VILLAGE: GADABANIKILO, ODISHA

VASUNDHARA
democratizing natural resource governance

ECOLOGICAL,INSTITUTIONAL AND ECONOMIC ASSESSMENT OF COMMUNITY FOREST MANAGEMENT

UNDER THE ECOLOGICAL & INSTITUTIONAL NETWORK OF THE NATIONAL SUPPORT GROUP ON JFM

vasundhara

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August, 1997

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INTRODUCTION

Community management of forests has been a major contributing factor to the health of the forests. A lot of support has been generated for Community Forest Management (CFM) of forests in various sections of the society. However research on CFM has generally been more concerned with institutional and human issues. That CFM gives a boost to forest health has always been pointed out. But this has been based rather on personal experience and belief. There has been hardly much scientifically investigated and comparable information on this aspect. There was a clearly felt need for research the impacts of CFM on the health of the forest. The present study is a part of a nationwide research activity on CFM and Forest Health coordinated by a national level Economic and Ecology network.

The study aims to generate the relevant facts on CFM in an Orissan village. The study was launched with the objective providing information to other researchers, policy makers, and to find out a scientific rationale for CFM. But when the research actually commenced the needs of the local people start gaining importance. The major objective thus became " how to help the community managing its forest to improve their Forest Management Methods and System". We have intimated our findings to the study village and they may use these to improve the existing system. But the real benefit can come only if this information is shared with other villages elsewhere. The study village has a Management System, which is not only scientific but tries to be egalitarian as well. So there remains a lot of scope for making real contribution to the CFM movement by making other forest protecting communities aware of these practices.

METHODOLOGY

The study seeks to provide information that is comparable with similar information from elsewhere. This is the major strength of the series of research studies coordinated by the network. To achieve comparability the methodologies adopted have to be similar. So apart from necessary adjustments to suit the local conditions, the methodology for the present study has been that prescribed by the network.

Area Overview/ Tangi - Ranpur Overview:

Tangi-Ranpur forest protection zone forms part of Khurda and Nayagarh districts in Orissa. Administratively, both of these places constitute development blocks. Both areas come under the Khurda Forest Division. The total number of revenue villages in both the blocks is around 750. The area has the unique feature of more than 100 self initiated communities protecting their nearby forest patches. These areas mostly come under Reserve Forest which spreads over ten RFs viz., Dhani, Patia, Kuhudi, Maninag, Sulia-A, Sulia-B, Satavaya, Nuapada, Gadabaniokilo - Sanakilo and Kunjer. Around 185 villages are situated near forests, of these around 120 villages are involved in forest protection[1]. Recently about 40 villages have come together to form the Maa Maninag Jungle Suraksha Parishad to work on various issues relating to the Community Forest Management.

In nearby Nayagarh protection zone more than 300 villages protecting and managing their forests. The movement facilitated by the Briksha O' Jivara Bandhu Parishad has to the formation of the second largest CFM federation in Orissa.

The village is immediately surrounded by 27 forest protecting villages, which fall under three forest protection clusters/zones in the area. The uniqueness of these three clusters is that all of them are very old protection systems. Of these villages 11 villages initiated protection in the 60s, 14 villages in the 70s, only one village in 1988 and Gadabanikilo in 1940. The area under the protection of these villages varies from 80 ha. to 250 ha.. The forest is mostly Reserve Forest with 20 villages protecting RF and only 7 villages involved in Revenue Forest protection.

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[1]Of these 120 villages, around 82 villages have stable forest protection system, 38 villages are in a state of flux, having second thoughts. Apart from these 120 villages involved in forest protection, 23 villages have abandoned forest protection and in 42 villages till date there has been no efforts for forest protection.

Most of the forest protection efforts were initiated in early 1980s. However, there are few villages in the area which started protection way back in 1940s and1950s. The case being presented here is one of the many cases of self-initiated forest protection which has a long history of forest protection since 1940s.

INSTITUTIONAL ISSUES IN COMMUNITY FORESTRY

1. VILLAGE PROFILE

LOCATION:
Village Gadabanikilo is situated in the Khairpalli Gram Panchayat of Ranpur block in Nayagarh district of Orissa. It lies between 85^0 23' and 85^0 24' North latitudes, and 20^0 3' and 20^0 4' East longitudes. It is only seven kilometers away from the state highway linking Chandpur and Rajsunakhala, in the northwest corner of Ranpur (the block headquarters). The villages which surround Gadabanikilo are: (1) Giridharpur in the north west corner, (2) Sanapathuria in the north, (3) Gunduria in the North-East corner (4) Durgapur in the East, (5) Khunta bandha in the South-East, (6) Sanakilo in the South.
The average annual rainfall is more than 1500 mm with more than three-quarters of the rain coming from June to September. The village inherits its name from the Ranpur Kingdom. It was one of the four 'Gadas' (forts) of the Ranpur king.

DEMOGRAPHY*:*
The Ranpur block region shows few interesting population characteristics. For one, it has a sex ratio favorable to women, with about 1005 women per 1000 men. This is the best in the district. Another important feature of the region is that it is largely dominated by the Khandayats, warrior peasants of the erstwhile kings. This has contributed greatly to the existence of strong cultural unity. The chief occupation is agriculture and almost three-quarters of the main workers are classified as cultivators or agricultural laborers. Not more than 2% of the main workers come under the classification of livestock, forestry, fishing related occupations. All this has significant impact on the forest protection initiatives in the area.

In the Gadabanikilo village there are about 143 households with a population of approximately 1500. The main caste /religious groups are Brahmin, Malli, Bhandari, Khandayat, Sundhi, Sudra, Harijana and Muslim. The village consists of seven sahis (small hamlets) which are situated at a very close proximity to each other. Some of them are new as people have recently settled there due to **increase in population and breaking down of joint families.** The seven sahis (hamlets) are Gada Sahi, Sudra Sahi, Nua Sahi, Harijana Sahi, Mohammadian Sahi, Patna Sahi, College Sahi, and Nuagaon. The last two are new sahis and the rest are older sahis.

The village is surrounded by a few tribal hamlets belonging to other villages. The tribals are highly forest dependent and play a major role in the whole process of forest protection.

SOCIO-CULTURAL ASPECTS:

It is a well-knit village with strong social bonds. Here, Hindu and Muslim have peaceful co-existence and they not only share common issues and problems but also each other's festivals. Gadabanikilo like most other villages in the area has a highly Khandayat dominated social structure. This is evident from the composition of the forest protection committee. The overwhelming dominance of the Khandayat caste combined with a will to live harmoniously provides the village a high degree of unity.

"Raza" is the common festival observed together by all the communities in the village with gaiety. They have a "Raza" committee to organize the festival. Raza is an Oriya Hindu festival but even the Muslims also take part in this. The Muslims also play a significant role in the Dussehra celebrations.

Majority of the villagers are agriculturists and a significant portion of their livelihood is characterized by dependence over the forest. The village has also produced

many service holders which includes IAS and people in high ranking government jobs. The village was strongly associated with the anti British campaigns of the Orissan Gaadjats and famous for the memory of Raghu and Dibakar, two famous revolutionaries of the state.

INSTITUTIONAL ASPECTS:

A Village Committee (VC) manages the village. VC is the most important village institution. The committee had its origin way back in the year 1940. Since then it has been looking after many aspects of village life starting from "Raza" festival (cultural) to forest protection. The VC has undergone several changes over the years. (See Box: the Village Committee)

"Baishiguntha", the village temple, is a hub of the village's social life. All the major decisions of the VC are taken in the premises of "Baishiguntha".

Educational institutions include one minor school, one primary school, one high school and one college. The VC started the minor school and the high school in 1952 & 1962 respectively. There is also a separate committee looking after the affairs of the college.

Other institutions include the "Raghu Dibakar Sahitya Sansad", which is a literary club.

2. FOREST PROFILE

The Ranpur block has about 11% of its total geographical area under forests. The forests in the vicinity of Gadabanikilo are the only ones in the region to have a significant number of Mahua(*Madhuca latifolia*). The forests of Gadabanikilo come under the dense Dry type mixed forests classification. The total area of the forest area protected by the villagers is about 300 hectares.

