



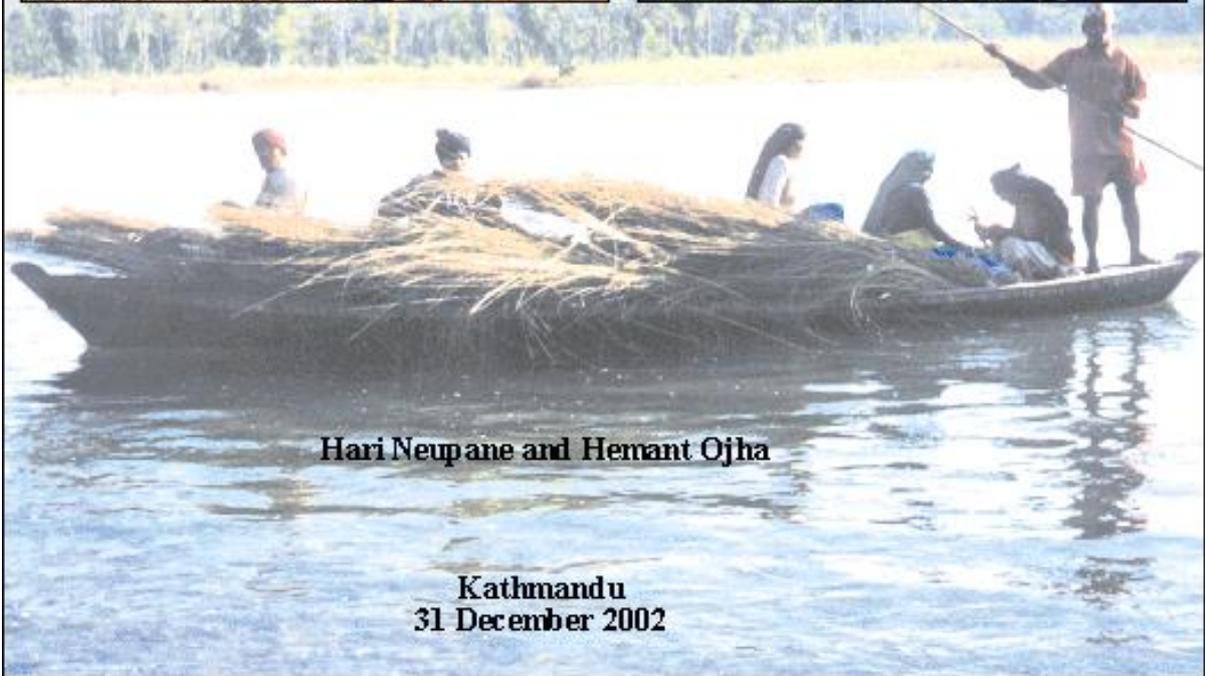
Promoting Community Action for Biodiversity Conservation and Livelihoods

A Case Study of Sishwar Community Forest, Nawalparai

A Report on Participatory Action Research Conducted by
ForestAction Nepal

with Financial Support from

The Whiteley Awards Foundation, UK



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1. Introduction

1.1 About the report

This research report describes the objectives, methodology and outcomes of a participatory action research project on promoting community action for biodiversity conservation and livelihoods. The project was implemented by ForestAction with a small grant from The Whitley Awards Foundation in collaboration with a national NGO.

The study focused on the role of communities for biodiversity conservation in the Buffer Zone area of Royal Chitwan National Park. The primary objective of this research is to develop a methodology for integrating and livelihoods concerns in the context of community forestry. The focus of the study was to facilitate community and their actions on conservation and management of species under selection stress as well as identify policy issues and opportunities in relation to the integration of biodiversity concerns in community managed forests.

In Nepal, over 11,000 FUGs have been managing more than 850,000 ha of country forests. However they have not incorporated the concept of biological diversity in their operational forest management plans (OP). In addition, most OPs focus on timber-oriented management strategies, ignoring a number of valuable products that are useful to poor communities and their livelihoods. The action research mode allowed the project team to increase awareness of communities on both institutional and ecological aspects. Several of the changes induced through the project actions are expected to create conservation impact and enhance biodiversity based livelihood opportunities.

The report comprises of six main sections. The first section, or *Introduction* provides objectives, background and rationale, limitations including about the research project. The second section describes research *methodology* developed for the project. The next section describes the *Context* of biodiversity conservation and livelihoods. In section four, an overview of research site is given. The main *Findings* of the research are provided in the fifth section. Finally, *conclusions* are drawn from the research along with some recommendations.

1.2 Background and rationale

Community forestry in Nepal is the principle programme addressing the issues of conservation of forest and pasture ecosystems as well as livelihoods. Under the programme, there are over 10,000 FUGs that have been entrusted with the responsibility and authorities of forest resource management, which is based on operational plans agreed by District Forest Officers of the Department of Forest (DOF) and the local communities.

Most of the operational forest management plans (OPs) are designed to give emphasis on economic plants. Many inferior types of endemic plants are often ignored and eliminated as weeds during harvesting and silvicultural practices. One of the reasons for this is that the objective of the DOF, that is the lead agency in implementing community forestry emphasise of timber-oriented silvicultural and forest management practices in community forests. In addition, at the community level, local elites dominate decisions about the use and management of forest diversity, and the values of the wealthiest and privileged castes also coincide with those of the government foresters. Thirdly, even the projects, research organisations and NGOs have done little to promote use and conservation of a huge range of biodiversity. In particular, promotion and conservation of species that are not of any direct and immediate use is a great challenge.

1.3 Objectives and key research questions

In this context, the research on community action for conservation of biodiversity was implemented, the purpose of which was to design, develop and test a methodology for integrating biodiversity and livelihoods concerns in the management of community forest.

Specific objectives the research were:

- Promote community action for the conservation of plants under "selection stress" within community management
- Develop a methodology for incorporating biodiversity concerns into community managed forest
- Identify policy issues and opportunities in relation to the integration of biodiversity concerns in community managed forests

Key research questions were:

- What is the existing knowledge with the local people on use of plant and animal species around them? How do different stakeholders including local people perceive biodiversity?
- How different group of people interaction with each other in relation to biodiversity management? What institutional arrangements are in place?
- How can outsider facilitate in developing institutional arrangement and resource management strategies to better address issues and opportunities in relation to sustainable biodiversity use?
- What specific policy issues exist in relation to promoting participatory biodiversity management?

1.4 Some limitations of the research

There are some limitations for this study.

- The research site had to be changed from the hill area to the Terai due to the security related reasons. In the Terai site as well, movement to and from the area was difficult in a couple of times.
- While we wanted to situate our sites in the area where the density of institutional, socio-economic and policy issues are diverse and dense, this left us deciding a site across the Narayani River, limiting access into the forests during the peak flood times. There was also a threat from wild animals, which the research team had to cope with.
- Research officer left the ForestAction team during the middle of the study because he got the MSc scholarship award in Indian Institute of Technology, India. So next person needed more time to get familiarized with villagers and local institutions.

2. Research Methodology

2.1 Research approach, techniques and tools

The methodology of research was largely based on the Participatory Action and Learning approach (Rahaman and Fals-Borda 1991, Malla et al. 2000). It comprises mainly of four major steps: a) assessment of situation/data collection, b) identification and analysis of issues/problems, c) action planning, and d) implementation and monitoring (figure 1) of community action for conservation of biodiversity. It is carried out through a series of meetings and using a range of participatory methodologies. Sishwar Buffer Zone Forest User Group (FUG) members, the local partners of the research, actively took part in the research process with researchers from ForestAction. In the process, the role of researcher is more like a facilitator.

During the project period, attempt was also made to assist the forest users to improve management plan and practices. The one-year of fieldwork in Sishwar Buffer Zone Forest User Group at Rajahar-3, Piprahar, and Nawalparasi district has concentrated on these outputs.

The participatory biodiversity research method used in this project had to be made useful to the user group situation, and by documenting the process, attention was paid to how this can be made applicable to wider contexts.

The method is based on the learning process where FUG identify issues/problems, make an action plan and initiate action to address the problems, monitor the actions, and then reflect/share results and improve the future actions. The process is presented in the diagram below and then each an every step is tabulated in subsequent sections.

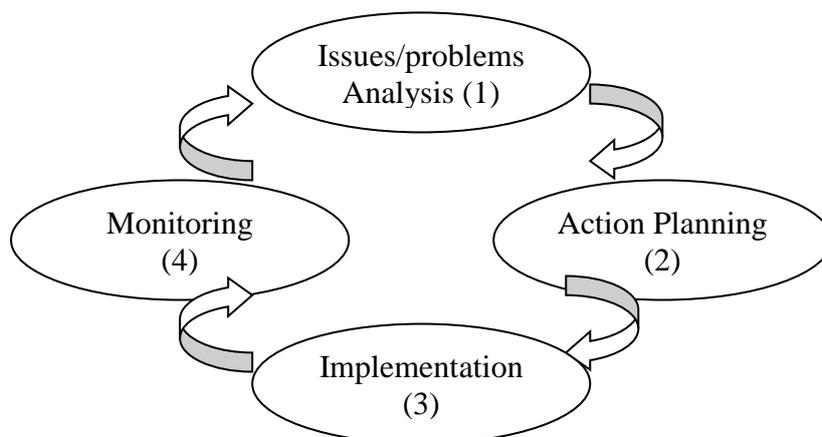


Figure 1: Learning Process

The research steps described below were used in the research site.

2.2 Site selection

Before selecting the site, the research team discussed among team members of ForestAction, and visited some community forests of Baglung and Nawalparasi districts. After having informal discussion with committee officials or leaders of the FUG, ForestAction Team decided to launch the research project in Sishwar Buffer Zone Community Forest Group at Rajahar Village Development Committee (VDC) - 3, Piprahar, Nawalparasi district. Buffer Zone Conservation Project of Royal Chitwan National Park has been working in this area since 1996. The selected FUG was the first Buffer Zone community forest in Nawalparasi. It has the peculiar forest type i.e. riverine forest, primarily consisting of Sisoo (*Dalbergia sissoo*), and Khair (*Acacia catechu*).

