A final field report on

The Benefits of Nature Conservation: Implications of Economic Instruments to reduce human-wildlife conflict in the case of Three VDCs of Bardia National Park, Nepal.

Submitted by,
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1 Introduction

The continued destruction of biodiversity, poor conservation outcomes and minimum community participation has heightened the concern about the communities' role in the resources use conservation (Agrawal and Gibson, 1999). Communities have an important role to play for the conservation of biodiversity in protected areas (Berkes, 2007). Recognizing such roles of communities, different concepts had been developed in past decades in the form of community-based conservation, integrated conservation and development projects, community managed conservation etc., (Hulme and Murphree, 2001). However, presumption of predictive models of social-ecological systems and deducing the universal solutions as panaceas for overcoming the problems of biodiversity conservation has been found to ignore the nature of complexity in such social-ecological systems as well as the necessity of managing commons at multiple levels (Berkes, 2007; Ostrom, 2007; Ostrom *et al.*, 2007). To understand the impact of institutions and institutional arrangements in the form of community-based conservation projects a study was carried out at Nepal's Bardia National Park.

1.1 Aims and Objectives

The overall aim of the project was to find out the impacts of incentive measures and management approaches used to resolve conflict between park and local community and to explore the effective measures to resolve the threat to community as well as biodiversity conservation.

The specific objective of the second field work was to:

1. Collect necessary gap data for further information
2. Identification of the variable, through in-depth analysis, important for causing conflict, resource extraction and the negative attitudes towards the ongoing development projects.
3. Understand overall impact of institutions
4. Role-playing game taking variables from step second for improving knowledge of the current scenario and to initiate the collective learning of stakeholders on system components and dynamic processes and economic incentives with respect to park management.

1.2 Methods

For the fill-ups of data mostly, on attitudes of communities towards the park and the institutions a questionnaire survey was carried out in the same three villages, namely, Thakurdwara, Shivapur and Suryapatuwa at Bardia National Park, figure 1. Households which were visited during the first fieldwork were given a unique identity code while entering the data so that a consistency could be made for the entire study. Similarly, same enumerators were used for the survey to increase the reliability in the data collection.

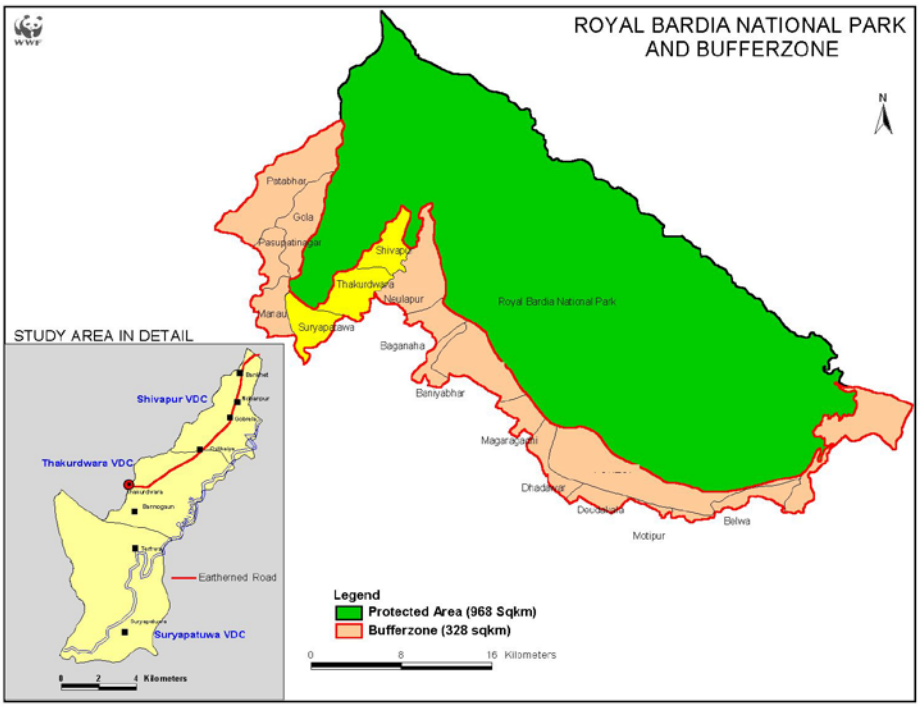

Figure 1. Bardia National Park and the three studied villages (in the inset).

