

**Joint Forest Management and Forest Protection Committees:  
Negotiation Systems and the Design of Incentives-  
A Case Study of West Bengal**

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**JOINT FOREST MANAGEMENT AND FOREST PROTECTION  
COMMITTEES : NEGOTIATION SYSTEMS AND THE DESIGN OF  
INCENTIVES -- A CASE STUDY OF WEST BENGAL**

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## Chapter I: INTRODUCTION

The traditional bias of Indian forestry was the production of revenue-yielding timber. To achieve this aim, a forest bureaucracy was created to manage the forests - alienating local communities from their own ecosystems. But the Forest Policy of 1988 announced for the first time that forestry should meet community and environmental objectives. It advised the forest department to share both the responsibilities of forest management and the returns from forest produce with the forest fringe communities. This has certainly been a bold step towards effectively managing our country's forest resources.

### 1.1 The Arabari Experience and National Forest Policy

West Bengal has been a pioneer of joint forest management and has had some success, especially in the degraded lateritic areas of South West Bengal. During 1971-72 a bold forest officer of Medinipur undertook a pilot project known as the Arabari Socio- Economic Project – it was managed by 618 families belonging to 11 villages. The forest officer met around 3600 villagers in groups, to make them understand that if they were allowed to regenerate, these degraded forests had the potential to ensure the livelihoods of many villagers in the long run. This venture not only created a qualitative change in the degraded forests of Arabari but gave a whole new dimension to the traditional system of forest management.

Yet at that time there was no legal provision in the forest policies and laws that allowed for the involvement of the local communities in forest management. The project was neither a government sponsored project, nor was it funded by any other agency. In 1992 this project received international recognition when it was granted the Paul Getty award. Gradually, the concept of the joint management of forest resources by the forest department and the 'forest protection committees' (FPCs) took shape and was given the name of joint forest management (JFM). The success of the FPC program in regenerating the *Sal* forests of South West Bengal drew the attention of the State Forest Department in the late 1980s, and was subsequently endorsed by the Government of India's Ministry of Forests and Environment.

Following the provisions of the National Forest Policy of 1988, the Government of India, issued an order on June 1, 1990, conveying to State Governments a framework for creating a massive people's movement through the involvement of village committees for the protection, regeneration and development of degraded forest lands. This gave an impetus to the participation of stakeholders in the management of degraded forests situated in the vicinity of villages. The joint forest management (JFM) programme in the country is structured on the broad framework provided by the guidelines issued by the Ministry. It is essentially an endeavour of social fencing of the forest lands by the local communities in return for free access to non-timber forest produce, a 25 percent share of the intermediate biomass yield from forestry operations, and 25 percent of net sale proceeds from the rotational harvest of poles or timber. So far, during the last 10 years, 22 state Governments have adopted resolutions for implementing the JFM programme in their respective states. As on 1.1.2000, 10.24 million hectares of forest lands are being managed under JFM programme through 36,075 committees (Jcdha,2000) As a form of participatory development, JFM is programmed to serve the following purposes :

Environmental:

- a) to protect and maintain the already existing but fast depleting forests  
and water resources.
- b) To encourage regeneration of the degraded forest lands for increasing green cover.

Economic:

- a) to efficiently manage the local forest and water resources.
- b) To offer the directly forest dependent population a means of subsistence and income generation.

Socio-Political :

- a) empowerment of the local communities for decision-making in forest use, by bestowing upon them their usufruct rights over forest lands .(Pattanaik and Dutta, 1997).

Thus the central idea behind this new system of forest management is to transform the age-old authoritative and policing role of the state forest department (FD) in relation to the forest fringe communities into that of a facilitator.

JFM seeks the sharing of both responsibilities and accountabilities between the FD and local communities in managing the forests. It is the outcome of the realisation that without the willing and active participation of fringe communities , no programme to arrest the fast depletion of forests, and to regenerate the already degraded forests, would ever succeed. By empowering the local communities JFM aims to make them realize that their right over forest resources should be accompanied by their duties to protect and manage these resources. Therefore, JFM is the sharing of products, responsibilities, and decision-making power over forest lands between the FD and local user communities. It is based on the premise that local communities can regenerate and protect the degraded forests if they are empowered and compensated for their opportunity costs.

Thus, the spirit of JFM is to take on the issue of micro-level planning through participatory development. It wishes to manage common property resources in an optimum way such that both the people and the government, irrespective of their political affiliations, get together and participate. .(Pattanaik and Dutta, 1997).