HISTORY OF FOREST PROTECTION :

The history of forest protection in Gadabanikilo goes back to the year 1940. The village is surrounded by forest on three sides and there are a number of villages bordering the forest on the other side. The people of Gadabanikilo blame these villages for the devastation of the forests. Those villages are : Khairpalli, Sanapathuria, Badapathuria, Giridharpur, and Kila, all within a radius of 3-4 kms.

The protection efforts were initiated by a group of people who informally came together and took up forest degradation as the major issue affecting community life. It came as more of a realization due to the massive degradation of the surrounding forests directly
affecting the day to day life of the villagers.

The primary reasons for initiating forest protection were directly related to the basic forest requirements, which became scarce due to massive degradation of forest. The needs that led to forest protection were more related to the requirements of the typical peasant household. According to some old men of the village, **there was not even wood to set the funeral pyre, leave aside other basic requirements.** Thus, efforts were made to get back the lost wealth (forest) by concerted efforts. However forest based livelihood like fuelwood head-loading etc. were out of the scheme of things.

The immediate steps taken by the villagers were:

1. Declaration of certain patches of the forest as restricted area. Those patches are : Belabani, Khandiabandha, Jharitaila, and Gadabandha Mundia.
2. Mahua Dunga, a patch of Mahua (*Madhuca indica*) trees, was declared as free for people of Gadabanikilo in order to meet fuel wood requirements.
3. A watcher was appointed. Each household contributed 2 Paise per month for the salary of the watcher.
4. The 10-member village committee took the overall charge of the forest protection.

Strict protection continued for 14 years, i.e. till 1954, in the forest patches except in Mahua Dunga. In the year 1955 the then 7-member committee arranged for the first ever cleaning in the "Tailamala" jungle.

The continuous protection brought the forests to a stage where it was in a condition to produce and meet certain more requirements of the villagers. The village committee reserved some forest patches for cleaning purpose. The patches are Padar(meaning barren in Oriya), Belabani Jungle, Tailamala Jungle, Khandia Bandha, and Jharitaila.

The forest protection system in Gadabanikilo village has evolved through time. The rules have been changed and arrangements made as and when the situation demanded. At present, there are two permanent paid watchers for the forest. The rules pertaining to selection, election of committee members, collection & sharing of benefits today reflects a more equitable and just system. (Detailed discussion is done in subsequent pages).

At present, the forest benefits the villagers in multifarious ways. They are :

1. Wood for the funeral pyre.

2. "Mahua Flower & Tola(Mahua Seed)" for each household.

3. Fuelwood for each household.
4. Forest as a village resource having tremendous potentialities for future.

5. Income from forest helps in taking up developmental work for the village like they have constructed the college recently.

3. <u>INSTITUTIONAL PROFILE</u>

From the very beginning till today the forest protection in Gadabanikilo has continued through some institutional mechanism, i.e. informal as well as formal. It started very informally by a group of individuals, but got strengthened and formalized in course of time. Today, it follows specific rules for selection, election of members, penalty for the offenders, collection of fuelwood & other NTFPs and their equitable distribution, protection of the forest etc. Due to its capacity enhancement the committee which started with the primary task of forest protection has taken the shape of a full-fledged Village Committee. It is also looking after other socio-economic & cultural activities in the village like the ' Raza' festival, village "Jantala" (mass feast), conflicts and other activities related to/affecting the village life.

The following shows the steps through which the village committee has evolved to its present position:

- **1940 :** Ibrahim Khan, Nakula Parida, Udaya Nath Rout, Ram Chandra Parida, Kulamani Parida, Dhuli Parida, Govinda Chandra Paikray, Ratnakar Parida took initiatives for the protection of forest. As an immediate step, they declared Belabani, Khandia Bandha, Jhari Taila & Gadabandha Mundia as restricted area and allowed free access to Mahua Dunga. Thus, started the very first village committee of Gadabanikilo.

- **1943:** A "Yubak Sangha" (youth association) consisting of Jaba Khan, Jahu Khan, Dhuli Parida, Jagannath Rath, Naba Parida, Ramchandra Parida, Nabin Sahu, Fakir Parida, Khali Parida and Banamali Parida started celebrating the "Raza" festival involving the entire village.

- **1954:** The village committee was dissolved and a new committee consisting of seven members, viz. Digambar Rath, Dhuli Parida, Nakul Parida, Gobinda Chandra Paikray, Dambarudhar Parida and Bambradhar Barala was formed. Immediately after its formation the committee arranged for the first ever cleaning in the Tailamala forest.

- **1962:** New committee was formed consisting of Ramchandra Rout, Loknath Parida, Magi Parida, Somnath Rath, Loknath Parida, Ganesh Parida & Nimai Parida as its members.

- **1963:** Few members of the "Raza" committee died. Therefore, decision was taken to combine it with the village committee. The village committee took the charge of Raza, Dola, Jantala, Homa, conflict resolving, forest etc.

- **1973 - 1996:** Some new members were taken in the committee. The members are Nakula Parida, Magi Parida, Dambarudhar Barala, Ganesh Parida, Ramchandra Rout, Laxmidhar Parida and Purnachandra Rath.

Features of the Village Committee :

At present the seven-member committee which was formed in the year 1973 is looking after the affairs of the forest. Even though the villagers make no such distinction, as such, the seven-member committee acts as the Executive body and the General Body comprises of all the adult members of the community. There are no fixed sessions for both the bodies to meet. However, the General Body sits I5 days before 'Raza' festival (in June) basically to decide the arrangements for the 'Raza' festival and to approve the Income and Expenditure account. However, it can meet any number of times in a year wherever its urgency is felt. The seven-member committee (Executive Committee) meets more frequently in a year.

There is no fixed term for the Executive Committee.

The members are free to resign on their own or the General Body can decide to terminate membership of any member of the EC if he is found not to be discharging his responsibilities. When such a vacancy is there new members in the EC can be decided in the General Body. The membership is decided on selection basis and its number is not fixed. There is no participation of women in both EC and General Body.

Who is eligible to become a member:

Four attributes were considered necessary for membership in the committee.

1. The member should be articulate in public.
2. The member should have the ability to work towards the wellbeing of the village.
3. The member should be well versed in handling situations of conflict and resolving them.
4. The member should be of good character and integrity.

The members of the committee come from different economic classes. However the Khandayats have an overwhelming majority in the committee on account of their large population. A committee member is fined Re.1/- for not attending a meeting. Failure to attend 3 consecutive meetings, leads to the nullification of his membership.

PROTECTION SYSTEM :

Watcher*:* The overall charge of the forest rests with the committee. However, when protection in specific is referred to, it is directly related to the watcher system, that is being followed. At present there are two watchers appointed by the committee. After a recent increment the committee is paying them Rs.180/- each. They move in the forest and keep vigil over it. Any offender caught by the watchers is brought before the committee. At the time of Mahua collection and cleaning operations they play a major role in selecting the patch and keeping watch on the entire operation.

Previously there was only one watcher who was appointed in 1950 and in the year 1962 another watcher joined.
In 1996 one of the two watchers resigned due to his old age and the committee has appointed a new watcher.

Penalty*:* There are no specific/fixed rules set for punishing the forest offenders. However, the committee has evolved a set of informal rules and regulations which adequately explains the penalty system.

As it goes from the very beginning the committee fixes or decides a fine amount to be collected from each offender which varies from case to case. The committee may also excuse an offender if the members so decide.