During the initial discussions, the FUG itself was found to be keenly interested to implement the conservation of biodiversity research in their area.

Some broad criteria that were used to select the research site are given below:

- Forest is officially handed over to FUG
- The FUG is relatively older so that the research can be enriched by the local institutional experience
- FUG households consist of different castes and ethnic groups
- FUG members have interest to take part in the research

2.3 Data collection

The information were collected through various actions conducted in several rounds of visits in the field. Following methods, tools and techniques were employed:

a. Discussion with FUG committee members

Research team conducted formal and informal discussion with user group committee of the selected FUG, i.e. Sishawar Buffer Zone FUG. During the discussion, research team focused on clarifying the objective and purpose of the biodiversity research, with reference to local biodiversity and livelihood agendas. The main focus was on facilitating a reflection on local level biodiversity conservation issues. These discussions clarified the roles and expectations of both communities and the research team. The main discussion points are as following:

- i. Awareness creation and extension among the members
- ii. Misuse of Medicinal plants, or *jadibuti* due to lack of knowledge
- iii. Potential of rattan (*Calamus* spp) species for the protection of Sishawar community forest
- iv. Potential of bamboo and grass species to control the flood and reduce the river-bank cutting problem
- v. We also need to learn from the protection mechanism of National Park (NP) and introduce the protection system in CF
- vi. Relation between NP and Buffer Zone CF:
 - The primary objective of the Buffer Zone programme is to reduce pressure of local people on the NP and vis-à-vis.
 - Formed six CFs in Rajahar VDC
 - Users have been getting Thatch grass –Khadai from Sishawar CF
- vii. Difference between Buffer Zone CF and other CF: The primary objective of Buffer Zone CF is to reduce pressure of the livestock on the NP area. Due to the increment of tree covered area or tree growth within the NP, there is a shortage of grasses to wild animals and then they come out for grasses in Buffer Zone area, including the research site. This has been an issue of local concern for the past several years.

The committee meeting decided to arrange Tole level discussion for wider sharing about biodiversity conservation research. An example of the meeting calendar is given in Table 1.

Table 1: Date and time for Tole level meetings

S. No.	Tole	Date	Time
1	Voktaghari	3/1/059	6- 8 AM
2	Bichako Tole	4/1/059	11-1.0 PM
3	Piprahar Tole	5/1/059	6 PM
4	Bote Tole	6/1/059	Morning

b. Tole level discussion

After formal/informal discussion with FUG committee, the research team discussed with more Tole residents at four different Toles/hamlets. The main objective of the Tole level discussion was to clarify the research objective and identify the real biodiversity concerns and perspectives of men and women of various ethnic and wealth classes. The values of biological diversity, including specific species knowledge and management practices were discussed during the Tole discussions. The research team realised that the Tole level meeting helped to reach Tole residents including women, disadvantaged and children for raising critical awareness. In addition, the Tole gathering helped to share/communicate decisions of committee meeting.

c. Baseline information collection

The baseline information of the FUG households was collected, which included: information on land, livestock holdings, historical background and context, knowledge and perception regarding biodiversity, forest management, and use pattern of the forest products including different herbal plants and the various problems associated with forest products as well as biodiversity conservation. These information were collected from committee meeting, key informants, Tole members meetings, focus group discussions, field observations, and transect visits. A detailed household survey (32 households out of 127) was conducted to collect household level information. In addition, some secondary information were collected through the review of FUG documents.

The meeting of committee and other few group members including outside researchers discussed ways to collect information by different wealth categories. For this purpose, the FUG households were divided into four wealth categories by using their own criteria like A, B, C and D, on the basis of land, income/employment status, house type and livestock holding. The criteria and categorised households were presented in the following Table 2.

Table 2: Wealth category with their characteristics

Wealth Rank	Land holding (Katha)	Income/ Employment	Type of house	Livestock holding
A	> 20	More, Govt. services	RCC	>3 with good health
B	10- 20	Few, Lower level employee	Simple, Tile, Khadai Thatch grass	1-3 (medium)
C	5-10	Very few, Factory worker	Simple, Khadai, Thatch grass	Up to 1
D	up to Landless	No	Very simple Khadai, Khadai	No

A total of 32 households were selected randomly for the household survey from all categories. This represented about 26 % of the total households (see Table 3). The household survey was conducted after development of the open-ended checklist. In this survey, the research team wanted to know about the knowledge and perceptions of local people on biodiversity and its conservation and management, political regime determining who controls which resources and how.

Table 3: Sample households

	A	B	C	D	Total
Total HH	38	23	36	27	124
Sample HH	10	6	9	7	32

Percentage	26.3	26.1	25.0	25.9	25.8
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d. Joint workshop with FUGC and Tole representatives

The joint workshop among the selected Tole representatives and FUG Committee members was held away from the research site at Thimura, Chitwan for two days. The workshop was really an exciting event for both researchers and community representatives in terms of jointly making a reflective inquiry into biodiversity issues, and opportunities. As a background, the workshop also provided an opportunity to further discuss the objectives and the process of the research, refine and detail research steps, and prepare joint future plans of research to explore marketing, institutional, resource management and policy aspects of biodiversity management.

The workshop participants formed four separate committees for community mobilization, handling legal arrangements, resource assessment and management, and marketing. A main coordinating committee representing coordinators of the above mentioned four different committees was also formed to lead the future process of biodiversity exploration and management plan development. A field trip was organized with technical guidance from a local herbal expert, and participants collected samples of over 60 useful herbal plants from the community forest. A discussion on the use of these plants was also held, which provided an opportunity to local people to identify plants of medicinal and economic value. At the end of this workshop, all participants expressed that they have a lot of biodiversity based opportunities locally, particularly in medicinal, economic and ecotourism aspects. The important conclusion was that the main coordinating team as well as the four sub-teams of communities, in support with the research team, would continue to explore and develop plans for biodiversity management.

Box x. Objectives of community workshop in Thimura

- Identify biodiversity concerns and opportunities at local level
- Clarify the purpose, process and expected outcome of the research project and explore partnership between the project and the local communities
- Explore policy issues
- Prepare list of NTFPs, parts used and their uses
- Prepare sub-committees to assess various information like action plan
 - Main group- group mobilisation
 - Market information
 - Policy (rule/regulation, list of organisation that promote NTFP, rate/market explore, etc.)
 - Discuss strategies of resource assessment

e. Participatory resource assessment

With the help of elected Tole representatives, FUG committee members and other interested persons, the overall distribution and abundance of various biological resources were located in the map. These data indicated the type and stock of biodiversity resources in the area. This has enabled FUGs to identify opportunities and constraints with respect to natural resource management.

For resource assessment, the community forest of 25 ha was divided into three blocks. At least two plots were assessed in each block. The local representatives and the research team completed the intensive assessment of resources in the Sishawar community forest jointly. As the biodiversity was our major concern, we focused mainly on the species and plant counts to find the density, abundance and vegetation index. For this purpose a total of 10 sample plots, each having the circular area of 5m radius, were taken through the forest. Specific objectives of resource assessment were as follows:

- Identify the herbal plants that are found in the community forest and private lands
- Estimate the resource availability in Sishawar community forest area
- Explore the use (technical) value, method of those identified herbal plant species
- Assess the trends of product utilisation
- Assess biological resources in privately controlled land of forest users

In one Tole, we discussed species diversity found in private land. We found that the people do have interests in household level cultivation of some forest based species i.e. Tulasi (*Occimum sanctum*), Lemon grass (*Cymbopogon spp.*), Bojho (*Acorus calamus*).

f. Focus group discussion

Several meetings /discussions were held with several committee members, key informants and some active general members of FUG at different stages of the research process. The initial focus group discussions generated information on the group, their functions, achievement and conflicts. Such meetings towards the end of the research process facilitated the development of action plans, their implementation and monitoring.

The collected information was analysed by the project team only however, the preliminary findings were triangulated with representatives of committee and Toles. Analyzed data were shared with the community members.

3. Context of Biodiversity Conservation and Livelihood in Nepal

Nepal is home to a large proportion of flora and fauna species even though it represents only 0.1 % of the World's land surface area. This is because its diverse terrain encompasses a wide variety of ecosystems. Nepal's topography makes it unique in the world due to its altitudinal variation ranges from 58 to 8848 m (Mt. Everest). Echolm (1976) highlighted the environmental degradation of Nepal due to deforestation and soil erosion. The protected areas are gradually established due to the support of international conservation organisations like WWF and IUCN. In Nepal, a chain of national parks, reserves and other protected areas (17) have been established which cover more than 18 % of the national territory to date. These represent various ecosystems- tropical, temperate and alpine areas. Forests are the source of a variety of foods, medicines, and other products and these forest foods are important for dietary balance. In recent days, both developed and underdeveloped countries are much more concerned about livelihoods of the people and the biodiversity they use. Biodiversity implies the sum of species diversity, genetic diversity and ecosystem diversity.

In the past, the protected areas had been conserved primarily as a result of the effort of the government offices as conventional approach and the conservationists and planners did not understand the role of local people, who depend on surrounding forest for daily needs such as fodder, fuelwood, timber and thatch (Joshi, AR. 2000). There is degradation and fragmentation of forest habitats (e.g. tigers) outside the boundaries of the protected areas due to forest product collection by local people from the protected areas. It is realised that the role of local people is crucial for effective conservation and reflected in the Buffer Zone Management Regulation, 1994. However, there are very few successful stories in the Asian Region so far (Fisher and Jackson, 1998). Under this regulation, the buffer zone management programme has been implemented in the protected areas since 1996, the aim of which is to reduce conflicts between authority of Park and local people and support in biodiversity conservation. Royal Chitwan National Park (RCNP) extends 5 km outward from the park boundary, covering 126 wards of 34 VDCs. About 20,000 households of these VDCs rely on the protected areas for their livelihood.