## **1.2 The Status of JFM in India with respect to the area under JFM, the number of Village Forest Committees and their performance until December, 1998.**

Until December, 1998, 20 States have issued their resolutions for JFM. Reports for the status of JFM had been received only from 10 States. As per these reports about 1.30 million hectares of degraded forests in the country are being managed and protected through 20134 Village Forest Committees (Details shown in Table-1.1)



in 10 States. The following States have issued administrative resolutions for adopting Joint Forest Management (JFM) till December, 1998.

- |     |                   |     |               |
|-----|-------------------|-----|---------------|
| 1.  | Arunachal Pradesh | 11. | Maharashtra   |
| 2.  | Andhra Pradesh    | 12. | Orissa        |
| 3.  | Assam             | 13. | Punjab        |
| 4.  | Bihar             | 14. | Rajasthan     |
| 5.  | Gujarat           | 15. | Tripura       |
| 6.  | Haryana           | 16. | Tamilnadu     |
| 7.  | Himachal Pradesh  | 17. | Kerala        |
| 8.  | Jammu and Kashmir | 18. | Nagaland      |
| 9.  | Karnataka         | 19. | West Bengal   |
| 10. | Madhya Pradesh    | 20. | Uttar Pradesh |

Under the Joint Forest Management local people are organised into Village Forest Committees (VFCs). The area under JFM is managed jointly by VFCs and Forest Department according to scientifically prepared " Micro Plans " through Participatory Rural Appraisal (PRA). Local NGOs are also involved through services rendered by them. Almost all states permit 100% intermediate forest produce from thinning, lopping and minor forest produce to VFCs. However, the share to beneficiaries from final harvest (timber) varies from State To State.

**Table 1.1 Statement of Forest Area and Number of VFCs under JFM as Furnished by the States, December 1998**

<u>Sl. No.</u>	<u>State</u>	<u>Area covered under JFM (ha)</u>	<u>No. of VFCs</u>	<u>Remarks</u>
1	Madhya Pradesh	136000	6531	
2	Haryana	63000	361	
3	Karnataka	81350	925	
4	Andhra Pradesh	595859	2350	
5	Kerala	2000	7	6 VFC and 1 Tribal society
6	Uttar Pradesh	14810	4021	Gram Samaj Land Van Panchayat
7	West Bengal	449300	3289	
8	Rajasthan	24400	1640	
9	Himachal Pradesh	6005	125	
10	Jammu and Kashmir	5447	1174	
Total of 10 States		1377871	20134	

Source : Agenda Notes  
Forest Ministers' Conference, 1998  
M.O.E.F., Govt. of India.

### 1.3 The State of Forests and JFM in West Bengal

In 1989, of the total area of 89,000 sq. km., actual forest cover in the state was only 9.43 per cent of the entire area. In 1991, this figure decreased to 9.03 per cent of the total area of the state [FSI 1989, 1991 ]. But in 1993 forest cover in the state increased to 9.22 per cent of the total area [ GoWB 1993 ]. Forest statistics in 1994 recorded 13.4 per cent of the total geographical area under forest (government defined forest areas ) whereas according to remote sensing data (RSD) this percentage is 14.97 [GoWB 1995]. Table-1.4 shows that the maximum area under forest cover is found in Jalpaiguri district (1,790 sq.km.) while the minimum is recorded in Hooghly district ( 3 sq.km.) .

The Arabari experiment had demonstrated that with open communication and co-operation of the local people it is possible to dismantle the tradition of conflict between FD and communities. By 1989 when formal state government order was issued, over 1,52,000 ha of forest lands were already being managed by over 1,200 FPCs on voluntary basis [GoWB 1995:142]. The geometric rate of growth of FPCs between 1980 and 1995 reflects the aspiration of forest communities to have their rights over forests recognised during this period of authority reallocation (Table 1.3). By 1994, JFM had spread to 4,23,816 ha of protected forest area with 3,06,545 members in 2,745 FPCs [GoWB 1995:32]. Out of this, 73 per cent of FPCs were in South West Bengal.