The records of the fine book maintained by the committee give the total number of offence cases in a particular period of the year. The penalty books are loosely maintained and it only shows the cases for few months in the year. There is only mention of the date, name of the offender, father's name, nature of offence and the forest patch where offence has taken place. There is no record of the amount of penalty imposed for individual case. A brief summary of the cases of violation of the regulations between 1991 to 1996 is provided in Table 9 in the annexure:

Total number of cases of misuse and their nature

YEAR (Period)	FUELWOOD	MAHUA	TEAK	OTHER	TOTAL
1991-14.11.91	**13**	**1**	**1**		**15**
1992-1.1.92 to	**167**	**3**	**1**	**13**	**184**
1993-17.9.93 to 2.10.93	**101**	**-**	**-**	**52**	**153**
1994-11.7.94 to 18.10.94	**102**	**9**	**1**	**16**	**128**
1995-5.9.95 to 5.12.95	**35**	**-**	**-**	**4**	**39**
1996-1.1.96 to date	**106**	**-**	**-**	**16**	**122**

Analysis of the six years' offence cases shows the trend towards growing dependence on fuelwood which is not being met sufficiently through the provisions of the committee for taking fuelwood from the forest. Number of cases relating to the cutting of big trees is less as compared to the total number offences relating to fuelwood.

Rules & Regulations:

This can be divided into the following categories:

1. Rules pertaining to the collection and sharing of Mahua flower and Seeds and the whole of Mahua patch.
2. Rules for patches under cleaning.
3. Rules for the use of "Padar" patch.
4. Rules pertaining to grazing.
5. Rules pertaining to "Sanskar" (Cremation).
6. Rules with regard to free and restricted access in various patches of forest.
7. There are even rules which specify the species which can be cut and which can not be.

The above rules and regulations have been discussed vividly in the portion dealing with the **Production and Distribution system.**

PRODUCTION AND DISTRIBUTION SYSTEM

1) MAHUA FOREST :

Mahua forest of Gadabanikilo is a valuable resource for the entire community. Mahua (flower & fruit) is the largest forest produce. The Mahua forest is situated on the west of the village and spreads over an area of 30 hectares. The status of the forest is Reserve Forest.

The village committee has made a different set of rules for this patch of forest. There is both **restricted and free access** in the patch. Restrictions are imposed on cutting of Mahua trees and specific rules are there for collection and sharing of the produce. Apart from Mahua and Teak trees, there is free access in this patch for collection of fuel wood and grazing.

Seasonality of Mahua :

Mahua flower is available in the months of December and January (Pusha & Magha). Mahua Seed ripens and is ready for collection during the months of April and May (Chaitra to Jyestha).

Collection & Benefit Sharing:

There is no specific rules pertaining to the collection and sharing of Mahua flower. All the 143 households are free to go to the forest and collect Mahua flowers during the season. However, the only rule is no one can collect flowers directly from the trees. It is only the flowers which fall on the ground are allowed to be collected.

But, there are well-defined and specific rules with regard to the collection of Mahua seed. The system and rules are as follows:

1. 143 households are equally divided into 4 blocks.

2. The VC decides the date for the beginning of collection season.

3. Usually only one block is allowed to collect on a given day, but in good harvest years two blocks are allowed to gather Mahua Seed from the forest on the same day. The first block is allowed to go for collection on the first day. On the second day, another group is allowed, and, in the subsequent two days other two groups are allowed for the collection. On the fifth day the first group goes for the second time and the cycle continues till the season ends.

4. One member from each household is allowed to go for collection.

5. The committee members take the block to the edge of the Mahua forest and leave them there for collection.

6. The timing for collection is from 6 A.M. to 11 A.M.

7. 15 members from the block stay in patrolling duty for that day after completion of the collection work. The remaining 15 members of the block do it in the next turn of the block for collection.

8. The day's collection is brought to the Bhagabat Tungi(traditional place of religious discourses, especially on the Gita). Each individual deposits half of his collection to the village common pool.
9. At the end of the season the entire amount of Mahua seed, accumulated in the common pool is distributed equally among the 143 households. This enables the households who do not go for gathering to obtain a quantity of the seeds.
10. If a particular household does not go for collection it can share its turn with another individual. The amount collected is shared 50:50 between them.

An estimate by the villager shows that total 40 households get involved in the collection of Mahua flower and they collect between 30 Kgs to 1 Qtl. Around 7 households collect 1 Qtl. and the rest collect 30 to 50 Kgs.

Similarly, each household collects around 50 Kgs of dry Mahua seed in a particular season. Each of them extracts two tins of Mahua oil for own consumption. They sell Mahua seed at Rs.6/- per Kg. and Mahua oil at Rs.20/- to 25/- per Kg.

The committee formulated all the rules pertaining to the Mahua patch in the year 1955.

In 1996 decision taken in the General Body to lease out the Mahua Seed collection. Magi Parida, watcher, got the lease for Rs 1500/- in partnership with 14 persons in the village. The reason for giving out Mahua seed on lease was that the quantity of flower was less and it was felt that if all the households were allowed to collect there would not be sufficient Mahua seed to collect. The leaseholder's record shows that they collected a total of about 15 Qtl.. Another 10 to 15 Qtl. has been collected clandestinely by the villagers.

The records of 1995 shows a total of 56.80 Qtl. of Mahua seed were collected through bloc method.

In 1997 the average share of Mahua Seeds have been about 40 kilos per collectors' household. The share per non-collectors' household has been roughly 20 kilos.

2) CLEANING[2] PATCH (FOREST) :

Forest protection in Gadabanikilo had its origin from the non-fulfillment of the basic forestry needs / requirements of the villagers, fuelwood being the foremost amongst them. Therefore, the VC has made elaborate arrangements with regard to fulfillment of basic forestry needs. Rules with regard to Mahua forest is one such arrangement which has already been discussed. Specifications regarding cleaning operations in different forest patches are another set of arrangement for meeting fuelwood requirements of the villagers. A reflection of this can be seen in the decisions of the very first committee in the year 1940. i.e. few patches like Belabani, Khandia Bandha, Jhari Taila, Gada Bandha Mundia were declared as restricted and Mahua Dunga was kept as free access area for meeting firewood requirements. This arrangement continued for 14 years till the first cleaning operation was undertaken in the Tailamala forest in 1954. Cleaning is done twice in a year, viz. before rain & immediately after agricultural harvest. The decision with regard to cleaning rests with the VC.

Subsequently, few more forest patches were reserved for the purpose of rotational cleaning, viz. Padar, Belabani Jungle, Tailamala, Khandia Bandha, Jharitaila etc. Rules for cleaning operation and sharing of benefits differ from patch to patch. Let us discuss them separately.

Rules pertaining to cleaning and distribution :

In the cleaning system of different patches the same bloc method is used as in the Mahua patch. Two persons are allowed from each household and one block on each day goes for cleaning. They cut from 7 A.M. to 12 P.M. and whatever material is collected during this time they are free to take that. On the fifth day only those persons are allowed who have not participated in the cleaning operation on the earlier four days(along with their blocs). If they don' t go on the fifth day then they would lose their turn. Specific and separate/plots are allotted to each bloc of individuals.

Till 1995 the Committee collected Rs 2/- per cartload of cleaning material. The charges were hiked to Rs 15/- per cartload in 1996 in order to meet the requirement of money for salary of the watcher.

These rules apply equally to all the forest patches where cleaning operation is carried out.

Based on their experience, the villagers estimate that an area of 12-15 acres are required for cleaning operation at one time to meet the fuelwood requirements of the entire village.

[2] Cleaning refers to a sort of forestry operation which involves cutting/cleaning of he ground cover (less important or un-required species) and thinning and pruning of trees which have over grown in order to facilitate regeneration. Villagers widely use this word 'cleaning' whenever they cut tree branches or collect fuelwood in large scale by cutting unimportant species, sizing the grown up trees or similar activities. However, the committee has made a list of species which can be cut and which cannot. In the case of Gadabanikilo cleaning is taken up for large-scale collection of fuelwood. The committee fixes up the norms of such operations. The general rule being that no big green trees, or branches of it can be cut. Only specified species can be cut at any stage. For other species only dead, dry, diseased or adversely competing trees or branches can be cut.

TIMELINE OF CLEANING OPERATIONS AND THE FOREST PATCHES CLEANED :

1985 : Middle of Belabani Tailamala forest and Padar.

1986 to1990 : Forest near Godabandha on the left-hand side of the road and Padar. Kadalibadi forest near Sanapathuria.

1991 : On the north of Kaianhuda forest near Tailamala and to its extreme north in the second cleaning.