It is said that community forestry policy of Nepal is one of the most progressive forest policies in the world. Community forestry is one of the major programmes of the Department of Forest (DOF). Participatory forestry programme has been implemented through out Nepal with support from several bi- and multilateral organisations. This rapid shift towards participatory forest management and biodiversity conservation is rooted in the failure of the centralised structures (Jackson and Ingles, 1994). The programme has been considered a viable strategy for checking the rate of degradation and reviving the habitat of natural species. The special feature of this programme is involving the local communities as local organisations for conserving/managing the forests for their own betterment. Under this programme, the government has been handing over the responsibility of protection, management and utilisation of the government forest to local communities as forest user group (FUG). To data, there are over 11,500 FUGs that are managing 850,000 ha of the country's forests, which is managed based on management plans agreed by District Forest Officers of the DOF and FUGs. Despite the growth of participatory ideologies during the past decades, the issues of conservation of forest and pasture ecosystems as well as livelihoods have been poorly addressed. In particular, the issues of conservation of biodiversity have not received adequate attention during the preparation of operational plan.

The rate of growing poor in the world, especially in the developing countries and their "unsustainable practices" lead to degradation of natural resources (Hardin, 1968; Eckholm, 1976). Many researchers of various institutions and countries have raised the issues of environment degradation that caused negatives impacts on human life through different conventions. Deforestation, desertification and loss of biodiversity in developing countries have been raised the

serious global environmental concern since late 1970s. Due to the implication of these causes, the livelihoods of the millions of people are critically worsening especially those who live in and around the resources (Redclift, 1987; Guha and Gadgil, 1985; Guha and Martinez-Alier, 1997). Consequently, the governments have revised their own policy and programmes or conservation of natural resources with emphasis on environment management. The participatory nature conservation programme is developed as part of overall development intervention and environment management process.

The participatory philosophy emphasises to reduce costs, save time and maximise efficiency. However, there is conflict between local people and conservation authorities over the use of natural resources. Due to use-right conflicts between people and protected areas, the local people lose their access and control rights over the use of natural resources and then their livelihoods become serious. It is realised, however, there is no way to conserve the country's forests except participatory development paradigm. The policy have stressed the development and management of all accessible forest resources about 61 % of the country's forests through active participation of the local communities. Community forestry programme has been implemented in the whole country through the past two decades.

Nepal is rich in medicinal and aromatic plants- non-timber forest products (NTFPs). Approximately 5400 species of vascular plants have been recorded including over 700 medicinal and aromatic plants and distributed through out the mountain region of Nepal. These herbs are not only used in traditional health care system but also in production of special medicines or drugs. The local people have been harvesting such plants traditionally for subsistence, and some of them have been traded from the time of immemorial. Upreti (1996) noted that more than 100 species are traded from Nepal from, out of which over 97 % of the total export goes to India. Due to the increasing demand of Ayurvedic medicines nationally and internationally, some species of medicinal plants are over harvested. Moreover, the primary producers do not often know sustainable management techniques including other conditions affecting growth and yield.

A few species that are known in the national and international markets are under high market pressure. However, there are hundreds of species decaying every year because entrepreneurs have no ideas about the species although they have been used in the past. The Master Plan for the Forestry Sector (MPFS, 1989) raises the issues related to NTFPs conservation and development and the government has a policy to promote commercial farming of medicinal herbs with people's participation. The current Forest Act and Regulation have also simplified and categorized the species according to different status of use or ban.

Most of the operational plans are designed to give emphasis on economic plants especially those tree species that are valuable for house construction. Many inferior types of endemic plants are often ignored and eliminated as unwanted species or weeds during harvesting and silvicultural practices. There are several associated reasons and assumptions behind the operation. Firstly, the objective of the DOF, the leading institution for implementing community forestry, emphasises for timber-oriented silvicultural and forest management practices in community forests. Secondly, local elites dominate decisions about the use and management of forest biodiversity either in formulation of rules or in taking the decisions in assembly/meetings at community levels. The social structure is very complex and disadvantaged groups cannot express their views in the public forum. Thirdly, the values of wealthiest and privileged castes also coincide with those of the government foresters because the performance of these people are evaluated on the basis of tree felling or forest harvesting disputes. Lastly, even the projects, research organisations and non-governmental organisations (NGOs) have done little to promote use and conservation of a huge range of biodiversity. In particular promotion and conservation of species that are not of any direct and immediate use is a great challenge.

4. Overview of Research Site

The study area is the Piprahar, Ward 3 of Rajahar VDC situated in south-eastern part of Nawalparasi district about 150 kilometres south-west of the capital city of Kathmandu, and about 25 kilometres south-west of Narayangadh Bazaar along the East-West Highway of the country. Nawalparasi district is located in the central Terai of Nepal. Rajahar VDC is about 85km away from the district headquarter, Butwal. The location of the research site is shown in figure 1. The site is part of Buffer Zone area of Royal Chitwan National Park where the Buffer Zone Conservation and Management Programme is being implemented.

Agriculture is main source of subsistence of rural people. Major crops are paddy, wheat, maize and mustard. There are mainly two types of land for crop production such as *Bari* or *Tadi* (which is non-irrigated) and *Khet* or *Ghol* (irrigated land). Bari land is generally used for cultivating maize and millet whereas Khet land is for cultivating paddy, wheat and maize. From the household survey and group discussions, 102 varieties of cereal crops were identified, of which 41 are paddy, 10 potato, 8 maize, 6 mustard, 2 wheat, and 2 finger millets. The research site is considered a good area of crop production in the district.

Traditionally, the agricultural land, especially Khet, generally does not contain trees. However, a few newly domesticated and exotic plant species are being planted in Bari. Almost all households keep livestock such as buffaloes or cow for milk production, sheep and/or goats for meat and oxen or he-buffaloes for draught power.

The community is highly heterogeneous in terms of caste, ethnicity, economic class and gender. The main caste/ethnic groups in this group are Tharu, Brahmin, Chettri, Magar, Bote, Majhi/Musahar, Newar, Bishwakarma, Sarki, Pariyar and Gurung (see table 4b). All of the four principal caste category according to Hindu religion are found in the area. In terms of ethnicity, indigenous fishing communities (Majhi and Bote) as well as traditional farming groups of the area (Tharu) and migrants from the hills (Brahmin-Chettri, Magar, Newar, Gurung). The community is divided into four wealth categories. Some households are wealthy in terms of land, agricultural production and off farm income. Those who earn off-farm income are mainly the government services holders, schoolteachers, Indian army, and factory worker or labourer.

Sishawar Buffer Zone Community Forest User Group was formed under the Buffer Zone Regulation Act 1995. This FUG comprises of 124 households, mostly from ward 3 and few households of wards 2, Piprahar of Rajahar VDC. The group was formed in 1997 and has grown in size from 81 to 124 members in 2002 and the total population is about 1000. The group has a committee with 11 members including women (9.1%).

All caste/ethnic groups depend on the diversity of species found in the forest ecosystems for many basic livelihood needs such as food, fuelwood, thatch grass, timber, medicine, fish and water. Tharu, Majhi/Musahar and Bote are indigenous peoples living around the protected areas and in total their population is about 60 %. Majhi/Musahar and Bote are heavily dependent on the diversity of species for their basic livelihood needs, including food (vegetable- *Niuro*), fish, firewood, thatch grass and medicine. The Musahar and Bote are the least socio-economically developed ethnic groups in the research site. They are mostly illiterate. They have neither the registered land nor cattle. However, they have small huts on non-registered land, usually at the bank of Narayani River. They spend much of their time on fishing, collection of vegetables, as well as working for others as labourer. They are connected to various national political parties in the communities such as Nepali Congress, Nepal Communist Party (UML), Rastriya Prajatantra Party.

The whole community is divided into four hamlets/Toles and these Toles are more or less inhabited by similar caste/ethnic groups (Table 4).

Table 4: Distribution of households and ethnic composition of user group

a. Household (HH) distribution among Toles

Name of Tole	HH	Caste/ethnic group
Voktaghari	38	Brahmin, Chhetri, Newar, Sarki
Bichako Tole	35	Brahmin, Chhetri, Tharu, Kami, Damai, Magar
Purano Tole	36	Tharu, Magar, Brahmin
Bote Tole	18	Bote, Manjhi/Musahar, Tharu, Kami

b. Ethnic composition

Ethnic group/caste	HH	%
Brahmin/ Chhetri	35+8	33.8
Magar/ Gururng	7+1	6.3
Newar	3	2.3
Tharu	52	40.9
Bote	8	6.3
Manjhi/Musahar	5	18.5
Kami / Damai/ Sarki	3+2+3	6.3

5. Findings and Discussions

This section presents findings of the study in relation to three key objectives. First, an assessment of biodiversity status, local institutions and management practices are briefly outlined. This is followed an analysis of participatory action research process and results achieved, including a generic methodology for incorporating biodiversity issues in community managed forests. Finally, key issues and opportunities for improved management of biodiversity are discussed.

5.1 Biodiversity status, institutions and management practices

5.1.1 Status of current biodiversity situation in the area, with special reference to species under stress

Status of species under selection stress

The participatory forest resource assessment identified more than 65 medicinal plants (see annex 3) and about 60 other species including tree, shrub and herbs in the Sishwar community forest. Out of them, five herb and tree species (Bojho, Vokta, Sissoo, Khayer, and Simal) are important species for rural livelihoods. Vokta, Sissoo and Khayar species are likely to be extinct from their communities if the current trends of resource extraction continues. Some these species are used in making ropes and for construction of houses including animal sheds. Encroachment to forest areas for agriculture is also a source of forest degradation. In addition, naturally regenerated Simal species are also being destroyed in the farm land because farmers want to clear their field and make more land for cereal crop cultivation. Free grazing systems in the past also contributed to the loss of biodiversity in the area, and this was particularly severe in cases where community members had little knowledge on the importance of seemingly inferior species of plants.

