

ipac

**Site-Level Field Appraisal for Integrated
Protected Area Co-Management Project:
Khadimnagar National Park**



April 2009

IPAC Project, RDRS Bangladesh, Sylhet Cluster





Site-Level Field Appraisal for Integrated Protected Area Co-Management: Khadimnagar National Park

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EXECUTIVE SUMMARY

1. A two-step rapid appraisal process, initially RRA, followed by subsequent PRA, was undertaken to make a comprehensive situational analysis of the Khadimnagar National Park during March to April 2009, aiming at helping to shape the future activities for the improved management of the KNP within the Integrated Protected Area Co-Management Project. Specifically, the appraisals focused on the assessment of major stakeholders, understanding causes for the forest degradation and its underlying facts, identifying the challenges for the project and exploring the opportunities for its improved management. In addition to application of various RRA and PRA tools, like trend and seasonal analysis, Venn diagramming, livelihood analysis, ranking, scoring, resource mapping etc., a series of household and group interviews, and focus group discussions were also conducted.
2. The Khadimnagar National Park has been established to preserve the remaining natural hill forest patch of Khadimnagar Reserve Forest in 2006 under the Bangladesh Wildlife (Preservation) (Amendment) Act 1974 with the area of 678.80 ha (1676.73 acres). But the total area of reserve forest under Khadimnagar beat is about 1890.73 acres, where as about 1676.73 acres located at Khadimnagar and the rest of 214 acres located at near Bateswar area. Prior to declaration of Khadimnagar National Park on 13th April the forest was declared as Reserve Forest in 1957.
The park is situated in the Union of 3 No. Khadimnagar and 4 No. Khadimpara of Sadar Upazila in the district of Sylhet. The forest is under the jurisdiction of North Sylhet range-1 under Sylhet Forest Division. Khadimnagar NP is located at a distance of 15 km on the Northeastern of the centre of Sylhet city along Sylhet – Tamabil highway within Khadimnagar sadar upazilla and Khadimnagar beat office located lies in between 24^o57'14.8" N and 091^o56'18.9"E.
3. A total of 22 villages having varied degree of stakes with the forest have been identified, of which all village are located outside of the forest in the range of 1-5 km away from the forest. Charagung TE village and Khadim tea estate villages has major stakes with the forest among the tea estate villages. Moreover, out of 22 total six villages have Major stakes and five villages have medium to major stakes with the forest. Four villages have medium stakes with the forest. Five villages have minor to medium stakes while the rest villages have minor stakes. The majority of the fuel wood collectors come from Alurtal, Mokamergul, Dalaipara, Kalagulbosti, Charagung TE etc and the illegal feller mainly come from Alurtal, Mokamergul etc.
4. There are Six tea estates bordering the forest, of which Four tea estates (Kalagul, Borojhun, Gulni and Habibnagar tea estates) have medium level of stakes with the forest, as many of its unemployed labor are involved with fuel wood collection and illegal timber felling and the rest have minor and/ or negligible stakes.
5. Based on resource exploitation, a total of 14 stakeholder groups has been identified in the area, of them 12 are primary stakeholders and are involved directly in resource extraction and forest conversion activities, and the rest 3 are secondary stakeholders. Of the primary SH, three SH groups (moholder, illegal timber feller, fuel wood collector) have major stakes with the forest having major role in forest degradation, while other three have medium (Bamboo collector, house building materials collector) and the rest have minor stakes with the forest. Demographically, the stakeholders fall into four categories, viz. Ethnic villagers, local poor people, tea estates labor, moholders. The local poor people, including the ethnic villagers are involved with major

extraction of resources from the forest. Moholder (auctioneer), who are rich and locally influential, are involved with legal tree felling and destroy the forest biodiversity in the way of clear felling operation.

6. About 50-100 people on a regular basis from the outside villages and tea estates enter the forest for fuel wood collection. The collectors are usually adolescent and adult male and females. In addition to individuals, there are a number of organized gangs engaged in illegal bamboo extraction and they are predominantly from few villages. About 10-20 people collect bamboo from the forest each day.

7. All HHs of the adjacent settlements (Tea estates villages) mostly dependent on the forest for their everyday household needs of fuel wood, house building materials, vegetables and others. They also collect some vegetables, fruits and other NTFPs from the forest for their HH needs. Traditionally, the local people are used to collect various resources from the Khadimnagar and other adjacent reserved forests. Many poor HHs, from the identified villages entirely or partially depended on the collection of fuel wood, bamboo vegetables. Almost 100% illicit fellers sell the timber, but most of them undertake it for added income. Many HHs are however entirely dependant on this activity.

8. According to local people's perception, the forest cover has decreased by only about 15-20%, compared to pre-liberation period. On the other hand, forest thickness and abundance of tall trees have decreased approx. by 60%. The abundance of herbs and shrubs and sun-grass has also decreased by about 45-50% due to clearing and claiming land for plantations. Indigenous bamboo now remains only by 20%. Except birds, the abundance of major wildlife has also decreased by more than 60%. The abundance of medicinal plants has also decreased by 60%. The decrease in the abundance in wildlife has probably caused by 65-70%. The abundance of fruit bearing trees has decreased by 60%. The NTFPs, like honey and sun-grass have also decreased alarmingly.

9. By now, many wildlife species have become extinct from the forest. Among the extinct animals, tiger, barking deer, wild boar, porcupine etc. are notable. Some other wildlife, like deer, fishing cat, jungle fowls, python, wildfowl, Mothura, cobra, dhanesh, moyna, vultures and turtles have also become variously threatened.

10. Compared to pre-liberation period, activities like illegal fuel wood collection have increased by 60-65%. On the other hand, collection of wild bamboo decreased by about 40%, and honey by about 60% owing to unavailability of these resources. Collection of sun-grass has however increased during 80's due to large scale felling and then slightly declined by now, again due to claiming of sun-grass beds for plantations. Hunting of wildlife has also decreased by more than 80% mainly due to serious decline in the resource.

11. About 11 different types of resources are extracted from Khadimnagar Reserved Forest. Of them, two (fuel wood and bamboo) are extracted on a large scale, two on a moderate scale (timber and building materials), four on a minor scale and rest four are on a very negligible scale. The main purposes for resource extraction are meeting HH needs, selling for added income/and or to support and supplement livelihood. Timber felling, fuel wood and bamboo collection, collection of house building materials, hunting etc. are posing threats to the forest and has a huge impact on forest regeneration and local biodiversity.

12. Extraction of resources from the forest is season dependant. Most of the timber illegally felled during the rainy season as forest patrol is poor during that period. Fuel wood is mainly collected during dry season due to easy accessibility and mobility inside the forest. Bamboo extraction mainly takes place in drier months that corresponds to local needs for house building.

13. Major causes for the degradation to forest in order of magnitude are as follows: clear felling, FD's plantation strategies, fuel wood collection, bamboo extraction, coal extraction, medicinal plants (Udal/Ulot combal) collection, illegal timber felling, hunting, and cane collection, collection of house building materials by nearer villagers and Tea laborers. The prevailing extreme poverty in the locality, unemployment, coupled with weak law enforcement situation made poor local people to be reliant on the forest resources for meeting HH needs and added income. Scarcities in the availability of these resources in the locality are also the underlying causes for forest use. It is unlikely to prevent the illegal forest extraction activities unless these underlying causal factors are addressed. The local poor people, including the tea estate laborers are mainly involved with direct extraction of forest resources and are responsible for causing most harm to the forest.

14. FD's poor forest patrol, easy negotiation with local FD staff, inadequate man power of FD, and the involvement of influential moholder with the forest was all contributing to illegal fuel wood and bamboo collection.

15. In addition to local consumption at HH level and by local hotel and restaurants, a substantial amount of fuel wood transported to other urban areas. There are about 4-5 fuel wood traders in Shahparan Bazar, Pিরerbazar, Shahebbazar and about 5-6 in Majortilla. However, they receive fuel wood from other forests as well. Besides, 5 local brickfields, which burns coal, also use about 40-50% fuel wood as burning material and a substantial quantity of it comes from Khadimnagar RF. There are about 10 sawmills in Shahparan (5), Shahebbazar (3) and Pিরerbazar (1), Maheshghat (1) owned by very influential persons. It is alleged that the sawmills receive illegally felled trees as well at a cheap rate. It is also alleged that the local furniture shops, a large number of them exist in the area (about 15), have also links with timber feller, sawmills, and thus appear as important secondary stakeholders.

16. FD's plantations strategy has been seen as one of the major causes for forest and biodiversity degradation. The plantation targeted to production forestry, no biodiversity conservation strategy was considered. In addition to high valued timber trees, the park planted with exotic trees, sometimes with mono species. Bamboo and cane, and agar also planted in an extensive area. The plantation practices include clearing and subsequent weeding of the proposed plantation areas, has contributed biodiversity loss and habitat loss for the wildlife.

17. Based on limited HH survey, it appears that in the locality, majority of the people (55-60%) are poor, followed by middle class 20-25%, extreme poor 17-20%, and 3-5% are rich. The major primary occupation of the local people is agriculture (65-70%), principally paddy cultivation, followed by day labor (20-25%), fuelwood and timber poaching (3-5%), small business (2-3%), service (3%) and overseas employment (1-2%). The literacy rate is low (35-40%). Currently 80-85% children go to schools. In average, about 15 % people of the area (including tea estate) are unemployed, this figure vary with seasons, being most in chaitra, Baishakh, Jaistha, Ashar.

18. The local power structure remains as a crucial issue to the management of the forest. There are about 30 local influential people, who actually have major control over the local people and

locality and even over local administration. Some of them have linkages with the illicit feller. The local public representatives (including MP) are also very influential and are main sources for local conflict resolution. The tribal people have their traditional way of governance of their community.

19. Coal extraction by few stakeholders is illegal activities who are from the nearer villages. A gang of stakeholder from near villages does the extraction practices in the Khadimnagar Reserve Forest. The extraction practices of coal hampered natural regeneration and source of forest firing. Therefore, reduce the biodiversity value of the areas as well as contribute to habitat loss.

20. There is one ethnic community, Patra Samprodai, located nearest the forest. They are inhabiting nearest in the Faringura village. Their main occupation is day labor, followed by fuel wood collection, vegetables etc. This community is dependent on the exploitation of forest resources for their HH needs.

22. The major NGOs that operate in the locality are CARITAS, FIVDB, ASA, BRAC, Grameen Bank, etc. Their major activity is credit programs exclusively for the women. Some of them have concentrated on health, education and alternate income generation. There are also one community organizations and deal with local problems and welfare and cultural activities. However, they are not much active.

23. Many NGOs and one bank provide micro-credit to local people. Bank loans mainly provide for agriculture. NGOs provide credit mainly for IGA. NGO's IGA programs concentrate on small business, home gardening, poultry, livestock rearing etc. and their activities mainly focused on the women. Skill development activities by the NGOs are limited.

24. The main sources of conflict among local people occur over land disputes, livestock grazing, children affairs, money lending and transaction, marriage affairs, family affairs, etc. Conflicts are resolved by arbitration by local elites & public representatives (UP chairman and members), Local Matbar, Panchaet. If the local efforts are not fruitful, it may lead to filing cases with Thana-police, and may end up in courts.

25. Major concerns regarding forest biodiversity conservation and management include clear and illegal timber felling, fuel wood and bamboo collection, FD's plantation strategies, hunting, local poverty and unemployment, weak law enforcement etc. The challenges for the project seem to be stopping illicit felling and collection of forest resource, changing FD's production forestry and plantation strategies reducing local poverty and unemployment, building relationship with neighboring tea estates etc.

Acronyms

Acronym	Detailed name
AIGA	Alternative Income Generating Activities
ASA	Association for Social Advancement
BDR	Bangladesh Rifles
BO	Beat Office/ Beat Officer
BRAC	Bangladesh Rural Advancement Committee
BRDB	Bangladesh Rural Development Board
BREB	Bangladesh Rural Electrification Board
CBO	Community Based Organization
CDS	Community Development Schools
CMC	Co-Management Committee
CODEC	Community Development Centre
Dept.	Department
DFO	Divisional Forest Officer
FD	Forest Department
FGD	Focus Group Discussion
Fig.	Figure
FRMP	Forest Resource Management Plan
FSP	Forestry Sector Project
FUG	Forest User Group
GD	Group Discussion
Govt.	Government
HHs	Households
IGA	Income generating Activities
Int.	Interview
IRG	International Resource Group
IPAC	Integrated Protected Area Co-Management
kg	Kilogram
KI	Key Informant Interview
LGED	Local Government Engineering Department
Mat.	Material
MACH	Management of Aquatic Ecosystem through Community Husbandry
MP	Member of Parliament
NACOM	Nature Conservation Management
NGO	Non Government Organization
NSP	Nishorgo Support Project
NP	National Park
PA	Protected Area
PDB	Power Development Board
PRA	Participatory Rural Appraisal
RDRS	Rangpur Dinajpur Rural Service
RO	Range Office
RRA	Rapid Rural Appraisal
SH	Stakeholder

KNP	Khadimnagar National Park
KRF	Khadimnagar Reserve Forest
TE	Tea Estate
Tk.	Taka
UP	Union Parishad
USAID	United States of Association for International Development
WFC	WorldFish Center

Introduction

1.1 Project Background

In Bangladesh, natural forests are under constant pressure and have already been significantly degraded and fragmented. In an estimate, forest cover in the country has fallen by more than 50% since 1970. This situation is threatening the value of these forests as habitat for biodiversity and for provision of vital environmental services. If this trend continues, it will soon result in a serious ecological catastrophe and a declining spiral of production and productivity irreversibly detrimental to the livelihood of people living in and around the forest, historically dependant on them. Therefore, there is an urgent need to reduce or reverse the detrimental impact on forest biodiversity and maintain resource sustainability through improved management and creating alternate livelihood opportunities for people dependent on forest resources.

The concern for biodiversity assets in the country has a long history and Bangladesh has a strong commitment to the cause of biodiversity conservation from the national, regional and global perspective as reflected in its endorsement and ratification of many national, regional and international conventions, treaties, protocols etc. related to biodiversity conservation.

The alarming situation in forest degradation in the country and the governments commitment to national and international community, spurred government effort to designate and establish a number of protected areas, (including National Park, Wildlife Sanctuary and Game Reserve) with biodiversity significance under the provision of Wildlife Preservation Act, 1973. But there has been a little change in the degrading situation of these PAs with regard to biodiversity and its environmental services. Poor governance and lack of appropriate and pragmatic management regimes for these PAs has been linked to the failure in PA management in the country.

Responding to the urgent need to address the forest conservation and related economic opportunity creation, The US Government and Government of Bangladesh elaborated and signed a Strategic Objective (SO 6) Grant Agreement to improve management of open water and tropical forest resources. This agreement sets target for improving forest management

In the context of the agreement, the Forest Department has worked with USAID to jointly develop a project, called Co-management of Tropical Forest Resources of Bangladesh to accelerate and consolidate protected area management and more active local participation in forest resource management. The Forest Department and USAID recognize the need for the continued effort to manage the forest resources of Bangladesh and has set long-term greater vision with renaming the project as NSP then Integrated Protected Area Co-management, which include wetland co-management as well.

The Integrated Protected Area Co-Management Project is a continuation of NSP and MACH project. The project is to demonstrate a replicable case for establishing a good governance system that will ensure sustainable management of protected areas of Bangladesh, NSP was working in a number of selected pilot protected areas but IPAC project will be covered the Maximum Protected area. Specifically, the project is designed to scale up forest co-management model, to halt and/or reverse degrading trend in forest and wetland resources

and its habitats, reduce unsustainable practices, bring about changes in policy environment in favor of co-management, strengthen stakeholders capacity in natural resource management, improve livelihood of local poor people in order to curb dependency on forest and wetland resources.

1.2 Information Needs of IPAC and Logical Basis for Conducting PRA/RRA

For any project, development or research, information are needed for designing and planning project interventions, setting implementation strategies, evaluation and monitoring of project performance and impact. Information at the initial stages of the project thus helps the project in carrying out its activities effectively and efficiently.

It has been emphasized from the beginning that that IPAC will avoid information overload, rather it will concentrate on collection of relevant information by using appropriate methodology. Therefore, it was necessary to carefully scrutinize the information needs and determine its relevance to the project objectives and activities.

The generation of information, in principle, is guided by project objectives and goals. The IPAC is particularly concerned with the established co-management mechanism of forest resources in one hand and developing a prescription for the technical management of its resources, on the other hand. Therefore, generation of information is thus centered on the characterization of local community (stakeholders) likely to be involved with the project and local resources that are to be managed.

⇒ Co-management ----stakeholders and their activities, socio-economics, behavior, community power structure, their needs and expectations, conflict, challenges etc.

⇒ Resource management ---- resources and its status, trend and causes for resource degradation, resource exploitation, threats to local resources and biodiversity

This preliminary assessment of information needs for IPAC through scooping exercises provided precursors for brainstorming for identifying specific information needs that will be collected through subsequent appraisals. It was thought that at the initial stage of the project a rapid appraisal would be very appropriate in terms of cost effectiveness, usefulness, reliability, and overcoming time constraints.

Rapid Rural Appraisal (RRA)/ Participatory Rural Appraisal (PRA) are packages of methods and tools for collection of qualitative information about local people, their life, environment, their resources, activities and living conditions in a short time. The purpose is to utilize knowledge of the local people in designing and setting implementation strategies of a project/program and /or to monitor and evaluate project performances and impact. It is also considered as a process for involving local people in the project planning and /or implementation and monitoring. In fact, RRA/PRA is thus considered as an integral part in down-top planning process in many development or resource conservation projects.

RRA was carried out as an initial activity in the field with primary focus on stakeholder assessment and also equally intended for generating information that will help to get a sense

of range of key issues and challenges that need to be addressed and be better informed on the context (social, economic, ecological) in which the project is likely to intervene.

Built upon the outcome of the RRA, subsequently PRA was planned to collect in depth information on the identified issues and to ensure greater participation of local people in information collection.

1.3 Purpose of the Report

The main purpose of the present report is to present a synthesis of all findings from RRA and PRA exercises conducted in Khadimnagar National Park during March to April, 2009. The report also details the methodology and tools used and highlight the issues in forest management and biodiversity conservation and identify the challenges for the IPAC Project. Finally the report makes suggestions on what the project and Forest Department need to do immediately. Finally, the report puts forward set of recommendations for the improved management of the Protected Area.

1.4 Outline of the Report

The site level appraisal report, at first, provides an executive summary which summarizes the entire ranges of the findings, methods used, issues and challenges identified during PRA. The report starts with general introduction in **Chapter 1** that includes the background information of the project, information needs of IPAC and logical basis for conducting PRA/RRA, the purpose of the report etc. A brief description of the site is provided with a site map in **Chapter 2**.

Chapter 3 sets out the methodology of the study that deals with the approach taken for the implementation of the fieldwork of RRA and PRA, study team and study period, objectives and methodology of the study. The chapter also includes study period, setting RRA and PRA issues and questions, formation of RRA and PRA field teams, selection of RRA and PRA spots, choice of RRA and PRA methods and tools and the limitation of the field work. Outcomes of the RRA and PRA exercises are described in **chapter 4** which contain major findings and analyses. The findings are mainly presented as situational analysis of the forest resources, stakeholder analysis, resource and resource extraction, trend analysis, socio-economical situation of the surrounding area, seasonal trends in resource extraction, etc. In short, this chapter reflects the current status of the forest dynamics with social dynamics.

Chapter 5 presents issues and challenges for IPAC, an extended section based on PRA/RRA outcomes, identifying present issues of concern and challenges for IPAC and highlights the opportunities for the project. The final **Chapter 6** embodies a set of suggestions and recommendations regarding the implementation of the project. At last a number of necessary references of the documents consulted and photographs are appended as annexure with the report.

2. Description of the Project Site

The Khadimnagar National Park is situated in the Khadimnagar Union of Sylhet sadar Upazila in the district of Sylhet. The forest is under the jurisdiction of North Sylhet Range-1 under Sylhet Forest Division and it has only one forest beats, namely Khadimnagar forest beat. Khadimnagar NP stands on the Sylhet-Tamabil high way and is at a distance of 15 km northeastern of the center of Sylhet city.

The Khadimnagar Reserved Forest covers an area of about 1890.73 acre and it is governed by the Forest Act 1927 (with subsequent amendment). But the Khadimnagar National Park has been declared to preserve the remaining natural hill forest patch of Khadimnagar Hill Reserve Forest in 2006 under the Wildlife Preservation Amendment Act 1974 with the area of 678.80 ha (1676.73 acre). The forest area is undulating with slopes and hillocks, locally called tilla, ranging from 10-50 m and are scattered in the forest. The forest is drained by a number of small, sandy-bedded streams, all of which dry out following the end of rainy season in October-November. The national park is alongside the sylhet-Tamabil highway. The hole shrine of Hazrat Shahparan (R) is also located at the same place on the highway.

The forest is semi deciduous tropical forest, where tall trees are deciduous and the under storey evergreen. Prior to decleration of Khadimnagar National Park on 13 April 2006 , the forest was declared as reserved Forest in 1957. The Park is popularly known as Khadimnagar Reserve Forest. The natural forest was covered mostly with inferior quality natural bamboo. (*Dendrocalamus hamiltonii*). This were gradually felled and substituted by tree plantations during early 1960s to give a tropical forest look. Planting of some, cane was done underneath the trees. Some commercial bamboo thickets were also developed at the margin of the forests.

At present, it is a pride and joy for a large number of urban populations of Sylhet city, as a source of green recreation.

There is no forest village located within the Reserved Forest but there has an ethnic (Patra Samprodai) community located at out side of the forest in Faringura village. This is a tribal community, and has about 30 HHs. The adjacent areas have been covered by Tea estates. The other settlements that have stakes with the reserve are located about 1-5 km away from the reserve. The Northern part of the forest is bordered by Kalagul T E and Burjan TE. The northeastern part of the forest is bordered by Gulni T E. The southern boundary of the forest is bounded by Khadim and Charagung TE. The western side is bordered by Kalagol TE and the east site is bordered by Habibnagar TE and Bateswar Jalalabad Cantonment.

Khadimnagar Forest operates on the principle of production forestry, e.g. the forest was periodically clear felled and subsequently planted with valuable timber trees and other plants. Plantations in Khadimnagar reserved forest started in 1951 and up to the period 2004, about 2290.50 acres planted. Initial plantations included only long-rotations, primarily with teak and conspicuous tree species. Intensive plantation of the forest occurred during the period 1980-1990. The later plantations include mainly short-rotational monoculture plantations, mostly with exotic, rapid growing species. The commonest species for short-rotation plantations are malaccana, eucalyptus, akshmoni, mangium etc. the FD has also planted cane and bamboo. The plantation practices were included burning and subsequent weeding,

proved detrimental to the forest environment and its biodiversity. The forest generates a substantial amount of revenue by clear felling of timber trees and bamboo. Now a day the FD is operating different types of plantation activities like: - Agar plantation, Long rotation plantation etc.

A complete picture on the biological resources of the forest is not available. As revealed from secondary data collection, a total of 20 species of amphibians, 9 species of reptiles, 28 species of birds and 26 species of mammals have been recorded from the forest. The forest is highly degraded in its biodiversity. A number of animal species have already become locally extinct, while many more on the threshold of extinction and a large number of them are variously threatened.

Clear felling, FD's plantation strategies, over exploitation of many forest resources are posing threats to the forest environment and its biodiversity.