Focus group discussions were organized to understand the institutional impact on the communities' capacity building. Similarly, all the meetings organized by the park office were also attended to understand the priorities of park management plans and the state of community participation on the development of such plans, figure 2. Such meetings were very useful to identify communities' problems and their ideas about possible solutions.

Figure 2. Meeting organized by the park office

2 Results

2.1 Livelihood capitals: The building blocks of poor living

Status of communities' livelihood capitals were studied in terms of three important factors at Bardia, village wise, ethnicity wise and wealth wise. Different levels of livelihood capitals showed that how with the same level of resource flow from development projects had different impacts on the different group of communities, figure 3.

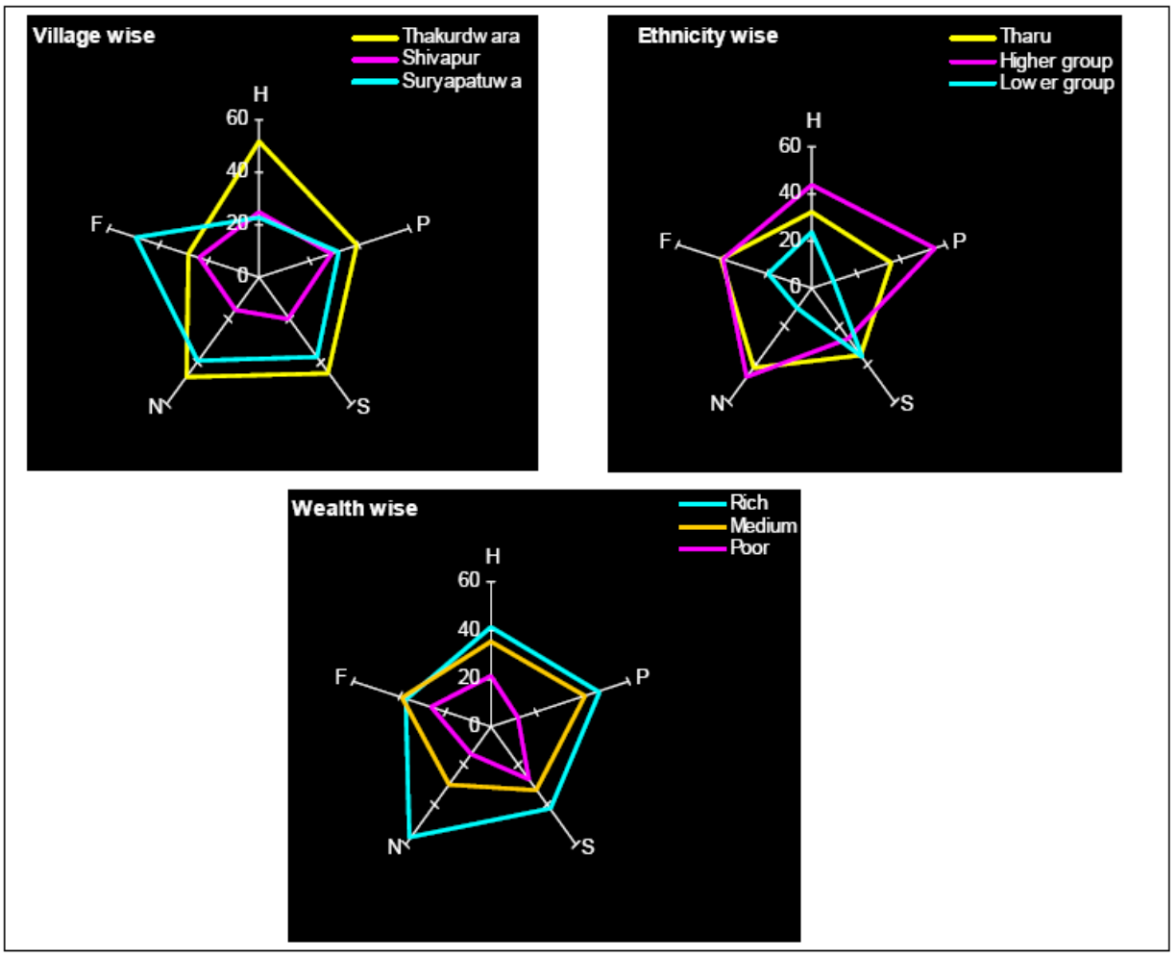

Figure 3. Asset pentagons showing the status of five livelihood capitals in three villages, (H= Human, P= Physical, S= Social, N= Natural, F= Financial)

Among the three villages, Thakurdwara village had the highest access to most of the capitals, except financial. Shivapur village had the lowest access to all livelihood capitals and was thus the poorest village by a long way. Natural asset was high in Thakurdwara with respect to land, availability of buffer zone and agroforestry schemes. Households with landholding more than 4 ha, together with higher percentage of land holding between 2 to 4 ha came from Thakurdwara village. Further, all the wards at Thakurdwara have Buffer Zone Community Forest and households with large lands had a well-developed agro-forestry system. This made a large share of villagers in Thakurdwara less dependent on national park resources. However, the situation in Shivapur village differed significantly. It had a higher percentage of households with land holdings less than 0.5 ha and there were no community or government forests for resource use. Households with lack of natural capital ended up using park resources to fulfill their daily needs. 65% of the households at Shivapur village were totally and illegally dependent upon the park resources to fulfil their needs and to supplement the subsistence based agriculture. Households at Shivapur village visited the park every day for fodder and fuel wood collection. Respondents at Shivapur village indicated that their well-being was fully dependent on the resources derived from park. Among all the villages, financial asset was higher at Suryapatuwa village, being close to the India, households members were