The underlying reasons for depletion of forest resources are institutional weaknesses, limited knowledge and skills, poor communication (external facilitators never reached beyond the committee key officials), lack of appropriate harvesting strategies, encroachment, and natural calamities (flooding, bank cutting, forest fire).

According to the users, they have experienced that reduction in mustard production in recent years, and several reasons were identified through participatory analysis of ecological aspects and historical trends. Change in farming and livestock feeding system¹, haphazard use of chemical fertilizer over the prolonged period of time, and removal of Simal (*Bombax ceiba*) trees from their field for widening land size were among the main reasons. At the time of the study, hardly any Simal trees were observed in the area. The local people have perceived that the yield of cereal crops including mustard decreased due to shading effect of the trees. However, some people were found to realise that the tree felling activities also lead to degradation of environment.

Earlier, the forest was almost barren and degraded one. Due to strict protection and management of the forest by local people, the forest vegetation is regenerating naturally. At the moment, the scenario of biodiversity has been changed and several new few species of tree, shrub and herbs have rejuvenated, including various medicinal species (which is summarised in Table 5. According to the villagers, there have been some changes in species diversity since 1988 when many people migrated to this area from the hill districts namely Baglung, Lamjung, Palpa, Parbat, Tanahun, Gorkha and Okhaldhunga.

¹ mobile or temporary cattle-shed system in which cattle are shifted from place to place or land to land for manuring.

Table 5: Species diversity in community forest and private land resources

	Species found before CF	Disappeared Species	Rare species	Newly appear species
CF Flora	Khayar, Sissoo, Simal, Jamun, Gayo, Ginari, Chhatiwan, Amala, Kutmiro, Ban Amili, Karma, Bhelore, Khar Khadai, Siru, Kans, Dayali, Ghantisare, Aank, Tapre, Titepati, Bhant, Tayari, Dhursul, Dadchitka, Tamraura, Niuro, Pipla, Gurjo, Kurilo, Rudilo, Sitalchini,	Babul, Aank, Bhogate, Chhatiwan	Bayar, Sissoo	Khasreto, Saruwa, Banmara, Jadibuti (37 species), Gandhejhar,
Fauna	Gaida, Chittal, Tiger,	-	-	Kalo Bhalu, Wild Pig, Kharayo, Various birds,
Species found in private Land	Ramsingh, Simal, Sissoo, Khayar, Bakaino, Badahar, Sami, Bhogate, Rukh Bayar, Guava, Mango, Rukh Katahar, Litchi, Popaya, Banana, Tulasi, Bans	Satyajeewan	Karma, Ank, Vokta, Sissoo(N), Bhojo, Gujargano	Coffee, Neem, Amala, Banmara, Kodo, Bodi, Babiyo, Amriso, Ipil-Ipil, Supadi, Nimaro, Kagati, Shakharkhanda

5.1.2 Existing management practices, including preferences of various ethnic groups of users

a. Management practices

The forest users are strictly prohibited to fell standing green tree according to their operational plan. They must take approval for collection of fallen, broken, and *Khar/khadai* (thatch grasses) from their community forest. They collect Khar/khadai annually as a main forest product. For collection of Khar/Khadai, the group members, non-users and other neighbours should pay Rs. 100, 150 and 200/Katha respectively, in addition to the Boat charge to cross the river. Similarly, the group members can collect grass from March to June and they should pay Rs. 30 /months as collection charge. The group can implement any forest development activities that it wish to undertake only after receiving approval from the Park authority.

A number of forest based economic opportunities are missed every year due to lack of knowledge and skills about growth, harvestable amount, and sustainability of a number of medicinal plants found in the community. This is further constrained by a lack of knowledge on park regulations in relation to resource management and commercial use. According to the users, they did not know about economic value of herbs and shrubs species for example, Pipla, Gurjo, Sikakai, Rudhilo, Bojho. So they have not written anything about its protection and management in operational plan. Every year they harvest all medicinal plants during grass and Khar/khadai collection time as grass, not as medicine.

Meanwhile this project have started to work closely with Sishawar Buffer Zone FUG on the basis of 'learning by doing' principle. During the project period, committee officials, Tole representatives and many other users have been made aware on the conservation of biodiversity as a means of sustainable livelihoods.

Box 1: Forest product with species rank by ethnic groups					
Product	Species	B/C	M/G	T/M	B/M
Boat's timber	Sissoo	-	VII	-	I
Khar/Khadai	Khar	I	IV	-	II
Firewood	Sissoo, Khayar	II	II	I	III
Herbal plants	Pipla, Sikakai, Gurjo, Kurilo,	-	VI	II	IV
Timber	Sissoo, Khayar, Jamun, Simal	IV	I	IV	V
Niuro	Niuro (Pani/Kali)	-	VIII	-	VI
Grass	Khar, other	III	III	-	0
Ag. implement	Sal	-	V	III	0

Note: I = high priority... VIII = least priority
 - = no response, 0 = not required

Species preferences by two ethnic groups		
Species	B?C preference	Bote/Majhi preference
Sissoo	I	I
Khayar	II	III
Jamun	III	IV
Simal	IV	II
Kutmiro	V	0
Gindari	VI	0
Dhayaro	VII	0

b. Species preference by ethnic/economic groups and their implications management decisions and plans

The local people do give equal value to all species of flora and fauna. They want to protect and conserve those species which are highly valuable for their uses (see Box 1). Brahmin and Chhetri were found to prefer tree species like, Sissoo, Khayar, Jamun, Simal because they need timber for big or permanent house construction and furniture making. Similarly, they have kept more livestock for milk and manure as well as draught power so they require more grasses than others.

Unlike the rich people, the poor households do not normally require timber as they can not afford constructing big houses. They rather need fuelwood and other non-timber forest products. Similarly, they have no money to buy bundle of thatch grass, although they need it for roofing their houses. On the contrary, the rich people can cut and collect many bundles and sell to outsiders after meeting their own demand. So they can earn two-three folds of their investment but the poorer cannot do this because of lack of money.

The user group committee dominated by the upper caste, wealthier males of Brahmin, Chhetri, Magar, Tharu, with a representative from Bote ethnic group. An analysis of committee decision-making practices indicated that it is Brahmin (especially the secretary) who usually dominates the decisions.

c. Religious values of various plants in human life

People have used several parts of various herbs, shrubs and trees from the time of immemorial, including for religious purposes in Hindhu and Buddhists traditions. Table 6 summarises religious use of plant species by different ethnic groups. Annex 4 provides detailed list of species along with their Latin names.

Table 6: Relationship between plants and the religious life of different ethnic groups

S. no.	Caste/ethnic group	Religious activity/festival	Uses of various plants including fish
1	Tharu	<i>Jitiya</i>	<i>Badma Pat Bandhne</i> (Leave tight on Arrow)- Leave of Bel, Katahar and Paddy <i>Bans ko sinka dhanus ko Bad Banaune</i> (Arrow made of Bamboo's Sinka): Dig out the branch of Kavro and tell and hear the story of Sun <i>Prasad</i> : Used different fruits e.g. Mas, banana, rice, milk of cow
		<i>Kriya</i> (Funeral)	Banana's leave: used as dish plate because it is not used by others.
		Dashain	Cut Kupindo
		Marriage	A fresh fish
		<i>Barana</i>	Chamal (uncooked rice), Pitammar (yellow cloth), Sal Dhhup
2	Bote	-	They do not celebrate religious activity
3	Aale Magar	<i>Lingo/Mandap</i>	Need 5 <i>lingas</i> (straight branch with leave and shoot) of each species of Sal, Bamboo and Banana Leave of Pipal, Bar and Bel Rope of Babiyo Different fruits
		<i>Panchbali</i>	Need a piece of wood especially Sal
		<i>Marda/death</i>	Bamboo pieces Leave of Sal
		<i>Kriya</i> (Funeral)	Banana's leave
		<i>Pinda</i>	Need leave of Usir, Bhringiraj/ Bhringijar, Bhangarai and Apamarga
		<i>Barana</i>	-
<i>Las gadda</i>	Used a <i>linga</i> close to cemetery (it means the dead body can not cross over the shade of <i>linga</i> ?)		