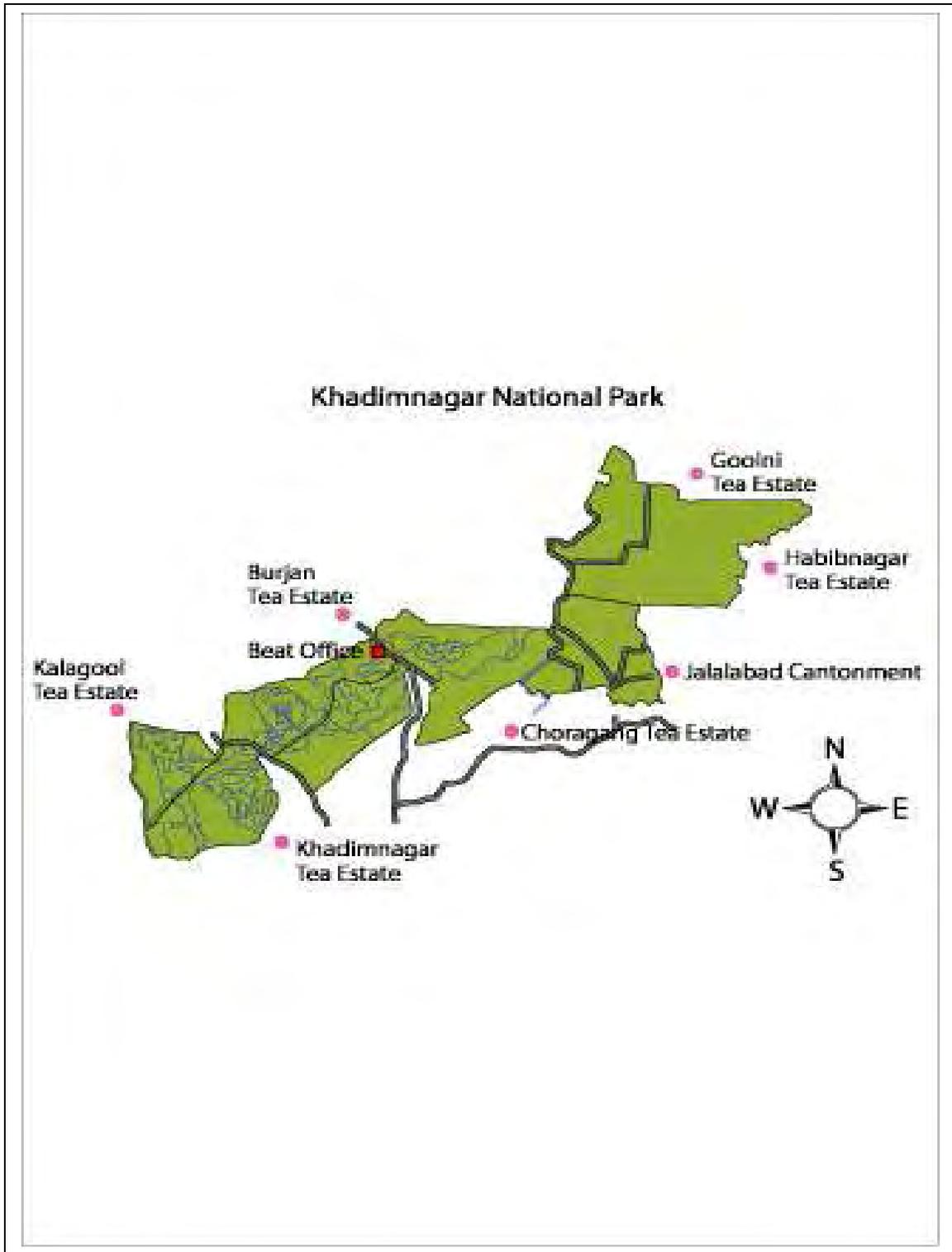


Fig.1: Map of Khadimnagar National Park

3. Methodology

As mentioned in the preceding section a two-step rapid appraisal strategy was taken. RRA was conducted in the initial stage in the appraisal process, followed by PRA. RRA was carried out as an initial activity in the field with a primary focus on generating information that would help to get a sense of the range of stakeholders, key issues and challenges that need to be addressed and provide information on the context (social, economic, ecological) in which the project will operate. Built upon the outcome of the RRA, a subsequent PRA exercise collected in-depth information on the identified issues and was designed to ensure greater participation of local people in information collection.

The overall purpose of the RRA and PRA was to come up with a comprehensive situational analysis of the Khadimnagar RF with a view to understand: -

- ⇒ Who destroys and how the forest is destroyed
- ⇒ What are the underlying driving forces for the forest degradation
- ⇒ Cause and effects of the behavior of local people
- ⇒ Opportunities for improvement in forest management

3.1 Developing the RRA and PRA: Issues and Methods

An inception workshop was organized on 24th February 2009 at Srimangal for IPAC North-East Cluster to identify, prioritize and finalize the RRA/PRA issues and questions. The type and nature of issues, the research team's accessibility and mobility in the area, the behavior of local people and their rapport with the field staff were all taken into consideration in the design of these methods and tools. The workshop was attended by specialists and representatives from WorldFish Center, field implementation partners (RDRS) and local FD staff, who were likely to be involved in the RRA field exercise. This workshop provided an opportunity to prepare a field protocol, decide and agree on approaches, methods and tools to be used and to make and consolidate team understanding.

The detailed methodology for these activities was embodied in a manual and used in training workshops with the field teams to give instruction in using the research tools and to ensure that the methodology remained same across the team and across the sites. An experience sharing meeting was organized for the RRA & PRA team members on 23rd March 2009. The purpose was to give the RRA and PRA field team instructions in using various tools. Moreover, A RRA team formed for starting RRA activities in Khadimnagar and detail planning discussion session on RRA/PRA held at IPAC NE cluster office, Srimangal.

The RRA was mainly based on unstructured and semi-structured household interviews, KI interviews, group interviews and focus group discussions (FGD). A limited number of other RRA tools were also used like trend analysis, seasonal analysis, sketch mapping etc. The issues and activities covered in the RRA are shown in Table 1.

Table-1 Selected RRA Issues for KNP Site, Specific Activities and Tools Used

Sl.	RRA Issues	Specific activities	Tools Used	Participants
1	Stakeholder Assessment	<ul style="list-style-type: none"> ♦Identification of settlements, resource users, local institutions and agencies and organization, community organizations etc and their roles and activities 	HHs Interview, KI FGD GD Sketch mapping	Local HHs Local school teacher, Doctor Community people (villagers, elites etc) Local community people Political leader Local people
2	SH Demographic profile	<ul style="list-style-type: none"> ♦Settlement wise no. of HHs/population ♦HH occupation, education, forest use, land holding 	Secondary Info HH Int., KI, GD, FGD Trend Analysis	Local union parishad HHs heads/members Community people School/College teachers & local public representatives
3	SH Economic Activities/ Livelihood Strategies and Human Capital Development	<ul style="list-style-type: none"> ♦HH primary and secondary income sources of HH ♦Richness/poverty ♦Unemployment and its seasonal trend ♦Credit and alternate income generating opportunities ♦Skill and skill development opportunities ♦Seasonal workload of male and female 	HH Int. GD KI FGD Seasonal Calendar	HHs heads/members Teacher, retired officers, old people Public representative Local elite Community people
4	Gender Issues	<ul style="list-style-type: none"> ♦General impression on living standard, education and health status etc. ♦Participation in decision making (household and PA management) ♦Women mobility in the area ♦Access to IGA and credit etc 	HH Int. GD FGD KI, Direct observation	HHs heads Women group Community people Local elites RRA team members.
5	Behavior of local people	<ul style="list-style-type: none"> ♦Initial response of the local people and FD staff towards the project ♦Sources of conflict and conflict resolution 	FGD GD HH int.	Local community FD staff HHs heads
6	Local Level Awareness	<ul style="list-style-type: none"> ♦Awareness and perceptions about resource degradation and conservation ♦Willingness for resource conservation ♦Awareness about the existence of nearby park/game reserve and reserved forest ♦Knowledge about forest and wildlife preservation acts 	HH int. GD FGD	HHs heads Local community FD staff

Sl.	RRA Issues	Specific activities	Tools Used	Participants
7	Resources /resource status	<ul style="list-style-type: none"> ♦Trend in changes in major resource bases ♦Endangered/extinct plant and animals ♦Causes for the decline in different resources 	Trend analysis, HH int, FGD GD KI	Local people/FD staff Local HHs heads FD staff Community people Local educated old,
8	Resource exploitation	<ul style="list-style-type: none"> ♦Major forest resources collected, including NTFPs: ♦Reasons and extent of exploitation of different forest resources ♦Dependency on the forest/forest products ♦Seasonal trend in resource exploitation ♦Future risks ♦Medicinal plant uses and reason for not using these 	HH int, FGD, GD KI, Trend analysis, seasonal calendar	Local HHs heads Public representatatives & FD staff Community people Local educated old, Local elite and FD staff HHs interview and KI
9	Resource regeneration practices	<ul style="list-style-type: none"> ♦Plantation status in the locality ♦Problem with natural regeneration in the forest ♦Plant nursery ♦General land use pattern in the buffer zone ♦Major agricultural crop ♦Seasonal pattern in agriculture 	Secondary Information, FGD, GD, KI, Seasonal calendar	Secondary data from FD FD staff Community people Local elite, teacher Community people
10	Legal aspects	<ul style="list-style-type: none"> ♦Access to the forest by locals ♦Forest villagers and land use agreement ♦Conflict and negotiation with FD staff ♦Land encroachment/recovery ♦Law enforcement mechanisms in the PA ♦Illegal tree felling and forest cases 	FGD GD KI FGD KI	FD staff and forest villagers Local community and local govt. members Local elites FD staff, community people Teacher, ex-officers,
11	Power structure	<ul style="list-style-type: none"> ♦Local influential and their role, local hierarchy ♦Nature and sources of power and their domain of influence ♦Conflict and conflict resolution ♦Social cohesion and adhesion 	HH int, FGD, GD, KI	Local HHs heads Local community and local govt. Local community Local elites
12	Others	<ul style="list-style-type: none"> ♦Access to areas and settlements ♦NGO activities in the locality ♦Challenges for conservation ♦Local problems ♦Mobility in the area 	HH int, FGD, GD, KI	HHs heads Local community and local govt. Local people & FD staff Local elites

PRA issues and questions were developed by a three-person team of experts on the basis of field experience and outcomes of the RRA exercise. During the PRA, tools like Venn diagramming, resource mapping, seasonal analysis, trend analysis, livelihood analysis etc., were used in addition to interviews, focus groups and more informal discussions. More than one tool was used to research any particular issue to allow the research teams to triangulate the information gathered. The issues and activities performed in the PRA are summarized in Table 2.

Table-2 PRA Issues, Specific Activities Performed and Tools Used In KNP Site

Sl.	Issues	Specific activities	Tools used	Participants
1	Forest make up dynamics	<ul style="list-style-type: none"> ♦ observation on forest physiography and topography and forest make up ♦ land use cover, resource exploitation and regeneration areas, animal distribution ♦ changes in forest cover, thickness, vegetaion, settlements, animals and availability of resources 	Transect walk KI Resource mapping Secondary data, FGD, KI Trend analysis	PRA Team Local elite, FD staff FD staff and village headman, forest villagers. Local people and FD staff, forest villagers
2	Local governance system and community structure and functions	<ul style="list-style-type: none"> ♦ Decision makers--- influential people ♦ Local community organizations and institutions and their linkages ♦ Local conflict and conflict resolution ♦ Social cohesion and adhesion ♦ Collective action ♦ Local problem, cause and possible solution 	Venn diagram Ven diagram Venn diagram FGD/GD FGD & GD and Ranking	Community people Community As above As above and local elite
3	Livelihood strategies	<ul style="list-style-type: none"> ♦ Income and expenditure sources, Livestock, Richness and poverty 	Wealth ranking HH interview	Women group and local people
4	Gender issue	<ul style="list-style-type: none"> ♦ Family decision making ♦ mobility ♦ workload ♦ Education and access to credit 	Decision making Chart Mobility map Daily and seasonal work chart HHs Int. & FGD	Women group Women group Women group Women group Women and local educated people
5	Fuel wood collection	<ul style="list-style-type: none"> ♦ Information on collector ♦ Purpose and driving force for collection ♦ Dependence on the extraction for their livelihood and its extent ♦ Uses and marketing channel of the resource 	FGD & GD, seasonal analysis	Fuel wood collector, community people, local hotel and tea stall owners

Sl.	Issues	Specific activities	Tools used	Participants
		<ul style="list-style-type: none"> ◆Level of extraction and seasonality ◆Conflict with FD or other people over the extraction ◆Negotiation for carrying out the activity ◆Alternate source for the collection of the resources ◆Needs and expectation of the collector ◆Impact on the forest and future risks for the collector 		
6	Illicit felling	<ul style="list-style-type: none"> ◆Information collector ◆key people behind the activity and network ◆Purpose and driving force for collection ◆uses and marketing channels and dependence ◆What encourages them to take up the activity ◆Anybody protect them, if they are in problem ◆Protection by FD or by any other agencies (e.g. Police etc.) ◆conflict and negotiation with FD or other people ◆needs and expectation of the feller ◆impact on the forest and future risks for the illegal feller ◆Seasonality's and trend in timber extraction 	<p>FGD, GD and KI</p> <p>Seasonal calendar and trend analysis</p>	Illegal timber feller, FD staff and community people, teacher and local elite
7	Collection of trees as building materials	<ul style="list-style-type: none"> ◆Information on collector ◆purpose and reasons for collection ◆uses of the resource and extent of extraction ◆dependence on the extraction and marketing ◆conflict and negotiation with FD or other people over the extraction ◆alternate source for the collection of the resources ◆needs and expectation of the collector ◆impact on the forest and future risk for the collector 	FGD, GD and KI	Community people, FD staff, forest villagers, local public representative and elite
8	Bamboo and cane collection	<ul style="list-style-type: none"> ◆Information on collector ◆purpose and reasons for collection ◆uses of the resource and extent of extraction ◆dependence on the extraction and marketing ◆conflict and negotiation with FD or other people over the extraction ◆alternate source for the resources ◆needs and expectation of the collector 	<p>FGD, GD</p> <p>Seasonal</p>	Bamboo and cane collector, community, people and FD staff

Sl.	Issues	Specific activities	Tools used	Participants
		<ul style="list-style-type: none"> ♦ impact on the forest and future risk for the ♦ seasonal changes and trend in abundance 	calendar and trend analysis	Bamboo collector and local people
9	Information on Ethnic Community	<ul style="list-style-type: none"> ♦ Distribution of ethnic communities settlements ♦ Present economic activities ♦ Resources exploitation and dependence on forest resources ♦ relationship and conflict with FD ♦ internal governance system ♦ needs and expectation 	FGD	Ethnic Community and local community
10	Coal collector	<ul style="list-style-type: none"> ♦ historical perspective of tree burning for coal production in the area ♦ information on involvement with coal collection practices ♦ dependence on the activity ♦ Impact on the forest resources 	FGD GD GD	Coal collector FD staff Local community

Each PRA tool was used to collect information about more than one issue, as shown below:

Venn diagramming: local power structure, local community organizations, local institutions and agencies, local conflict and conflict resolution, family decision making, mobility of women & men, local NGO/CBOs

Seasonal calendar: fuel wood, bamboo and timber collection, unemployment, workload, accessibility to forest, transportation problem, brickfield/sawmill operation, forest patrol, agricultural activities, collection of building materials, hunting, vegetable collection, damages by elephant, sand collection, palm oil seed collection, sun-grass extraction.

Trend analysis: forest cover, forest thickness, tall trees, herbs and shrubs, forest use, unemployment, local solvency, land encroachment, settlement/population solvency/income, livelihood expenditure, literacy, unemployment, use of forest for income, use of forest for HH needs, transportation and mobility, homestead plantation, food scarcity, credit and IGA, occupation, damages by elephant, wildlife, hunting, illegal tree felling, fuel wood collection, bamboo and cane collection, fruit bearing trees in the wild, livestock, turtles and tortoises, agricultural activities, medicinal plants.

Ranking and scoring: local problem ranking, wealth ranking, and livelihood analysis

Transect walk: Soil, vegetation, land use, elevation, crops, wildlife, human activities etc

Forest resource mapping: forest land use cover, resource zones, resource exploitation zones, animal distribution, settlements.

3.2 Fieldwork Preparation

3.2.1. Selection of RRA and PRA Sites

On the basis of information provided by local FD staff and the field implementing NGO (RDRS), various sample locations were selected for the purpose of information collection. These locations are hence called RRA and PRA spots. The selection of locations was based on a number of selection criteria. The selection process was completed during planning workshop. While the number of sites visited during the RRA was limited, the team focused on gaining an overview of issues covering the whole of the Reserve Forest area. However, because of the size and geographical location of the RF, it became clear there would have to be a trade off between the size of the study area and the depth and quality of the information collected. Therefore, a decision was made that the PRA would focus on only issues and stakeholders relating to the management of forest within the Khadimnagar protected area. A list of the selected RRA and PRA spots for KNP site is given in Tables 3.

Table 3 List of Selected RRA & PRA Spots & Schedule for Visits

Date	Village/ Location	Performed activities	Remarks
12/03/09	At IPAC Office Srimangal	Planning and discussion	Day long discussion and planning on RRA & PRA activities
14/03/09	Beat office, KNP Khadim TE village	KI(1) GD(1), HH interview (3) Social Mapping	GD with local community & HH interview with female participants. Social Mapping with KI
15/03/09	FaringUra, Iagul	KI(1) FGD(1) GD(2), HH interview (3) Social Mapping	GD with local community & HH interview with female participants. Social Mapping with KI
24/03/09	Mokamergul	GD(1), HH interview (2) Social Mapping	GD with local community & HH interview with female participants. Social Mapping with KI
	Daspara	KI interview (1) GD (1), HH interview (1)	KI with local UP member, GD with local community & HH interview.
25/03/09	Burjan TE	GD (1), HH interview (2) Social Mapping	GD with local community of TE village & HH interview. Social Mapping with KI
	Charagung TE	FGD (1), KI (1) HH interview (2) Social Mapping	FGD with local community & HH inter view with female participants. KI with local UP member, Social Mapping with local people
4/04/09	Kalagul Tea estate	GD (1), KI(1) HH interview (3)	GD & HHI with Local People
	Khadim TE	GD (1) KI (1) Social Mapping	KI & Social Mapping with local UP member, GD with local community
05/04/09	Shaheb bazaar Faringura	FGD (1) GD (1), KI (1) Social Mapping	GD with local community KI with Ex chairmen & Social Mapping with local people
	Kalagul Tea	GD (1)	GD with local community & HH inter view with

Date	Village/ Location	Performed activities	Remarks
	estate	HH interview (2)	female participants.
06/04/09	Kollogram,	KI (1) FGD (1), HH interview (2) Social Mapping	FGD, HH interview & Social Mapping with Local community, KI with local mohaldar
	Surmagate Tikirpotti	GD (1) KI (1) HH interview (2)	GD, HH interview with local community and KI Local UP Member
07/04/09	Alurtal	FGD (1) GD (1) HH interview (2) Social Mapping	FGD, GD & HH interview with local community and Social Mapping with KI
	Majortilla	KI (1),	GD with local community & HH inter view with female participants.
08/04/09	Kidirpur Dalaipara	GD (1), HH interview (1) Social Mapping	GD & HH interview with local community. Social Mapping with Local community
	Forest visit	FGD(1) Forest resource mapping, Transect work Social Mapping	FGD with forest staff, Forest resource mapping, Transect work with forest villagers and FD Staff
12/04/09	Gulni TE, Barnagar, Ramnagar	GD (2), HH interview (4) Social Mapping	GD & HH interview with local community. Social Mapping with Local School Teacher

3.2.2 Formation of RRA and PRA Field Teams

The RRA & PRA field teams were formed with representatives from RDRS and local enumerator having biological and sociological background. The teams made for the RRA and PRA field exercises are provided in the table. The team is consisting of six members and worked simultaneously in the field, but at different locations.

Table-4 RRA & PRA Team for Khadimnagar National Park

Sl. No.	Name	Team Composition	Designation & Organization	Duties
1.	Md. Abdul Kader	Team Leader	SF, RDRS Bangladesh	PRA/RRA field exercise & Report writing.
2.	Mr. ASM Sharif	Team member	SC, RDRS Bangladesh	Coordinating with team
3	Tapash Kumar Roy	Team member	PMARA, WorldFish center	Resource person for team orientation, RRA field exercise & report editing
4	Parvez Kamal Pasha	Team member	ESF, RDRS Bangladesh	PRA/RRA field exercise
5	Shaila Sultana	Team member	COGF, RDRS Bangladesh	RRA field exercise
6	Abdul Mazid Masum	Team member	Local Enumerator, Khadim Tea estate.	PRA/RRA field exercise

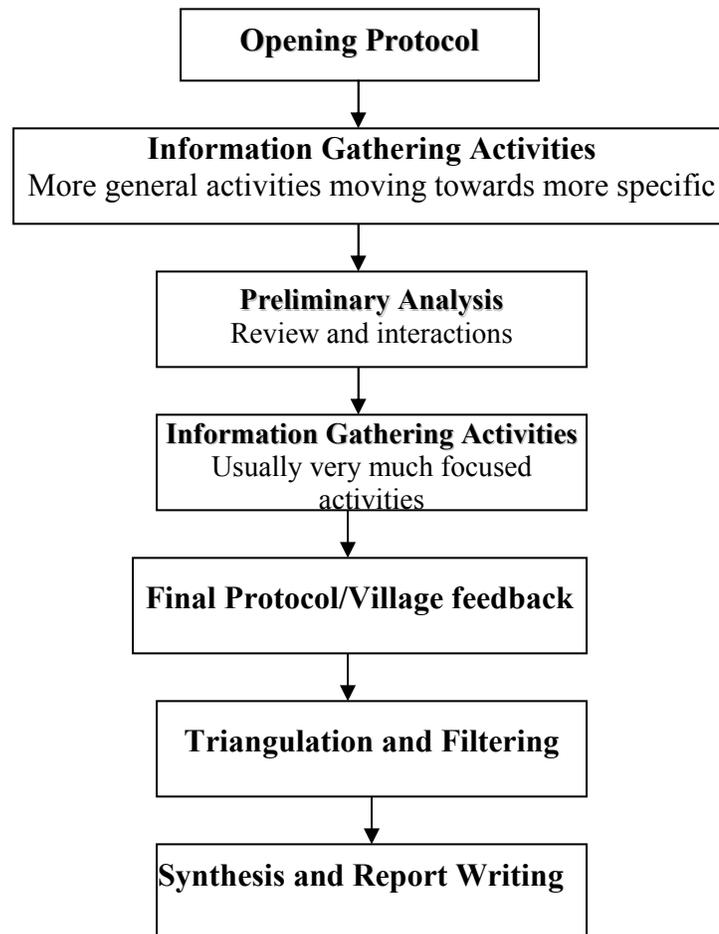
The RRA & PRA field exercise was conducted simultaneously during 14th March to 12th April 2009, the detailed time schedules for the field activities are provided in Table 3.

3.3 Field Implementation Strategies

3.3.1. Organization of the RRA and PRA field work

The organization of field exercises involved a series of logical steps. The field teams always made efforts to adhere to those steps. The flow of activities is shown in the following flow chart.

Fig. 2. Flow of RRA/PRA Field Activities (3-4 days)



During RRA exercise, a total of 6 HHs interviews, 3 group interviews, 2 key informant interviews, 2 resources & social mapping and 2 Focus group discussions with FD staff were conducted. The other RRA tools were applied during above mentioned interviews and discussions. Similarly, during PRA a total of 23 HH interviews, 12 Group interviews, 10 resources & social mapping and 5 focus group discussions with ethnic villagers and 4 key informant interviews were conducted. This is summarized in Table-5.

Table 5: Summary of Performed Activities in KNP site during PRA & RRA at a Glance.

Appraisal	Village/ Settlement covered	FGD	GD	KI Interview	HH Interview	Transect	Resource and Social mapping
RRA	4	2	3	1	6	-	2
PRA	12	5	12	4	23	1	10

The other PRA tools were used either during the above exercise or in separate exercises dedicated for this purpose. Further details on the implementation of the fieldwork methods used are provided below.

3.3.2. Household (HH) interview

- ⇒ Individual/HH interviews were conducted with randomly selected interviewees, typically visiting one household at each stop.
- ⇒ Both male and female respondents were considered.
- ⇒ Typical HH interview last for about 1 hr – 1:30 hr
- ⇒ The interviewees were not treated as respondents to a questionnaire, but active participants in an unstructured/semi-structured interview. A checklist of issues was used as a basis for questions, not necessarily addressing all questions in each interview and sometimes departing from basic questions to pursue interesting, unexpected or new information, relevant to the project and situation.

3.3.3. Key informant (KI) interview

Key informants are local people who have extensive knowledge on the local environment, situation and events. The purpose of this interview was to utilize them in collecting information from them relevant to the project needs.

- ⇒ KI interview was by prior appointment. A local guide helped in making appointment with the KI. The interview was taken by paying visit to Key informant HH or by inviting him to the team base
- ⇒ A preliminary discussion with local FD staff, IPAC field partner staff and interview of local people gave adequate clue for selecting KI. Preferably local schoolteachers, retired officials, local elites or local public representatives would be selected as the KI.
- ⇒ A typical KI interview lasted for about 1.5 hrs. The entire team took part in the interview taking session
- ⇒ As with HH interview, a similar checklist of questions was used for the purpose of KI interview.

3.3.4. Group interview

- ⇒ The purpose of the planned Group Interviews was to collect some information on the locality and local situation based on the consensus of the local people.

- ⇒ Interviews were conducted at places, preferably at local tea stalls, road junctions and other local community places, where local people gathered spontaneously. No formal invitation to the local people was made for participating at the group interview.
- ⇒ Mapping, seasonal ties, ranking and scoring exercises, whenever possible, were done in such group interviews.
- ⇒ Typically a group interview lasted for about 1-1.5 hrs
- ⇒ At least one group interview was held each day
- ⇒ This was basically an unstructured interview and a checklist of issues was used as a basis for questions

3.3.5. Focus Group Discussion

- ⇒ Focus Group Discussions were carried out with different professional groups, resource user groups, local public and government representatives with a view to collect information on specific areas.
- ⇒ During PRA, FGDs were principally conducted with different stakeholder groups, mainly with local FD staff, local public representatives etc. other professional groups, like fuelwood collector, sawmill owner, etc.
- ⇒ The FGDs were conducted by invitation and a local guide was used to invite the people.

3.3.6. Other PRA tools

- ⇒ Other PRA tools were either incorporated into the interview and discussion processes outlined above or carried out through separate exercises dedicated for this purpose. Resource mapping, Venn diagramming, seasonal calendaring, trend analysis, ranking, scoring etc. were done usually in separate sessions dedicated to these activities. However, sometimes, these exercises were also performed during group, focus group and key informant interviews. The participants were either invited local people or local people instantly gathered at places.

3.3.7. Direct Observation

The team while walking through the project area, talked to local people, discussed many things and made observation on the resources, people's behavior and their activities, etc. These observations and informal discussions helped to triangulate collected information and generate new questions for interview or discussions.