migrated to India and were bringing money to invest on their farmland and other activities. Similarly, as they had open access to the government forest, there was no problem for fodder or fuelwood collection so they had higher number of livestock to any other village. Moreover, people from Suryapatuwa considered active in terms of outputs delivered from aids such as income from livestock raring, vegetable farming, so had higher access to the aids from the development project. However, even in the presence of aids and

development projects, households at Shivapur had not stopped extracting resources, projects were skeptical about communities and their role in the park development, so were less reluctant to give any further support.

Higher caste groups (Brahmin, Chettri and Thakuri group) had better access to all of the capitals except for the social capital, figure 3. The low level of social capital was due to the competition between them to prove influential in a society. Through their status as higher caste groups they tend to be better educated, have household members working in service sectors and higher amounts of land holding. Most of the user committee chairpersons within the Buffer Zone Management Council were from higher groups. However, the different higher caste groups are competing against each other to get privileges from funding organisations and development projects; this resulted in low levels of trust and little information flow between them. Compared to the higher group and Tharus, people from low caste groups had less access to all the capitals except for the social one. 72% of the households belonging to the lower caste group were part of the Poor category, and 12% of them had no houses and lived in slums. Most family members were uneducated and were mostly working as labourers and few had land less that 0.5 ha. However, they had higher level of social capital in relation to trust within their community, better cooperation, collective action and information flow within their own groups. Households coming from the lower caste groups felt closer to each other compared to the higher caste group. Poor households had less access to aid from development projects compared to the Higher and Tharu groups. Lower groups participate less in development programmes and even if they wanted to participate, the rules were such that they found it difficult in terms of training or financial resources to fulfil them. For instance, only rich households could afford to install biogas plant because of the cost involved, as the down payment for biogas was more than the annual income for poor household.