		<i>Jhang Pharkayakko</i>	Branch of Asuro with leave and shoot and put on trail (Children follow his/her parents or relatives when s/he leave the home for long time so s/he break the branch and keep the shoot portion of branch towards house on trail. It is doing because the child/children will not sick (or <i>Sato ajaos</i>).
4	Brahmin/ Chhetri	<i>Nuwaran</i> (Name is given by Purohit)	Leave of Pipal, Bar, Mango, Sal, Bhalayo, Spike of Nibua Flower of various plants according to season
		<i>Brataabandha</i>	Need 5 Lingas of Sal, Bamboo and Banana Leave of Mango, Kush, Dubo, Rope of Babiyo Stick of Painyu Various flowers and Jauteel Homan samida of Khayar or Sal
		Marriage	Homan samida of Khayar or Sal Various flowers
		<i>Murda</i>	Bamboo
		<i>Kriya</i>	Khochha made from the leave of Sami or Kavro or Dumri and put into river (<i>Kholama Bagaune</i>)
		<i>Saune Sakranti</i>	Need of Kurilo plant, Kukurddaaino, Siru, Bhalayo, Khirro Four piece of fuelwood with fire (<i>Agulta</i>) for throwing in four direction
		<i>Teej ko Panchami</i>	Need of Datiwan
		Dashain	Various flowers including new yellow maize plant A plant of Sugarcane
		Deepawali/Tihar	Khochha made from leave of Nibuwa or Dhursyauli for lamp Various flowers including Titepati Rope of Babiyo
		<i>Satyanaraayan ko Puja</i>	Various flowers Prasad of different fruits, cereal and milk of cow
		<i>Sabtaaha</i>	Need 5 linga of Sal, Bamboo and Banana Various fruits and flowers Coconut with coverage (<i>Jata sahit ko</i>) Oil of Teel Prasad of different fruits, cereal and milk of cow
		<i>Mage Sakranti</i>	A kind of sweet (Laddu) of Teel
5	Blacksmith		Similar to Brahmin /Chhetri

5.1.3 Biodiversity Institutions

Institutions

There are two types of conflicts in relation to biodiversity use. One is among members of the group regarding resource distribution and utilisation; and other is between group or communities and Park authorities regarding restriction over resource use. It was found out that the elite or wealthy people have been hijacking the forest products but the resource poor households are unable to access the products. The community forest is totally protected from livestock. The local people experienced that the wild animals increased in number and types like Rhinos, Spotted deer, Wild pig as well as other carnivorous Tigers, and Bears compared to past days. The crops field are being eaten and damaged about 10,000 kg annually by wild animals but the farmers have not got compensation despite the existence of policy of compensating or supporting the local people under Buffer Zone Management Programme. In addition, several people are attacked by wild animals in and around the protected areas and they could get reimbursement of only 50 % of the treatment bills. The earlier observation that despite the

Ethnic group	Voktaghari	Bichko	Piprahar	Bote Musahar	Total (%)	Committee member
Brahmin /Chhetri	33	9	1	0	43 33.9	5 (45.4%)
Magar/ Gurung	2	3	6	0	11 8.7	2 (18.2%)
Tharu/ Mahato	0	19	29	4	52 40.9	3 (27.3%)
Lower caste	3	4	0	14	21 16.5	1 (9.1%)
Total	38	35	36	18	127	11

Note: Lower caste includes Bote, Manjhi/Musahar, Kami, Damai and Sarki however Bote is water touchable caste.

flow of huge resources in the name of Buffer Zone Management, the programme seems to be unable to establish live and coherent relationship between local people and protected area management (Brandon and Wells, 1992) seem to still valid.

b. Institutions and conflicts

Piprahar community comprised of 142 households distributed among four Toles namely Vokataghari, Bichko, Piprahar and Bote/Musahar. 25 households especially Majhi/Musahar were denied membership to FUG because of lack of money (Rs. 150.00) for taking membership of this FUG. They used to collect the forest products free of cost in the past. However, they are not included in the user list. The committee comprises more than 45 % of Brahmin/Chhetri whereas lower castes are only 9.1 %, although number of households in the community is dominated by Tharu ethnic group. The ethnic distribution of the group and committee composition are tabulated in the Box 2.

The committee members did not hear the voice of lower caste especially Bote and Majhi/Musahar. According to Ambar B Majhi, they did not require grass because they have not kept the cattle, and they need Khar/Khadai for roofing their huts. However, the committee has allocated plots that having poor quality of thatch grass, which is not good for roofing. The representative of committee of this ethnic group could not influence in the committee decision.

In addition, most of decisions are done by the committee whereas secretary controls and imposes his ideas over the decision. There are emerging several issues regarding product distribution process, cost of the product, decision-making process, communication, membership, and financial aspects of the group.

Bote and Majhi people are fishing communities from the ancient period. At the present, they are facing difficulties to survive because of reduction in availability of fish in Narayani River due to pollution and also restriction in fishing from the Park authority. On the other hand, they are landless and could not get land for cultivation because most of the large land holders are followers of Nepali Congress Party and they support only to their voters rather than Majhi and Bote households (personal com. with researcher 2002).

5.2 Participatory Action Research Process and Results

5.2.2 Actions and immediate outcomes

Actions	Summary descriptions
i. Site selection	The originally proposed research site was Painyu Pata community forest of Baglung district but it was difficult to launch the research due to poor security situation. Then Sishawar Buffer Zone community forest was selected as research site for the research. This community forest is surrounded by Narayani River and its braches.
ii. Data collection	
a. Discussion with FUG committee members	The research team shared objectives and working approach of the research project. They agreed to implement the biodiversity research in their group and they set timetable for Tole level discussion.
b. Tole level discussion	Tole level discussions were arranged to reach maximum number of households, beyond committee members. This meeting was helpful to communicate objectives and working approach of the research, and able to select more appropriate Tole representatives to be engaged directly in the process.
c. Baseline information collection	Baseline information comprises of socio-economic and bio-physical information. Socio-economic information was collected from interactive discussion with the households' member(s) during the household survey. Biophysical information was collected from participatory forest resource assessment and several interactions with key informants. From these exercises, the users learnt their socio-economic and forest resources condition as first step towards identifying issues and opportunities in relation to biodiversity management and use.
d. Joint workshop with FUG	From joint workshop of committee and Tole representatives, they planned some

committee and Tole representatives	activities such as identify medicinal species in the CF, conduct resource inventory, organise meetings and discussions, explore market for different products, and find out policy provisions in relation to marketing of forest products. Finally, they formed four different sub-committees to implement the above activities.
e. Participatory resource assessment	The members have identified 65 medicinal species of which Pipla, Sissoo, Khayar, Rudhilo, Simal, Apamarga, Gurjo, Ginari, Niuro, and Balu are the most common. The collected information was useful for sustainable harvesting and management of prioritised species.
f. Focus group discussion	This type of discussion helped to understand the real situation of group management, conflicts, and insights of the group activities.

5.2.3 Key results

a. Changes in perceptions and improved awareness

The awareness level of the forest users on the value and importance of biodiversity and its potential for local livelihood has increased primarily due to reflective and interactive meetings at different levels: committee, Tole, and focus groups. Now they are protecting various plant species that are naturally regenerated in their own land and also committed to promote through artificial regeneration of the valuable species as well. Earlier, they eliminated many pockets of Bojho plants because they did not have knowledge about its values (Box 5).

Box 5: Bojho elimination

Nityananda Kanel is a progressive farmer and he started to pioneer commercial vegetable farming first in his communities. He migrated from the western hill district of Baglung in 1990. According to him, there were a lot of naturally regenerated Bojho species in their area. It used to grow in wetland or swampy areas. They did not know about their medicinal value or economic importance so they completely destroyed it from their own land.

b. Results/changes in plans and practices

As a result of the project intervention, Sishwar FUG as well as its neighbours have decided to incorporate management arrangements for herbal plants in their operational plan based on what they learnt from the findings of one year research. They have started to make formal and informal requests to authority of protected areas for approving the changes in their operational plans. In particular, they want to include medicinal species such as Pipla, Rudhilo, Gurjo, Apamarga, Sikakai, Kurilo. In addition, they have decided to protect these valuable species during Khar/Khadai and grass collection seasons, during which such species used to be damaged. They are also discussing a provision of leaving at least 20 of the growing stock for ensuring regeneration.

c. Sale of forest products

FUGs are given authority to sell the surplus forest products so they can raise funds and can use the income for forest management and community development. Due to the existing forest management practices, the group could not sell any forest products but some wealthy and/or elite members were able to earn money by selling surplus Khar in prices more than 15-20 folds higher than their purchase prices from the community forest.

As a result of new information and insights from the project initiated activities, some innovative users have cultivated herbal plants. For example, three users including woman have experimented Tulasi (*Ocimum sanctum*) in their private land and they have sold in the rate of 40-60 rupees per kg. They have also received some knowledge and skills about its value. They are determined to cultivate this plant in additional areas in the years to come. Because of demonstration effect, other community members are also planning to cultivate this species in as much as about 0.5 ha of land. In this way, the forest users have decided to protect various herbs that have medicinal values. At the moment, out of 65 herbal plants (see Annex 3) they have prioritised about 9 most abundant and high value species for conservation and promotion.

d. Forest products distribution and use pattern

According to the operational plan, they could not fell the green standing trees and can collect fallen trees from the community forest. Therefore, forest users, particularly the poor and disadvantaged had very limited chance to get timber and small poles. Project researchers observed that there is no single piece of sawn timber used in the houses of Majhi/Musahar and Bote. The wall of their houses is made of Khadai but not from stone or Brick or timber.