1992 : Near Kaianhuda forest of Tailamala and its adjoining forests in the second cleaning.

1993 : Tailamala forest and nearer to Kaianhuda forest.

1994 : Khandiabandha Talaberana and Uparberana forest.

1995 : Khandiabandha Uparberana forest and Belabani.

The total area of forest under the Cleaning patch is 150 ha. approximately.

3) PADAR PATCH (FOREST) :

"Padar", as the term indicates, means, "an open space" without any dense cover of vegetation. Gadabanikilo village has a patch of Padar on an area of 55 acres, which is on the north of the village and at a distance of 1/2 Kms. from the village. It is situated on revenue land. The total area under Padar is around 55 ha.

Till 1945 there were various species of vegetation present here, *Pterocarpus marsupium, Diospyros melanoxylon, Strychnos nuxvomica, Terminalia tomentosa, , Emblica officinalis, Terminalia chebula, Terminalia bellerica,Buchanania lanzan, Diospyros sylvatica, Zizyphus oenoplia*, Tundupoda, Banabanka Kanta, Kaniari, Kanta Baula, Kala Sahaj being the dominant.

However, there was massive degradation of this patch as people from villages like Khairpalli, Sanapaturia,
Badapaturia, Giridharpur and Kilo interfered in it and even rootstocks were not spared.

At present, the Padar patch is full of shrubs and thorny bushes with sparse concentration of *Madhuca indica & Mangifera indica* trees in some blocks of it. A rough estimate by the villagers shows that there are about 1000 to 1500 Mahua trees and 500-800 mango trees present in the entire Padar. Out of the mango trees only 10-12 belong to the government and the rest are private trees. Rights on the private trees solely belong to the persons who own them.

Cleaning & Sharing:

Since there are only thorny bushes and other similar species present in the Padar, it is suitably used for fuelwood purpose only. Cleaning is done on rational basis. *The rules pertaining to cleaning and distribution are applicable to the cleaning of Padar also.*

As the villagers recollect, the Padar has been brought under cleaning operation thrice, i.e. in 1970, 1980-81 and 1985.

Other uses of the Padar :

Besides cleaning materials, the Padar also caters to other basic requirement of villagers like, it provides space for graveyard. The details are below:

1. Hindu Graveyard - 4-5 acres in the South North Corner.
2. Muslim' s burial ground 2 Acres in the North.

3. Harijan' s burial ground- 2 acres in the North.

On the North the Padar is surrounded by the bamboo forest and mango groves of Sanapathuria village.

4) <u>GRAZING SYSTEM</u> :

Grazing is one of the most traditional activities which the villagers of Gadabanikilo have retained till today. This is a yearlong activity which, at present, takes place through seven groups of graziers in the village. There are four cow herds and three herds of goat and sheep. The grazing year starts from the "Dola Purnima" (Holi). Though there is no such rules making this activity caste bound, it is seen that mostly "Gauda" and "Sahara" caste people take up this activity in the village of Gadabanikilo.

The entire forest patch which belongs to the village Gadabanikilo is free for grazing. There are about 500 cows and 250 goats and sheep in the village who depends on the forest for grazing. The timing of grazing is from 9 a.m. to 5 a.m.

The graziers charge in the following manner which is payable in installments :

- Cow with calf 8 Gouni(28 kg) of Paddy
- Cow without calf 7 Gouni (24.5 kg) of Paddy
- Heifer 6 Gouni (21 kg) of Paddy
- Calf 3 Gouni (10.5) of Paddy
- Goat and sheep 6 Gouni (21 kg) of Paddy

(1 Gouni = 5 Ser. 1 Ser = 700 gm approx.)

Forest patches and routes for grazing : The following are the routes and forest patches where the graziers take the cattle :

ROUTES

I : Karkacha matigadia - school field - Kaju field - agricultural field - Aamjhar and back through the same route.

II : Karkacha matigadia - Kochilapatna - Mahua forest -Baunsabani and back.

III : Karkacha Matigadia - Mahua forest - Benagadia - Khuntabandha and back through the same route.

IV : Karkacha Matigadia - Gotha Berna Jami - Belabani and back through Tailamala forest.

There is no such fixed rule for who will go in which route/direction. It depends which herd comes first to the *Karakacha Matigadia* and then in which direction it proceeds. The other herd wills automatically go in the other direction and subsequent herds follow it. It is based on their mutual understanding.

The herds of goats and sheep go to the "Tangi"(barren land) because it is full of thorny shrubs (Bududukia Kanta). Besides, they also go to the Belabani and Padar. Apart from the fixed routes the cow herds also go to Tailamala, Belabani, Benagadia Dunga, Jaritaila Padar, Bhuine Mundia Padar and agricultural fields immediately after harvesting. During summer season the herds go to the "Aamtota" (mango groves) during mid-day. They also go to the nearby village forests of Kochilapatna, Khuntabandha, Durgapur, Aamjhara, Sanakila etc.

Who come to Gadabanikilo forest for grazing :

A number of herds from other villages come to Gadabanikilo forest for grazing for 5-7 days in a month. The total number of cattle coming to Gadabanikilo forest will be approximately 1000 and the villages to which they belong are Aamjhara, Sanakila, Gouda Patna, Dobha, Sanapathuria, Gunduria and Khairpalli. On the whole, the Gadabanikilo forest **supports** approximately **2500 cattle** with varying levels of dependence.

5) "SANSKARA" SYSTEM :

The most disturbing experience of the villagers of Gadabanikilo during the days of forest degradation was non-availability of wood for funeral pyre. At present, the VC has framed rules pertaining to the wood requirement for funeral. Species like **Benta, Narigini and Telakarhuan** catch fire easily and can be used almost directly after being cut. Therefore, the VC has reserved these species exclusively for the purpose of funeral.

A person requiring wood for funeral can take any of these species directly from the forest without informing the VC. The quantity of wood is not fixed and it depends on the quantity required. The VC also allows the nearby villages to take wood for funeral with its permission.

6) FREE AND RESTRICTED ACCESS :

There is free access in the entire forest as far as the collection of NTFPs, except Mahua (flower of *M. indica*) and Tola(fruit of *M. indica*), is concerned. People from outside the village can also collect these items from the Gadabanikilo forest. However, there is restriction in the same patch with regard to cutting of big trees and collection of fuelwood. Therefore, the protection and management of forest in Gadabanikilo is maintained through both free as well as restricted access mechanisms.

7) PROTECTION TO TREES FROM FELLING:

Can be Cut	**Can't be cut**	
Cassia fistula	Aegle marmelos	Lannea coromandalica
Combretum decandrumm	Azadirachta indica	Madhuca indica
Diospyros sylvatica	Cassia fistula	Mungai
Firiki	Diospyros melanoxylon	Pterocarpus marsupium
Jhadapan	Emblica officinalis	Pterospermum heyneanum
Kukurchelia	Jayasandha	Semecarpus anacardium
Other shrubs	Jhadapan	Streblus asper
Pokasungha	Kala Sahaj	Strychnos nuxvomica
Smilax macrophylla	Karada	Syzygium cumini
Tela Kerhuan	Lagerstroemia parviflora	Terminalia bellerica
Zizyphus oenoplia	Lagerstroemia reginae	Terminalia chebula

Trees in the “cannot be cut” category can also be cut during the cleaning operation if they are found to be **dead, diseased or deformed**.

NTFPs of Gadabanikilo

Some patches of the forest produced different types of NTFPs after prolonged protection. The major NTFPs available in the forest are Harra, Bahra, Aonla, Chiraunjee, Tendu leaves, Nux vomica, and Bael. For most of the NTFPs proper utilization is not possible as no market is available for the products. Bael (Aegle marmelos) is eaten raw or made in to *sherbet*. Harra, Bahra and Aonla are used locally for medicinal purpose. There is a market for Harra in the state. But in the absence of private middlemen this market is not exploited. In the recent past Harra was extracted under an purchase agreement with a private agent but the system broke down because of cheating by the purchaser. Bahra has very little market potential and hence is not harvested. Purchase rights for all the three myrobalans are presently with the Tribal development Cooperative Corporation of Orissa(TDCCOL). Under this system any private businessman purchasing them can be prosecuted. However, in spite of the monopoly purchasing rights the TDCCOL does not undertake procurement in the region as the quantities are too low to justify a purchase center.