Access to all capitals was much lower for the poor groups, figure3. However, the most striking differences in access between rich and poor were remittance, livestock and aid from development projects. Poor households had higher access to remittance; since they were not well educated and did not have enough land to feed their family by farming, they had to seek employment abroad. Rich households tend to be better educated and could earn from their farmland and invest so that there was no need for them to go abroad for work. Also in keeping livestock the behaviors between rich and poor differed significantly. Keeping livestock requires much attention and care, which is why rich households preferred not to have any livestock. It was easy for them to buy milk and other dairy products instead of owning a cow or buffalo. Rich households having land between 2-4 ha and more than 4 ha of land, give their land for sharecropping, so they did not need cattle for manure purpose. Rather than cost, it was their choice. Aid from development projects such as cash, irrigation, high breed livestock, seeds and tools reached mostly rich and medium households. Medium groups benefited most from aid, followed by the rich and then the poor. Medium groups were much active visiting the offices of funding organisations and putting their needs, however lower groups were much quieter and participated passively in many of the projects.

2.2 Illegal resource extraction: Drivers of resource extraction

Results of the logistic regression revealed that illegal resource extraction was significantly influenced by nine independent social, ecological and institutional variables. Ecological variables that were important included distance to the national park, distance to the buffer zone community forest and percentage of crop damage. Social variables included land holding size, livelihood need and household with diversity in livelihood strategy. Similarly, significant institutional variables were resource use restriction as motivation of resource extraction, household involvement in the development projects and park-people conflict. Among these distance to the park, household with diversity in livelihood strategy, household involvement in the development projects and land holding size appeared as the most influential variable. The independent variables that have positive influence include distance to the buffer zone community forest, park-people conflict, livelihood need and restriction in resource use as motivation for resource extraction

and percentage of crop damage. Among these five variables, park-people conflict and restriction in resource use appeared to be the most influential variables. Illegal resource extraction for local community was mainly for the fulfillment of their daily livelihood needs, as according to the one of the respondents:

"If I don't go the park, my children including my animals would starve to death. Children go here and there and get some food, but for animals, I don't have land to give them agricultural by-products or graze in the farmland, when they are hungry they start crying and how long can you hear their outcry when you have forests in front of you full of resources, so I go every now and then mostly whenever needed to get the fodder and fuelwood". (Chitkaiya Village, Thakurdwara VDC)

2.3 Local's attitudes: Attitudes toward the park and staff

Communities were asked to express what the national park meant for them, figure 4. More than half of the respondents, i.e. 52% agreed to the statement "it is a place where all the animals, birds, and other kind of animals together with plants are protected and conserved for future and tourists", whereas only 35% agreed to the statement "…limitation for livelihood…". When they were asked from whom it is protected, they suggested that it is protected from the residents. Among the three villages, the highest percentages of households agreeing with the statement came from Suryapatuwa (which is the one furthest away from the park), where 100% of respondents stressed that the national park is a place for biodiversity conservation.

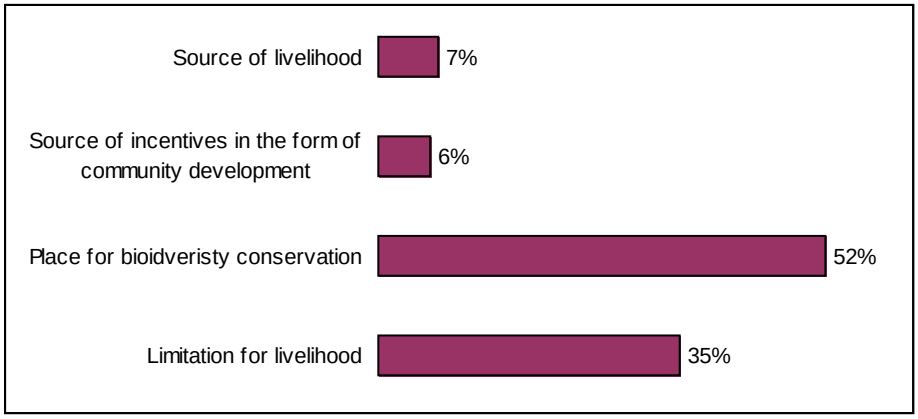

Figure 4. Households' perceptions about the park

However, in the presence of benefits, only 6% of the households recognized park as a source of incentives. Those 6% of the respondents belonged to the households who had received direct benefits from the park such as being involved in vegetable farming, installing biogas, receiving sewing machine or a scholarship for school. This implies that generally villagers perceived benefits as being more for the broad communal benefit rather than individual benefits to households. Because of this many households did not consider the park as providing benefits to them but regarded the park as the place for wildlife conservation. Similarly, only 7% of the household considered the park as a source of livelihood, according to them…."*park gives them fodder, fuelwood, seasonal vegetables and many more"*.

