Chapter VII

Conclusions and recommendations

This chapter consolidates the insights from the study. It is attempted to assess the benefit of the new methodology, assess if the study fulfilled the initial objectives and answered the research question. This chapter also briefly proposes further action based on the study.

7.1 Conclusion

The most important realization from this study was the awareness of the ability of role-playing game to facilitate discussion between two conflicting communities in a non-confrontational and non-threatening mode. This is considered as a vital observation because there were many reservations on communities' participation and commitment in the process of addressing irrigation water sharing issues.

RPG was efficient in facilitating collective learning and evolving shared understanding of the problem. The RPG prompted a "sense of collectiveness" and interdependence that helped in expanding the scope to explore alternative strategies to overcome water-sharing problems. The increased level of knowledge on water sharing and management from 36% in May to 90% in December has clearly shown the usefulness of RPG in collective learning and fostering common goal among the farmers.

Players through their participation in 2 sessions of Dompola RPG have increased their awareness on the issue and most critically the collective aspiration towards better management of conflict in water sharing. The following suggestions made by players during the individual interview and group discussion evidently indicate the improvement of communication between two villages. Some of the critical suggestions were:

a. Renegotiation of water release dates (e.g. pre-pond by 5 days; adjust during double months);
b. Support diversification of crops and adjustment of water allocations to the cropping systems;
c. Establish watershed level management committee to manage Lingmuteychu watershed; and
d. Strengthen local development committee to promote collective actions in NRM.

As shown in Section 5.5, at the household level water is shared principally within the kinship network. In case of sharing water with acquaintances, one-day share of water is exchanged against one unit of labor. The protocol of exchange in Section 6.3 helped in understanding the intricacies of the decision-making process. The study also highlights the inconsistency of local rules in sharing water and need for strengthening traditional institutions in resource management. The testing of different scenarios indicated that alternatives exist which can be tested to improve situation. To ensure adequate sharing of sharing of irrigation water between communities and network of irrigation canals, two communities need to organize and exchange collectively. This will enhance the exchange mechanism between two villages.

The MAS results consistently indicated that social network extended to both villages and exchange protocol allowing exchange of water between two villages either against cash or labor provides better alternative to use resources and earn higher income. This confirms the benefit of greater social connectedness to higher income and improved social cohesion (Narayan and Pritchett, 1997; Schuller, 2001).

The study further confirmed the usefulness and ability of CORMAS to facilitate integration of knowledge for better understanding of interaction among agents and explaining the effect of their decision on resource dynamics. It can also capture emergence of global phenomenon from local actions at agent level.

CORMAS helped in developing multiple scenarios using different combination of parameters and simulating them over numerous time steps. The data capturing in Excel (used in this study), ASCII and Access further facilitated data management and analysis. The graphic probes in CORMAS provide quick visualization of results. With the multiple windows, CORMAS enable learning my simulation.

The three scenarios (individual mode of communication, collective mode of communication, and swapped roles) in 2 sessions of RPG helped farmers and researchers to visualize the effects of three scenarios on land use, water use and income. According to players' response, it helped them to establish a common understanding of the value of collective water management and sharing. Using the same principles, 36 scenarios were used in CORMAS through 3 social networks, 6 water exchange norms, and 2 rainfall patterns. Effect of 36 scenarios on water and land use can be resourceful platform for stakeholder participation.

In a resource scarce situation where stakeholders tend to access the resource from individual point of view without collective concern contradictions among the user build up. Further when the intensity of resource use is influenced by external factors such as market, the complexity of the systems amplify. In such complex dynamic systems, there is always the necessity to experiment new methodologies to deal with such complex issues.

When the research intends to address collective learning and voluntary changes, there is a need for research team to be fully involved with the society and the situation as one of the stakeholders. It is only through such involvement, communication and facilitation, that discovery learning and voluntary change in behavior in the villagers can be fostered (Röling et al. 1998).

The field study also showed that the process by which information is generated to conceptualize RPG and participation of people in the game stimulates continuous and shared knowledge acquisition to hypothesize concept of development.

As ComMod process encourages active and interactive participation among the player, it motivates players to work towards identification of appropriate strategies for common good.

It is worth mentioning that organizing RPG needs specific skill in planning and facilitation. It is highly time and resource demanding tool. While RPG can facilitate conceptualization of MAS, CORMAS too demands considerable computer skills to be able to build and execute the model.

7.2 Recommendations

Irrigation water allocation is inherently and inevitably a negotiated process. Particularly in water stressed situation, the question is not of "supply management" rather it is the demand management that will make impact on resources base. As such, emphasis on negotiated approaches can contribute to better understanding and facilitation to build social capital to respond to challenges of increasing competition for scarce water resources. It will also facilitate better governance of natural resources. To keep up the aspirations of players, actions in the field should start with a minimum time lapse. The following recommendations can be drawn from the study:

As player and other members of the community have not been exposed to MAS scenarios and simulations, it would be most appropriate to present the model for validation and explaining its outputs to stakeholders. This will help farmers to validate the models and select viable options for experimentation. This experimentation can be beneficial for collective learning and joint identification of workable scenarios for improving water sharing in the community.

Using the knowledge gained from the study, the shared understanding of villager on water sharing and based on the recommendation, a collective discussion to negotiate the date of water release in Dompola canal can be re-organized. During the Dompola RPG bringing forward the date by 5 days was suggested. Now it is important to discuss and make it operational.

As it was suggested during RPG sessions, the lessons learned from the current studies should be used to establish watershed level management committee to manage Lingmuteychu watershed. This has been particularly considered as an urgent and important intervention from the point of social networking and institution building.

The exchange protocols from household level to village based to community level can be formalized to facilitate collective resource management of water resource. In the mean time, as suggested by the players and observers adjustment of water allocations and use should be done based on cropping systems

The involvement of local development committee members as observers in second session of Dompola RPG made it clear that the Block development committee needs to be strengthened to promote collective actions in NRM. Towards this action, capacity development of committee members and information exchange is expected to help in institutional development.

7.3 Further research issues

The two sessions of RPG played in this study helped in reinforcing the collective learning on water resource sharing and management. Between two sessions of the game, there was significant increase in proportion of players who thought resource sharing was important. This could have been better explained if a close monitoring on the behavioral change after the first RPG session was done. Therefore, it will be worthwhile to investigate how such changes take place. At the same time, monitoring the process of change in community is yet another interesting area of investigation. Use of spatial representation of agents, canal and field can be used to in RPG and MAS to generate more understanding of the complexity.

Comparison of ComMod with other participatory tools in similar environment for collective learning and facilitating use of knowledge based decision-making in natural resource management will enhance the applicability of the approach.

Often the scale of study using ComMod is small, especially in this study. How can the lessons learned form such exercises be scaled up to network of canals, to watershed levels or for wider scale application? A detail study on scaling up of ComMod can broaden the scope for application of the approach.

Considering the complexity of methodology, particularly the CORMAS simulation, further work towards simplification will facilitate application of ComMod in the field of NRM. It is also suggested here that capacity development of researchers in using ComMod should continue.