3.3.8. Secondary Information Collection

Some demographic data was collected from the relevant local Union Parishad sources. The report on secondary information collection on the RF prepared under IPAC was also consulted, whenever necessary.

3.3.9. Reflection and Analysis

After each day of fieldwork, the team sat together for about 1 ½ hours for team interaction and triangulation. The activities performed during the session included:

- ⇒ Reviewed information gathered that day and made summary of the information, triangulated whenever necessary. The person designated for report writing took note of discussions
- ⇒ Planned the next day's activities
- ⇒ Methodological review

3.3.10. Triangulation and filtering

Single information may be collected by using several tools or from several sources. The team cross-checked their results and accepted the most logical analysis. During these feedback sessions and subsequent data analysis, team members were required to use their own judgment to ensure the most reliable analysis of the situation.

3.4. Limitations of the Fieldwork

The main limitation of the fieldwork was that it took place during the summer season. At the mid day, it was hot & shiny day so the working conditions more or less difficult mainly in-group discussion.

One problem was particularly noticed in discussions with stakeholders in the tea garden around the KNP site, they was busy their daily activities so they could not agree to provide us sufficient time for group discussion. On the other hand, in the tea garden, most of the respondent was employee of the garden and did not feel comfortable in responding to the queries regarding their stake and resource collection from the RF. Some times the respondent hoped to receive some incentives training and AIGs from IPAC project.

Some people that they had received the job after a long ordeal and would not take the chance on being too open with honest answers as it might bring negative influence in their employment situation and if the worst happens, they might even lose their jobs also expressed it. Especially the tea estate inhabitants were not friendly and also asked to take permission from their authority.

4. Outcomes

4.1 Status and Trend in the Forest

Out of 765.18 ha, about 678.80 ha was declared as a National Park. In fact, most parts of the natural forest were altered by clear felling and subsequent long and short rotational plantation practices. However, in some of the oldest long-rotation plantations, the vegetation cover has taken on the structure of a secondary natural forest with the re-growth of creepers and naturally occurring trees and undergrowth species.

Secondary data collected on the forest show that there are about 20 species of amphibians, 9 species of reptiles, 28 species of birds, 26 species of mammals in the KNP. No floral survey information on plants is available. However, the major timber trees are represented by Chapalish (*Artocarpus Chaplasha*), Agar (*Aquilaria agallocha*), Teak/Shegun (*Tectona*

grandis), Lohakath (*Xylia dolabriformis*), Kadam (*Anthocephalus chinensis*), Pitraj (*Aphanamixis polystachya*), , Assar (*Microcos paniculata*), Bot/Banyan (*Ficus benghalensis*), Bhor (*Zizyphus jujube*), Bolos (*Sapium baccatum*), Bon Lichu (*Walsura robusta*), Chalta/Elephant Apple (*Dillenia indica*), Chatim (*Alstonia scholaris*), Jog-dumur (*Ficus racemosa*), Kaimula (*Engalhardtia apicata*), Kak-dumur (*Ficus hispida*), Kakra (*Aporusa dioica*), Kanaidinga (*Oroxylum indicum*), Kanchan (*Bauhinia acuminata*), Koroi (*Albizia procera*), Mandar (*Erythrina variegata var. orientalis*), Olive (*Elaeocarpus robustus*), Pani-dumur (*Ficus clavata*), Shimul (*Bombax ceiba*), Kanthal (*Artocarpus heterophyllus*), Bon Supari (*Caryota urens*), Champa, Chikrashi, Dhuna, Garjan (*Dipterocarpus terbinatus*), Dewa/Bhorta (*Artocarpus lecucha*), Awal (*Vitex penduncularis*), Gamar, Jam, Nageswar, Sundhi, Bohera, (*Toona ciliate*), Tairol, Suruj tree etc.

Among exotic short-rotational trees are Eucalyptus (*Eucalyptus camaldulensis*), Akashmoni & Akashmoni hybrid (*Acacia auriculiformis*), Mangium (*Acacia mangium*), common in plantation areas. There are many types of bamboo such as Jai bansh, Muli bansh and various cane/ ratan like *Jali bet* (*Calamus tenuis*), *Golla bet* (*Daemonorops jenkinsianus*). Besides, there are many types' climbers and vines, herbs and shrubs.

Fig. 3 shows the vegetation covers of the Khadimnagar RF. The natural vegetation is restricted to a limited area and dominated by indigenous tree species, like jam (*Eugenia spp.*), Chatim (*Alstonia scholaris*), Dhakijam, rata (*Amoora wallichia*), dumri, menda, Bot/Banyan (*Ficus benghalensis*), Chapalish (*Artocarpus Chaplasha*). The natural forest is moderately thick with plenty of underneath vegetation. The rest of the areas are covered by plantations, both long- and short rotation plantations. The long rotation plantations are also limited to small areas (5 small plots) and dominated by teak (*Tectona grandis*), Jarul (*Legarotromia Speciosa*), Garjan (*Dipterocarpus terbinatus*), mehogany (*Swietenia mahogany*) etc. Most parts of the forest are covered with short rotational plantations. Some of the short rotational plantations are of mixed species; the main species are akashamoni, (*Acacia auriculiformis*), Eucalyptus (*Eucalyptus camaldulensis*), mangium (*Acacia mangium*), etc. There are some mono-species short rotational plantations. These mainly include malacana, agar, palm etc. Bamboo and cane have been planted in a number of plots.

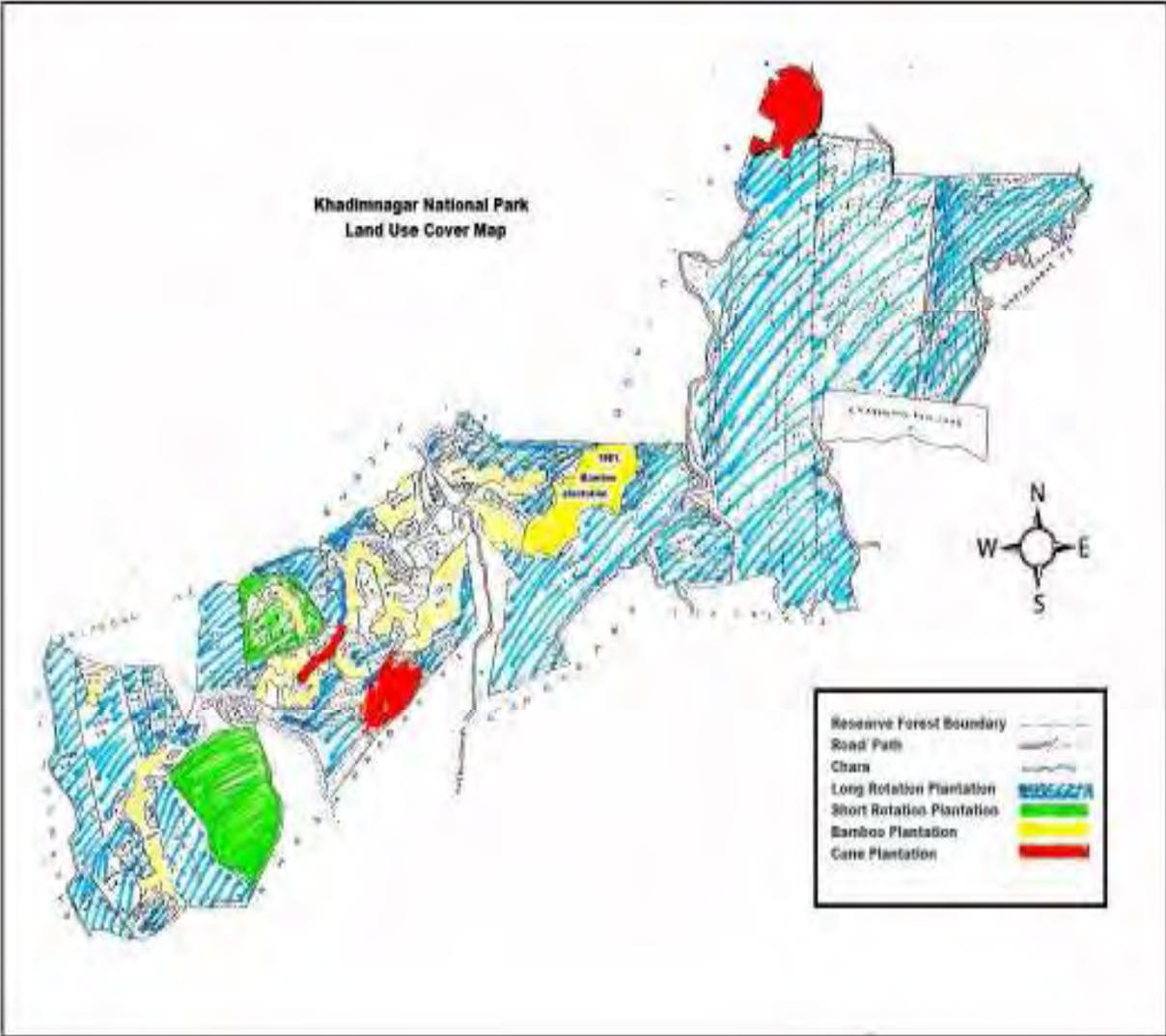


Fig.3: Land use cover map of the Khadimnagar National Park.

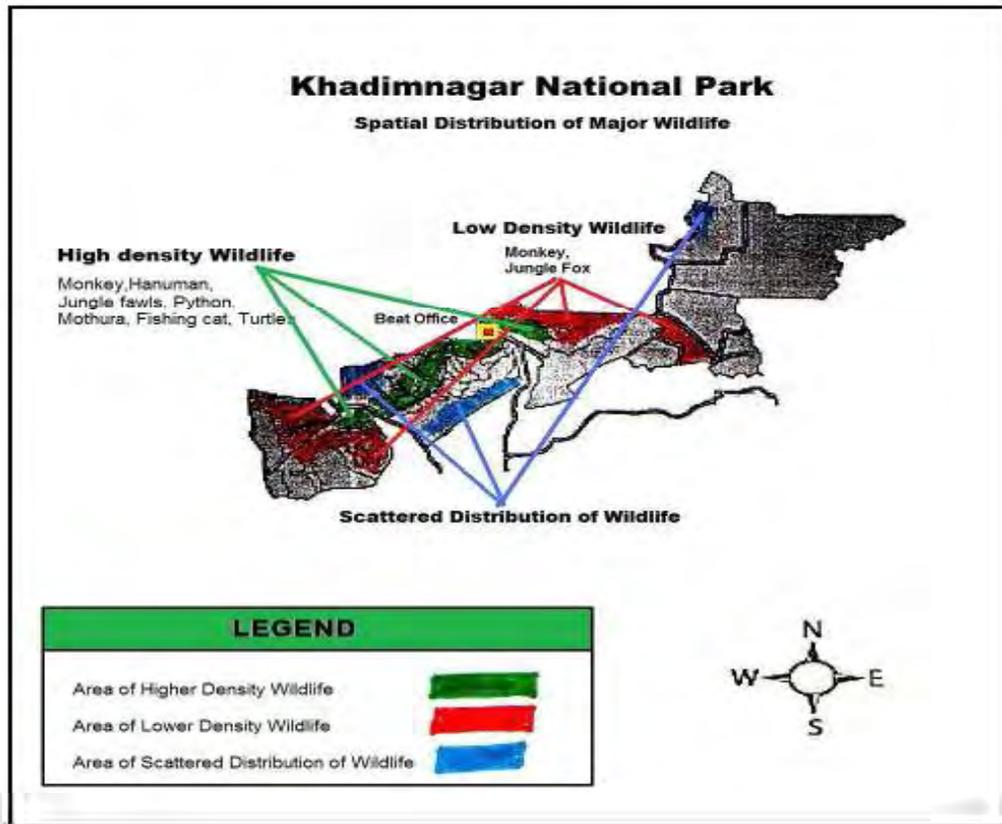


Figure. 4: Spatial distribution of Major wildlife in Khadimnagar National Park.

Major wildlife species are concentrated in the natural forest areas. The important species are Macacques, humans, Fox, monkeys, jungle fowl etc. Some major wildlife species are also available in the long rotation plantations. The new plantations of exotic trees are very poor in its wildlife. The monkeys are also found in the peripheral areas of the park.

Table 6: Status and Trend in Changes of Resources in Khadimnagar Reserve Forest.

Issue	Pre-1971	15 years ago	Present	Cause of changes	Future Risk
Forest Cover	00000	0000	0000	Clear felling in the past and present	High
Forest Thickness	00000	000	00	Clear felling, illegal tree felling, burning and weeding practice for plantation in natural and planted forest areas, fuelwood collection etc.	High
Tall trees	00000	000	00	Legal felling in the past and present, timber poaching, tornado etc.	High
Herbs and Shrubs	00000	000	00	Burning and weeding, for new plantation in natural and artificial forest area, fuelwood collection,	Medium
Wildlife	00000	000	00	Habitat loss, food scarcity, lack of safety, hunting in the past, disturbances by resource collectors	High
Hunting	00000	00	0	Prohibition, and unavailability of game animals and birds	Less
Illegal tree felling	0	000	00	Greed of some local FD staffs for extra benefit, illegal timber business of powerful people, local poverty, unemployment	High
Fuelwood collection	0	000	00000	Traditional practice of local people for HH consumption, local poverty, unemployment, easy access.	Moderate
Bamboo (natural)	0000	000	00	Natural bamboo stock decreased due to auction and over exploitation	High
Bamboo (planted)		00	00000	Stock increased due to FD,s plantation strategie	
Cane		0	000	Stock increased due to plantation by FD since 1997	less risk
Fruit bearing trees in the wild	00000	000	00	Natural death, felling, fuelwood collection, absence of fruit trees in new plantations	Medium
Medicinal plants	0000	000	00	Habitat destruction, clear felling, land clearing in the way of plantation, fuel wood collection,	Medium
Livestock	00	000	0000	For alternative income	No Risk
Agricultural activities	000	0000	000	Cultivation of various agricultural species, new variety cultivation in the locality	Less
Sun grass	00	0000	000	Over exploitation, claiming land sungrass bed, grew as result of clear felling,. For new plantations	Moderate
Vegetable	0000	000	00	Clear felling, plantations of exotic species, ,	Less
Fodder	00000	000	00	As above	Medium

Honey	00000	00	0	Clear felling of trees, decrease in fruit bearing trees, and monoculture with exotic plant species	High
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Table 6 shows the changes in forest make up, forest resources and resource related activities with time. Virtually, there has been a little change in forest cover and the cover has decreased by only about 10-15%, compared to pre-liberation period. On the other hand, forest thickness and abundance of tall trees have decreased approx. by 60%. The abundance of herbs and shrubs and sun-grass has also decreased by about 50-60% due to clearing and claiming land for plantations. Indigenous bamboo now remains only by 15%. Except birds, the abundance of major wildlife has also decreased by more than 60%. The abundance of medicinal plants has also decreased by 60%.

Since the forest has been degraded in its plant stock and nature, it has become less suitable for the wildlife as their habitat. The decrease in the abundance in wildlife has probably caused by 60-70%. The abundance of fruit bearing trees has decreased by 60%. The NTFPs, like honey and sun-grass have also decreased alarmingly.

Many wildlife species have been extinct by now from the forest. Among the extinct animals, tiger, barking deer, bear, Chitah, wild boar, sazaru, Gui shap, Sakun, etc. are notable. Some other wildlife, like, meso bagh, Mayna, python, wildfowl, cobra, dhanesh, Egale, Mathura, vultures etc, are variously threatened.

Trend in changes in the resource collection activities is shown in Table 6. Compared to pre-liberation period, activities like fuel wood collection have increased by 60-65%. On the other hand, collection of bamboo decreased by about 40%, while that of wild bamboo and honey decreased by about 60% owing to unavailability of these resources. Collection of sun-grass has however increased during 80's due to large scale felling) and then slightly declined by now, again due to claiming of sun-grass beds for plantations. Hunting of wildlife has also decreased by more than 80% mainly due to serious decline in the resource. Widespread tree felling occurred during liberation and immediate after liberation period. Then the trend slowed down remarkably during 80's and early 90's and again increased after 90's and the activity further increased from 1999 and has declined around 2009.

4. 2. Settlements in and Around Khadimnagar Reserve Forest and its Level of Stakes with the KNP Site

4.2.1 Settlements

A total of 22 villages having varied degree of stakes with the forest have been identified. Fig. 1 shows the location of the identified villages in and around the reserved forest. The villages belong to three Unions namely Khadimnagar, Khadimpara and Fatepur. Out of 3 union two (Khadimnagar, Khadimpara) union are under Sylhet sadar upazilla & anotherone is under Goianghat Upazila. In Khadimnagar National Park, 5 tea estate villages are located adjacent the reserve forest in the range of 1-3 km. and the rest are located outside of the forest in the range of 1-5 km as the forest is immediately bordered by tea estates. Table 7 provides information on the village HH number, its location and level of stakes with the forest.

Of the identified villages, ethnic Patro Khasia village has medium stakes near the forest, as all of its HHs is dependent on the various resources of the forest. The majority of them are fuel wood & NTFPs collectors.

Fig. 5 shows the human pressure on the different areas of the forest that arise from various settlements. Being bordered by tea estates, the people from Mokamergul and Alurtal areas enter the forest through the Charagung TE and Kalagool T E. People from Alurtal, Faringura, Lagul, Enatabad, Barnagar, and ramnagar, through the Kalagul TE and Gulni tea estates. The people from the settlements are mainly involved with illegal fuel wood, bamboo collection and timber felling. People from Tikirpotti, Dalaipara, and Pিরerchak infiltrate the forest directly from the southeast site and walk along the tea garden roads. They mainly collect fuel wood, timber and building materials. All HHs of the villagers for their every day HH needs of fuelwood, building materials, vegetables and others. However, they do very little for commercial purposes. Some unemployed and poor people from the adjacent tea estates also infiltrate the forest, mainly for fuel wood and house building materials. Some of them are, however, involved with illegal felling. Illegal felling also takes place during clear felling.

Khadimnagar National Park

Human settlement and pressure on forest from neighbouring Villages

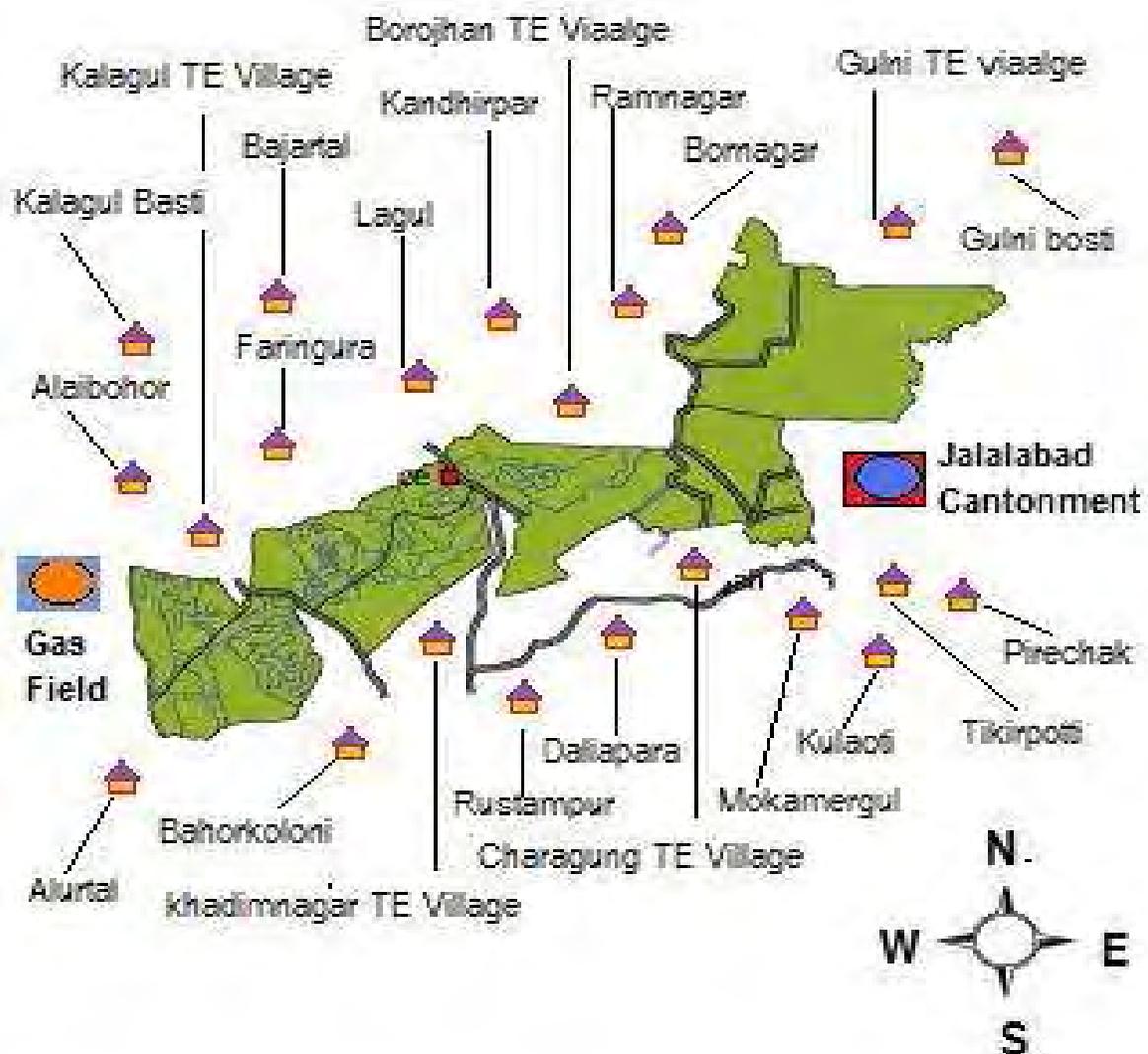


Figure. 5: Human settlement and pressure on KNP from neighboring villages

Table-7: Information on Villages Having Stakes with Khadimnagar National Park

Sl. No.	Name of village	HH Nos.	Location	Level of stake	Type of stakes
Under Khadimnagar Union					
1	Khadimnagar Tea estate village	436	Adjacent	Major	Collect fuel wood, house build. mat., vegetables and other NTFPs, and others
2	Charagung Tea estate village	142	Outside	Major	Collect fuel wood, house build. mat., vegetables and other NTFPs, tree felling and others
3	Burjhan Tea estate village	165	Outside	Medium to major	Involved with fuel wood collection
4	Kalagul Tea estate village	247	Outside	Medium	Sun-grass and fuel wood collector
5	Bajartal	37	Outside	Medium to major	Involved with both tree felling, fuel wood collection and NTFPs
6	Alaibohor	48	Outside	Minor to Medium	Involved with both tree felling and fuel-wood collection
7	Faringura	163	Outside	Major to Medium	Involved with both tree felling and fuel-wood collection
8	Lagul	85	Outside	Major to Medium	Involved with both tree felling and fuel-wood collection
9	Kalagul basti	54	Outside	Major	Involved with fuel-wood collection
10	Kandirpath	60	Outside	Minor to Medium	Involved with both tree felling and fuel wood collection
Under Khadimpara Union					
11	Dalaipara	145	Outside	Major	Sun-grass and fuel wood collector
12	Mokamergul	116	Outside	Major	Involved with both tree felling and fuel-wood collection
13	Tikirpotti	116	Outside	Medium	Involved with both tree felling and fuel-wood collection
14	Kulaoti	24	Outside	Minor to Medium	Involved with both tree felling and fuel wood collection
15	Pirerchak	402	Outside	Medium	Collect fuel wood, illegal tree felling, house build. mat., vegetables and other NTFPs,
16	Rustampur	86	Outside	Minor	Involved with fuel wood and NTFPs collection.
17	Bahorkoloni	355	Outside	Minor to Medium	Some peoples are involved with illegal tree felling
18	Alurtal	57	Outside	Major	Involved with both tree felling and fuel-wood collection
Under Fathepur Union					
19	Gulni Tea estate village	160	Outside	Minor to Medium	Cane, Sun-grass and fuel wood collector
20	Gulni basti	85	Outside	Major to Medium	Involved with both tree felling and fuel-wood collection
21	Ramnagar	55	Outside	Medium	Involved with both tree felling and fuel-wood collection
22	Bornagar	80	Outside	Minor	Involved with both tree felling and fuel-wood collection

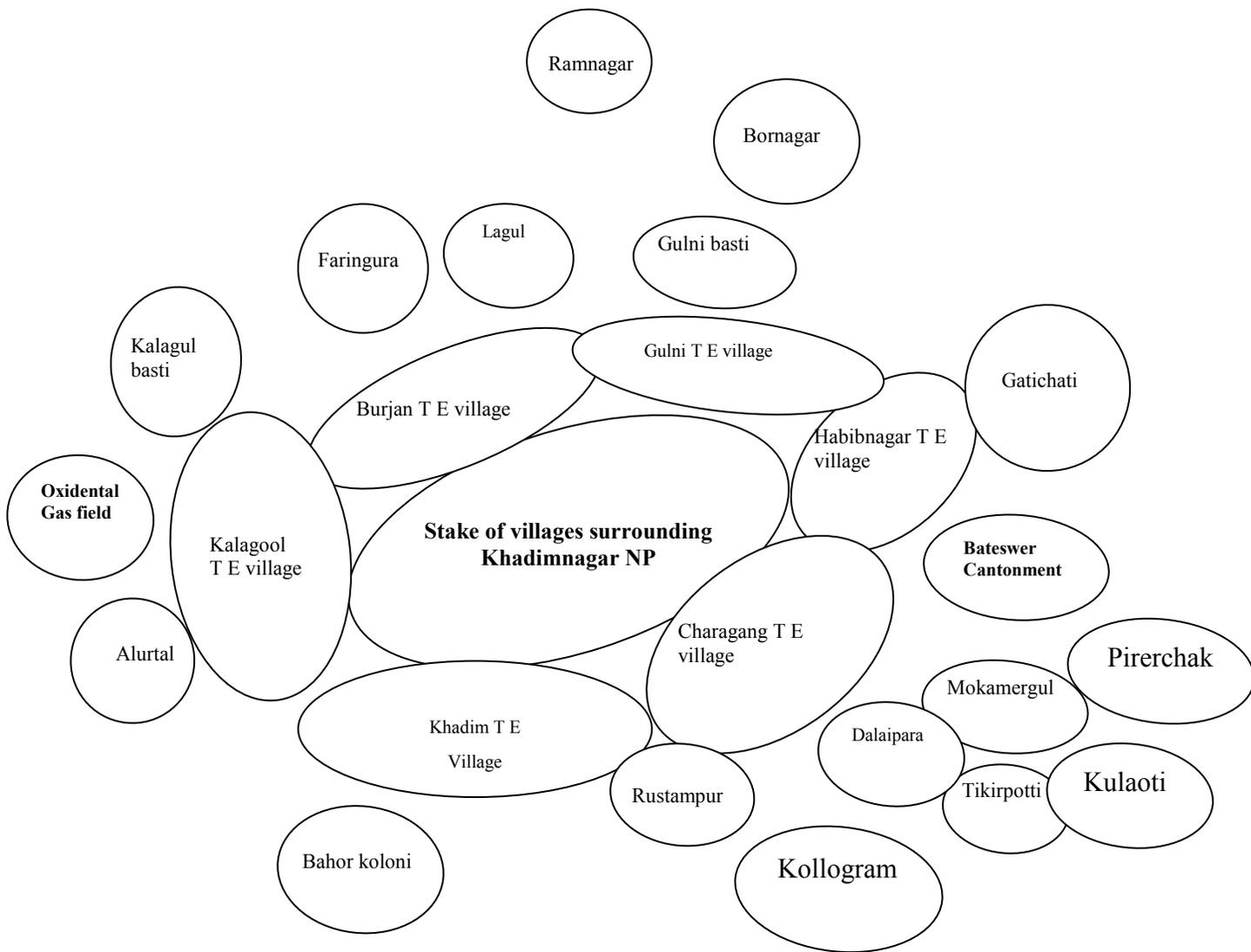


Fig. 6. Relative level of stakes of different villages with Khadimnagar RF

4.2.2 Tea Estates Surrounding Khadimnagar National Park

There are Six tea estates bordering the Khadimnagar RF, namely Khadimnagar, Charagang, Burjan, Kalagool, Gulni and Habibnagar tea estates (Table 8). Besides, there are some more tea estates in the area, but away from the KRF and thus have negligible stakes and therefore are not mentioned here. Almost all the bordering tea estates have substantial number of unemployed inhabitants who enter into the reserve and thus have stake with the forest. Of the estates, Charagang and Khadimnagar tea estates have more stakes than the rest. The people from the tea estates mainly collect fuel wood and some inhabitants are involved with illegal bamboo and cane. It is reported that people from Amo and Laskarpur tea estates are involved with tree felling. Sometimes, the illegal fellers use tea estates for the transportation of illegally felled timber.