A regression analysis was carried out to explore if some socio-economic variables are responsible for holding such attitudes of communities. Interestingly, compared to the illegal resource extraction none of the social variables were found to be significant in holding positive attitudes towards the park. The significant factors that explained the attitudes of communities were percentage of crop damage, impact on the livelihood of communities due to wildlife problems and household involvement in the development projects. As household's involvement in the development project was found important households were asked if their involvement in such projects have changed their attitudes. Among the total, 64% of the

households suggested that there has been no change in their attitudes towards the park and wildlife conservation and that they did not perceive development projects as benefiting them. However, 11% of the households did agree that their attitudes towards park and wildlife protection have extremely improved due to the different incentive programmes. The households who claimed that their attitude has changed were directly involved in the different income generating activities and had received benefits to improve their livelihood and came from Thakurdwara village. According to one of the respondents:

"If there had been no wildlife in our forest (park) we would not have been getting any benefits as we have seen in our relatives' village. They are not included in the buffer zone boundary so they are not getting any benefits in Suryapatuwa itself". (Suryapatuwa village)

As households showed positive attitude towards the park, it was necessary to see if their positive attitude is reflected on their behavior. To observe the relationship between positive attitudes and illegal resource extraction behavior, a chi-square test was carried out. A significant relationship was observed ($N = 358$, $\chi 2 = 89.13$, $Df = 2$, $P = 0.00001$) between the total households and illegal resource extraction.

Figure 5. Households extracting resources from the park.

However, a village-wise comparison showed a non-significant relationship for Thakurdwara and Suryapatuwa, but a strong significant relationship for Shivapur village. Although a higher number of respondents from Shivapur village showed positive attitude towards the park, the positive attitude was not reflected in the change of illegal resource extraction activity. Even though a higher percentage of households had a positive attitude, lack of alternative resource use area and a demand to fulfil their livelihood needs drove households to illegal resource extraction.

2.4 Impact of resource extraction on forest structure and biodiversity

Level of resource extraction was different for Thakurdwara and Shivapur village, thus level of resource extraction vegetation survey was carried out in the park area along these two villages. For this analysis, indicators that accounted for the resource use by human such as percentage of trees lopped, lopping intensity, number of dead stumps, human trails, dung piles, and cattle number found inside the plot was used to test the difference in two villages. The mean for all of the variables was found to be higher for the site along the Shivapur village, figure 6, which confirmed that the impact of resource extraction by rural communities was higher at Shivapur village compared to the Thakurdwara.

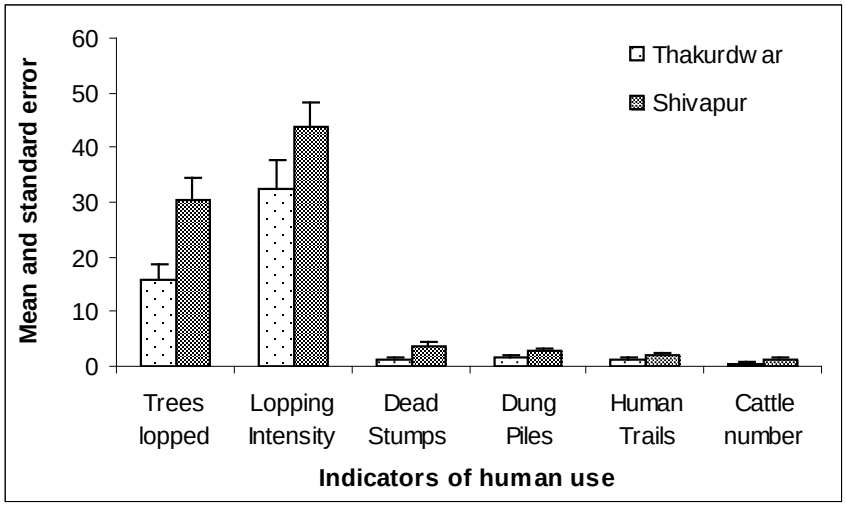

Figure 6 Mean and standard error for human use indicators

However, among all the indicators only the percentage of trees lopped (t-test: t = 5.863, p= 0.001), the average lopping intensity (Chi-square test: $\chi 2 = 349$, df = 38, p= 0.000) and number of dung piles (t-test: t = -2.899, p= 0.005) were found to be significant in explaining the differences between the two villages.