The problem in case of the collection of Tendu Leaves is similar. The leaves are a major income earner for the people who collect them. All over the Kendu Leaf Wing of the forest department procures the leaves the state. In places where the quantities do not suffice the establishment of a procurement setup the Dept simply does not collect the leaves from that area. Like the TDCCOL not

allowing private trade in NTFPs leased out to it, the dept also does not allow private collection and utilization of the leaves. This keeps the people from benefiting from this resource. TDCCOL's role as the dog in the manger has in fact been a major constraint faced by NTFP based forest management all over Orissa.

Char is one of the most expensive NTFPs found in the country. One kilo of processed char seed may sell for a consumer price of 200 to 350 rupees in the market. But the local people do not have the skills requisite for processing the seeds and a potent source of revenue goes unutilized.

Where as there were no fixed rules for other produces the committee finalized a set of rules for the production and sharing of the produces from the Mahua forest which has grown into a valuable resource for village Gadabanikilo.

NTFPs and Tribals

The forests of Gadabanikilo are a source of livelihood for a large number of tribal households residing in the nearby villages. The tribal women are head-loaders and are considered as enemies of the forest by the villagers. However NTFP collection by the tribals is freely allowed. A lot of the NTFP collections are not a competitive resource use for the villagers as they do not collect and market those NTFPs. This is caused by various factors like higher income levels, a feeling that NTFP collection is an inferior activity, as also by lack of skills.

The major NTFPs collected by the tribals are as follows :

Kendu(*Diospyros melanoxylon*) Leaves:

The collection season lasts about three months from late March to early June. The typical tribal household collects around 250 to 500 bundles(each containing 20 leaves) per day. The number of days of collection ranges from 40 days to 80 days. The leaves are sold clandestinely to Bidi manufacturers. The price of leaves was Rs 1.00 per bundle last year giving a daily return of 25 to 50 rupees and a total return of 1500 to 2500 rupees over the season. The forest officials often harass the tribals as Kendu Leaves are a nationalized item and may not be sold to any one but the Kendu Leaf department. As there is no departmental collection center in the area such harassment is highly unjustified.

Aonla :

Aonla is collected in late autumn and early winter. The fruits are dried before sale. The price in the local market hovers between 5 -6 rupees per kg of dried Aonla. Total collection hovers around 50 kgs per season and the income from Aonla around 300 rupees.

Kochila(*Strychnos nuxvomica*) :

The fruits are collected and sold to agents of Ayurvedic medicine manufacturers. The price is 300 rupees per quintal, collection per season from 1 to 2 quintals, and the income from Kochila 150 to 300 rupees.

Char Seed:

the tribals sell Char seed in its unprocessed form at Rs 3.50 to 4.50 per kg. In its processed form char seeds obtain a price of more than 100 rupees per kg in the primary market. The conversion rate is approximately 1 kg of processed seed per 8 kgs of seed. The value addition through processing is more than 70 rupees per kg of processed Char. The annual collection ranges from 10-20 kgs up to 1.5 quintal of unprocessed seed, giving an income of up to 600 rupees or more.

Mahua Flowers :

Unlike Mahua seeds there is free access to other villages for Mahua flower collection from the Gadabanikilo forest. Mahua flowers are sold to agents of local(illegal) distillers. The price is Rs 10 per

kg is a very good figure in deed. Any thing beyond 5rupees may be considered a good price for Mahua flower.

Mahua Seed :

Mahua seed is not permitted to be collected by people of other villages. However clandestine collection of Mahua seed prevails, especially in the uncleaned and cleaned patches. The price ranges from 6 rupees to 10 rupees. Annual collection a tribal household is in he region of 50 kgs, and the annual income around 400 rupees.

Neem Seed:

Neem seeds are sold at 5 rupees per kg. Collection figures of 10 to 20 kgs are common.

VEGETATION ANALYSIS

Introduction :
The study aims to assess the impact of forest management practices followed by the village community. The results are expected to aid the forest protecting village the best management alternative for their forest patches. The study goes on to compare the forest patches on the basis of implications of the different management practices.

Specific Objectives :

⇒ To assess species diversity, distribution and density of trees and stems.

⇒ To estimate Basal Area, DBH & Height distribution.

⇒ To estimate the Standing Biomass and optimum extraction levels.

⇒ To understand the importance accorded to species vis-à-vis their availability in the forest.

Management System

Forest Patch	Access	Management Objective
Padar	Grazing	Regeneration
Mahua	Grazing, Firewood wood use of all species excluding Mahua	Production of Mahua Flower & Seeds
Cleaned	Grazing	
Uncleaned	Grazing,	

Number of Plant species :

The method of calculating species richness is to distinguish plant species in to Herb, Shrubs and Trees and then go on to record the number of species under each category. The figures for this are given in Table:5. The Cleaned and the Uncleaned patches have almost the same number of tree species, the former having 57 and the latter 56. The number of tree species in Padar and Mahua patches are 33 and 39 respectively. The Mahua patch has the largest number of shrub species(24) while Padar patch with 21 has the second largest number. The Uncleaned patch has just 8 while the Cleaned patch has 18. Similarly Padar patch has the largest number of herb species(44). Cleaned patch has 35, Mahua patch has 25 and Uncleaned patch has the smallest number(19). This can be explained through an analysis of the canopy cover. The Padar and Mahua patches have hardly much canopy cover and due to greater availability of sunlight the herb and shrubs develop better. The Uncleaned patch has the densest canopy. Naturally the development of herb and shrubs is greater there. The management practice of cleaning affects the shrub species more than the herb species. Shrubs are larger and thus its more convenient to get rid of them. It is more difficult to clear herb. This may explain the fact that while the Cleaned patch has the only the third largest number of shrub species, it is second in case of herb.

Analyzing the number of tree species growing in to individuals above 5 cms in DBH is an interesting way of measuring the degree of protection provided to a particular patch of forest. The individual plants are divided in to three size classes,

1. Individuals with DBH exceeding 5 cms.
2. Individuals with DBH below 5cm.
3. Ground vegetation for which DBH can not be calculated.

The figures for the above analysis is given in Table:6 in the annexure.

The Cleaned and the Uncleaned patches have almost the same number of species growing in to individuals in the 1st category. The former has 52 while the latter has 49. The Mahua patch has just 1 species in the 1st category as the patch is managed solely for the purpose of Mahua production. In case of the 2nd category Mahua patch has the maximum of 75 species. Due to heavy firewood extraction no tree species but for Mahua reach beyond the 2nd category. This increases the number of species found in the 2nd category. In the 3rd size category the Padar patch has the maximum of 86 species. Again the richness as regards the smaller size category can be attributed to heavy degradation of the patch and thus inability of the tree species to grow in to individuals of teh1st or the 2nd size category. In a way this analysis is indicative of the difference between what is and what could be if complete protection was given.

DBH & Height Distribution of Trees

DBH:
The DBH of the trees have been measured directly in some cases through the use of calipers. For the rest DBH is obtained by converting the GBH measurements. The Padar patch has the greatest percentage(74 %) of trees in the >10 cms DBH class while the Mahua patch gas 70.6 %. The Uncleaned patch has 46.7 % and the Cleaned patch has the lowest(29.00 %). The High percentage in case of the first two patches is due to the presence of a few large trees whose growth is aided further due absence of crown competition. A significant comparison, however, can be made between the Cleaned and the Uncleaned patches. The Cleaned patch has a much lesser percentage of trees in the >10 cms size class as compared to the Uncleaned patch. This may be explained by the former's proximity to the village and the main road and consequent higher rate of exploitation. On the other hand a high 23.4 % of trees in the Cleaned patch are in the size class 5-10 cm which indicates better regeneration (in the absence of age classification, DBH and Height classification may be used as indicators of regeneration). The Cleaned patch distribution is the closest to a normal distribution.