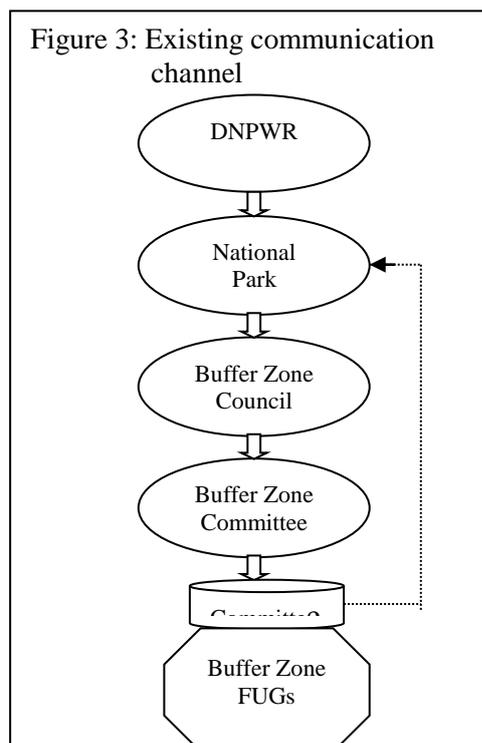
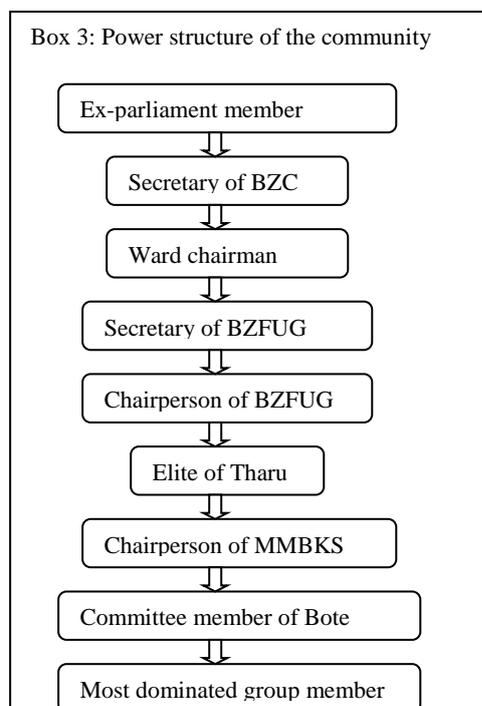
Many users of Majhi/Musahar and Bote ethnic group expressed that thatch grass is second prioritised forest products for roofing their houses during the focus group discussion. About 14 households of this ethnic group could not cut thatch grass in last year harvesting time. They did not know application time and they could not deposit money before harvesting of thatch grass. However, the elite group harvested bundles of thatch grass and sold to outsiders or neighbouring FUGs' members at higher prices. According to committee secretary, about 3500 rupees can be earned from allocated two Katthas land if s/he sells all thatch grass. It means anyone who have money could get the product. At present, the committee has given first priority to group members. Because of project intervention, those who have not received FUG membership are also entitled to access Khar/Khadai on sharing basis (50 %).

e. Change in local resource management policy (e.g. Thatch grass)

Earlier, the forest was totally open for grazing. There was a lot of human pressure. Many people relied on the fringes and protected forests so there was conflict between the park management and local communities. The forest is totally closed by the group after local communities got management rights and responsibility. Now the local resource policy has changed from blanket protection approach to sustainable use approach.

f. Scaling up in neighbouring FUGs

The experience of sishwar FUG in relation to biodiversity management is being communicated through different mediums, including the informal interactions at local tea shops to several neighbouring FUGs. As a result, one or the other form of the activity is being replicated by more than 10 neighbouring FUGs.



5.3 Key issues, analysis and discussions

Key opportunities and constraints in relation to sustainable biodiversity management under community based forest management, with special reference to buffer zone program, are discussed below:

a. Power imbalance

In the community, a few elites have always taken influential positions. For instance, the top 5 hierarchical layers and key power holders are from Brahmin/Chhetri ethnic group and then local elites whereas very negligible role has been allocated to so call 'untouchable' castes (see Box 3).

This is also activated indirectly by the government officials because they come and contact only with the village leaders, and they do not like to spend much of time with the villagers. Most decisions are made at the committee meeting and little is discussed at the general assembly. Both of these means of decision-making have failed to address the voices of the poor or minority users.

Therefore, the methodology incorporates steps and tools to address the imbalance power and allow context-specific learning as regards 'how to balance' the power structure for sustainable use of biodiversity.

b. Limited communication

Communication is one of the key elements of the institutional development process. However, limited communication has always been a great challenge in the community. Due to the hierarchical social and governmental structures, there are several levels and people involved in the communication processes. In this research site, the communication system is mostly unilateral, which means message mainly flows from more powerful to less powerful or powerless (such as from key officials of the Buffer Zone Committee, local leaders or key official of Buffer Zone FUG to the members of FUG).

The government officials usually inform legal provisions and program related services to only key committee officials rather than general members of the group (see Figure 3). The decisions of committee meetings are not usually communicated to all the users. Evidences were found in which some of the members could not use forest product from community forest because of a lack of information. For instance, thirteen households of Bote and Musahar were not informed about Thatch grass harvesting last year so they were unable to repair their huts' roof. Consequently, this unfair situation lead to unsustainable use of biological diversity.

The proposed methodology encompasses learning from such experiences, and seeks to ensure smooth communication within the community.

c. Limited information on value

Various essential utensils prepared from forest products are competing with industrial substitutes. For example, the Vokta were used, especially by the poor, to make various products such as *Dori*, *Namlo*, *Damlo*, etc. that are essential in the farming system. However it is being replaced by Plastic rope in present days. The wealthy man or elite does not care much for the well-being of the poor population. Therefore, they destroyed Vokta species and now it is difficult to introduce even artificially.

In addition, they do not have ideas/information on value of particular species about its demand in the local and national as well as international markets. This situation is likely to lead to unsustainable use of biological diversity. This learning is also considered in the preparation of this methodology for incorporating biodiversity concerns in community managed forests that helps to make people aware on the importance and opportunities for generation of income from the sustainable use of natural resources.

Box 4: Some issues in the research site

- The pressure of wild animals is increasing in the cultivated areas of local people.
- About 1000 kg of every seasonal cereal crops of this group are destroyed by Rhino every year but nobody could not reimbursed the amount from the Park authority.
- Community forest land (about 7ha) is eroded by flooding because the community forest is locked by Narayani River and also increasing bank cutting problem.
- Fourteen households of Majhi and Bote could not get Thatch grass from community forest in last year because they do not have money to pay the committee on the time of harvesting.
- Most of them are nearly landless people, however, they have been covering less than two Kattas of land.
- Restriction of fishing however the fishing is main customary right of indigenous people.
- Availability of fish in Narayani River is reducing due to mix up the chemical wastages from Bhrikuti Paper Mill and Beer Factory.
- Buffer Zone Management Programme could not improve the quality of indigenous people's life.

d. Local institutional

Sishawar Buffer Zone FUG is formed by the help of the Park Ranger under the policy of Buffer Zone Regulation, 1995. Many households of different ethnic groups/castes, and wealth categories' people joined the group for fulfilling their basic through conservation of forests and biodiversity. The local people are united in the name of FUG aiming to communicate their voices to the government for development of communities and welfare of their own. However, most of the forest users could not understand about the concept of forest conservation and management. There is very poor communication, leadership and management skills. Several conflicts are persistent (see Box 4). FUG members have confusion in many aspects of forest management and organizational development, and lack adequate knowledge and skills about biodiversity conservation.

e. Policy issues and opportunities

It is said that Nepal's community forestry policy is considered to be one of the most progressive forest policies in the world. Similarly, the National Conservation Strategy (NCS, 1970) encompasses four elements such as to satisfy the basic materials, spiritual and cultural needs of the people, to ensure the sustainable use of land and renewable resources, to preserve the biological diversity and to maintain essential ecological and life support systems. It means that the policy of the government has given high priority to local people getting benefits from biodiversity protection. There are lot of opportunities to develop poverty reduction schemes for the rural people who are living under the poverty level.

Buffer Zone FUGs are given ownership of forests but no green tree felling right as well as rights to land. The forest users can take responsibility for protection, management and utilisation. Consequently, they have to go to market or neighbouring FUGs buying timber for construction of house and boat. As a result, the forest dependent and poor households have not been benefited as stated in the Master Plan for Forestry Sector, 1989, National Conservation Strategy, 1995 and Nine Fifth Year Plan.

Buffer Zone FUGs are not recognised as independent institutions as against the community forestry FUG. In addition, Warden of Park is always imposed over decisions of the groups. The concept of institutional structure is based on the committee concept rather than whole group. The local people, who have suffered from crop damage and predation on livestock by park animals, are not compensated. Thus park externalities and compensation is another constraining. According to the Park policy, compensation seekers should apply to the park administration detailing nature and quantity damaged and the expected amount of compensation. However, the poor and disadvantaged groups are hardly in a position to go through these formalities to be able to get their legitimate compensation of wildlife damage. The failure to get timely and adequate compensation has often contributed to a loss of faith in biodiversity conservation.

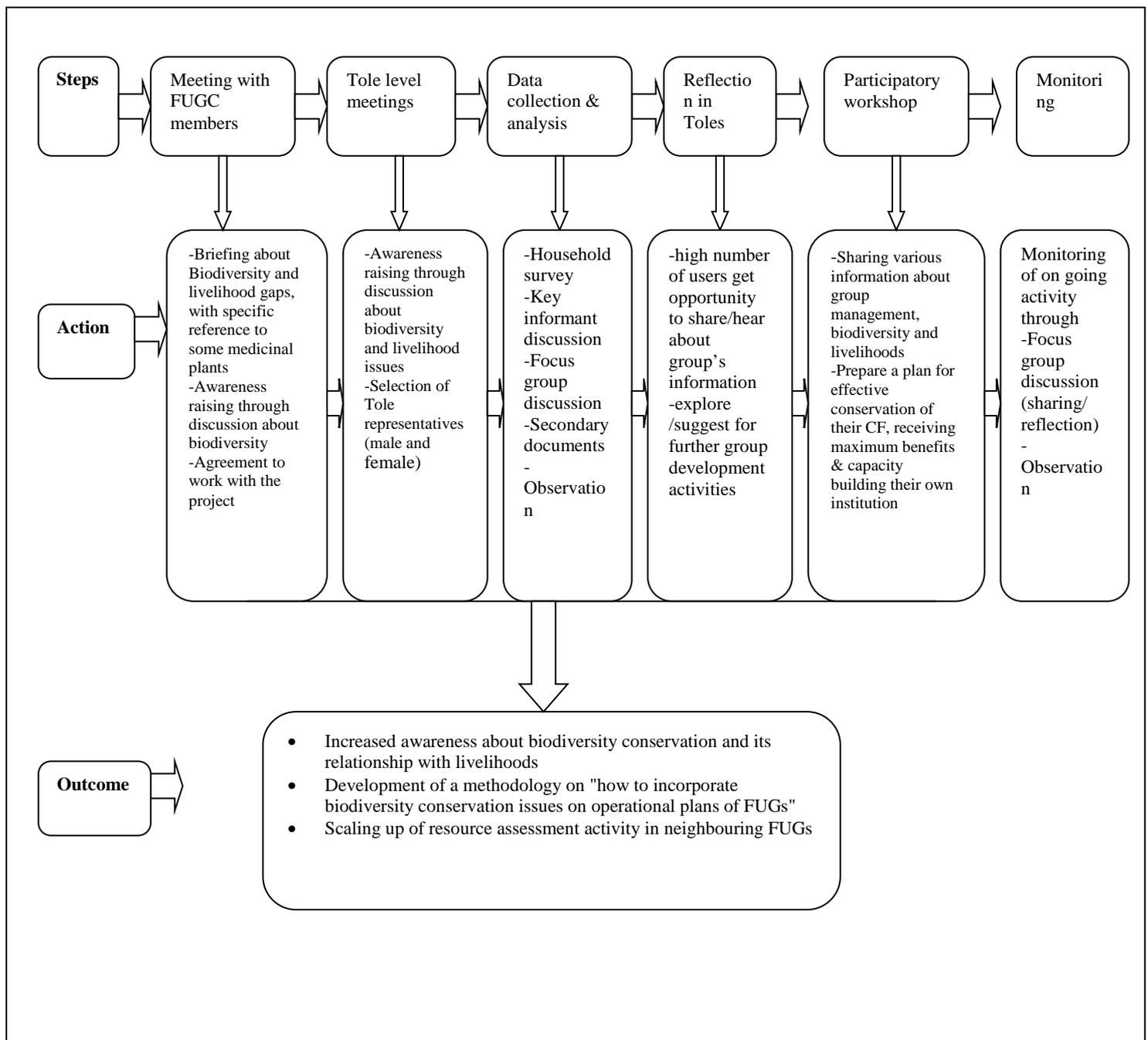
Key policy constraints affecting sustainable biodiversity management are:

- ❑ There is no/limited space for private/civil organisations for collaboration in conservation and management of biological resources.
- ❑ In addition, FUGs have not been given adequate rights for conservation, management and utilisation of the resources.
- ❑ The existing resource monitoring system is very poor even though it is measured in terms of financial expenses.
- ❑ There are no enterprises registered, and functions at the local level.

These are the constraining factors for effective and sustainable biodiversity management. So the policy should be formulated on the basis of proper understanding of field constraints. Pokharel et al (2002) found out that there is a negligible relationship between centre to local level, and this leaves many local opportunities and constraints unaddressed.

5.4 Towards a generic methodology to facilitate biodiversity management and utilization within community-managed forests

While it may be difficult to recommend a generalized methodology of incorporating biodiversity concerns in community managed forest, the in-depth insights gained through the intensive action research process, we are fairly confident to draw some step-wise procedures for this. Our fairly good understanding of the contexts and processes through which community based forest management takes place in Nepal has allowed us to explore and evaluate various steps that can be applied in wider contexts in Nepal. We suggest a sets steps that can be applied, which may ideally be considered under an adaptive approach so that context specific adjustments and innovations may be made.



6. Conclusions and Recommendations

- Immediate change can be effected in sustainable biodiversity management practices through participatory action and learning process. Key changes visible at the end of the action research were: a) better protection of newly identified resources, b) cultivation of some valuable plants, c) improved management practices of medicinal herbs in the forest area, d) development of more equitable resource use practices, e) development of more participatory decision making practices, f) motivation of community members to explore resource status, management arrangements and pinpoint questions of further investigations.
- Limited access of the poor and disadvantaged groups in decision making as a result of prevailing hierarchies in caste and class as well as gender discrimination has constrained the access of these groups in benefit sharing. This has minimized the incentives of such groups to participate in sustainable resources management and biodiversity conservation.
- Elite members of the community treat the poor and marginalized as ignorant and incapable as most of them are illiterate and can not express their voices openly in the meetings. This has further alienated such groups from legitimate resource use.
- A methodology based on the principles of participatory action and learning can help both outside facilitators and local communities to work together in exploring issues and opportunities in relation to biodiversity management at local level. The methodology should be iterative and should make it possible to reach beyond the executive committee or the elite members of the community, while at the same time involving the latter groups in the process of getting reoriented.
- Indigenous ethnic groups, who are often marginalized from the mainstream forest decision making processes, have relatively better knowledge of biodiversity of the area, as they are the ones who are more closely related to the various components of biodiversity for livelihoods. However, since their knowledge is not taken into account in the community decision making processes, such knowledge systems is being degenerated. Awareness on values of plants appeared to encourage locals to search for existing knowledge and revive it for their use.
- Any method on promoting sustainable biodiversity use can take local knowledge as the beginning point, and additional external knowledge may then be provided as further questions to learn arise
- Under Buffer Zone regulation, while the FUGs are given some responsibilities and use rights, the extent of rights still, particularly in terms of choices offered to communities for the structure of institutions, and the extent of resource use rights. This has limited the incentives of local communities to get engaged in more active management of biodiversity.
- The current operational forest management plan is too general, and the study identified avenues for improvement, and the users are discussing possible options for improvement. This indicates a participatory action and learning can contribute to improve planning.
- The current approach of biodiversity conservation is not able to address the subsistence level of problems of indigenous people so their livelihoods are in critical condition. There is

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Glossary of Local Terms

Adhiya: Sharecropping arrangement between tenant and landlord in which the tenant must give half of the production including straw or grass.

Bari: Bari land is dry or non-irrigated arable land especially grown for maize and millet.

Bratabanda = son he can take responsibilities of Hindu religion and after this ceremony he is given holy rope which contains six ropes of cotton thread.

Damai = tailor, lower or untouchable caste

Damlo = rope which is used to keep cattle.

Dashain = a great festival of Hindu

Dori = a rope

Ghol = khet land or irrigated land where cultivates mainly rice, wheat and maize.

Jhang Pharkako = a tradition of Magar and Gurung; a service holder leaves home and s/he put small twigs on the trial and press by stone when their child following to her/him.

Jitiya = a tharu festival

Kami = blacksmith, lower or untouchable caste

Kattha = a unit of land measurement, which is equal to 1/30 ha.

Khet: Khet land is wet or irrigated arable land and situated on the lower area or low altitude where paddy and wheat can be grown.

Kriya = funeral

Las gadda = kept dead body into cemetery

Lingo = a stick (small pole) size with branches and leading shoot that is used in various festivals

Lure = lean and thin man in Nepalese culture

Mage Sakranti = a festival day or 16th January (first of Magh month of Nepali calendar)

Mandap = holy place

Manjhi/Musahar = lower or untouchable caste

Murda = a dead body

Namlo = load carried on the back by the help of rope with flat rope

Nuwaran = name is given to new child by priest.

Panchbali = a festival

Pinda = rice pudding especially made to give in the name of dead parents

Sal Dhup = used in holy places and made from Sal (*Shorea robusta*)

Saptaha = a big ceremony

Sarki = cobbler, lower or untouchable caste

Satyanarayan ko puja = a ceremony

Saune Sakranti = a festival day or 17th July (first of Saun of Nepali calendar)

Tadi = non-irrigated land or bari land

Teej ko Panchami = a women festival

Tihar /Deepawali = a second big festival of Hindu culture

VDC (Village Development Committee): VDC is local government or local council and it encompasses nine wards.

Annex 1: Checklist for Interview

I. Source of food, household need and income

What?

Where?

Seasonal variation

Role in collection and processing

Legal/social provision

Change over time

Volume/extent of contribution

II. Occupation/employment

Major occupations/employment

Strength and weakness of each occupation

Labour division among the family members

Change over time

III. Cultural aspects of livelihoods

Rituals, festivals and ceremonies of different ethnic groups

Use of biodiversity resources in these activities

IV. Medicinal use of biodiversity resources

Health problem of human, animals, crop

Healing and treatment system and use of biodiversity resources

V. Knowledge on biodiversity resources

Other possible use of these resources

Plant and animal species found in the CF and their various use

VI. Critical times/shocks

The major shocks during last 20 years

Copping strategy during these crisis

VII. Management of community forestry

Operational plan

Actual practice

What bare the gaps and why?

Sense of biodiversity among villagers

How it is reflected in plan and practice?

VIII. Social structure

Social map

General household survey (format below)

Wealth ranking

Preference ranking (among various species of plant and animals)

Social relation among users (pattern client relations)