2.5 Institutions and institutional arrangements

One of the outcomes of group discussions was to draw the Venn diagram to see how close the households feel with different institutions present at Bardia National Park, figure 7. Informal institutions included user committees (UC), user group (UG), CBOs and village chief, whereas formal institutions included government laid departments such as agriculture centre, Livestock department, village development office, health post INGOs and NGOs that existed in and around BNP. The distance of each circle from the community as shown in the form of house, represents its extent of interaction with their lives and livelihood; and the highlighted, double and single border of the circle represents the importance of the institutions to the communities, figure 7. In many cases, the institutions that communities trusted most and felt that they existed for their welfare were the social institutions formed by communities themselves such as UC, UG and village chief in the figure7, where all of them are located in the heart of the house. Close relationship and interaction with social institution suggest that communities have build up social capital through CBOs, UG and UC. This is one of the good impacts of projects, as they had taught them about forming groups and saving money. Saving money and providing loans builds up trust among the communities which will help in the collective-action for communal works.

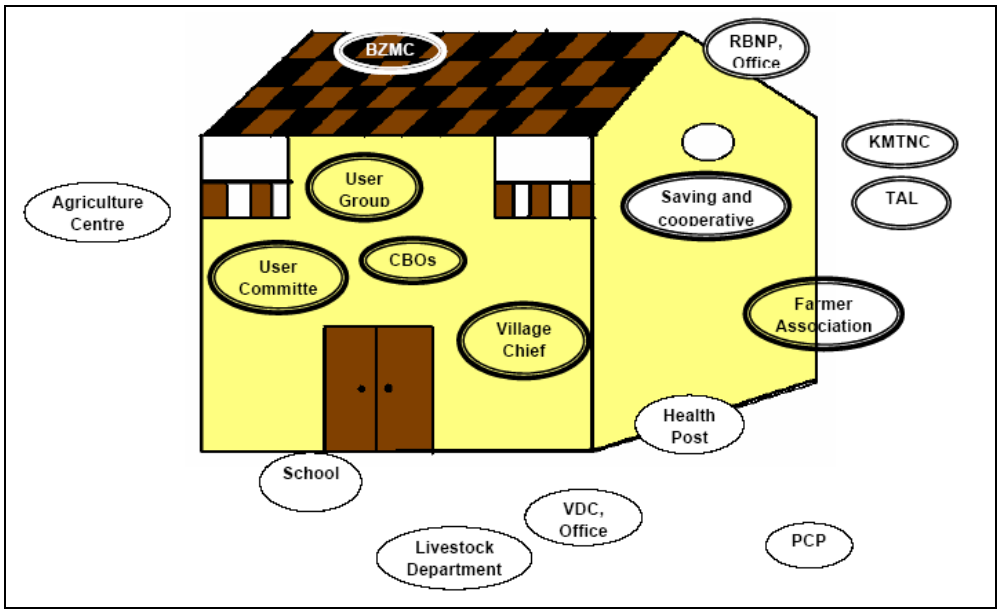

Figure 7. Venn diagram showing interaction between community and each actors

The other most important social institutional for communities is the village chief with whom individuals in a community have a very close relationship and daily interactions. For the social mobilization process village chief is the main person and it has existed before the park was established and till today people respect and follow the village chief. For many of the collective action work with respect to the park and other village work, information is channeled through village chief, figure 8.


Figure 8. Collective action from communities for trench construction.