Height:
The height classification shows a pattern similar in some respects to that shown by the DBH classification. The Padar & Mahua patch again return figures that are highly skewed. Their vegetation is restricted to tightly to the height class 5 - 10 mtrs because of the presence of a few trees having an inherent tendency to develop short-thick stems and large crowns. The comparison between Cleaned and Uncleaned patches again shows the absence of larger trees in the Cleaned patch and better regeneration. the Uncleaned patch shows a distribution close normal distribution as it did in case of DBH comparison.

Basal Area & Standing Biomass

Basal Area :
The Basal Area is an indicator of the standing stock in a forest and more specifically shows the ground coverage of stems. The Uncleaned patch has the highest Basal area of 20.67m^2 Ha^{-1}. The Cleaned patch has almost half of that at 10.83m^2 Ha^{-1}. The other two patches have very little Basal area, Padar has 0.52 m^2 Ha^{-1} and Mahua has 0.76 m^2 Ha^{-1} . Thus even though the number of species and number of trees are quite similar in the Cleaned and Uncleaned patches, the Uncleaned patch has a far greater Basal Area due to the presence of larger trees.

Standing Woody Biomass:

Standing Woody Biomass(SWB) is best measured by using volume tables for specific species and then adding the volume figures to get the totals. However due to the absence of quantitative relationships between Height-DBH and volume for most of the species a general formula was used. The formula gives a very rough calculation which might be significantly different from the actual SWB. Still it does aid comparison to a great extent.

The Uncleaned patch has the highest SWB (172.01 m.t. per Ha) while the Cleaned patch has about half of that(90.11m.t per Ha). The Mahua patch has a standing woody biomass of 6.33m.t. per Ha and the Padar patch has 4.35 m.t. per Ha. The formula used to calculate the SWB was :

Standing Woody Biomass = -1.689 + 8.32 (Basal Area)

Mean Annual Increment & Sustainable Extraction Rates :

Like Standing woody Biomass an accurate estimate of Mean Annual Increment can only be obtained through the use of species specific regression equations. In the present case, however such a possibility does not exist and thus a generalized formula is used to give an approximate figure. Thus MAI is taken as 2 . 84 % of the SWB. On the higher side the extractable limit may be taken as 50 % of the MAI and on the lower side it may be taken as one-third of the M A I.

The current extraction rates vary from patch to patch. From the Uncleaned patch the villagers do not allow any extraction. From the Cleaned patch the villagers get regular cleaning output. In the year prior to the study there had been two cleanings each of which provided a cartload of fuelwood to every family. A cartload is roughly equal to 5 quintals. Thus each family got approximately a ton of fuelwood from cleaning. Thus the village as a whole extracted about 143 tons of fuelwood in the year. The cleaning output provided four months fuel supply to the villagers. In addition to this fuelwood extraction also took place for cremations in Gadabanikilo as well as nearby villages. At the removal rate of roughly two Quintal per cremation and the average rate, over the last three years, of two cremations per annum including those in nearby villages, the total extraction comes to approximately 144 m.t. Even with half a century of protection history, the forests of Gadabanikilo are not entirely free from the problem of clandestine removals by nearby villagers. The social implication of the clandestine removals by the women of the Saura tribe, a major issue in itself, is considered to be beyond the scope of this report and requires detailed study. The implication on the vegetation, is clearer. The daily removals by the Sauras would be approximately half a quintal, giving an annual removal figure of up to 20 m.t., again from the cleaned patch. Thus the annual removal figure turns out to be approximately 164 m.t. from the cleaned patch.

The collection from the cleaned patch is within the upper value of extractable limit set at 50% of MAI(191.93 m.t.). The collection is higher than the lower value of extractable limit for the cleaning patch set at one-third of the MAI(127.96) but lower than the combined extractable limit of the cleaned and uncleaned patches(229.72). In this case the villagers may be advised to start extracting some of their fuelwood requirement from the uncleaned patch as well.

The villagers collect shrubs and leaves for fuel. The contribution from shrubs and leaves together to their annual fuel requirement is twice that of than the cleaning output. Shrubs are collected from all the patches except the Uncleaned patch. This contributes up to two months fuel supply to the villagers. The major contribution to the fuel supply comes from leaves, mostly Mahua leaves. The villagers get up to six months, April to September, fuel supply from leaves. A sack of leaves is enough for up to seven days. About 20 families in the village do not collect leaves and buy fuelwood from outside to carry them through this period.

Fuel Use Pattern

Fuel of forest origin	Period of Use	Months sustained
Cleaning Output	December to April	4
Shrubs	October to December	2
Leaves	April to October	6

Species Choice and End Uses

Both timber and NTFP values of trees influence the species choice in the village. A very important fact not to be forgotten is that the forest protection initiative were caused by the understanding that the destruction of forests have severe negative impact on the water availability for agricultural purposes. Thus a clear cut species choice is not even expected as the primary value for which the forest and therefore the trees are being saved is their perceived contribution to the water balance and there is hardly much distinction made among tree species on this value. Upon inquiry other needs that led to forest protection came to notice as did species preference based on these attributes. We shall put forward two of the other major reasons and their role in species preference. Firewood for funeral pyres were a major felt need and Benta, Telakarhuan, Narigini and *D. sylvatica* which burn easily even when green were given importance for that purpose. The other major felt need is the contribution of Mahua seeds to the annual income and thus Mahua received maximum importance on this account. People had elaborate and strict rules to safeguard the continued existence of these species.

End use of the various forest produce was greatly confined to the village itself. Firewood was consumed for domestically and there was almost no sale outside. Head loading is not permitted. Stolen material did reach the nearby markets but this was unorganized and sporadic. Collection of Mahua flower is not organized and not very significant. The use of Mahua seeds was mostly for domestic consumption in the form of oil. The oil is extracted locally by the village Ghana (bullock driven oil expeller) by the "*Teli*" family. Other major NTFPs include Harra, Bahra, Aonla, Chiraunjee, Mango, Bael, Jamun and Tendu. Mango, Chiraunjee, Bael and Tendu were eaten. There is hardly any marketing of NTFPs because of low prices and irregular procurement. *Tendu leaves* (called Kendu Patra in Oriya) is not collected, as there is no *Phadi* (Govt. Collection center) in the area.

Regeneration:

Regeneration is analyzed on the basis of DBH and Height classes. The other major parameter, Age of individuals, could not be used due to lack of information on that regard. The regeneration was good in the Cleaned and the Uncleaned patches. On the basis of DBH class it was found that regeneration was the best in the Cleaned patch- 71 % of individuals in the less than 10 cms DBH class and 23.4 % in the less than 5 cms DBH class. The Uncleaned patch also had a good regeneration status. Mahua patch also had good regeneration considering that it had almost 30 % of individuals in the less than 10 cms DBH class in spite of Mahua having a tendency to grow in to short, squat individuals under a low tree density regime. The height class based analysis reinforces the results of the DBH class analysis in case of the Mahua patch and the Cleaned patch. The Uncleaned patch shows poorer regeneration. But under the dense vegetation of the Uncleaned patch individuals tend to grow taller. Thus the fact that a very large percentage of trees are in the greater height class does not necessarily imply poorer regeneration. The regeneration parameters used and their values for the various patches are outlined in the table below.

Implications of Vegetation Management

Sustainable management of resources has become a catchword in recent times. More and more people are realizing its importance. The necessity of teaching local people about Sustainable management of resources is obtaining support from more and more quarters. The villagers of Gadabanikilo may never have the all-important phrase, but they have shown the way through their work. The way the forest is divided in to patches for fulfilling various needs is indeed an example of a most scientific system.

The Uncleaned patch serves the purpose of protecting the forest from intruders through a dense vegetative fencing. The issue of who shares may be a thorny one. But the immediate effect of an overgrown and thorny outer boundary of a forest patch has been on the whole rather beneficial to the health of the forest. The Uncleaned patch also maintains a very high degree of species diversity, thus serving greater ecological needs. The Cleaned patch serves the firewood and small-timber requirements of the people in a continuous manner. The Mahua patch provides the people with the major NTFP that provides a major item of food and also significant income generation potential. The Padar patch seems to be overexploited but not without reason. The Padar patch has provided the necessary breathing space for the other patches to develop their potential. Now that the three patches are well stocked and able to sustain grazing and firewood pressures the Padar patch is also getting a

slight respite as the utilization pressure, especially the grazing pressure, has been eased to a significant extent.