Table 8 List of tea estates surrounding the Khadimnagar RF and their level of having stakes with KRF

Sl	Name of the Tea Estate (TE)	Location	Level of stake
1	Khadimnagar Tea Estate	South, adjacent	Major
2	Charagung Tea estate	South, adjacent	Major
3	Burjhan Tea estate	North, adjacent	Medium
4	Kalagul Tea estate	North- west, adjacent	Major to Medium
5	Gulni Tea estate	North-East, adjacent	Medium to Minor
6	Habibnagar Tea Estate	East, adjacent	Minor

4. 3. Stakeholder Assessment

At least 3 categories of stakeholder could be recognized in Khadimnagar Reserved Forest, such as

- ⇒ Primary stakeholder- involved with direct extraction of resources from the forest or their activities directly affect the forest
- ⇒ Secondary stakeholders – indirectly linked with the forest, involved with trading or exert influences on the forest
- ⇒ Institutional stakeholder- involved with developmental activities and administration of the adjoining areas

4.3.1. Primary Stakeholders (SH)

Table 9 provides information on stakeholder type & category, stakeholder description, their activities, dependency, relative level of stakes with the forest and their impact on the forest. About 15 different primary stakeholder types, who directly extract different resources from the forest, have been identified. Of them, 2 SH groups (fuel wood collector, Bamboo collector) have major stakes with the forest having major role in forest degradation, while 4 SH have medium level (moholder, house building materials collector, illicit feller and coal collector) and the rest 9 (SHs) have minor stakes with the forest.

Except the moholders, most of the primary stakeholders are poor people from the adjacent Tea estate village and as well as from identified outside villages. Old and unemployed adults collect fuel wood from Khadimnagar RF. Illegal felling of timber trees are carried out by

adult people and usually they are poor. Usually, the rich and middle class people are not involved with direct extraction of forest resources. However, they buy many forest resources, including fuel wood and bamboo, and other products from the primary stakeholders.

It was revealed from PRA field exercise that landholder are directly involved with extraction of major forest resources, followed by tea estate laborers and local poor people.

Table 9 Information on the stakeholders of KRF (based on resource extraction and direct activities in the forest)

Sl. no.	SH name	SH types	SH description	Role / Description of Activities of SH	Dependency	Level of stake	Remarks
01	Moholder (auctioneer for tree felling)	Direct/ primary	Some rich and influential people from the outside of the forest area.	Legally clear fell forest through winning auction. In addition to timber trees, completely destroy all under storey vegetation. Mix some illegally felled trees.	Not dependent on the activity	Medium	Clear felling practice of moholder is detrimental to forest biodiversity FD gets revenue
02	Illicit feller	Direct/ primary	Adult male from some villages, some labourer for clear felling, unemployed people from tea estate. Mostly poor.	Selectively fell the valued timber trees. Usually enter the forest at night. Reduce forest cover, thus destroy habitat They come from some nearby settlements	Many HHs entirely dependent on this activity Many depend partly on it for their livelihood	Medium	They are mainly organized gangs. They are influenced by timber trader and moholder
03	Fuel wood collector	Primary	Local poor people, Tea garden labor (mainly men and women)	Collect dead trees, small trees, non-timber trees, and young of timber trees, tree branches etc. Cut, chop, bundle and carry away as shoulder or head load, sometimes use van, rickshaws	Many HHs dependent for HH use Many HHs sell for livelihood support, entirely or partly	Major	Fuel wood collector sometimes collect vegetable Tribal people collect bamboo shoot
04	Honey collector	Primary	Local people, mainly poor people	Collect from forest seasonally and occasionally	Mainly for HH consumption, but not dependent	Negligible	Usually it is not an intended activity
05	Bamboo collector	Direct/ Primary,	Individual/ group Local poor, Tea garden villagers	Collect bamboo from forest for domestic and commercial use	dependent for HH consumption	Major	Planted bamboo beds are also auctioned and clear felled FD gets revenue

Sl. no.	SH name	SH types	SH description	Role / Description of Activities of SH	Dependency	Level of stake	Remarks
							from auction
06	Sun grass collector	Primary	Tea garden villagers, local poor people, employed people.	Harvest and bundle and carry as head load or shoulder load.	Meet household needs, some sell for supplementing income during harvesting season.	Minor	Mainly Tea villagers and people from adjacent area
07	Fruits	Primary	Local poor people	Mainly collect Jackfruit, blackberry, Mango, Chapalish, Dewoa,	Not dependent	Negligible	
08	Hunter/trapper	Primary	Elite and rich from the area and outside the area.	Mainly hunt game birds, wild fowl, wild boar, small deer, and others.	For HH consumption Not dependent	Minor	Tea villagers traditionally used to hunt every type of wildlife. Presently their activity is limited
09	Vegetable collector	Direct/primary,	Tea garden villagers, poor people, mainly fuelwood collector and occasionally the outside villagers	Collect vegetables, like, kachu, Kachu lata, deckishak, Falong shak, Potato, etc.	Meet HH needs only Not dependent, also met from homestead gardens	Minor	Tea villagers and most people from outside villagers
10	Medicinal plant collector	Primary	Some local people	Collect some limited species specially Ulotkambal medium scale	Not dependent	Minor	Sometimes, local kabiraj collect it
11	Coal collector	Primary	Some local people	Felling natural tree and branches & debris and burning in the forest for coal making.	Dependent on this activity for livelihood support	Medium	This practice occurred by a gang of stakeholder in inaccessible area of KRF.
12	House Building material	Primary/Direct	TE villagers and surrounding people	Collect various materials as per need for HHs building.	Partially dependent	Medium	

Sl. no.	SH name	SH types	SH description	Role / Description of Activities of SH	Dependency	Level of stake	Remarks
	Collector						
13	Sawmill owner and operator	Indirect/ Secondary,	Individual/ Group	Help in conversion of illegal timber and encourage illegal tree felling and trading	Not dependent	Minor	
14	Furniture owner shop	Indirect/ Secondary,	Individual/ Group	Have a good link with illegal feller and encourage illegal tree felling by purchasing illegal timber mainly from saw mills	Not dependable	Minor	
15	Brick field owner	Indirect/ Secondary,	Individual	Use fuel wood and small timber, encourage illegal tree felling having good link with illegal feller	Become established	Minor	

4.3.2. Secondary Stakeholders

A total of three secondary SH groups have been identified. They are not directly involved with forest resource extraction from KNP, but are linked with its processing, either trading or utilization. A brief description of these stakeholder groups and their activities are given below.

4.3.2.1 Timber Traders

There are about 10 to 15 timber traders in the area, based at Shahaparan, Pirerbazar, Majortilla and Shahebbazar who are involved with timber trading. Many of them have no valid license for the trading of timber. They usually receive sawed timber from sawmills and trade locally. It is alleged that they sometimes receive illegally felled timber from thieves and get sawed and sell it and thus help in the illegal felling of timber.

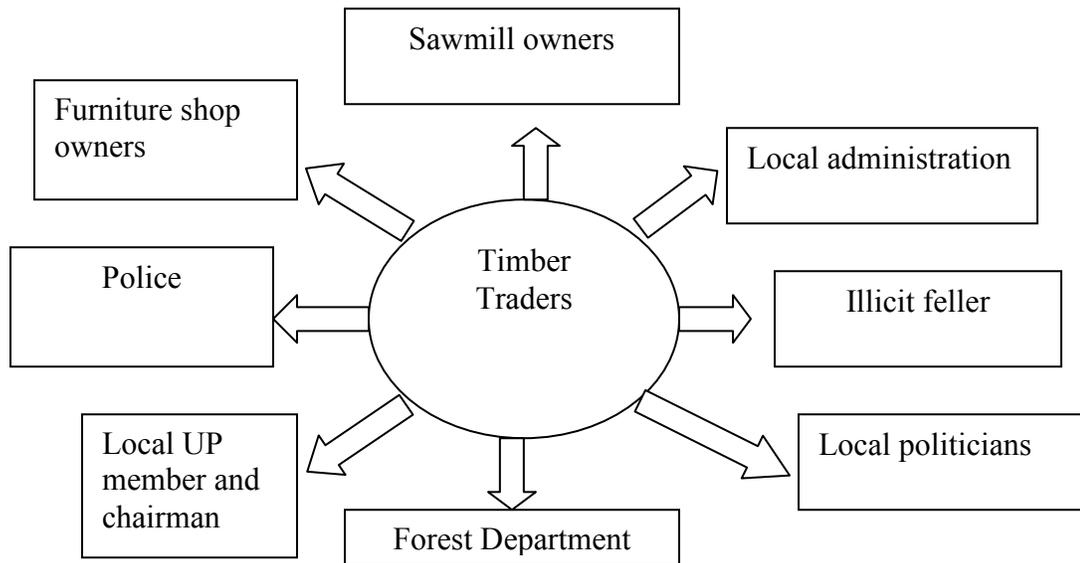


Fig. 7. Link of various stakeholders with Timber traders

4.3.2.2. Sawmill owners

Sawmills owner have a medium indirect stake with the KNP. 10 saw mills have been identified. Table 10 shows the distribution of sawmills surrounding the RF.

Table 10: Distribution of Sawmills In the Area

Sl	Location	No. of sawmills
1	Shahparan	5
2	Sahebbazar	3
3	Pirerbazar	1
4	Maheshghat	1
Total		10

There are 5 sawmill at Shahparan area, about 3 sawmills at Sahebbazar and 2 at Pirerbazar and Maheshghat which are located at surrounding Khadimnagar Reserve Forest. Some influential people of the locality own these mills. These sawmills usually receive both legal and illegal timbers for sawing into the logs. The sawmill owners buy illegal timbers at a cheaper rate, eg. 250-300 taka per cft, whereas the actual market price would be of more than is 500-600 taka per cft. It appears that sawmill owners encourage illegal felling of trees form nearby forest, including KNP. Sometimes, they may have internal linkages with timber traders, FD local staff and illegal fellers. At present 2-3 Sawmills are operated at surrounding KNP.

4.3.2.3. Furniture Shop Owners

There are about 20 furniture shops nearby bazaar of the Khadimnagar Reserve forest mostly located Shahebbazar, Shahaparan, Pirerbazar, Khadimpara etc.. Furniture from the area goes to different parts of the Sylhet district. Sometimes, the FD check post checks this furniture but probably have little impact. Furniture shop owners have good linkages with the sawmills and sometimes with illegal feller as well. According to local people, the shops, in addition to legal timber, also use smuggled timber from the forest. They usually collect sawn timber from sawmills, sometimes shops buy round timber directly from the illegal fellers or timber traders and get it sawn in sawmills. Majority of the traders are from outside of the project area.

4.3.2.4. Fuel wood Trader

A number of fuel wood traders have been identified that have indirect stakes with the RF, collected fuel wood from the local direct collectors. There are about 5-6 fuel wood traders at Shahparan bazaar, about 3-4 at Shahebbazar, Pirerbazar and Majortilla. Several trucks of fuel wood is transported everyday from this area and majority of which come from clear felling and substantial fuel wood also sold locally by the traders. The traders procure fuelwood from the individual collectors, stack them and sell it to the local consumers, while the others transport it by trucks to Sylhet sadar, Golapgonj, and adjacent upazilla etc. The marketing opportunities have increased during the recent times at the local level. The fuel wood is traded at the rate of Tk. 50-60 taka while buying and at Tk. 65-75 taka/maund while selling (1 maund = approx 37.5 kgs).

4.3.2.5. Coal traders

There are some coal traders have been identified that have indirect stakes with the RF and most of this stakes. A group of local poor people (10-15 people) was involved with illegal collecting coal from reserve forest. They burn different trees; branches and dead wood in the forest sell it to the second party at the rate of 150-200 tk. per bag. Second party buys coal from first party at the rate of 350-400 tk. per bag and sold it to the coal trader's s at Shahebbazar. Finally, coal traders sold each bag @ 500-600 tk. to the consumer mainly Hotels, Jewelry shops and other users at Sylhet city areas.

4.3.2.6. Brickfield owners

There are three brickfields far away from the RF that consumes substantial amount of fuel wood and maximum of it come from the RF. It was noticed that the local brickfields burn both fuel wood and coal for its operation. However, they need fuel wood for initiating fires in kiln and also it was estimated that they use about 45-50% fuel wood of its total fuel wood requirements. These three brickfields are located in Golapgonj, Muktrchak and Muradpur.

4.3.3. Institution/ Organizational Stakeholders

Besides the primary and secondary stakeholders, there are a number of institutions and organizations that are involved and have stakes with the RF. Among them the major institutions are described below.

4.3.3.1. Forest Department

Forest Department (FD) is directly involved with overall management of the forest at the local level. FD has the overall responsibility for management, conservation and development of the RF through planting, harvesting, patrolling and guarding the forest resource. The number of forest staff is inadequate for its management. There is a forest check post on the Dhaka -Shylhet old highway at Khadimnagar. Overall, FD plays a positive role in the protection of the RF, a few FD local staff and officials are alleged to be involved indirectly with illicit felling activities. However, this was not noticed by the PRA team. According to local people, FD staffs take money (e.g. 20 taka for each entry) from fuel wood and bamboo collectors to allow them to enter into the RF.

4.3.3.2. NGOs and credit provider Banks

Among the other institutions, NGOs and banks have direct stakes with the people living around the KNP. The major NGOs & bank that operate in the locality are: BRAC, ASA, CARITAS, FIVDB, PASKP (Patra Samprodai Kaillan Parishad), Grameen Bank. Besides, Sonali Bank and BRDB also operate in the area. The major activities of the NGOs are concentrated on health, education and alternate income generation. Some of them have credit programs exclusively for the women. Several NGOs and banks provide micro-credit to local people (Table 11) to improve their livelihood conditions. These institutions provide micro- credits for agricultural activities, small business and IGA. The IGA programs concentrate on small business, poultry, livestock etc. NGO's credit is mainly focused on the women.

Table 11 List of NGOs / Banks Operating Around the KNP and Their Area of Activities

Sl. No.	Name of NGO/ Banks	Location	Activities
1	BRAC	Surmagate	Micro credit programs, education, health, awareness,

2	ASA	Saheb bazar	Micro credit for agriculture, small business, poultry and livestock
3	CARITAS	Surmagate,	Education, Technical training for income generation, health awareness, micro-credit for agriculture
4	FIVDB	Saheb bazar	Credit programs, training on agriculture and other IGA
5	Sonali Bank	Khadimpara	Credit and Savings
6	Grameen bank	Saltikor	Credit Programs
7	TMSS	Majortilla	Health, Credit Programs
8	PASKP	Saheb bazar	Credit Program

Overall, NGO activities are inadequate to support the livelihoods of the surrounding village people surrounding the RF. Recovery of credit is poor. There is also a lack of coordination and motivation by the NGOs working in the locality. More IGA support is required to bring changes in the livelihood of the poor people. Skill development activities by the NGOs are limited. Fig. 8 shows the NGO's relative activities in the area.

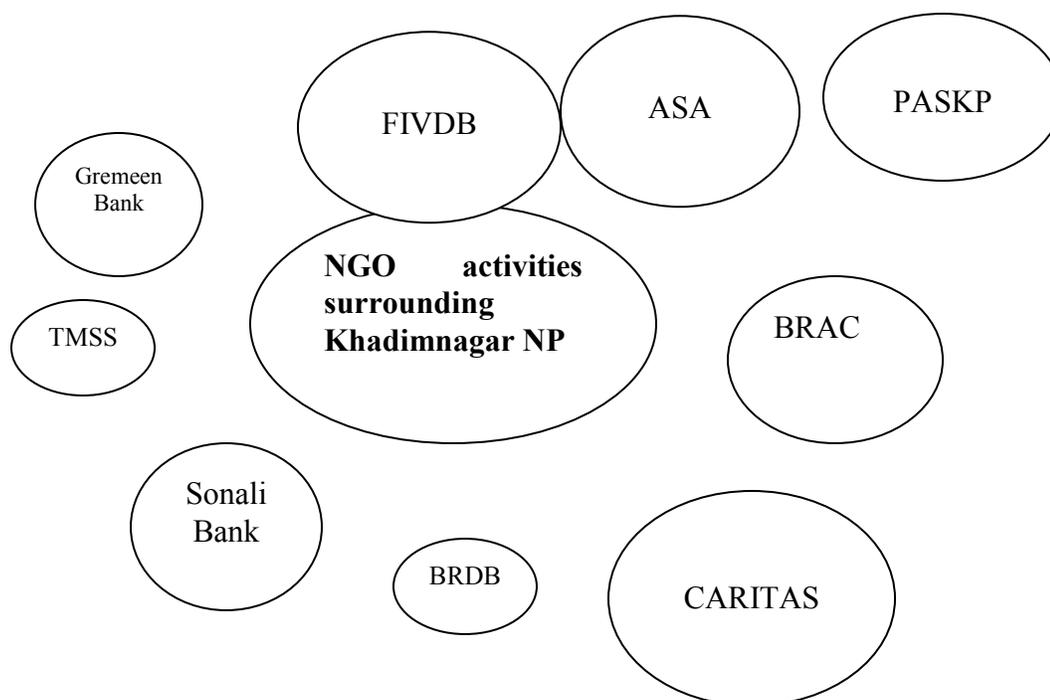


Fig. 8. Scale of activities of different NGOs in KNP and its surrounds

4.3.3.3. Local community organization (CBOs)

There is Six tea labor association in the surrounding Tea estates villages e.g. Khadim TE, Kalagool TE, GulniTE, Burjan TE Charagung TE and Habibnagar TEsmall. Each labor

association is lead by elected president and each president is elected for two years. Here also identified an ethnic community based organization PASKP (Patra Sampro dai Kallyan Porishad) mainly support education and credit facilities to the community male and female members. Moreover, one youth organization named "Jagoron youth association" established at Khadimnagar tea estate villages and local youths are involved with social welfare and cultural activities.

4.3.3.4. Police and ARMY

Police and ARMY are two main law-enforcing institutions who have substantial stake with the forest. They patrol in the area and on the highway to enforce the overall law and order including forest protection laws. It was reported by local people as well as by the FD staff that sometimes ARMY entered in to the forest from Jalalabad cantonment at Batswar and use KRF as a training ground. They enter in to the park in groups containing 400-500 shouldered at a time. Illegal tree fellers stopped their activity in this time. However, forest undergrowth and wildlife habitat fall in to disturbance during operation of ARMY training.

4.4. Dependency of the Stakeholders on the Forest Resources

Traditionally, the local people are used to collect various resources from the KRF and other adjacent state forests. The entire ranges of the stakeholders could be broadly categorized into four groups.

Local sawmills and furniture shops depend to some extent on the legal and illegal timber from the nearby forests. However, their livelihood is not dependent on the supply of timber from the KNP. Similarly, the moholders, who was involved with clear felling, are not also dependent on the timber from KRF. However, the local people who was employed by the moholders and involved with illicit felling are entirely or partially dependent on the forest extraction activity for supporting their livelihood.

Tea estate villagers are entirely dependent for fuel wood and building materials for meeting HH needs on the forest. It seems that there is no alternate source for its supplies. They also collect vegetables, fruits and hunt some wildlife.

Table 12 Resource Wise Dependence of Different Resource Users

SI	Name of Resources	Users	Causes	Extent	Dependency of localities	Risk
01	Timber	Moholder, illicit feller, Saw mill owner, Furniture Shops, Timber trader	household use, building materials	Medium	5%	Medium
02	Fuel wood	Local people, a few outside users	Mainly commercial use (selling for livelihood) and HHs consumption (small amount)	Major	30%	Major
03	Bamboo	Local people, outside users (as building materials)	As poles, fencing, basket and others, fuel	Medium	25%	Moderate risks
04	Cane	Local users	Basket binder	Less	5%	Less

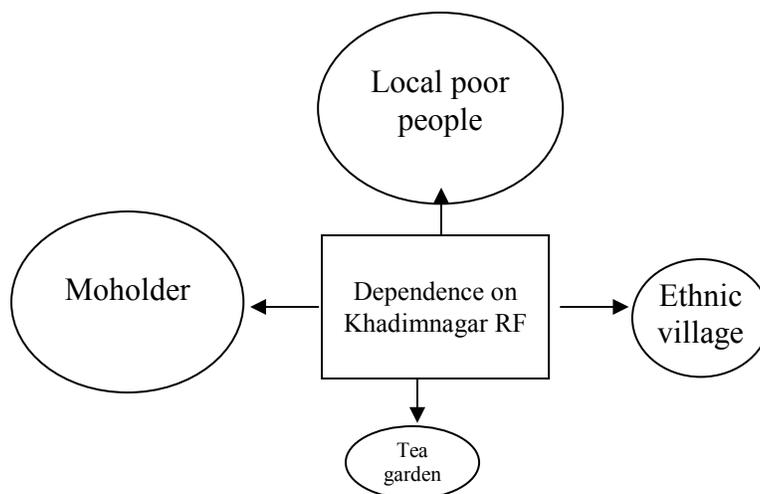
05	Medicinal Plants (Udal & others)	Local people, a few Kabiraj	As medicine	Less	2%	Less
06	Honey	Local People	Food, medicine	very less	1%	Less
07	Herbs	Local People	As vegetables	Very less	2%	Less
08	Bird	Local People	For meat (wild fowl, Ghughu)	Very less	.5%	High
09	Rema	TE villagers (indigenous people)	Meat as household need	Very less	.5%	Medium
10	Sun grass	Local people	Cattle feeding, house roofing	Less	3%	
11	Fruit	Local People	Food	Very Less	2%	Less
12	Vegetables	Local People	Food	Less	5%	Less
13	Grass	Local People	For Cattle feeding	Medium	20%	High
14	Coal	Local People	Mainly commercial use (selling for livelihood)	Less	2%	Less

A large number of HHs of the identified villages depend on the extraction of fuel wood and building materials from the forest. It is the poor who collect these resources, mainly for their HHs consumption and also for selling. The poor people from the neighboring tea estates collect fuel wood and other NTFPs from the forest. Some HHs sells these for added income. Some of them involved with illegal felling of timber and thus are dependent on their forest extraction activity.

