order of 1 taking the role

of 7, 2 that of 8, 3 that of 9, and so on. Farmers swapped the roles as they considered it as a means to discover and experience the condition of the other village.

Similar to other studies, the pertinent benefit of the swapped game was the learning experience for both teams. There was one player who hesitated to play the role of the Dompola farmer, as his major concern was low income. We presumed that demotion in role from higher category to lower made the player discontented. The rest of the players considered the session as an opportunity to learn about the problem of Dompola farmers and the potentials of Limbukha farmers.

5.6. Performance of irrigation system

For the purpose of generating greater interactions and motivation among the players in the RPG, 3 comparative indicators out of the 9 indicators developed by IWMI were adapted and used in the study (Molden et al., 1998). The three comparative performance indicators relate output to unit of land and water used. The 3 comparative indicators are output per unit cropped area, output per unit command area, and output per unit of irrigation water diverted. Actually these comparative indicators make it possible to see how well irrigated agriculture is performing at the system, basin or national scale. However, in this study as it has been adapted to use as a tool to measure comparative performance of irrigation in two villages.

- *Gross margin per unit of cropped area*: It is the average gross income of all the players received from all the plots planted to crops. For instance, in Limbukha number of potato and rice plots together form cropped area.
- *Gross margin per unit of command area*: It is the average total gross income of all the players per hectare of command area. The total command area in the game for Limbukha is 3.4 ha and 3.2 ha. For Dompola.
- *Gross margin per unit of water used*: It is the average total gross margin received from growing crop against the unit of water used to irrigate the field.

5.6.1 Gross margin per unit of cropped plot in the game

The gross margin simulated from the RPG was used to calculate output per hectare of cropped area. The number of plots planted with potato and rice are considered as cropped area. Based on the RPG results, gross margin per hectare varied between US\$ 1,035 and \$ 2,042 per hectare with an average of \$1,688 and standard deviation of 382 US\$ (Figure 29). The gross margin per hectare of Dompola is almost at par with Limbukha during normal rainfall pattern. When the season starts with low rainfall and when both the cycles face low rainfall, output of Limbukha as a whole is lesser than Dompola. It implies that rainfall and limited supply of water affects Limbukha more than Dompola.

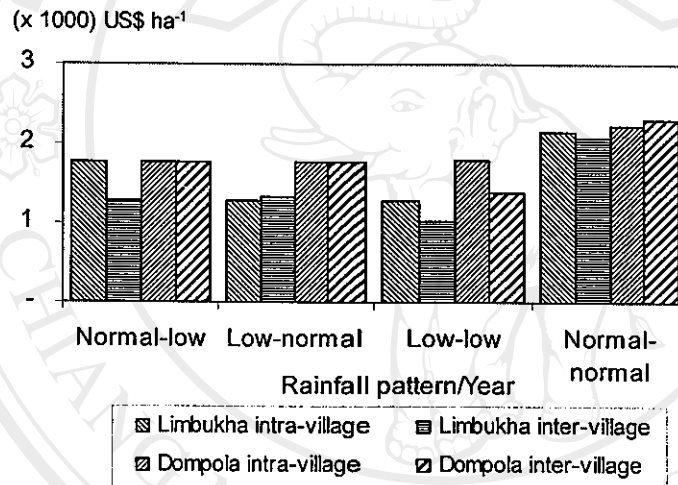


Figure 29: Gross margin per hectare of cropped area (US\$ ha⁻¹) in Limbukha and Dompola generated from RPG, December 2003.

However, reduction in output during year of low-low rainfall pattern in a collective mode was more prominent in the case of Limbukha. It was also observed that intra-village mode of communication performed better compared to inter-village communication. For instance, on an average output was 12% higher for under intra-village communication than inter-village mode in Limbukha. In case of Dompola, there was not much difference between two communication modes.

5.6.2 Gross margin per unit command area in the game

In the game, crop yield depended on rainfall pattern and the crop price varied with the market state. The gross margin per unit of command area varied between US\$ 992 and \$ 3,150 per hectare of command area (Figure 30). Gross margin in Limbukha under intra-village communication mode was 12% higher than under inter-village communication. However, there was no significant difference between the gross margins under two communication modes. This indicates that Limbukha players are better organized and efficient in crop selection and water sharing under intra-village communication mode. But under the collective communication mode, Limbukha players shared water with Dompola, which could have lowered their income. Conversely, a higher output was expected in Dompola under collective mode, which was not the case. It was only when rainfall pattern was normal in both cycles that there was an increase of 4% in gross margin in Dompola.