MAJOR FINDINGS

1. Locally developed forest management system (LFMS) of Gadabanikilo is simple but scientific.

2. The LFMS takes care of the livelihood and survival needs of the villagers.

3. LFMS lays greater emphasis on firewood and NTFP production.

4. The Villagers are concerned about the beneficial impact of forests on the local agro-ecology and this forms the major cause for forest protection.

5. The LFMS gives due emphasis to the mode of sharing of forest produce and equitable distribution methods have been established for sharing NTFPs, Firewood and small wood.

6. Ecological objectives are amply satisfied and the diversity of plant species in the forests is maintained at a high level.

7. The LFMS shows due concern towards the needs of adjoining villages.

8. The LFMS indicates that there is need for intensively managed forests as well as for forest areas that are given protection and are allowed to be significantly free from human intervention. While the former fills in direct livelihood needs the latter is perceived to help in maintaining a better agro-ecological system. The latter also helps in protection efforts in its role as a vegetative barrier.

9. Grazing may be detrimental to the health of degraded and newly regenerating forests, but can be compatible with the maintenance of a well-developed forest area even under an open grazing regime.

10. The LFMS indicates the need for setting aside a portion of the forest for intensive use so as to tide over the scarcity of forest produce in the initial stages of forest protection. However once the forest develops this intensive use area may be developed in to a good forest patch by giving greater protection, aiding natural regeneration and, if possible, through artificial regeneration methods.

SUMMARY

The village Gadabanikilo is located in the Tangi Ranpur forest protection zone of Orissa. The people here have developed a scientific way of managing their forest, which involves the division of the forest area in to separate patches (blocks) to serve different purposes. This has resulted in the fulfillment of the major needs of people in a better manner.

The villagers have maintained four distinct blocks that are classified as the Padar, Mahua, Cleaned and Uncleaned patches.

The Cleaned patch provides for the firewood and small timber needs of the people.

The Mahua patch provides Mahua flowers that yield edible oil used by the villagers.

The Uncleaned patch with dense vegetation and a thorny undergrowth is maintained for its role as a barrier to the entry of outsiders in to the protected area. It also serves greater ecological interests by maintaining a very high level of species diversity.

The Padar patch served as the intensive use area which eased pressure from the other three patches and let them develop to their present condition. All the patches support grazing.

The village has well-developed sharing mechanism for the various major forest produce like Firewood & Small-timber and Mahua seeds.

Years of protection have resulted in well-stocked forests and excellent diversity in terms of plant species.

The Forest Management system is need-based and emphasizes more on livelihood needs rather than generation of commercial output.

The needs of nearby villages are also taken care of to a significant extent who have been given grazing rights for the forest area. Nearby villagers are allowed to collect all NTFPs excluding Mahua. The committee permits the nearby villagers to collect one Quintal of firewood for cremating their dead.

TABLES

Table 1: Number and Type of Quadrats

Quadrat type	Size of the Quadrats	No. of Quadrats
Tree Quadrats	50m X 40m	20
Shrub & Small Trees Quadrat	10m X 10m	40
Herbs Quadrat	1m X 1m	62

Table2: No of trees in various diameter classes

Diameter	< 5cm		5-10 cm		10-15cm		15-20cm		20-25cm		>25cm	
Forest Type	No	%	No	%	No	%	No	%	No	%	No	%
Padar	1	4	5	22	11	48	3	13	0	0	3	13
Mahua	16	11	26	18	80	56	17	12	4	3	0	0
Cleaned	316	23	642	48	272	20	80	6	22	2	18	1
Uncleaned	75	6	649	49	297	23	146	11	67	5	74	6

Table 3: Height Class Distribution

Height	<5 mtr		5-10 mtr		10-15 mtr		15-20 mtr		>20 mtr	
Forest Type	No	%	No	%	No	%	No	%	No	%
Padar	1	*4.5*	21	*95.5*						
Mahua	7	*10.0*	63	*90.0*						
Cleaned	131	*9.7*	964	*71.5*	253	*18.8*				
Uncleaned	32	*2.5*	409	*31.4*	679	*52.1*	177	*14.6*	5	*0.4*

Table 4: Basal Area & Standing Woody Biomass of Quadrats

Forest Patch	Padar	Mahua	Cleaned	Uncleaned
Basal Area (M^2 Ha^{-1})	0.52	0.76	10.83	20.67
Standing Woody Biomass(Ton Ha^{-1})*	4.35	6.33	90.11	172.01

*SWB = [-1.689+8.32(Basal Area)]

Table 5: MAI (mean annual increment) for the various Forest Patches

	SWB (m.t./ Ha)	Area of the Patch	Total SWB	MAI for the patch (@ 2.84 % of SWB)
Padar	4.35	55	239.25	6.7947
Mahua	6.33	30	189.9	5.39316
Cleaned	90.11	150	13516.5	383.8686
Uncleaned	172.01	60	10320.6	293.105
Total		295	24266.25	689.1615

Table 6: Increment and Extraction Rates for Forest Patches

Forest Patch	MAI	Extractable Limit		Actual Extraction (mt)
		@ 50%	@ 30%	
Padar	6.79	3.40	2.26	Shrubs
Mahua	5.39	2.70	1.80	Shrubs
Cleaned	383.87	191.93	127.96	164
Uncleaned	293.11	146.55	97.70	Nil
Total	689.16	344.58	229.72	N.A.

Table 7: Species Richness in plant categories

Forest Patch Vegetation Type	Padar	Mahua	Cleaned	Uncleaned	Total
Herb Species	44	25	35	19	64
Shrub Species	21	24	18	8	39
Tree Species	33	39	57	56	68
Total	98	88	110	83	171
Tree Species present in the >5 cms DBH class	6 *(18%)*	1 *(3%)*	52 *(91%)*	49 *(88%)*	

Table 8 :Top Five Tree Species on the basis of Basal Area

Padar		Mahua		Cleaned		Uncleaned	
Species	Basal Area %	Species	Basal Area %	Species	Basal Area %	Species	Basal Area %
Mango	36.8	Mahua	100	Mahua	28.85	Mahua	26.5
Osta	30.8			Kalachua	11.69	Kalachua	21.4
Chara	24.7			Chara	8.04	Chara	9.5
Kumvi	4.9			Nirasa	5.66	Harida	5.1
Mahua	2.7			Harida	5.54	Mahi	3.6

Table 9 : Top Five Tree Species on the basis of Frequency of occurrence

Padar Patch		Mahua Patch		Cleaned Patch		Uncleaned Patch	
SPPS	%Frq	SPPS	%Frq	SPPS	%Frq	SPPS	%Frq
Chara	47.8	Mahua	100	Kalachua	18.9	Kalachua	37.7
Mango	26.1			Mahua	16.2	Mahua	12.0
Mahua	8.7			Nirasa	12.7	Harida	7.8
Bamboo	8.7			Chara	8.0	Chara	7.7
Osta	4.4			Harida	6.8	Aonla	2.7
Kumvi	4.4			Bahada	2.7	Mahi	2.6

Table 10 : Total number of cases of misuse and their nature

YEAR (Period)	FUELWOOD	MAHUA	TEAK	OTHER	TOTAL
1991-14.11.91	**13**	**1**	**1**		**15**
1992-1.1.92 to	**167**	**3**	**1**	**13**	**184**
1993-17.9.93 to 2.10.93	**101**	**-**	**-**	**52**	**153**
1994-11.7.94 to 18.10.94	**102**	**9**	**1**	**16**	**128**
1995-5.9.95 to 5.12.95	**35**	**-**	**-**	**4**	**39**
1996-1.1.96 to date	**106**	**-**	**-**	**16**	**122**

TABLE 11:Alphabetical Listing of all Tree, Shrub & Herb Species in the forest area