Table 12 shows the dependence of different stakeholder groups on different resources for their HHs needs and supporting their livelihood. Almost, all HHs of forest villages are dependent on the fuel wood and house building materials, vegetables from the forest for their HH needs. But, they do not collect these for commercial purpose. Many poor people completely dependent on selling of fuel wood and many of them sell it for added income. It was revealed from FGD with local people that about 3-5% people from the nearby villages completely or partly depend on selling of fuel wood. Almost all illicit feller sell timber and many of them are completely dependent on it, while others do it for added income.

Fig. 9 shows the relative level of dependence of different groups of people on the forest, i.e. the pressure exerted by the stakeholders on the forest. It is apparent from the figure that the local poor people including the ethnic villagers are dependent on the forest.

Fig. 9.Relative level of dependence of major stakeholder groups on the KRF sources



4.5 Causes for the Decline in Forest Resources

4.5.1 General cause

Based on the perception of the team developed through discussions with different cross-sections of people in the area, a Venn diagram is constructed on the major causes for the degradation to the forest and its biodiversity and is shown in Fig. 10. The major causes for the decline in forest in order of magnitude are as follows: clear felling and illegal timber felling, FD's plantation strategies, fuel wood collection, collection of house building materials, hunting, bamboo and cane collection, coal extraction etc.

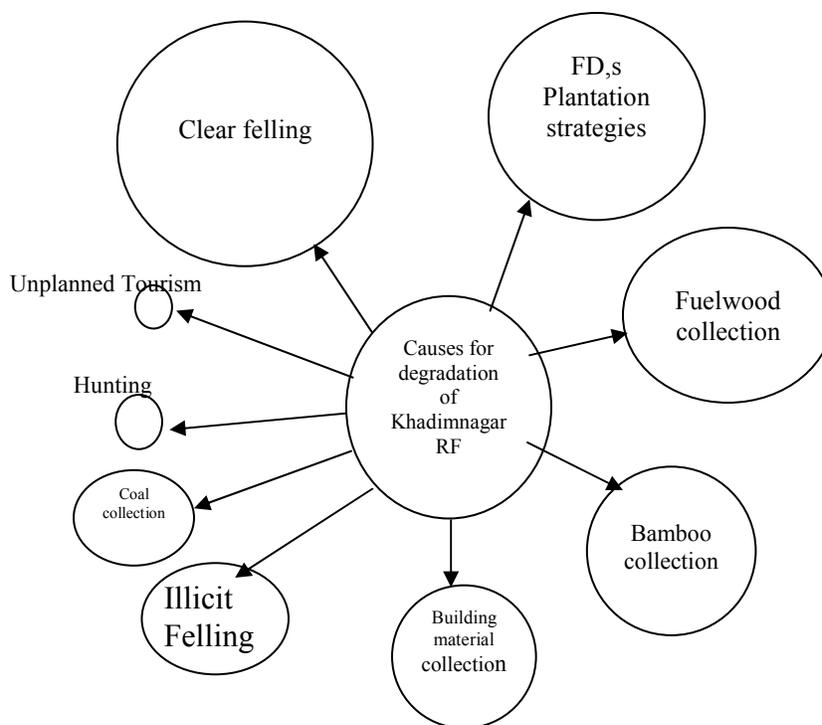


Fig. 10. Major direct causes for the degradation of Khadimnagar RF

Pair wise ranking (Table 13) exercises showed that presently clear felling practice is the major cause for the decline in forest biodiversity, followed by illicit felling, fuel wood collection and bamboo collection. Presently, hunting contributes negligibly as the activity is very limited. The role of FD’s plantation strategies for the forest degradation has not been explored.

Table 13 Pair Wise Ranking for Identifying Main Causes For Forest Destruction

	Clear felling	Fuel wood collection	Illegal felling	Bamboo collection	Hunting
Clear Felling	----	Clear felling	Clear felling	Clear felling	Clear felling
Illegal felling	Clear felling	Illegal felling	-----	Illegal felling	Illegal felling
Fuel wood collec.	Clear felling	-----	Illegal felling	Fuel wood collec	Fuelwood collec.
Bamboo collection	Clear felling	Fuel wood collection.	Illegal felling	-----	.Bamboo collec
Hunting	Clear felling	Fuel wood collection	Illegal felling	.Bamboo collection	-----
Rank	08	06	04	02	00

In order to investigate the underlying factors responsible for undertaking of these forest degradation activities by the local people cause and effect ranking was done and the outcomes are shown in Table 14 and Table 15. The exercises revealed that local poverty and unemployment are the main driving factors for the extraction of forest resources, followed by additional income needs and squeezed income opportunities. Some times

forest cases lodged by the FD and lack of some local resources are also driving the people for increased timber felling and including building materials (Table 14).

Table 14 Cause and Effect –Ranking (Understanding Underlying Facts for Forest Degradation)

Name of resource / Identified problems	Timber to sell	Fuel wood collection	Bamboo & cane sell	Hunting
Poverty	000	0000	00	
Unemployment	000	000	0	
Additional income needed	00	00	00	
Lack of house building mat.			00	
Forest cases (in Khadimnagar)	0			
Income opportunities squeezed	00	0	0	

FD’s poor forest patrol, easy negotiation with local FD staff, poor strength of local FD and emergence of increased local influential people are all contributing to illegal timber felling. Fuel wood collection has been linked to development of transportation system and marketing opportunities and drop in solvency level (Table 15).

Table 15 Cause and Effect (Investigating FD’s Management Practice and Local Situation)

Practice/management practice	Timber to sell	Fuelwood collection	Bamboo and cane collection.	Hunting
Poor forest patrol	00000	00	00	
Easy negotiation	00000	00	0	
Poor strength of FD /increased local strength	00000		0	
Transportation dev.	000	000	0	
Traditional practice	0000	0	0	
Increased role of local influential people	0000	0	-	

4.5 Exploitation of Forest Resources

A summary of information collected on resource exploitation from Khadimnagar Reserve Forest are provided in Table 16. A total of 11 different types of resource are extracted from the forest. Of them,) bamboo and fuel wood are extracted on a large scale, timber (includes both legal and illegal extraction) and building materials on a medium scale, wildlife, fruits, vegetables, sun grass etc. on a minor scale, while honey, cane, medicinal

plants on a negligible scale. Fig 11 shows the major resource extracting zones of the reserved forest.

The main purposes for resource extraction include meeting HH needs, selling for added income/and or to support and supplement livelihood.

Timber felling, fuel wood and bamboo collection, collection of house building materials, hunting etc. all are posing threats to the forest and its biodiversity through bringing qualitative and quantitative changes in the habitat and the wildlife they support.

Moholder, local poor people and unemployed tea garden laborer are the major categories of resource user.

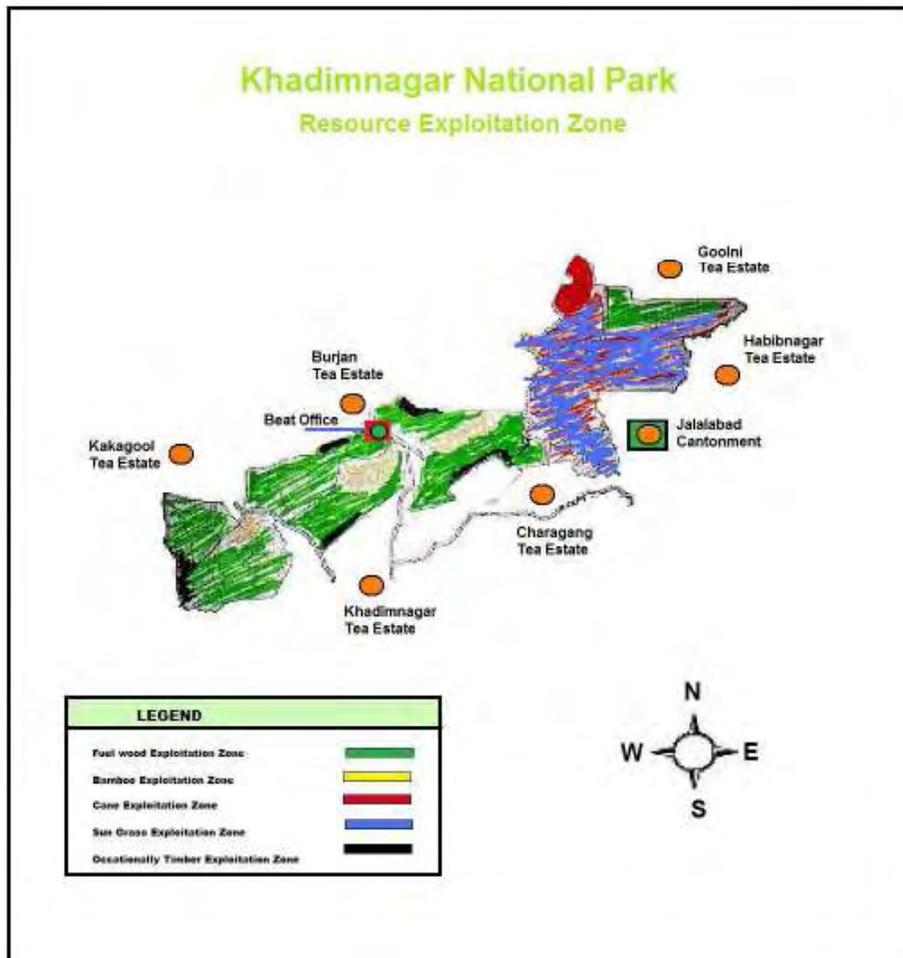


Fig. 11

Table 16. Information on Resource Extraction from Khadimnagar National Park

Sl. No	Name of resources	Resource collector	Purpose	Extent	Impact	Future Risk	Destination
1	Timber	Moholder, local poor people from adjacent villages, unemployed people from tea estates	For selling	Little	Reduce selectively large tree and forest thickness, loss of habitat and biodiversity	Medium	Local timber trader, sawmill, furniture shop, urban areas
2	Fuelwood	Local poor people, forest villagers, people from tea estates	For HH consumption Selling and HH comp. selling	Large	Loss of habitat, loss of forest biodiversity,	High	Local HHs, local markets, brickfired, transported to urban areas
3	Bamboo	Forest villagers, some local poor people from neighboring villages	Meet HH needs Selling for added income	Medium	Wild stock already heavily depleted, further extract aggravate the situation	High	Local HHs Local and nearby areas
4	Wildlife	Tea estates laborer Occasionally outsider	For consumption As hobby	Little	Stock heavily depleted	High	Local HHs
5	Building materials	Forest villagers Local poor people	Meet HH needs Selling for added income	Medium	Reduce abundance of small trees, loss of habitat, loss of wildlife	Medium	Local HHs Local markets
6	Honey	Local people	Own consumption	Negligible	None	Negligible	-----
7	Cane	Local people	HH use	Negligible	Little collected as they are not much available	Presently negligible	FD has many cane plantations
8	Fruits	Local people, children and women	Own consumption, few for sale in the locality	Minor	Hamper forest regeneration to a little extent	Little	
9	Vegetables	Mainly forest villagers and local poor people	Collect number of species of vegetables	Minor	No apparent impact	Negligible	
10	Sungrass	Local people,	Collect as house building mat.	Presently little	Reduce forest biodiversity	Negligible	Removed in the process of plantations
	Coal	Local People	Burning living and dead trees	Medium	Reduce forest biodiversity	Medium	
11	Medicinal plants	Few local people,	Occasionally collect some selective species	Little	Negligible	Negligible	

4.6.1 Seasonal changes in resource extraction

Table 17 shows the trend in forest resource exploitation by month. The exploitation of resources from the forest is season dependent. Most of the timbers are illegally felled during the rainy season as forest patrol is poor during that period. However, legal clear felling takes during the dry season. Fuel wood is mainly collected during dry season due to easy accessibility and mobility inside the forest during that time. Bamboos extraction mainly takes place in drier months that corresponds to local needs for house building. Medicinal plants, vegetables and some other forest resources are extracted to some extent mainly during rainy season. A little amount of honey is also extracted during summer (Baishakh-Jaistha).

Table 17 Seasonal Calendar of Resources Exploitation in Khadimnagar National Park

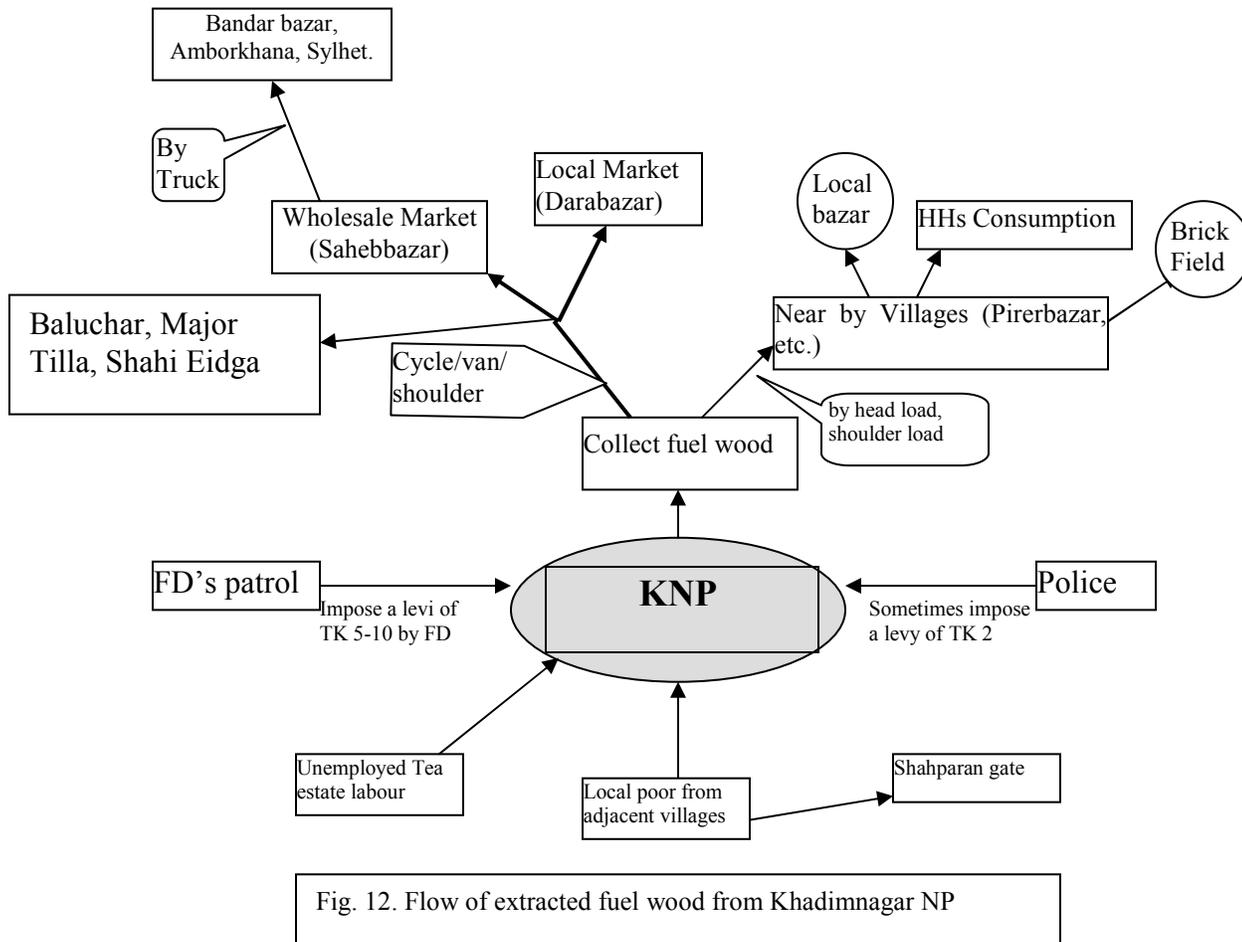
Name of Resources	Bais-hak	Jaista	Ashar	Shra-bon	Vadra	Ashin	Katrik	Agrah-ayan	Poush	Magh	Fal-gun	Chait-tra
Timber	00	00	00	00	00	00	00	000	000	000	000	000
Fuel Wood	00	00	00	00	000	000	0000	00000	00000	00000	00000	00000
Vegetables	00	0000	0000	0000	000	00	0	0	0	0	0	0
Bamboo, building materials	0	0	0	0	0	000	000	0000	00000	00000	0000	0000
Medicinal Plants	0	0	00	00	00	0	0	0	00	00	00	00
Wildlife	00	0	0	0	0	0	0	00	00	00	00	00
Honey	00	0	-	-	-	-	-	-	-	-	-	0
Coal	0	-	-	-	-	-	-	00	00	00	00	0

4.6.2 Important Resource Exploitation

4.6.2.1 Fuelwood collection

Extensive fuel wood collection is another practice in the reserve area that poses a threat to the forest biodiversity. This is a major and very visible activity in the RF. It is a year round activity, but major extraction occurs during the dry seasons. Fuelwood is collected both for household consumption and for commercial purposes.

Most of the collectors are adolescent boys and adults; both male and female. Most collectors are poor and supplement their income by selling fuel wood. According to local people that about 100-150 maunds (1 maund = approx. 37.5 kgs) of fuelwood is extracted for commercial purpose and another 50-60 maunds for household consumption every day. Some fuel wood collectors have substantial linkage with illicit feller and act as informative persons. Each male can carry or collect 2 Bhar (one shoulder load mean 1 Bhar equal to 2 boza or bundle that contains about 1 maunds of fuel wood), on the other hand female can collect 1 bhar per day.



As per local people estimate, about 100-150 people from the surrounding tea estate and nearby villages enter into the RF for fuel wood collection for commercial purposes and another 50-100 people enter into the forest to collect fuel wood for their HHs consumption, each day. As shown in Table 18, that the collectors are predominantly from few villages such as alurtal, , Mokamergul, Tikir potti, Dalaipara and neighboring tea estates, namely Charagung TE, Khadim TE, Burjan TE and Kalagul tea garden.

It is estimated that about 3-5% villagers are entirely dependant on this for their livelihood, and a much larger number of families undertake it to supplement their household income.

Table 18 Village Wise (Having) Distribution of Commercial Fuel wood Collectors in KRF

Sl no.	Name of villages	Fuel wood collector No.				Purpose of Use by the collector	
		Total	Male	Female	Children	Domestic use	Selling
1	Charagung TE	80	50	20	10	20	80%
2	Burjan TE	37	20	10	7	70%	30%
3	Kalagul TE	50	25	15	10	10	90%
4	Gulni TE	40	20	20	-	-	100%

Site-Level Field Appraisal: Khadimnagar Reserve Forest

5	Khadim TE	25	10	15	-	20%	80%
6	Alurtal	25	10	15	-	20%	80%
7	Tikirpotti	40	10	30	-	20%	80%
8	Dalaipara	30	10	20	-	20%	80%
9	Pirer chak	30	25	5	-	30%	70%
10	Bahar koloni	25	12	13	-	20%	80%
11	Sirajnagar	20	15	10	-	20%	80%
12	lagul	15	10	5	-	10%	90%
13	Faringura	30	20	-	-	10%	90%
14	Mokamergul	50	25	10	-	20%	80%
15	Kulati	25	15	7	-	25%	75%

Usually the fuelwood collectors enter into forest individually but occasionally they also enter by groups' consisting around 5 to 10 persons. After collecting a bundle of fuel wood, they carry it on their shoulder or head to the nearby convenient place from where they can transport or carry it easily to their selling places. Their main route of access to the forest is through the tea estates, roads and forest trails (Fig.12). In a FGD, the participants alleged that they pay between Tk. 5-10 as a levy to the FD for entering the forest to collect fuel wood. Access to the forest for collecting fuel wood is not restricted, if the levy is paid.

The collectors are allowed to collect dead branches of trees. However, in practice, sometimes they cut some young trees, and bundle them. Sometimes they leave the cut trees on the floor of the forest to get a dead appearance. They also cut the young valued timber trees and small bushy trees.

As shown in Fig.13 that a large number of women are engaged in fuel wood collection and as many as one third of them are female. The females who are engaged in fuel wood collection are used to sell almost one-third of their collected fuel wood for income whereas two-thirds is used for their household consumption.

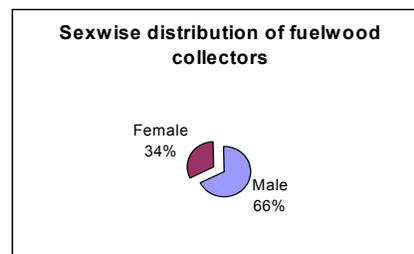


Fig.13

Besides the local household use, local tea stalls/ restaurants use fuel wood for burning in their kitchen that comes from the RF. Some local brickfields also use fuel wood for initiating fire in their kiln. Other local people buy fuel wood from the local market sold by collectors.

Fuel wood collected for commercial purposes mainly transported by cycle or as head or shoulder load to local markets where it is sold to fuel wood traders or to the local consumers; one wholesale market called Shahaparan, Majortilla, Shahebbazar, Pirerbazar from where fuel wood is transported to another place of Sylhet district by truck.

4.6.2.2 Timber extraction

Although timber is extracted in both illegal and legal way, timber extraction is regarded as the minor cause for the destruction of Khadimnagar Reserve Forest. Some people from the surrounding villages and tea estates are suddenly involved with the illegal extraction of timber

from the forest. The villages such as Faringura, Tikirpotti, Mokamergul, Kalagol bosti, Alurtal are mainly involved in this activity. However no illicit felling has been occurring now. In other villages, the numbers of timber poachers are few. Most of them poachers are poor. Besides, some unemployed laborers from some adjoining tea estates are also involved with illegal felling Charagung TE villages, Khadim Tea estates located near to the RF.

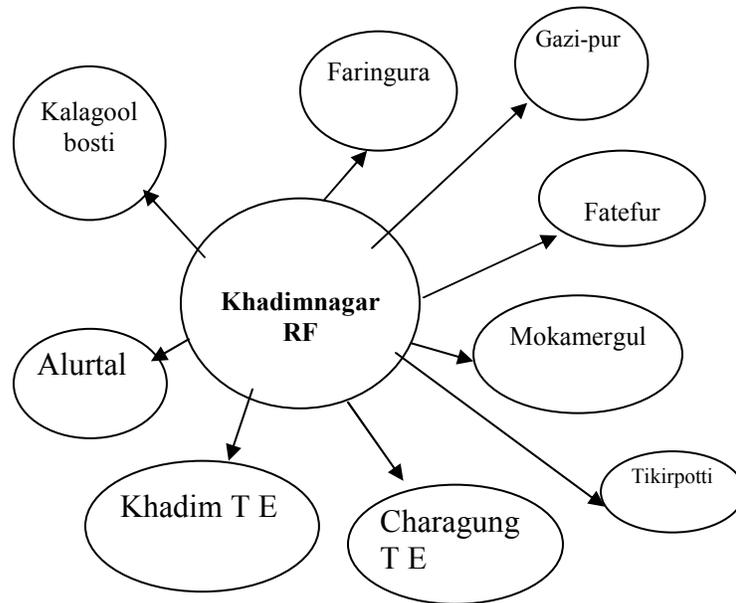


Fig .14. Relative stakes of different villages with illegal felling

They carry out this activity for supporting their livelihoods. As per local people, this activity provides cash income of taka 200-300 per day. Timber is extracted from the RF by two ways. One is legal way by clear felling, through auctioning by FD. FD auctions out different forest coupe/block for clear felling to auctioneers, locally called Mohalder. Another is by illegal felling. It is claim by the local people that illegally felled trees are smuggled out along with clear felled trees by the Mohalders. Fig.15 shows that the illegal fellers have linkage with different parties, including police, administration, local political leaders, FD etc. Both legal and illegal timbers are sold in the local market such as Sahebbazar, Pinerbazar, Shaparan to the timber traders. Then it transported to the various places of the country such as Sylhet, Companigonj, by truck, bus.

Different law enforcing agencies, such as police, RAB and FD check illegally felled trees at different posts. It appears that local Police play a positive role in this aspect, for forest protection.

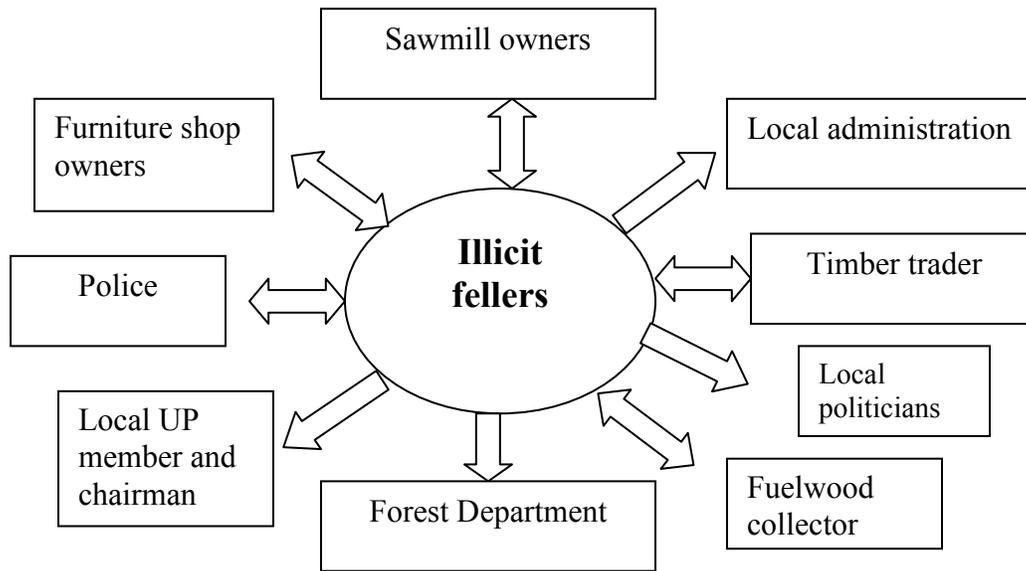


Fig. 15. Linkages of various stakeholders with illegal fellers

Trees felled mainly include the medium sized valued timber trees, like teak, chapalish, garjan, mehagoni etc. The activity is carried out at night and intensively during the rainy season when access to the forest is very difficult and forest patrol is restricted. But the mohalders felled the trees at dry seasons, mainly at daytime. However, the illegal fellers select the suitable trees during the daytime. Sometimes, they come across the forest patrol. Recently from last two years illegal felling has been stopped and occurred rarely.