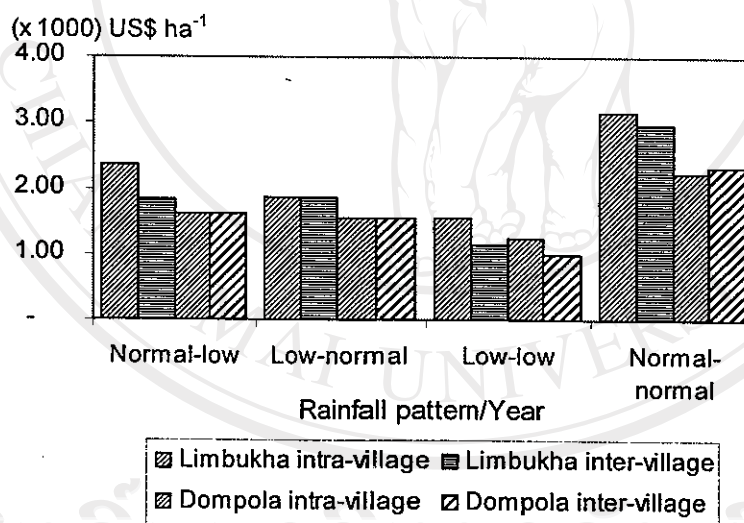


Figure 30: Gross margin per hectare of command area (US\$ ha⁻¹) in Limbukha and Dompola generated from RPG, December 2003

5.6.3 Gross margin per unit of irrigation supply

Output per unit of irrigation supply in Figure 31 varies from US\$ 0.7 to \$ 3.7 per Cubic meter of water supplied. On an average and across both communication modes, gross margin of Dompola was 55% higher than that of Limbukha. In both the villages, there was 40% increase in gross margin when rainfall pattern was normal in both

cycles. During other rainfall patterns gross margin is consistently low in both the villages. As in the earlier two indicators, in case of Limbukha on average gross margins under intra-village mode are 22% higher than in collective mode. Comparison between two villages, show higher gross margin in Dompola, in collective mode, gross margin of Dompola is 62% higher than of Limbukha. This can be associated to use of limited water appropriately.

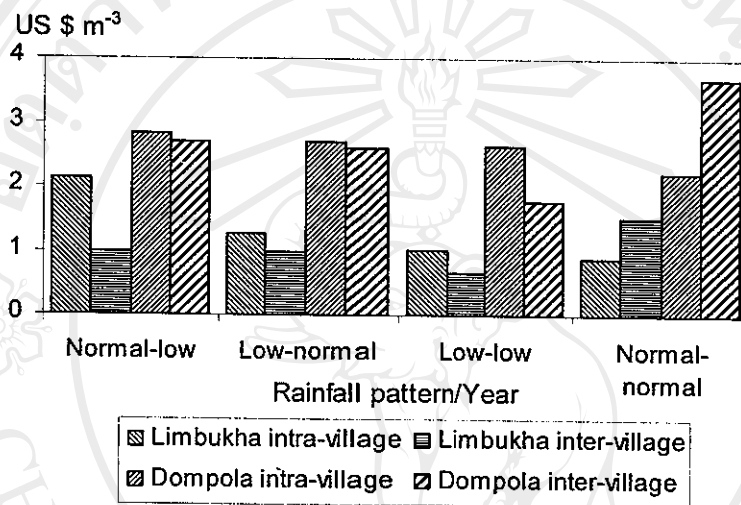


Figure 31. Gross margin per unit of irrigation water supplied (US\$ m⁻³) in Limbukha and Dompola generated from RPG, December 2003

Based on the gross margin per cropped area and command area, irrigation canal in Limbukha perform better than Dompola canal. While the differences are not very obvious, sharing the water resource through collective mode of communication can enhance the performance of Dompola canal. However, Dompola players performed better than Limbukha players in terms of using irrigation water, which was seen from higher gross margins per unit of water used.

5.7 Summary

The farmers of two conflicting villages willingly accepted role-playing game as a means to express their concern on water sharing. The results from the game indicated that RPG has been efficient in collective learning, learning about the problem and process. The game outputs helped in better understanding the problem of water

sharing and its impact. The use of three scenarios (mode of communication) created friendly environment for active interaction among the player.

From the game, it was clear that rainfall is a determining factor in ensuring the availability of irrigation. Kinship network determines sharing of irrigation water within a village. This closed sharing system is assumed to be a risk avoidance strategy when resource is limited. Within each village, players exchanged water against labor or cash. The pressure of water can be visualized by the structured and fixed water sharing system followed by Limbukha village. Dompola lacked the structured system of water sharing, which can be related to water stealing and time spent on guarding the canal. This opportunistic behavior of Dompola farmers could be related to unstable (uncertainty) irrigation supply. The game also revealed that the alternative communication mode can provide many alternatives for players to test its applicability. The unused irrigation water in Limbukha was efficiently shared with Dompola village against excess labor available in Dompola. It was also clear that monetizing water makes players more judicious in use of water. As the intra-village communication mode represented the reality, players tended to perform better even in the game. The inter-village communication mode did not influence Limbukha players in terms to resource use and income. However, it was clear that in the collective mode, Limbukha players could share all the unused irrigation water with Dompola player. Over all, Dompola players benefit more from collective communication mode.

Comparative performance indicator used in a tentative way revealed that Limbukha village performs better in term of gross margin per unit of cropped and unit of command area. Dompola performs much better in terms of output per unit of irrigation water. This is indicative information used in the game to show how individual player's performances can influence the overall performance of the village.

The dynamics used in the RPG will form a major input to the MAS model explained in Chapter VI. The role or kinship and exchange protocols will be used in generating multiple scenarios for identifying viable options for improving the situation.