IX. Historical background

Settlement

Social development aspects

Establishment of CF

Annex 3: Identification of Medicinal Plants in the Project area and their Uses

S. no.	Location of Medicinal Plants	Form	Parts use	Use form	Uses
1	Apamarga/ Dattiwan (<i>Achyranthes bidentata</i>)	Herb	Fruit	Powder	Used as diuretic and astringent, piles, Bachha lai runche lagema
			Leaves, bark	Pest	Used in stomach ache, piles, skin disease, wound
			Root		Control hypertension, poison
2	Areli kanda	Shrub	Bark of root	Powder	Control gastric, Kammari, old stomachache, injury. Mixed with other medicine
3	Ashogandha jangali (<i>Withania somnifera</i>)	Herb	Root	Powder	Tonic
4	Asuro (<i>Adhatoda vasica</i>)	Shrub	Leave	Powder	Control Bath Mixed with Juwano
5	Balla		Leave	Liquid	Control indigestion problem Mixed in honey or Misri
6	Bajradanti (<i>Potentilla fulgens</i>)	Herb	Leave, Bark	-	Control injury, hurt/wounded, toothache
7	Banmara (<i>Eupatorium spp.</i>)	Herb	Leave, young stem	Liquid	Control skin diseases, wound, tincture Mixed with Simali
8	Balu (<i>Sida cordifolia</i>)	Herb	Leave	Pest	Control pilo
9	Batulpate/ Chillapate (<i>Cissampelos pareira</i>)	Climber	Leave, stem, root	Powder	Control digestive problem, gastric, bleeding by livestock Cook powder and water
10	Bayer (<i>Zizyphus zuzuba</i>)	Shrub	Bark of root	Powder	Injury, tonic Mixed with Harchul, Thulo okhati, Seto jara, Pakhanbed
11	Bayubidanga (<i>Embelia ribes</i>)	Herb	Fruit	Powder	Control intestinal worms, churna, tonic Mixed with Musali
12	Bhiringiraj (<i>Eclipta alba</i>)	Herb	Leave, young shoot	Powder, pest	Control wound, fever, bleeding, means problem
13	Bhogate	Tree?	Leave	Powder	Control skin diseases
14	Bhorla (<i>Bauhinia vehlii</i>)	Woody Climber	Fruit, bark	Powder	Control rakta pradar Cook powder with water & eat with other medicine
15	Bilaune	Shrub	Leave	Liquid	Control headache
16	Biri		Root, stem	Oil	Control rheumatism Eat with curd/milk
17	Chabo	Herb	Fruit, leave & stem	Powder	Control cough, asthma, rheumatism
18	Chhatiwan (<i>Alstonia scholaris</i>)	Tree	Bark	Powder	Control stomach ache Eat with other medicine
19	Chini Mithi Jhar	Herb	Whole plant	Powder	Control Dhatu, urine system, garmiko
20	Dahikamle	Shrub	Root	Liquid	Control throat problem & fever Mixed with Pipla and Bhiringeraaj
21	Damai gedi	Tree	Fruit, leave, bark	Powder	Control fever, gota parema, garmi
22	Dhangero/Dhairo (<i>Woodfordia fruticosa</i>)	Shrub	Flower	-	Control diarrhoea, dysentery, chronic wound
23	Dudhe jhar (<i>Euphorbia hirta</i>)	Herb	Stem, leave	Powder	Control various wound
24	Dudhe lahara (<i>Hemidesmus indicus</i>)	Climber	Leave, stem	Powder	Control nerves disease Mixed with curd (dahi)
25	Eklebir (<i>Lobelia pyramidalis</i>)		Whole plant	Liquid /pest	Used as antispasmodic, poisonous, wound, cancer Mixed with honey, Pipla, Amala, Asuro
26	Ghod tapre	Herb	Whole plant	Powder	Control fever, bone fracture, improving

	(<i>Centella asiatica</i>)				memory, Mixed with Pipla and honey
27	Goleni	Herb	Root	Powder	Control epilepsy, Mix in curd and eat
28	Gurjo (<i>Trinospora cordifolia</i>)	Climber	Stem	Powder	Control chronic fever, cough, jaundice, rheumatism, piles, anaemia, blood pressure, diabetes, snake bite, scorpion sting, constipation, stomach problems
			Root	Powder	Asthma
29	Harchur (<i>Viscum articulatum</i>)		Bark, leave, root	Powder	Used in tumours, ear disease, wound, cracking of bones and tonic Eat with other medicine
30	Indreni bija		Root, fruit	Pest, fruit oil	Control thunelo, rheumatism
31	Jangali haledo/Panisaro	Herb	Rhizome	Powder	Control old stomach ache Eat with other medicine
32	Kalo musali (<i>Curculigo orchioides</i>)		Root	Powder	Tonic
33	Kamle	Herb	Root	Liquid	Cook with water & drink to control fever
34	Kammari		Stem, root	Powder	When Kammar pains Mixed in Hot milk or honey
35	Kauso		Fruit	Powder	Tonic Mixed with other medicine
36	Kurilo (<i>Asparagus racemosas</i>)	Herb or shrub	Root	Powder	Control stomachic, tonic, dysentery, blood and eye disease, leprosy, epilepsy, tuberculosis, other Eat with other medicine
37	Kurkure jhar	Herb	Leave, root	Liquid	Control Bath, stomach ache, women diseases
38	Kukurdaino (<i>Smilax macrophylla</i>)	Climber	Leave, fruit		Sinus
39	Kyamuna (<i>Careya arborea</i>)		Fruit, stem, leave, bark	Powder	Control cold, cough, headache
40	Lajjabati (<i>Mimosa pudica</i>)	Herb	Bark of root	Powder	Control women disease Eat with other medicine
41	Mitha neem		Leave, fruit	Leave/tea	Control constipation, dalchrinta Used as tea
42	Mulapate/ Sahasrajari		Root, leave	Powder	Control women disease Eat with other medicine
43	Oul/Ola (Magar dahi)		Rhizome	Powder	Control Ganogola Mix in curd, honey, banana
44	Pipla (<i>Piper longum</i>)	Climber	Fruit	Powder	Control abdominal pain, cough, asthma, cold, fever, tumours, piles, jaundice, purify blood, improve appetite, gastric, improving memory, leprosy, etc. Mixed in hot milk
45	Punanarba (<i>Boerhavia diffusa</i>)		Leave, stem, root	Vegetable, Powder	Control women disease, increase eye power Mixed with milk
46	Pustakari lahara	Climber	Root	Powder	Tonic Mixed with Pipla, Pakhanbed, Thulo okhati and Harchul
47	Rajbriksya (<i>Cassia fistula</i>)	Tree	Fruit	Pest	Control indigestion, diarrhoea, tonic
48	Rudilo		Leave, bark, root	Liquid	Control nimonea, cough, fever
49	Saj (<i>Terminalia tomentosa</i>)	Tree	Bark	-	Control Anaemia, Mixed with bark of Amala
50	Sanaipatti		Leave	Powder	Control swelling stomach Eat with other medicine
51	Sarpaganda (<i>Valeriana wallichii</i>)	Herb	Root	Powder	Reduce the blood pressure Mixed with Ashoganda, Seto musali, root of Kurilo
52	Satisal	Tree	Leave, bark	Pest	Control wound, skin disease

	<i>(Dalbergia latifolia)</i>			Liquid	Control stomach ache
53	Seto Musali		Fruit of root	Powder	Used as tonic
54	Sikakai <i>(Acacia concinna)</i>		Fruit	Powder/oil	Making soap
55	Simal <i>(Bombax ceiba)</i>	Tree	Khoto, flower, root	Powder	Used in women disease, digestive problems, garmi phalna, tonic. Mixed in milk and honey
56	Simali <i>(Vitex negundo)</i>	Shrub	Leave, bark	Liquid	Control wound, skin diseases, urinary system, Dad Mixed with milk
57	Simthi		Bark of root	Powder	Control digestive problems Mixed with honey, marich, gurjo
58	Sindhure/Rohini <i>(Mallotus philippinesis)</i>	Tree	Red fruit Bark	Powder	Control Kamar dukhuema, stomach ache Mixed with other medicine
59	Sungava/Sunathatch grassi	Parasite	Flower, fruit	Powder	Used as antispasmodic Eat with milk
60	Sun Tiki Phuli		Root		Control intestinal worm, blood pressure, purify blood, bhok nalagne
61	Tanki <i>(Bauhinia purpuria)</i>	Tree	Bark	Powder	Used as anti-diarrhoeic, anti-dysenteric, astringent Cook powder and water & eat with other medicine
62	Tantari	Tree	Leave	Liquid	Control old wound, Kirna
			Bark	Liquid	Indigestion, Ulcer
63	Tapre/ Chinchine <i>(Cassia tora)</i>	Herb	Seed/Fruit	Powder/pest	Control blood pressure, Madhumeha, skin diseases, worms Mixed with coffee/hot water
64	Teeta neem/neem <i>(Melia azadirachta)</i>	Tree	Leave	Powder	Control various diseases, diabetes, blood pressure Eat with other medicine
65	Titepati <i>(Artemisia vulgaris)</i>	Herb	Whole plant	Dhup	Control Mosquito, appetizer
			Bark of root	Powder	Control fever, fell down cases Mixed with milk and honey

Annex 4: Uses of Species in Religious Activities

S. no.	Local name	Botanical name of species
1	Apamarga/Dattiwan	<i>Achyranthes bidentata</i>
2	Asuro	<i>Adhatoda vasica</i>
3	Babiyo	<i>Eulaliopsis binata</i>
4	Banana/keras	<i>Musa paradisiaca</i>
5	Bar	<i>Ficus bengalensis</i>
6	Bans	<i>Dnedrocalmus spp.</i>
7	Bel	<i>Aegal marmelos</i>
8	Bhalayo	<i>Rhus succedanea</i>
9	Bhangarai	Unknown # 1
10	Bhringiraj	<i>Eclipta alba</i>
11	Dhursyauli	<i>Colebrookea oppositifolia</i>
12	Dubo	<i>Cynodon dactylon</i>
13	Dumri	<i>Ficus glomerata</i>
14	Jau	
15	Katahar	<i>Artocapus spp.</i>
16	Kavro	<i>Ficus lacor</i>
17	Khayar	<i>Acacia catechu</i>
18	Khirro	<i>Sapium insigne</i>
19	Kukurdaino	<i>Smilax spp.</i>
20	Kupindo	Unknown # 2
21	Kurilo	<i>Asparagus racemosas</i>
22	Kush	<i>Desmostachya bipinnata</i>
23	Mango	<i>Mangifera indica</i>
24	Mas	<i>Phaseolus radiatus</i>
25	Nariwal	
26	Nibuwa	<i>Citrus spp.</i>
27	Paddy/Dhan	<i>Oraiza sativa</i>
28	Painyu	<i>Prunus cerasoides</i>
29	Pipal	<i>Ficus religiosa</i>
30	Sal	<i>Shorea robusta</i>
31	Sami	
32	Siru	<i>Imperata cylindrica</i>
33	Sugarcane	
34	Teel	<i>Sesamum indicum</i>
35	Titepati	<i>Artemisia vulgaris</i>
36	Usir	
37	Various other flower and fruit species	
38	Fish	