4.6.2.3 Bamboo extraction

The process of the extraction of bamboo is more or less similar to timber extraction from the RF. The FD auctions out different forest coupe/block of bamboo called Bash (bamboo) Mahalders (auctioneers) at every two to three years. On the other hand, Tea estate villagers, local people collect bamboo illegally. However, there are groups of people are habituated with collection of bamboo either legally or illegally. Once there was a great abundance of natural Pencha bamboo in this forest. Due to the over exploitation and auctions as well as replaced by Zai bamboo plantation, the stocks of Makal and Mytinga are highly depleted. Mytinga bamboo is extensively collect both for household consumption and for sale. People from distant villages also come for collection of bamboo for household consumption. About 5% of the adjacent tea garden HHs are completely dependent of bamboo collection for their livelihood, while many HHs are also partially dependent on bamboo collection. In an FGD, the local participants claimed that for collecting bamboo illegally, they pay Tk.10 as a levy to the FD for eah entry. Access to the forest for collecting bamboo is not restricted, if the levy is paid.

Bamboo is also harvested through government auctioning from the reserve; however, in the current year there was no auction. Usually the illegally collected bamboo sent to Shahaporan bazar, Pিরerbazar, Shahebbazar and other local markets. The villagers use vans or carts to carry

bamboos to the market, occasionally they carry as shoulder load. The local bamboo traders transport bamboo to various places in the sylhet district by truck.

4.6.2.4 House building materials collection

House building materials are collected at a small scale from this forest, though this forest is situated far away from the settlements. The forest villagers collect their entire house-building materials from the forest. The Reserve area is also widely used by the surrounding rural population, mainly of neighboring tea estates, and people from the identified villages for collection of building materials. However, collection of building materials by them is not much. The building materials collected is mainly Bamboo, cane leaves and sun grass, sometimes-young trees of valued timber trees used as building materials for their houses.

4.6.3. Other Resource Collection

Different resource users also collect various other resources from the RF. Cane also collected at a negligible quantity from the forest. According to the FD, there was no natural cane in this forest but they introduced it by their plantation program since 1997. There are people in the adjacent villages of RF who collect vegetables and fruits from the forest. The vegetables collected include bamboo shoots (manthana), bonkachu (bandhugi), Alu, ramkala, thankuni, aorai kalai, karam, palong shak kachu, kachur lati, etc., mainly during rainy season. Very few villagers are involved with this activity. In addition, few people collect seasonal fruit from the forest. The main forest fruits that are collected by people are Chapalish, Kau, Kanthal, cane fruits and banana. The fruit collectors mainly collect these fruits for their own consumption. A few of them probably sell them to their neighbours or to markets for additional income. In addition, there is irregular hunting of jungle fowl by the tea laborers and local people for HH consumption. Sometimes few tea garden labour collected fodders from the RF. Sungrass are also collected from reserve forest.

4.7 Other causes for forest degradation

4.8 Local Community and Power Structure and Local Governance

4.8.1 Local decision makers and influential people

A total of 32 influential persons have been identified in the locality and many of them have control over the local people, their activities and even over local administration. Some of them have linkages with the illegal tree feller. Table19 provides the name and address of the influential persons, while Fig. 16 shows their domain and locations relative to the forest. The most influential person seems to be the local UP Chairmen of Khadimnagar and Khadimpara UP. There is another outsider influential persons who claims to be a relative of a powerful minister and has influence in the locality. Mr. Elias mia, another outsider from Kollogram, is a moholder and has good relations with FD personnel and the local MP.

Table 19 List of Most Influential Persons of Different Villages in and Around KRF

Sl no.	Name of most influential people	Designation	Name of Village	Union/Location
1	Md.Majaharul Islam Dalim	Chairman	Khidirpur	Khadimpara
2	Md Rafiq	Ex-Chairman	Pirerbazar	do
3	Md. Elias Mia	Mohalder	Kollogram	do
4	Md.Taleb uddin	Sawmill owner	Khadim chomuni	do
5	Mokles Mia	Political leader & Nursery Owner	Khidirpur	do
6	Muhibul Haq	Local elites & Ex Range officer	Khadimpara	do
7	Mr.Ranju	UP Member	Alurtal	do
8	Md. Joynal Abedin	Local elite	Alurtal	do
9	Md.Nazim Chowdhury	Local elite	Kollogram	do
10	Sabuj Thati	President, Khadim TE laborers	Khadim TE	Khadimpara
11	Tara mia	Sawmil owner & Local elite	Khadimpara	do
12	Lal mia	Sawmil owner & Local elite	Khadimpara	do
13	Manik mia	Ex chairmen, sawmill owner & Timber trader	Tillagor	do
14	Saidur Rahaman Enam	UP Member	Mokamergool	Khadimpara
15	Abdul Mazid Masum	Secretary, Social Development Affairs, Sylhet Human rights council Bangladesh.	Khadim TE	Khadimpara
16	Shyamol Shorma goush	President, Jagoron Youth Association	Khadim TE	Khadimpara
17	Jogesh	President, Gulni TE laborers	Gulni TE	Fatepur
18	Md. Monir uddin	Businessmen	Faringura	Khadimnagar
19	Md.Nura mia	Timber traders	Faringura	Khadimnagar
20	Mohibur Rahaman	Nursery owner	Faringura	Khadimnagar
21	Abdus Sahid	Local elites	Faringura	Khadimnagar
22	Abdul Jabbar	Ex Chairmen	Faringura	Khadimnagar
23	Md.Abdul Jalil Master	Ex Head master	Faringura	Khadimnagar
24	Amullah Bakta	President, Charagung TE laborers	Charagung T E	Khadimnagar
25	Md. Sirajul Islam	UP Chairmen	Amborkhana	Khadimnagar
26	Makon Nayek	President, Burjan TE laborers	Burjan TE	Khadimnagar
27	Sirajul Islam	UP Member	Burjan TE	Khadimnagar
28	Leven Nayek	President, Kalagool TE laborers	Kalagool TE	Khadimnagar

29	Asfaq Ahmed	Upazilla Chairmen	Amborkhana	Sylhet Sadar Upazilla
30	Md. Babul	Local elites & Political Leader	Bornagar	Fatepur
31	Manik member	Ex-UP member	Fatepur	Fatepur
32	Abul mal abdul Muhit	Political Leader	Local MP & Minister	Sylhet Sadar

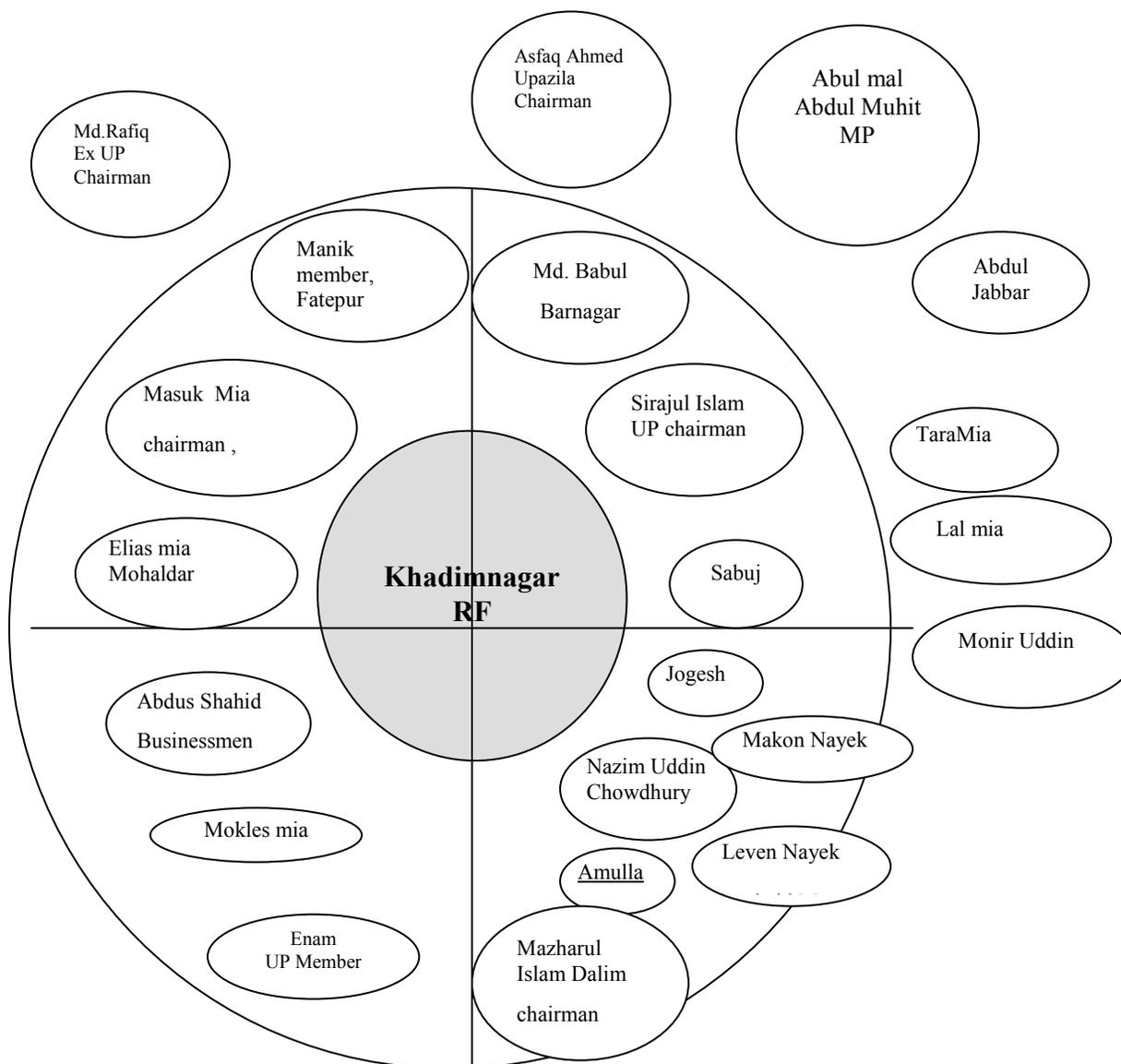


Fig. 16. Venn diagram of power structure showing the important local influential persons

4.8.2 Local governance

Local Union Parishad is the lower level local government entity and look after local welfare and development. It has also emerged as the main center for conflict resolution. The UP members, who are elected from different areas of the Union, look after their respective areas. The local public representatives are consulted whenever there is a local issue. There is also a new local organization, the Gram Sarker (Village Government), in each ward (village) and deal with all local issue, including welfare, development and dispute and conflict.

Police administration at Upazila level is the local law enforcing agency and are involved with maintaining local law and order situation. The police at Sylhet Sadar Upazila are very active and powerful. They are the authority to make arrests of warranted person by forest cases. They claim that they help in forest protection.

Khadimnagar Reserve Forest boundaries are bordered by Tea estate villages. The Tea garden laborers community has their traditional way of governance of their community. They are very organized community having respect to their community leaders called Panchaet. Fig.17 shows the relative involvement of different Government and Non-Government organizations in the locality for local welfare, development and administration

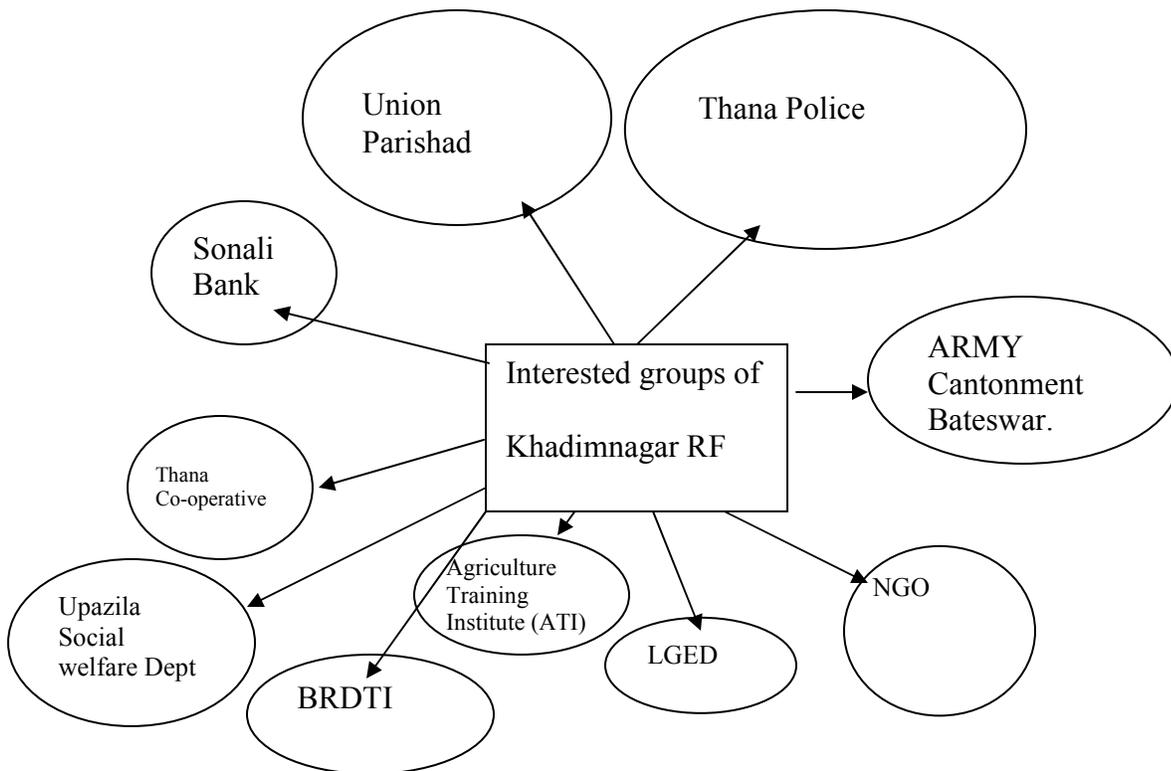
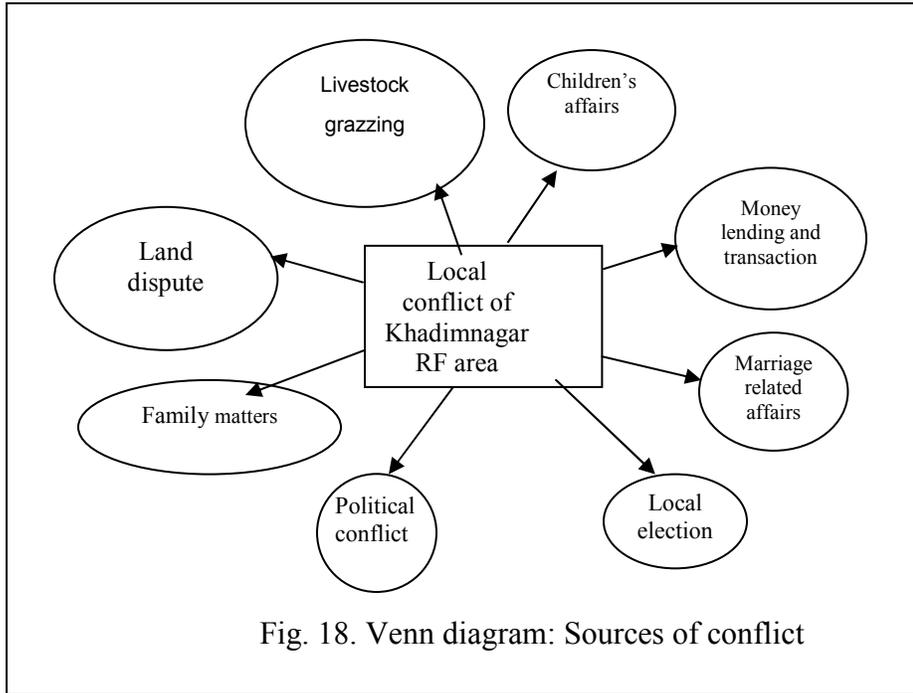


Fig.17. The relative level of stake of different institutions

4.8.3 Local conflict, conflict resolution, social adhesion and cohesion

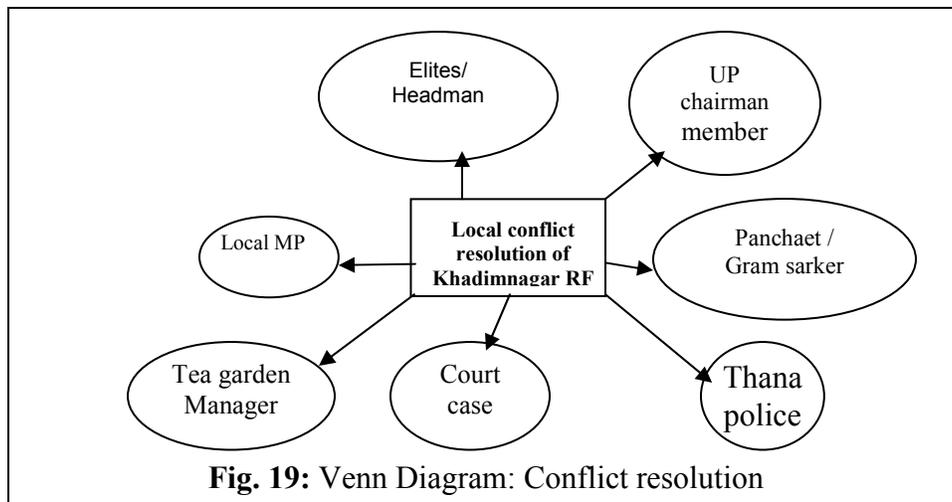
4.8.3.1 Sources of conflict

The main sources of conflict among local people are, land dispute, children affairs, livestock grazing, marriage related affairs, family affairs, money lending, local politics, local elections etc. Fig. 18 shows the major causes for local conflicts and their level of influence.



4.8.3.2 Conflict resolution

Conflicts are resolved by arbitration by local elites & public representatives (MP, UP chairman, members), Gram Sarker/Panchaet. If the local efforts are not fruitful it may lead to filing cases with Thana-police and ending up in courts.



4.8.3.3 Conflict with FD

There is a little conflict between with FD local staff and local people, particularly with tree feller from various villages. Sometimes there are direct conflicts with cowboys during patrolling, for cattle grazing.

4.8.4. Social cohesion and adhesion

Many social activities maintain social adhesion and cohesion among the villagers. Some of them are Eid ul Azha, Eid ul Fitre, marriage ceremony, Durgapuja, religious functions, collective action through local community organizations, etc.

4.9 Local Socio-economic Context

4.9.1 Demographic Profile

4.9.1.1 HHs

In total, there are approximately 3038 HHs (Table 7) in the identified villages having major and medium level stakes. Information regarding households for some villages were not collected. Of them, only 22 HHs belong to Ethnic Patra village.

4.9.1.2 Education

Table 20 presents information on the educational status of the area. It may be mentioned that extrapolation of data was made based on limited data collected through RRA exercises.

Among the tribal community, now day's 30-40% children go to primary school, only 10% go to High School and only 1% study in the colleges. Among the adult, about 80% are illiterate. (above 30 years of age).

Among the Bengalee, approximately about 45-50% adult are illiterate, about 40-45% children go to primary school, about 10-15% goes to high school and about 2-5% goes to colleges.

Table 20 Educational Status of the People in Different Villages Around The Khadimnagar Reserve Forest

Sl no.	Villages	Illiterate	Primary	Secondary	college
01	Mokamergul	50%	30%	19%	1%
02	Charagung TE	75%	24%	1%	-
03	Burjan TE	55%	40%	5%	-
04	Alurtal	40%	40%	20%	-
05	Kalagul TE	20%	68%	10%	2%
	Average	48%	40.4%	11%	0.6%

Source: RRA/PRA field exercise

4.10 Livelihood analysis

4.10.1 Occupation

The major occupations of the Tea estate villagers are day labourer followed by fuel wood collection. Almost all HHs of TE are engage with some sort of house building materials collection. On the other hand, the major primary occupation of Bangalees are agriculture (approx.65-70%), principally paddy cultivation, followed by day labour including (20-25%), fuelwood collection and timber poaching (3-5%), small business (2-3%), service (3%) and overseas employment (2%). The major secondary occupation is fuel wood and bamboo collection (5-8%), day labour (5-10%).

However, there has been shift in the occupation of the local people over time. Presently, the number of day laborers has increased with a decrease trend in involvement in agriculture (Table 21). Illegal logging has greatly increased over the past 15 years as a local occupation. . Occupation of some HHs from farming have changed to day labour, fuel wood collection, timber poaching and small business. Local people also adopted the other occupations like timber trading, furniture shops, and carpentry.

Table 21 Trend in Cchanges in Occupation of People Around Khadimnagar Reserve Forest

Sl	Occupation	Before 1971	Before 15 Years	Present
01	Agriculture	00000	000	00
02	Day Labourer	000	0000	00000
03	Business	00	000	0000
04	Fuel wood Collector	00	000	00000
05	Illegal Poacher/tree feller	00	000	00
06	Service	0	00	000
07	Timber Trader	0	00	000
08	Carpenter	0	00	0000
09	Sawmill operation	0	00	0000

4.10.2 Richness-poverty level

Table 22 shows that about 3-5% people of the area are rich, 20-25% are middle class, 55-60% is poor, and 17-20% is very poor. However, among the Charagung TE villages, poverty level is very high. About 70% are poor, 9% are very poor, 20% belong to middle class and only 1% is rich.

Table 22 Livelihood Status of The Adjacent Villagers of Khadimnagar Reserve Forest

Sl. No	Villages	Rich	Mid. Class	Poor	Extreme Poor
1	Mokamergul	5%	30%	45%	20%
2	Charagung TE	1%	20%	70%	9%
3	Faringura village	10%	20%	60%	10%
4	Burjan TE	5%	30%	60%	5%
5	Alurtal	5%	20%	50%	25%
6	Kalogol TE	5%	30%	55%	10%
	Average	5.10%	25%	56.66%	13.16%

Source: RRA/PRA field exercise

4.10.3 Unemployment

Unemployment is another severe problem that puts pressure on over exploitation of forest resources. In tea estates, on an average, about 20-25% people are unemployed. Among the villagers, about 5-7% people are unemployed. In average, about 15% local surrounding people are unemployed. However, there is a strong seasonal trend in unemployment level in the area. Unemployment is a major concern/problem in the area. According to the local people, the number of unemployed people increase during the dry season in Khadampara, Charagung tea garden, Mokamergul and Alurtal.

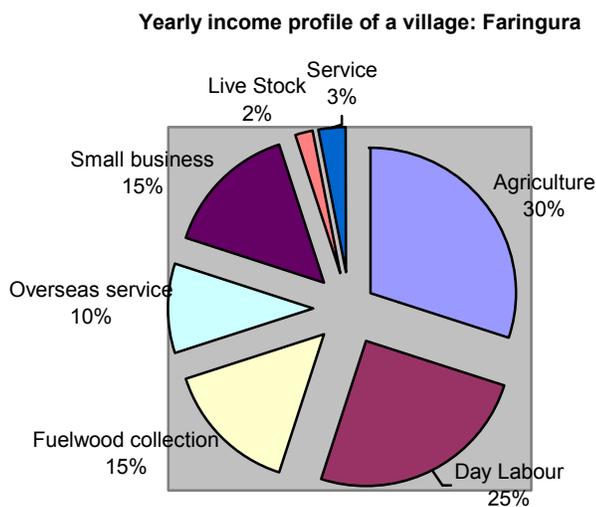
4.10.4 Credit

Several NGOs and one bank provide micro-credit to local people. Bank loans are mainly given for poverty reduction and integrated rural development through creating opportunity of IGA and also as seed money for agriculture and handicraft. NGOs provide credit mainly for IGA. NGO's IGA programs concentrate on small business, fish culture, poultry, livestock rearing etc. NGO credits are mainly focused on women. It was seen that local people also take credit locally from neighbors, relatives etc.

4.10.5 Income and expenditure profile

The Fig.20 and Fig. 21 present data on the income and expenditure profiles of a village, called Faringura village near Reserve Forest, respectively, as an example. FGD revealed that the major source of income in order of magnitudes is labourer, followed by agriculture, fuel wood collection, overseas services, small business, etc.

On the other hand, the expenditure profile shows that people spend major part of their income for purchasing food, followed by meeting cultivation expenses, clothing purpose, less for educational purpose.