List Of Trees		List Of Shrubs		List Of Herbs	
Sl	SPECIES	Sl	SPECIES	Sl	SPECIES
1	Acacia	1	Achun	1	Badiaghasa
2	Amba	2	Anachanra	2	Bahalbeni
3	Ambalata	3	Ankukoli	3	Baidanka
4	Aonla	4	Atandi	4	Bajramuli
5	Bahada	5	Bahadalia	5	Balapedi
6	Banabanakia	6	Baiguda	6	Baladakhia Ghasa
7	Bamboo	7	Balibhaincha	7	Balajhampuli
8	Bela	8	Balibhuindanka	8	Bana Nalita
9	Benta	9	Bana Atandi	9	Bana Malli
10	Bhalia	10	Bhaincha	10	Bhuin Limba
11	Bhalukuri	11	Bhuinkamada	11	Bisalya Karani
12	Chara	12	Bichhuati	12	Budhamundia
13	Chulijhunka	13	Chadchadi	13	Chadheigodia
14	Dalasingha	14	Chhotupana	14	Chemera
15	Eucalyptus	15	Dalatandi	15	Chhutiara
16	Gamvhari	16	Gaba	16	Dahidahikia Ghasa
17	Gaudakasa	17	Gayasa	17	Dahidahikia Nati
18	Giringa	18	Gila	18	Dantari
19	Gotha	19	Gohira	19	Dayana
20	Guakoli	20	Jarigacha	20	Dhobi Lai
21	Halada	21	Juna	21	Duba Ghasa
22	Harida	22	Kala Ankua	22	Gala Podia Ghasa
23	Hatilai	23	Kanasa	23	Gandigada Ghasa
24	Jammu	24	Khajuri	24	Gharapodia
25	Jayasandha	25	Khanda Kenda	25	Gharakoili
26	Jhadapana	26	Khanda Kola	26	Ghoda Lanjia
27	Kaincha	27	Khirikoli	27	Ghorakhia Ghasa
28	Kainchanala	28	Kodala	28	Ghuna Gachha
29	Kalamkal	29	Kukurchhelia	29	Indrajaba
30	Kalachua	30	Lajakuli	30	Jatajatikia
31	Kaniari	31	Muturi	31	Jhumpuri

TABLE 11 continued...

List Of Trees		List Of Shrubs		List Of Herbs	
Sl	SPECIES	Sl	SPECIES	Sl	SPECIES
32	Kantababula	32	Nahalbeli	32	Juna Ghasa
33	Kantabaula	33	Nai	33	Kadikia
34	Kantai Kuli	34	Natakaniari	34	Kakuchia
35	Kapasia	35	Nunu Kenda	35	Kamada Ghasa
36	Karada	36	Panakuiri	36	Kandarpa Raja
37	Kasi	37	Pokasungha	37	Karaba
38	Katakala	38	Sagadabatua	38	Khadika Ghasa
39	Kendu	39	Sanapokasungha	39	Kharua Lai
40	Kerhuan			40	Kolathia Ghasa
41	Khaira			41	Kolathia Ghasa
42	Khakada			42	Kujipana
43	Kochila			43	Manda Kaincha
44	Kumvi			44	Nadia Ghasa
45	Kusuma			45	Nailngudia
46	Lahanga Koli			46	Nalanalakia
47	Limba			47	Narahari
48	Luni			48	Naudankia

49	Mahalimba			49	Nauphalia
50	Mahi			50	Nephada
51	Matikinia			51	Nirmuli
52	Mahua			52	Nunununikia Ghasa
53	Morhian			53	Panua Nai
54	Mungai			54	Pedipedikia Ghasa
55	Narigini			55	Phirika
56	Nirasa			56	Pichhuli
57	Lunikoli			57	Pitabasia
58	Osta			58	Salar Kanta
59	Patuli			59	Sana Ghar Podi
60	Piasala			60	Senti Gaja
61	Saguan			61	Suruganthia Ghasa
62	Sahada			62	Tunda Poda
63	Sajanapaturia			63	Utrudi
64	Satara Kanta				
65	Sidha				
66	Sunari				
67	Tela Kerhuan				
68	Tinia				

TABLE 12 : LIST OF PLANTS AND THEIR SCIENTIFIC NAMES

Sl No	Local Name	Scientific Name
1	Acacia	*Acacia nilotica*
2	Achun	*Morinda tinctoria*
3	Amba	*Mangifera indica*
4	Ankukoli	*Alangium hexapetalum*
5	Ankula	*Alangium lamarckii*
6	Aonla	*Emblica officinalis*
7	Atundi-Lai	*Combretum decandrumm*
8	Bahada	*Terminalia bellerica*
9	Baidhanka	*Mucuna monosperma*
10	Bajramuli	*Sida species*
11	Banamalli	*Millingtonia hortensis*
12	Baula	*Mimusops elengi*
13	Baunsa-salia	*Dendrocalamus strictus*
14	Baunsa-Balangi	*Oxytenenanthera gigantia*
15	Baunsa-sundarakani	*Bambusa vulgaris*
16	Bela	*Aegle marmelos*
17	Bhaincha	*Flacourtia sepiaria*
18	Bhalia	*Semecarpus anacardium*
19	Bhuinlimba	*Andrographis paniculata*
20	Bichhuati	*Tragia involucrata*
21	Bisalyakarani	*Tridax procumbens*
22	Chadheigoda	*Vitax pedancularis*
23	Chara	*Buchanania lanzan*
24	Daba Baunsa	*Bambusa arundinacea*
25	Dahidahikia_nati	*Tinospora malabarica*
26	Duba - ghasa	*Cynodon doctylon*
27	Eucalyptus	*Eucalypus species*
28	Gamvhari	*Gmelina arborea*
29	Gayasa	*Leucena Leucocephala*
30	Gayasa	*Leucas species*
31	Ghodalanjia	*Albizzia species*
32	Gila	*Caesalpinia decapetala*
33	Giringa	*Pterospermum heyneanum*
34	Gohira	*Acacia leucocephala*
35	Guakoli	*Maba buxifolia*
36	Halada	*Adina cordifolia*
37	Harida	*Terminalia chebula*
38	Hatilai	*Heliotropicum indicum*
39	Jammu	*Syzygium cumini*
40	Jari	*Ficus retusa*

Table 12 continued...

Sl No	Local Name	Scientific Name
41	Jhumpuri	*Streblus taxoides*
42	Kaincha	*Abrus precatorius*
43	Kalachua	*Diospyros sylvatica*
44	Kanasa	*Hymenodyctylon excelsum*
45	Kanta Baunsa	*Bambusa arundinacea*
46	Kanteikoli	*Zizyphus oenoplia*
47	Kapasia	*Kydia calycina*
48	Karaba	*Dioscorea pentaphylla*
49	Kasi	*Bridellia retusa*
50	Kendu	*Diospyros melanoxylon*
51	Kerhuan	*Hollarhena antidysenterica*
52	Khair	*Acacia catechu*
53	Khajuri	*Phoenix sylvestris*
54	Khirakoli	*Carissa spinarum*
55	Kochila	*Strychnos nuxvomica*
56	Kumbhi	*Careya arborea*
57	Lajakuli	*Mimosa pudica*
58	Lunikoli	*Solanum nigrum*
59	Mahanimba	*Melia composita*
60	Mahi	*Lannea coromandalica*
61	Mahul	*Madhuca longifolia*
62	Matikinia	*Mitragyna parviflora*
63	Morhian	*Zanthoxylum budraga*
64	Muturi	*Smilax macrophylla*
65	Narigini	*Atalantia monophylla*
66	Neem	*Azadirachta indica*
67	Nirmuli	*Cuscuta reflexa*
68	Osta	*Ficus religiosa*
69	Patuli	*Lagerstroemia reginae*
70	Piasal	*Pterocarpus marsupium*
71	Saguan	*Tectona grandis*
72	Sahada	*Streblus asper*
73	Sidha	*Lagerstroemia parviflora*
74	Sunari	*Cassia fistula*
75	Tinia	*Albizzia odoratisima*