Compared to all the actors involved for BNP management, it was found that communities felt close ties with the BNP, park office compared to other INGOs and NGOs. The reasons for this difference was asked to the participants of the workshop for which they replied that they feel that BNP, office is there to help the communities as they had been there from many years and nothing has changed, they have always tried to help them (communities) in many ways, however the INGOs and NGOs are there for themselves, just to implement projects as they have to utilize the fund they have received and there are least chances that the NGOs and INGOs people listen to them (communities), further they stressed that the project implementing organisations would do what they are told, they are less flexible and more strict compared to the park office.

3 Challenges faced and Solutions adopted

Two important challenges were faced during the study.

1. Political instability in Nepal during the study periods. This fieldwork had to be postponed for a year due to instability and also during the field work due to the close periods three field visits were conducted from the month of Jan 07 till April 07. Closed periods caused disruptions in meeting communities and organizing the role-playing games as a long gap or no gaps could be made for two games.

2. Role-playing game. The important social, ecological and institutional variables that impacted illegal resource extraction and attitudes towards the park were considered for the role-playing game. As illegal resource extraction and attitudes were both important factors for biodiversity conservation which involved communities, significant variables were used to play the game. However, due to the long gaps between two games and closed periods, enough time could not be spent on the games. Although enough data could not be gathered to feed on the programmes, following important findings were made:

    - Livelihood need, diversification of livelihood strategy and projects that targeted direct livelihoods was important for communities. Impact on livelihood affected the level of resource extraction and attitude towards the park.
    - Alternative resource collection area was the most influential factor for getting involved in the illegal resource extraction for poor households. Rather than providing broad development projects poor households suggested that they would prefer more subsidized rate for the installation of biogas plants or improved cooking stoves.
    - Informal institutions such as village-chief, water guard were important for community mobilization, thus these needs to be recognized in park management plans and they should be considered as one of the stakeholder for park decision making.
    - According to communities', improvement in the management of institutions, rules-in-use, structure and functions of the institutions is necessary to smoothen park-people relationships.
    - Institutions at Bardia National Park lacked flexibility and adaptability. Both of these are the features of institutions which can govern social-ecological system in a sustainable way. The flexibility to adapt according to circumstances and learn from previous experiences is crucial to the success of local management initiatives and their sustainability over the long term. Social and ecological systems being linked and interdependent are coevolving and adapting to the changing local situations, on such case, the management initiatives should also evolve so as to adapt to new unforeseen situations. Such flexibility and adaptability of institutions was not observed at BNP. For instance, Buffer Zone Community Forest was given to the communities for the management, for which communities formed different institutions. However, compared to other community forests in Nepal under the forest department, the user groups of BZCF lack necessary powers in making decisions and do not have any hold over changing or modifying rules of the BZCF. This implies that the same management system developed on one case and one system will be applied everywhere across all user group, this will reduce flexibility to adapt to changing circumstance thus moving that forest related ecological system and social system towards vulnerability. Adapting the management systems as well as institutions to the situations of communities and their capabilities helps to frame the management process to incorporate the philosophical, methodological and practical challenges associated with the present use and management of natural resources. During such practices management process becomes a co-learning process where both the

managers and the communities are expected to learn from the situation. In that way a win-win policy for the environment and for livelihoods around BNP as well other protected areas could be achieved.

Thus, it is proposed that to achieve social, economic and ecological objectives conservation based programmes should be developed in such a way that they establish a direct dependency on the preservation of biodiversity for the livelihood practices. Further, to achieve social as well as ecological gains, adoption of adaptive management strategies are best as they allow flexibility and thus, helps to address the complexities and broader challenges of conservation problems. Flexibility to the changing situations will not only help to cope with changes for social-ecological system but also enhance the quality of the communities over a longer period of time.

4 Actions to be taken and Next steps

As livelihood needs, diversification in the livelihood strategy and involvement in the development projects were important, a project focusing on those key issues should be designed to see the direct impact of communities' suggestions and their involvement in such projects. Thus, a further study in a form of 3 year project is needed to see how such project could be designed from communities' perspective so that lessons could be learned for future projects and to understand where flexibility and adaptability of institutions is needed for natural resource management. .

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