% Expenditure profile of a village:Faringura

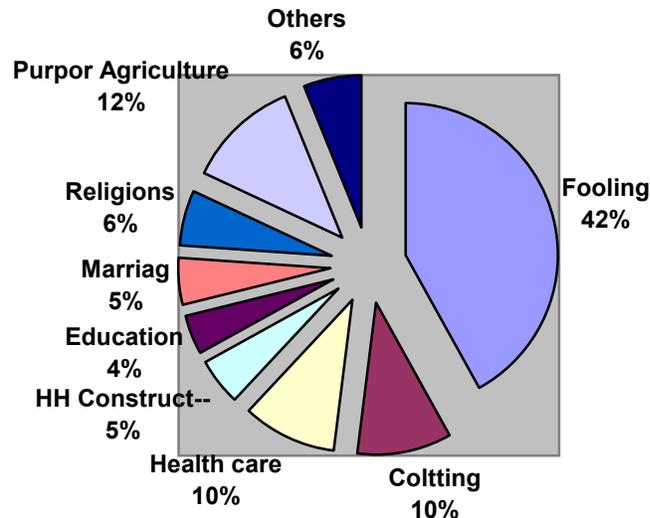


Fig.21

4.10.6 Skill & skill development opportunities

Overall, in the area, the number of skilled person seems to be very inadequate to undertake alternate generation activities. Skill development training provided by the NGOs are very limited and confined to some traditional areas of income generation. Local people, particularly the tribal, have got some skills, like bamboo basket and mat making, wooden made handicrafts (Patra Khasia). There are areas such as bamboo and cane handicrafts preparation, food processing and marketing, medicinal plants production and its marketing, cattle fattening, poultry, dairy, etc. Potential training and credit support in these areas could play a vital role in income generation of some of the local people and lessen their dependency on forest and at the same time very soft loan would help in undertaking these activities.

4.11 Social dynamics (Trend in changes in socio-economics)

4.11.1 General Dynamics

Table 23 shows the changes in some key socio-economic factors and local activities. Compared to 1970, there has been an increase in population; the expenditure of local people has increased with corresponding decline in solvency. Income of local people in terms of taka has increased, but at the same time livelihood expenditures have increased. Although, literacy rate has increased, unemployment rates have also increased. During this time, use of the forest for both as HH needs and income has increased. However, local food scarcity has reduced while opportunities for alternate income have increased.

Table 23. Trend in Changes in Some Socio-Economic Matrices of the Local People

Issue	Pre-1971	15 years ago	Present	Causes for change
Settlement/population	00	000	00000	Population growth,
Solvency	00000	0000	000	Livelihood expenditure increased, lack of added income and unemployment
Livelihood expenditure	00	000	00000	Increased price of goods, use of increased commodity
Literacy	0	000	00000	Awareness raising, increased educational opportunity
Unemployment	0	00	00000	Less cultivated land than pre- 1971, case in forest village, population growth, resource depletion
Use of forest for income	00	000	00000	Poverty, unemployment
Use of forest for HH needs	00	000	00000	Poverty, Population growth, easy access and no alternate source
Transportation and mobility	00	000	00000	Development of road communication and transport
Homestead plantation	0	00	0000	For income generation, HHs consumption, awareness
Food scarcity	00000	000	00	Increased employment opportunity and agricultural development
Credit and IGA	-	-	00	Increased GO, NGOs credit and IGA programs
Occupation	0	00	000	Increment of IGA and small business, day labour in forest

Note: 5 circles to indicate highest abundance/intensities/

4.11.2 Seasonal changes in socio-economics of the local people

Table 24 provides information on monthly changes in some socio-economic parameters and some resource extraction activities. Unemployment is higher during Baishakh-jaistha and during Poush-Magh. Timber felling is more during wet season while fuelwood collection is more during dry seasons. In summary, except timber felling, most forest resource extraction and related activities take place during dry months. Timber felling is inversely related to forest patrol. While there appears to be no direct link between seasonal unemployment and dependence on the forest resources, this is thought to be a causal factor in dependence.

Table-24. Seasonal Changes in Some Socio-Economic Matrices

	Baishak	Jaisthya	Ashar	Shraban	Vadra	Ashyin	Kartik	Agrah-ayan	Poush	Magh	Fal-gun	Chai-tra
Unemployment	0000	0000	0000	000	00	0	0	0	0	0	00	000
Accessibility to forest	000	00	00	00	00	00	000	0000	0000	0000	0000	000
Transportation problem	00	00	000	0000	0000	000	00	0	0	0	0	0
Brickfield/saw mill operation	00	00	0	0	0	0	00	000	0000	0000	0000	000
Forest patrol	0000	000	00	00	00	00	000	0000	0000	0000	0000	0000
Agricultural activities	000	000	000	000	00	0	0	0	00	00	00	000
Timber felling	00	000	000	000	000	00	00	0	0	0	0	0
Fuelwood collection	0000	000	00	00	00	00	000	0000	0000	0000	0000	0000
Bamboo	00	00	000	000	000	00	00	00	00	00	00	00
Building materials	00	00	0	0	0	0	00	00	000	000	00	00
Hunting								0	0	0		
Vegetable collection	000	000	000	000	00	00	00	0	0	0	0	0

4.12 Local Problems

Problem ranking exercise (Table 25) was performed to identify and understand the local level problems and its causal factors.. The major problems, according to the magnitude, are poverty, unemployment, road communication, electricity, drinking water, forest cases, etc.

Table 25. Local Problem and Their Causes and Possible Solutions

Name of Problems	Reason	Solutions
Poverty	Over population, unemployment, lack of capital to initiate IGA, lack of alternative income generating activities, lack of skills.	Creation of opportunities for new IGA and providing of credit without interest, skill dev. training, more NGO activities
Unemployment	Lack o f sufficient work, population pressure, Lack of education,	----- do-----
Education	There is no sufficient educational institution	Establishment of new technical & NFE schools, awareness, and financial support
Road communication	Road communication is not well in some area, most of the case, become difficult during rainy season	Local government and other concern agencies should give proper attention
Drinking water	Lack of deep tube well and fresh water	Need Government and NGO efforts to provide tub well and technology for safe water.

Electricity	Limited & interrupted electricity supply that hampers public life.	Electricity should be supplied through REB or PDB or introduce solar energy system
Forest case	Cases lodged by local FD against illegal resource extraction, sometimes causes are not valid	Illegal use of forest resource should be stopped. FD should not file any case based on falsehood.

A collation of problem rankings carried out during the PRA showed that poverty is cause for the use of forest. (Table 26).

Table 26. Pair wise Ranking of Some Local Problems

Identified problems	Poverty	Unemployment	Food security	Income needs	Fuelwood scarcity	Scarcity of house build. mat
Poverty	-----	Poverty	Poverty	Poverty	Poverty	Poverty
Unemployment	Poverty	---	unemploy	Income needs	unemploy	unemploy
Food security	poverty	unemploy	-----	Income need	Food security	Food security
Income needs	poverty	Income needs	Income needs	-----	Income needs	Income needs
Fuelwood scarcity	poverty	unemploy	Fuelwood scarcity	Income needs	-----	House build. mat
Scarcity of. H. build mat.	poverty	unemploy	House build. mat	Income needs	House build. mat	-----
Total	10	06	02	08	01	03
Rank	1	3	5	2	6	4

4.13 Gender Issue

4.13.1 HH decision making

Table 27 shows the role of different family members in taking HH decisions and Fig. 22 shows the relative level of influence of different members of the family in decision making. In Khadimnagar area, the husband takes the major HH decisions, followed by wife and sons. Daughters are rarely consulted in decision making. Women of ethnic community have a major role in many HH decisions making.

Table 27. Information on Family Decision-Making (Khadimnagar)

Name of decision	Husband*	Wife	Father	Mother	Elder Brother	Younger Brother	Son	Daughter
Marriage	0000	00					00	0
Sowing crops	000	000					00	
Land purchase	0000	00						
Land selling	0000	00						
Treatment	000	00						
Education	0000	000					00	0
Tree selling	000	00						
House making	0000	000						

Cattle Purchase	0000	00						
Loan	000	0000						
Savings	000	0000						
General expend.	0000	000						

** Husband is the head of the family, N.B. 4 circles have used to indicate highest intensities

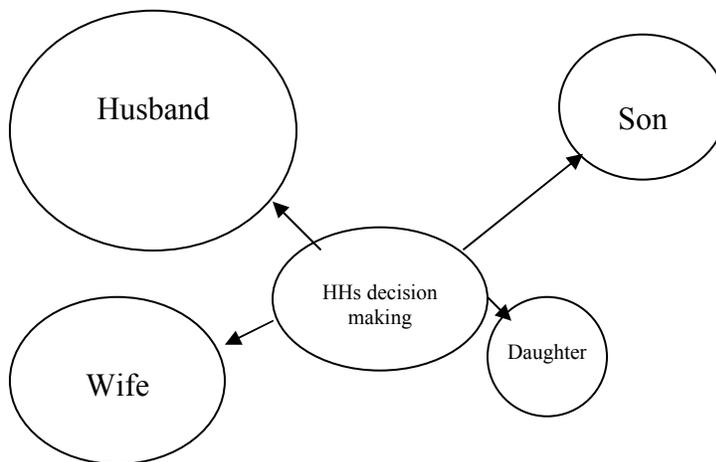


Fig. 22. Ven diagram of Family decision-making:

4.13.2 Outdoor mobility and access to credit and IGA

Table 28 shows that the women of the area have moderate mobility. Participation to social events by women is comparatively less than males. But in the cases of IGA & credit, the women have much higher access than the man. The cause behind this is that the credit providing organizations or NGOs prefers female than to male for providing credit. Women are moderately discriminated in case of employment in jobs, business etc. However, in the ethnic community, this picture is quite different; women are more involved in earning.

Table 28. Mobility and Participation in Social Events and Access to Credit and IGA by Male and Female in Khadimnagar Landscape Area.

	Outdoor mobility	Participation in social events	Access to credit	Access to IGA	Education	Employment
Male	0000	0000	0	0	000	00
Female	00	00	00	00	00	0

4.13.3 Workload of Local Male & Female

Generally, the in the Bangalee community, men have more work during Jaistha to Bhadra and again during the winter months. The females have more work during the dry months and the periods that correspond to the local agricultural activities. However, in the Tea labour community (Table 29), the women have more work than men except the month of agrahayan. In general, women in the locality have a lower workload than the men.

Table 29. Seasonal Workload of Male and Female for Khadim TE Villages

Months Sex	Baishakh	Jaistha	Ashar	Shrabon	Bhadra	Ashwin	Kartik	Agrahayan	Poush	Magh	Falgun	Chaitra
Male	000	000	000	000	000	000	00	00	00	00	00	00
Female	0000	0000	0000	0000	0000	0000	0000	000	000	000	000	000

4.13.4 Daily work load

Fig. 23 and Fig. 24 show the daily work chart of male and female, respectively, in a Patra family in Khadim Tea estate village. The females are typically involved with the household work and collect fuel wood, vegetables, and outdoor work. The males mainly do the outdoor works related to income generation.

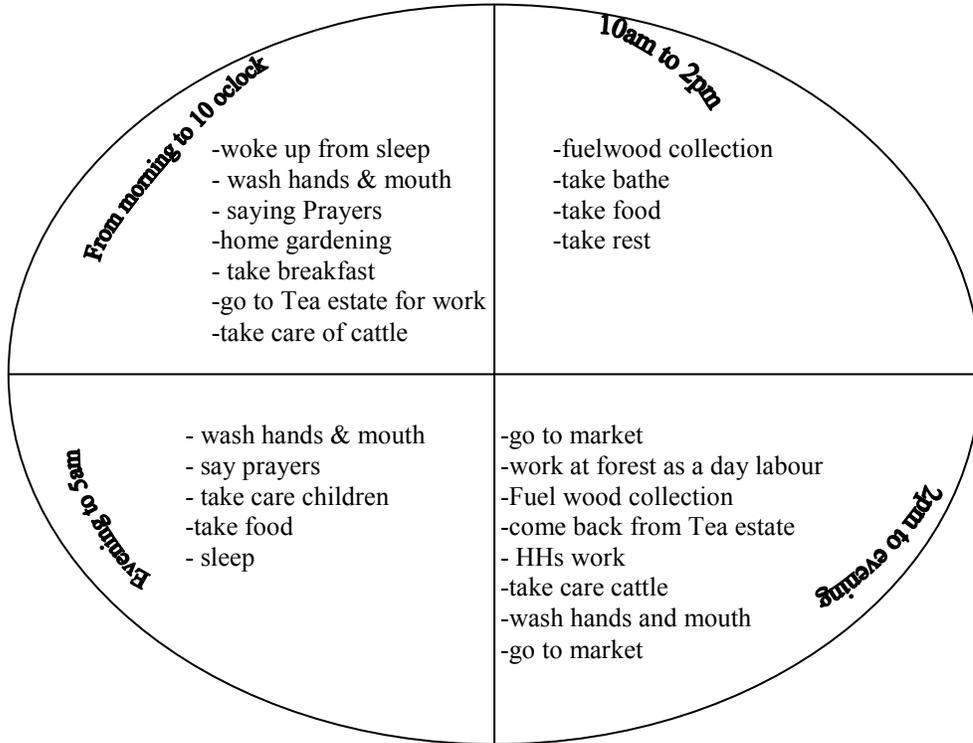


Fig. 23. Daily Work Chart of Men of Khadim TE Village

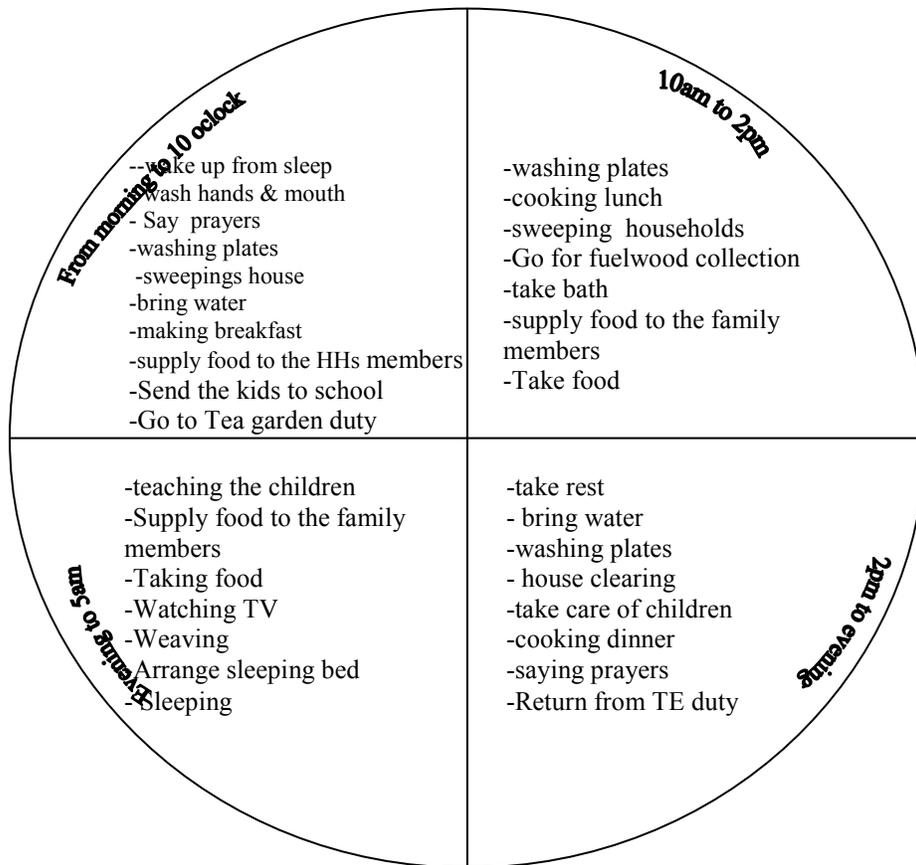


Fig. 24. Daily Work Chart of Women of Khadimnagar TE Village

4.13.5. Education

The overall literacy rates of male and females are close. In recent years, the numbers of school going girls are higher than the boys. However, in case of higher studies girls are behind the boys (Table 30). Overall, females are less educated than the males.

Table 30. Comparison of Educational Status of Male and Female in Khadimnagar Landscape Area

Overall literacy (based on adult)		Educational level (based on students)				
		Primary	Secondary	Colleges	Above	Informal
Male	000	0000	00	00	0	
Female	00	00000	00	0		

4.14 Local Level Awareness and Behavior

Local people know about some of the rules of forest Acts, but most of them do not know the significance of the RF. About 75% people are aware of the RF and many people know about some restrictions in the RF. Compared to male, female are less aware of it.

In Khadimnagar, people are aware about the degradation to forest and forest resources and its adverse impacts. They have a positive attitude towards conservation. However, local people know little about rules, regulations for the use of the reserved forest. Initial response of local people and FD staff towards the project was positive. As per local people, alternate income generation provision for the local poor people would be helpful for the successful implementation of the project. The ethnic community is well behaved and cooperative.

Most of the local Bengalese is also good people. However, some of them are rude. Reaction to IPAC is mixed. Some people expressed their concern that if the program affects the livelihood of local people they will not cooperate and may oppose the program. Initial response of the local people and FD staff towards the project is very positive and villagers are willing to cooperate.

4.15 Resource Regeneration & Plantation Practices

4.15.1 FDs Plantation /Product forestry by FD

The plantation policy for the Khadimnagar forest appears to be concentrated on the production of timber, cane, bamboo and some other forest products, with planning, establishment, management and harvest under the centralized control of the Forest Department. Initially the natural forest was covered mostly with inferior quality natural bamboo (*Dendrocalamus Hamiltonii*) FD records show that these natural forest were gradually felled with substituted by tree plantations in Khadimnagar Reserved Forest started in 1951 and up to the period 2004 about 2090.50 acres area have been planted by long rotation specie's. Moreover, total 200 acres short rotation species planted from 1987 to 1989. Bamboo and cane plantation were established from 1981 to 2004 in 618.00 acres and 563.15 acres respectively. FD records shows that about 217 species of trees were used in planting the forest. Intensive plantation of the forest occurred during the period 1980-1995. The later plantations include mainly short-rotation monoculture plantations mostly with exotic, rapid growing species. The commonest species for the short-rotation plantation are Akashmoni, Mangium and eucalyptus. The FD has also planted cane and bamboo in a substantial area.

Plantation practice: Plantation of the forest included clear felling of the original forest, burning of underneath vegetation. Although illegal logging has been stopped in the natural forest, FD continues to clear cut the mature plantations both inside and in bordering of the reserves.

It was expressed in an FGD that the FD's plantation strategy for Khadimnagar is still guided by the production forestry. Along with the traditional plantation practice with valuable long rotational timber trees, present plantations in RF include Dhakijum, Chickrassi, Chapalish, Agar, Garjan, Champa, teak, as well as short rotation exotic trees (i.e. Acacia hybrid, Mangium, Eucalyptus, Pine, Akashmoni, malakana) with mono species. Beside this bamboo and cane have been and being planted in many blocks. Cane has been planted as undergrowth.

4.16 Law Enforcing Mechanisms

In Khadimnagar, forest patrol is inadequate and FD staffs are not sufficient to protect the forest from illegal timber and fuel wood and other resource extractor. As revealed from FGD, FD staff does not serve the purpose of checking illegal timber adequately due to lack of sufficient staff. Sometimes forest cases are filed against innocent villagers and this activity fall them in the cycle. Local police takes lot of interest in enforcing law. However, ARMY cantonment located near in the northeastern side of KNP also acts as protection of illegal timber transportation.

4.17. Status and Role of ethnic community

There is no forest village located inside the Khadimnagar RF but there also inhabited ethnic community called Patra (Kashia) community surrounding the reserve forest, Like Foringura, Dalaipara, Ramnagor, Kalagoo bosti they are partially dependent on forest. They collect vegetables; house building materials and fuel wood from the RF. At present 70 % of the Patra are day laborers. Though they are partially dependent on forest resources for their livelihood but due to a small number of populations, this has overall little impact on the RF. There have no innate tendency of encroaching land or establishing new settlements inside the RF. In the Foringura village, male HHs members of ethnic Patra community are involved in wooden made handicraft practices. However, they have some expectation from the project that IPAC should provide some support to improve their livelihood development strategies.

4.18. Short listed Potential AIGAs

Name of AIGAs:

- 1. Home Gardening**
- 2. Fish Culture**
- 3. Poultry Rearing**
- 4. Cow Rearing and Fattening**
- 5. Plant Nursery**

Short listed Potential Enterprises

Name of Enterprises

- 1. Eco Tourism**
 - 1. Eco Tour Guide**
 - 2. Eco Cottage**
 - 3. Picnic Spot**
 - 4. Tourist Shop**
- 2. Bamboo and Cane Base Product Development**
- 3. Wooden Product Development**
- 4. Sewing and Tailoring / Weaving**
- 5. Improved Cooking stove**

5. Threats, Issues, Opportunities & Challenges for the Project

5.1 Threats to the Park and its Biodiversity

5.1.1. Clear felling and illegal timber felling

Matured plantations were cleared felled through a process of auction. The auctioneers were usually the local influential and very powerful person. They cut everything within their auctioned area. They removed the herbs as well as facilitated carrying and transportation of logs. It was alleged that some illicit felled timber was also smuggled out along with the clear felled timber. Widespread timber felling in the past caused to the reduction in the forest coverage, but was replanted with short rotational plantations. Timber felling was still widespread within the past RF area and selectively large trees were removed. The entire process poses most threat to the RF

5.1.2 Collection of fuelwood, bamboo and other house building materials

Collection of fuel wood, bamboo and house building materials are widespread within the RF and remain as important threat to the biodiversity of the KRF. The collection of these forest resources removed the indigenous, non-traditional timber trees and small trees and shrubs. All these contribute to forest regeneration and poor abundance of these exploited species.

5.1.3 FD's production forestry

FD aims at increasing the valuable timber trees to get the maximum biomass from the forest. Therefore, plantations are done with short rotational tress of rapid growth. Very often, exotic monoculture plantations are done. They also plant bamboo and also cane as undergrowth. This causes a great threat to the diversity of both plants and animals. Plantation practices include clearing of land and subsequent weeding to facilitate plant growth. This practice is also hampered the natural regeneration of the forest and reduces the biodiversity and thus this plantation practice remains as one of the major threat to the park biodiversity.

5.1.4 Livestock grazing

Livestock, mainly cattle and buffalos, grazing is widespread within the Reserve area, particularly during certain period of the year the cattle brows on seedling and undergrowth and thus interfere with natural regeneration of the forest

5.1.5 Hunting

Although not widespread, the local Tea laborer community hunt /trap some wildlife, the important species sought are Gui shap, small deer, jungle fowl, Matura, sometimes monkeys and some species of birds. It is reported that sometimes people from distant places come to the forest for bird hunting. Therefore, pose a threat to the wildlife of the park as their population is now highly reduced. It may be mentioned that in the past widespread hunting of wildlife contributed to serious decline in the resources. Hunting activities are not happening now in KNP.

5.1.6 Eco-tourism Activities

A large number of people visit the park during the winter on holiday, mainly for picnic purposes as well for nature observation. They enter the park and walk through the forest. At present, there have no sufficient tourist facilities like seating place, Trail indicator, Signboard, tourist shop, eco tour guide and water supply etc. If tourism is not planned, it could be a serious problem in future.

5.1.7 Medicinal plant: Udal (Ulotkombol) collection Activities

Collections of medicinal plants like udal/Ulot kombal are widespread within the RF and remain as important threat to the biodiversity of the KRF. The collection of these forest resources removed the indigenous species.

5.1.8 Coal extraction Activities

Coal extraction from RF is one important illegal practice, which is another important threat to the biodiversity of the KRF. Some natural trees gradually disappeared due to continuing this practice

5.2 Issues of Concern

The following are the major problems that need to be addressed in order to sustainable forest management of the Khadimnagar Reserve Forest.

5.2.1. Reduced forest regeneration: Mainly caused due to fuel wood collection and cattle grazing. Regeneration is required for brining back wilderness in KRF and it should be major option for the management of the KRF.

5.2.2. Over- and unsustainable resource exploitation: Mainly include collection of fuel wood, bamboo, building materials etc. and causing depletion in biodiversity. Project needs to address this issue.

5.2.3. Local dependence on the forest resources: Almost all tea garden labors and many HHs from nearby settlements depend on fuel wood, bamboo and other building materials for HHs needs and many HHs depends on it for their livelihood. Utilization of forest by local people causes harm to biodiversity. Thus this emerges as an issue of concern for the project.

5.2.4. Poor forest management by the FD and lack of specific Khadimnagar National Park Management Action Plan: As became apparent from the appraisal process that the forest is poorly managed by the FD, primarily due to lack of adequate and skilled man power for PA management, lack of logistics and incentives. Besides, the poor morale of local FD staff has been

identified as a major cause for illegal use of forest. Most importantly, there is no specific management action plans for the Khadimnagar RF and therefore these are important issues for consideration.

5.2.5. Local poverty and unemployment: Local poverty and unemployment have been identified as the driving forces for the illegal forest use by the local people. Unless the problem is reduced it is unlikely to achieve success in the implementation of the project and therefore draws particular attention for addressing the issue.

5.2.6. Lack of awareness among local people about biodiversity conservation: There is serious lack in understanding about benefit of biodiversity conservation and need for sustainable management of forest resources among the local people. It seems that enhancement local level awareness could help in the implementation the project.

5.2.7. Poor law enforcement for forest protection and role of local police administration: Forest patrol is inadequate to check illegal tree felling. Often, the fellers are organized armed gangs. The help from the other local law enforcing agencies is not adequate, rather the activity of local police is not sufficient to forest protection.

5.2.8. Changes in the landscape: Except for 679 ha area, the remainder of the KRF have been converted to plantation and thus brought a change in the original landscapes and its associated elements.

5.3 Challenges for the Project

The possible challenges for the project could be:

▫ **Stopping fuel wood, bamboo and building material collection:** As there is little alternative source for these resources in the locality and as livelihood of many HHs are dependent on this, it will be difficult to make a ban on the collection of these resources. Therefore there will be a huge task in addressing the issue.

▫ **Reducing local poverty and unemployment:** Unless the issue is not addressed, the illegal use of forest resources may not stopped. However, probably, it will be a difficult job for the project to address this issue.

▫ **Reversing FD's production forestry policy in favour of biodiversity conservation:** FD's production forestry is century old and therefore they are used to it. This still remain lucrative as it generate huge revenue for the government. The issue of biodiversity conservation is still to override the issue of demand for timber in the country. In the back drop of this scenario it will be difficult for the project to introduce practice for the conservation of biodiversity.

▫ **Establishing co-management regimes for biodiversity conservation:** Approach for resource management involving the various stakeholders is new in the country. It will be a huge task for the project in bringing the parties, particularly the local community on board could be a difficult job and to ensure their participation in all stages of project implementation.

5.4. Opportunities

- **Positive responsiveness of the local people:** The general people showed interest in the project. This aptitude of local people could utilize to ensure their participation in the project and thus will help in establishing co-management.
- **Eco-tourism development:** A large number of people visit the park. If Tourist facilities and infrastructures are developed, this will attract more visitors and ecotourism could be planned accordingly.
- **Buffer zone plantations:** There are huge denuded forest areas surrounding the park. This land could be brought under social afforestation schemes and could be used for sustainable resource exploitation zones. This scheme may reduce the dependency on the park's resources.
- **Scope for alternate income generation activities:** There is a good scope for undertaking various AIG activities, such as Home gardening, basket making, handicraft making, poultry, cattle fattening, tailoring, fish culture etc. This will help to reduce dependence on forest uses.
- **Habitat restoration and rehabilitation:** Still there are denuded areas within the RF, created due to clear felling and these areas could be brought under plantations with indigenous and eco-friendly plant species.

6. Suggestions and Recommendations

6.1. Poor forest management by the FD has been identified as one of the major causes for the forest degradation. Therefore, there is an urgent need to strengthen the local FD in the RF with adequate and skilled manpower and to capacitate them in dealing with co-management of Protected Areas. Specifically the FD may strongly consider the following:

- Adequate staffing, particularly for forest patrol under a skilled PA management manager
- Capacity building training for all local forest managers on sustainable management of forest resources and biodiversity conservation
- Providing appropriate logistics, like vehicle and modern arms and ammunitions for local FD
- Provision for providing incentives to local FD staff to make the job lucrative
- Steps for improving the morale of FD local staff and make them dedicated to biodiversity conservation
- Erection of fencing at strategic places of the park
- Provision for strong monitoring and supervision of local activities by a central cell.

Scientific and Technical Management of the RF

6.2. An appropriate, site specific and technically sound management Action Plan should be developed with consultation of local people. The action plan, among others, should have the following provisions:

- a plan of action for re-introduction and rehabilitation of endangered plants and animal species
- a plan of action for habitat restoration and rehabilitation
- a plan of action for protection and sustainable use of forest resources and biodiversity
- a long-term biodiversity monitoring plan to measure the changes in the biodiversity in the RF, not only targeting the measuring the changes caused due to project implementation

Some specific suggestions:

1. Clear felling from the RF should be stopped for conserving the biodiversity.
2. Plantations with exotic trees must be stopped and no long term strategies should be taken for plantation of the forest, rather principle of increasing wilderness by natural regeneration processes should be followed.

3. Short-rotational plantations with exotic trees should gradually be replaced with indigenous species. To this end, the plantations which have reached near maturity (around 15-20 years) may be clear felled and be planted with indigenous species with a focus on fruit bearing species.
4. A rehabilitation scheme should separately be considered for the non-human primates, the most important component of the Khadimnagar RF ecosystem. To this end the following could be considered:
 5. Re-establishment of habitat continuity between the fragmented habitats of the wildlife
 6. Plantation scheme with food trees suitable for non-human primates
7. Considering local dependence on the forest resources, sustainable use of some resources like vegetables, honey, medicinal plants and other non-timber forest products may be allowed.
8. Fuelwood, bamboo and the collection of some other major building materials should be stopped on a short term basis, but this may not be a success as long as there is a scarcity of its supplies in the area. However, once the stock is recovered it may be possible to exploit the resources on the basis of principle of sustainable use. Therefore, project should strongly consider the following:
 9. Establishment of a buffer sustainable resource use zone around the PA with provision for fuelwood plots, woodlots and other plantations required for house building purposes
 10. Providing resource substitution (for example, commercialization of fuel made of rice husk and others)
 11. Promotion of fuel efficient stoves in the locality
 12. Promotion of homestead plantations

Project activities targeted to local stakeholders

6.3. Poor resource users, particularly those who are dependent on the forest for their livelihood, should be identified and brought under AIG programs with provision that they give up the unsustainable use of forest resources. The possible AIG opportunities include, cane and bamboo based handicrafts, Home gardening, dairy and fish culture, poultry etc.

6.4. Attempts should be made to bring the local elites on board with the concept of forest protection. In particular, the project needs to consult local public representatives, including local Chairmen and members of union parishad and Upazilla Chairmen, MP, and involve them, at least in advisory role. The project should also work with existing local community organizations identified under the appraisals.

6.5. Awareness raising activities should be carried out on a priority basis in the area to make the people understand how they could benefit from this project

6.6. As there are many allegations about the local police helping the illegal resource users, (illegal tree fellers in particular), strong dialogue should be initiated with them involving the higher authority. A similar approach may be taken in the case of other law enforcement authorities, particularly with ARMY, to ensure the effective involvement of law enforcement agencies at the local level.

6.7. Forest cases against the local people have led to increased incidences of illegal tree felling. These cases should be reviewed and withdrawn, if necessary, as a trade off for the people's future role in the project.

6.8. Planned eco-tourism may be promoted in and around the Khadimnagar RF with provision for generating local funds for forest management and welfare of the local people.

6.9. The project should make an effort to negotiate with local development partners/agencies to extend their social welfare services to the area.

6.10. As an initial step, the project should concentrate its activity in Faringura, Khadim TE, Charagung TE, Kalagul TE, Mokamergul, Alutal, Dalaipara, Kulaoti etc. villages and later with the other identified villages having minor/negligible stakes.

6.11. The project should initiate dialogues with Moholdar, sawmill owners, fuel wood traders and furniture shop owners of Shahparan, Shahebbazar, Darabazar and Kkadim chomuni on a priority basis and later with the same of other local bazaar.

6.12. The project should also initiate dialogue with the surrounding tea estates, like Charagung TE, Khadim TE, Kalagul TE, BurjanTE, Gulni TE and Habibnagar tea estates etc. The discussion should at least concentrate on the possibility of habitat continuity between RF and the tea estate's forest/plantations for wildlife and the common interest for biodiversity conservation.

6.13. The project should also make provisions for generating a scientific and social knowledgebase about the RF. On an immediate basis, a comprehensive faunal and floral inventory should be made. Investigations into the threatened categories of plants should be made on a priority basis and a management scheme for their protection and rehabilitation should be developed.

Annexure-1

Summary Activities (pictorial description)



Discussion and Planning by PRA team at IPAC NE Cluster office before starting RRA/PRA activities in KNP



Base map of KNP at beat office



A natural stream flowing through the Khadimnagar National Park



Picture shows a forest coverage and species density near Khadimnagar beat office at KNP.



Wooden made handicraft- made by Patra (Khasia) community in Faringura village



FGD in Faringura village with Patra khasia Samprodai community.



**A forest tree burning for making coal at
Khadimnagar National Park**



**Conversation of log in to small pieces for using as
a fuel wood by the resource collector**



A forest trail used as a poaching route by the resource collector



A forest trail used as a poaching route by the resource collector



A new generation of ethnic Patro Samprodai (Khasia) community at Faringura village near KNP.



Head load of bamboo & fuel wood collected from Khadimnagar NP



Selling Fuel wood at Alurtal area by the resource collector



RRA team discussed with local community at Faringura village

Annexure-2

Checklist of questions of RRA for FGD, KI and HHs interview

a. Checklist of questions for FGD

I. Stakeholder Assessment

1. What are the settlements/villages from where the people come to the forest and collect resources? Please indicate its location on the map.
2. What are the different categories of people who collect different resources from the forest?
3. At what extent the local people depend on the resources they collect from the forest for their livelihood, please specify for each category of resource users group?
4. What are the local organizations/institutions which are involved with the development /management of the forest or its control or its resource exploitation/and or degradation? What are the activities of these institutions/organizations?
5. Please indicate how the different resource users and other stakeholder groups interact with each other or inter-linked with each other.

II. Resources and resource status

6. Which plants and animals have disappeared from the forest in the recent past?
7. Which plants and animals in the forest have been declining very rapidly?
8. What are the causes for the decline of these animals and plants-Ven diagramming
9. What are the major shifts in the abundance of various resources over time? Compare between pre-liberation and present status? ---Trend analysis

III. Power structure and local conflict

10. What are the sources of conflict among local people?---ven diagramming
11. Whom do the local people go for conflict resolution?
12. How the local conflicts are resolved?
13. What are the events that bring the local people together?----ven diagramming

IV. Resource exploitation

14. What are the various resources that are collected from the forest and who collect what? Please indicate on the format. ---use format
15. Exploitation of which resources is posing threat to its future availability?
16. Please indicate how exploitation of different resources varies with different seasons? ----- Seasonal analysis
17. Which animals and plants are collected more and which are collected less?
18. When there is scarcity of fuel wood in the locality and indicate how it varies with season? –seasonal calendar
19. Do the local people collect medicinal plants from the forest? Are they available now a day?

V. Demographic profile

20. What are major occupations of the people of the locality? Please rank them.
21. Are there many illiterate people in the locality? Do many people go to High school, college, and universities? Please rank them and indicate on the format
22. Do you think that the occupations of people in the locality have changed over past (30-50 years)? Please indicate the shift in occupation local people over time? Format, in which occupation the shifting have occurred (Trend analysis).

VI. Socio-economic activities/livelihood strategies

23. What are the major activities for earning of the local people and rank them according to their importance?
24. Are there many people who have no land?
25. Are there many people in the locality who have no work to do?
26. Please indicate how the availability of work changes with seasons?
27. What the local people do when there is less or no work for them to do
28. Do many people in the locality take loan from, bank NGO or other organizations and please mention the reasons for taking loans?
29. Do the local people get income generation training from various organizations?

VII. Gender issues

30. How do the roles of men and women differ in this community?
31. What are the different thing men and women do concerning the forest and forest products?
 - a. Does the male and female are equally educated in the locality?
 - b. Who take the decision for HH purchase, undertaking income generation activities etc. - male or female?
 - c. Do the females have access to loan and IGA as the male have?
 - d. Is the female are associated with forest management?
 - e. Please indicate on the format, what daily works are done by the male and what daily works are done by the female?----- Chart

IX. Others

32. What are major the NGOs operating in the locality? Please indicate their activities on the format?
33. What are major challenges for the conservation of forest resources?

b. Checklist of questions for Key Informant (KI) interview

Stakeholders Assessment

1. What are the organizations/institutions, which carry out any type, work in the forest?
2. What are the villages from where people come to forest for collecting resources? Please tell which villages are more involved and which are less involved?
3. What are the different categories/groups of people who go and collect various resources from the forest?
4. Who are the other people who don not use forest resources but have linkages with resource exploitation and development of the forest?
5. Are there any people who can be important for the conservation of the forest and its resources?

Power structure and local conflict

6. Who are the more influential people in your locality? Tell who more and who are less influential among them
7. What are the sources of conflict among local people
8. Whom do the local people go for conflict resolution
9. How the local conflicts are resolved
10. What are the events that bring the local people together
11. Have the local people any conflicts with Forest Department? If yes, what are those?

Resources and resource status

12. Which plants and animals have disappeared from the forest in the recent past?
13. Which plants and animals in the forest have been declining very rapidly?
14. What are the causes for the decline of various animals and plants?

Resource exploitation and dependency on forest

15. What are the various resources that are collected from the forest? Which are collected more and which is less?
16. What are the reasons for collection of these resources?
17. Which category/group of resource users are dependent on the collection of these resources?
18. What proportion of HHs benefit from the forest?
19. Collection of which resources likely to pose a threat to those resources/ availability in the future?
20. Do people collect and use medicinal plant from the forest?

Demographic profile

21. How many households are living in this community/thana? How many adults?
22. What are the major occupations of the local people?
23. What proportion of local people are illiterate and what proportion of people have read upto school, colleges and above.
24. How have the occupations of people in the locality have changed over past (30-50 years)

Socio-economic activities/livelihood strategies

25. What are the major activities for earning of the local people?
26. What proportions of local people are very poor (have food shortage), poor, middle class and rich?

27. Are there many unemployed in the locality? What proportion?
28. In which season(s) there is scarcity of work in the locality?
29. From which source the local people take credit?
30. What are the different organizations, which operate credit in the locality?
31. Do many people in the locality take loan from , bank NGO or other organizations
32. Have the local people skills that can be utilized for undertaking alternate income generation
33. Is there any work/economic opportunities that requires special skill that the local people don't have?

Legal aspects

34. Can anybody can go to the forest and collect any thing?
35. Is there illegal tree felling? Is it at large scale? Does it affect forest health? Are the feller local or come from outside?
36. What are the main reasons for tree felling?
37. Do you think that the forest department people are protecting the forest resources?
38. Is there any issue of forestland encroachment? What are problem with recovery of these land?

Gender issues

39. Does the male and female are equally educated in the locality?
40. Who take the decision for HH purchase, undertaking income generation activities etc. - male or female?
41. Do the females have access to loan and alternate income generating activities as the male do have?

Others:

42. What are the major threats to the forest habitat and its resources
43. What would be major challenges for the conservation of biodiversity and restoration of its habitat?

c. Checklist of questions for HH interview

1. Govt. has plans to preserve the forest biodiversity and to improve the socio-economic condition of the people ---- what do you think (Actually team will gave a statement on the purpose of their visit and on the project)
2. Do you know that the forest is a park/wildlife sanctuary/reserve
3. Do you know what are allowed and not allowed to do in the park/reserve/sanctuary
4. Do you think that the forest resources should be preserved/conserved ?

Stakeholders

5. What are the villages from where people come to forest for collecting resources? Please tell which villages more involved and which are less involved?
6. What are the various groups of people who collect different types of resources from the forest?
7. Who are the people who do not use forest resources but are involved with the forest or has control over the forest
8. What are the organizations/institutions which carry out any type of work in the forest

Resources and resource status

9. Which plants and animals have disappeared from the forest in the recent past
10. Which plants and animals in the forest have been declining very rapidly
11. What are the causes for the decline of these animals and plants

Resource exploitation and dependency on forest

12. What sorts of things do you use from this forest?
13. Does your household collect it/them, or do you obtain from someone else?
14. If yes, do you collect those for selling or for consumption?
15. Of those things you get from the forest, which ones won't be available in 5 or 10 years?
16. Do you use medicinal plants from the forest?

Power structure and local conflict

17. Who are the more influential people in your locality? Tell who are more and who are less influential among them
18. What are the sources of conflict among local people
19. Whom do you go for conflict resolution
20. How the local conflicts are resolved
21. Have you or your neighbors any conflict with forest department? If yes, what are those?

Demographic profile

22. What is your primary and secondary occupation?
23. How many people in your HH are educated upto School, how many in the colleges and above and how many are illiterate.

Socio-economic activities/livelihood strategies

24. What is your HH primary and secondary source of income
25. Do you have land of your own (home stead/agricultural)?
26. Is your HH income adequate to meet your family expenditure or you having surplus?
27. Have many people in the locality no work?

28. Have you work to do in all seasons? In which season/seasons people of the locality have little/no work
29. What do you do when you have no work opportunities locally?
30. Have you taken loan from, bank NGO or other organizations? Was it easy to get the loan
31. What are the different organizations, which operate credit in the locality?
32. Have you any skill to do a particular work but you don't do? Why don't you do it?

Resource regeneration practices

33. Are there many plant nurseries in the locality?

Legal aspects

34. Can anybody can go to the forest and collect any thing?
35. Do you know that there is tree poaching in the forest? If yes, from where they come (villages)?
36. Do you think that the Forest Department people are protecting the forest resources?

Annexure-3

PRA issues

PRA will build upon the RRA findings and is intended for collecting in depth information on the identified issues.

Understanding the forest make up and dynamics

Transect map : Necessary for understanding the present forest physiography and topography. A few transects across the forest will give an idea on overall make up of the forest. This exercise will also provide the opportunity for learning about the historical trend in changes in the forest make up in different areas of the forest. It will also provide the opportunity to learn many things about the forest while walk with a key informant.

The transect map should indicate

- ❑ land elevation (high/low)
- ❑ land cover/use pattern (trees/bush/grassland/agric. land/marshy land etc.).
- ❑ A similar transect map should be drawn based on the condition of the forest 30-40 years back.
- ❑ Should carry GPS to track the transect walk/take coordinate reading at intervals
- ❑ Should be accompanied by a key informant and learn about the changes over time in the forest

Trend analysis in forest dynamics: changes with time of the following: forest cover and thickness, abundance of tall trees and herbs and shrubs, settlements, population

Resource maps (on the forest): Helps in the understanding the distribution, concentration of different major resources of the forest, resource exploitation and regeneration areas. Also will show

- internal walkways, footpath trails, access roads
- encroached land areas
- settlements
- pressurized areas
- areas for plantation, agricultural and other resource regeneration
- areas for major resource exploitation
- distribution of various resources

Understanding the land encroachment process: Important for Teknaf and Chunati

- historical perspective and trend
- who and how
- uses and transformation
- legalization process
- causal factors
- impact on forest

Understanding local governance system and community structure and functions

- decision makers--- influential people
- hierarchy set up

- local community organizations and institutions and their linkages
- local conflict and conflict resolution
- social cohesion and adhesion (which brings them together)
- collective action

PRA ISSUES

Fuelwood collection/collector

Information to be collected:

- who collect (adult, boys or girls/ women, poor or rich/ employed labor, gang/armed gang, local/outsider if possible mention the settlements from where they come etc.)
- purpose of collection (for selling,HH consumption or both)
- what compels them to extract the resource
- do they depend on the extraction for their livelihood (partially/entirely, supplement income), at what extent and how
- What encourages them to take up the activity
- What are various uses of the resource
- if commercial-where do they sell, who buys, where does it go, who are the traders and where, prices at various levels
- Quantity collected/day/person
- any conflict with FD or other people over the extraction
- any negotiation or arrangement to carry out the activity
- any alternate source for the collection of the resources
- needs and expectation of the collector
- impact on the forest, as the participants see
- Risk for the collectors as the collector see, if the activity is carried out at this rate

Illegal timber felling

Information to be collected:

- Who collect (adult, boys or, poor or rich/ employed labor, gang/armed gang, local/outsider etc. if possible mention the settlements from where they come etc.)
- at individual or group level
- Who are behind the activity and indicate the network
- Purpose of collection (for selling,HH consumption or both)
- reasons for the activity
- uses of the resource at various levels
- what compels them to fell the timber
- Do they depend on the activity for their livelihood (partially/entirely, supplement income or for added income), at what extent and how
- What encourages them to take up the activity
- Anybody protect them, if they are in problem
- If commercial-where do they sell, who buys, where does it go, where are the traders-indicate the chain
- how the protection is provided by FD or by any other agencies (e.g. Police etc.) and at what stage
- any conflict with FD or other people over illegal felling

- any negotiation or arrangement to carry out the activities
- needs and expectation of the feller
- as seen by the feller, impact on the forest due to the activity on forest and its resources
- Impact on/risk for the collector, if the activity is not allowed
- Seasonalities and trend analysis

Collection of trees as building materials

Information to be collected:

- who collect (adult, boys or girls/ women, poor or rich/ employed labor, gang/armed gang, local/outsider if possible mention the settlements from where they come etc.)
- carried out at individually or in group
- purpose and reasons for collection (for selling, HH consumption or both)
- uses of the resource
- what compels them to extract the resource
- do they depend on the extraction for their livelihood (partially/entirely, supplement income), at what extent and how
- What encourages them to take up the activity
- if commercial-where do they sell, who buys, where does it go, who are the traders and where, prices at various levels
- any conflict with FD or other people over the extraction
- any negotiation or arrangement to carry out the activity
- any alternate source for the collection of the resources
- needs and expectation of the collector
- impact on the forest, as the participants see
- Risk for the collectors, as the collector see, if the activity is carried out at this rate

Bamboo and cane collection

Information to be collected:

- who collect (adult, boys or girls/ women, poor or rich/ employed labor, gang/armed gang, local/outsider if possible mention the settlements from where they come etc.)
- purpose of collection (for selling, HH consumption or both)
- what compels them to extract the resource
- Do they depend on the extraction for their livelihood (partially/entirely, supplement income), at what extent and how
- What encourages them to take up the activity
- What are various uses of the resource
- if commercial-where do they sell, who buys, where does it go, who are the traders and where, prices at various levels
- any conflict with FD or other people over the extraction
- any negotiation or arrangement to carry out the activities
- any alternate source for the collection of the resources
- Needs and expectation
- Impact on the forest, as the participants see
- Risk for the collector, if the activity is carried out at this rate

Information the Ethnic community:

- ❑ Distribution of ethnic community settlement in and around the forest
- ❑ Probable No. of HH in each settlement
- ❑ Present economic activities
- ❑ Resources (plants and other NTFPs) they extract and reason for extraction (consumption/selling or both)
- ❑ dependence on the forest resources and its impact on the forest
- ❑ land encroachment by them
- ❑ relationship with the local people or agencies
- ❑ internal governance system
- ❑ conflict with FD or other agencies or other people on their use of the forest
- ❑ needs and expectation
- ❑ reaction to the project

Understanding the land encroachment

- ❑ Historical perspective and trend
- ❑ Who encroaches and reason for encroachment and what drives to undertake the activity
- ❑ Legalization of process
- ❑ Conflicts and negotiation process
- ❑ Uses and transformation of encroached land
- ❑ What encourages them to encroach land
- ❑ Local mechanisms/system or traditional practice for land encroachment
- ❑ Trend in the changes in the intensity of the activity

FD's forest management regimes

- ❑ Forest patrol, check post operation etc.
- ❑ Activities of other organization in relation to the forest protection
- ❑ Any special management efforts for the NP/WS/Reserve etc.
- ❑ Forest cases and punishment
- ❑ Is the present regime effective in protecting the forest
- ❑ Prevailing unlawful extraction and uses
- ❑ If not effective, what are the causes for the poor management of the forest (lack of manpower and logistics/ accessibility and problem in movement/ fear of bandits/ local people more powerful/ little help from the higher authority/ low morale of FD staff/ intervention by the local public representative or political elite etc.)

FD's plantation strategies

- ❑ Area under plantation
- ❑ Species planted (information on clear felling etc.)
- ❑ Plantation practices
- ❑ Nursing and care (thinning etc.)
- ❑ Impact on the wilderness

Information on Brickfield/ Brickfield owners Nos. and distribution

- ❑ Owners and their influences
- ❑ Compliance to forest laws

- ❑ Period of operation
- ❑ Sources of fuelwood (from the forest concern or from elsewhere)
- ❑ Type of fuelwood used
- ❑ Network of supplies
- ❑ Approx. quantity used/year
- ❑ Impact on forest

Information on Sawmill/ Sawmill owners

- ❑ Nos. and distribution
- ❑ Owners and their influences
- ❑ Compliance to forest laws
- ❑ Period of operation
- ❑ Who brings timber to them
- ❑ Sources of timber (form the forest concern or from elsewhere-homestead)
- ❑ How distinction is made between timber from the forest and that from villages
- ❑ Inspection by FD/or other law enforcing authority
- ❑ Network of supplies

Livestock grazing

- ❑ Identification of grazing areas
- ❑ Types and No. of livestock
- ❑ Who owns the livestock (ethnic/poor/rich/influential/general people)
- ❑ Mention whether seasonal and all time
- ❑ Description of damages /impact caused by grazing
- ❑ Alternate areas for grazing

Information on clear felling (Khadimnagar):

- ❑ Area felled
- ❑ Name of auctioneers and their influences
- ❑ Natural or planted trees felled
- ❑ Felling practices (clearing, burning etc.)
- ❑ Operation period
- ❑ Transportation and marketing of felled trees-network
- ❑ Link with illegal feller
- ❑ Impact on the forest

FGD with Tea Garden people (Khadimnagar)

- ❑ Unemployment in the labor colony
- ❑ Penetration to NP?WS /RF by tea garden people
- ❑ Resource collected from the forest
- ❑ Reasons for invading the forest and collecting resources
- ❑ Ecosystem continuity with the forest
- ❑ Role of Tea Garden management in preventing poaching