**Table 1.2 : Forests in West Bengal at a Glance (1994)**

Geographical area	88,752 sq.km.
Total recorded forest area	11,879 sq.km.
Actual forest cover	8,186 sq.km.
Percentage recorded forest area to geographical area	13.38
Per capita forest area	0.02 ha
Reserve forest (per cent)	59 (7,054 sq.km.)
Protected forest total (per cent)	32 (3,772 sq.km.)
Unclassed forest (per cent)	9 (1,053 sq.km.)
Density	
> 40 per cent	3,362 sq.km. (41%)
10 to 40 per cent	2,705 sq.km. (33%)
Mangrove	2,119 sq.km. (26%)

-----  
 Source: Data compiled from State Report on WB Forest (1995), department of Planning and statistical cell GoWB.

**Table 1.3 : No. of FPCs and Total Area Covered (Year wise )**

<u>Year</u>	<u>Total no. of FPCs</u>	<u>Total area (ha)</u>
1980	8	772
1982	37	2812
1986	284	31610
1990	1722	2,26,704
1994	2745	4,23,816
1998	3289	4,49,300

-----  
 Source : SPWD (1993: 142), GoWB ( 1993, 1994, 1995, 1998 )

**Table 1.4 : Districtwise and Divisionwise Forest Area in West Bengal (Sq.Kms.)**

<u>District</u>	<u>Division</u>	<u>Forest Area</u>	<u>District Total</u>
Darjeeling	Kurseong	338	
	Darjeeling	310	
	Kalimpong	556	1204
Jalpaiguri	Jalpaiguri	396	
	Buxa	743	
	Baikunthapur	276	
	Cooch Behar	375	1790
Cooch Behar	Cooch Behar	57	57
Bankura	Bankura (N)	735	
	Bankura (S)	747	1482
Medinipur	Medinipur(East)	815	
	Medinipur(West)	894	1709
Burdwan	Burdwan	277	277
Hooghly	Burdwan	3	3
Purulia	Purulia	876	876
Birbhum	Birbhum	159	159
Nadia	Nadia Murshidabad	13	13
Murshidabad	Nadia Murshidabad	8	8
Malda	Malda W.Dinajpur	20	20
W. Dinajpur	Malda W.Dinajpur	18	18
24-Parganas	24-Parganas	1678	
	Sunderbans Tiger Reserve Forest	2585	4263
Total			11,879

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Source : State Report on West Bengal Forests (1995:8).

### 1.4 Features of JFM

In JFM, it is the primary users of forests who have been organised into FPCs for participating and developing forests jointly with the forest department. It is basically through the departmental initiative that the community groups have been identified except in the case of North Bengal hills, where due to an earlier period of political agitation and consequent alienation, help of non-governmental organisation was taken for facilitating a dialogue. Efforts have been made to involve all households in FPC village in the committee. The membership is joint, both husband and wife. The executive committee is an elected body with six elected members, one representative from the Panchayat Samiti at the block level, and the head of the Gram Panchayat or his representative. The local Beat Officer (Forester ) is the convenor. The features of JFM are indicated in Appendix –I, II & III.

The three tiers of the Panchayati Raj, which has been firmly established in West Bengal, have been tied up with the three tiers of the forest administration (i.e. Beat, Range and Division)(Palit,1999). As a matter of fact, a committee is registered only when the case is recommended to the DFO by the Panchayat Samiti.

For the four different agro-climatic zones in Bengal, separate sets of JFM notifications have been issued. The four agro-climatic zones are :

- North Bengal hills
- North Bengal plains
- Southwest Bengal
- Sundarbans

The basic contents of the order are the same, only the pattern of usufruct sharing varies. Apart from the provision of usufruct sharing all employment generated in the JFM areas through forestry activities generally go to FPC members. Besides, to reduce their dependency on the forests, the FPC members are trained in support activities like pisciculture, sericulture, bee keeping , lac cultivation, mushroom cultivation etc. After training they are also provided with necessary inputs. They are also helped through land development activities like construction of earthen dams, excavation of tanks, irrigation drains, water pipelines etc.

### **1.5 JFM related orders**

In 1987 the FD issued an order to distribute 25 per cent of net return from sal pole harvesting among participating communities. A scheme named 'Economic Rehabilitation of Fringe Community' was taken up by the FD which proposed various forest-based income generation programmes for fringe communities in SWB.

In 1989 the government of West Bengal (GoWB) modified and elaborated the PFM order issued in 1987, which involved only the economically backward population of the forest communities in SWB.

In 1990, after the GoI issued JFM order, the GoWB issued an order to modify further its PFM system to the form of JFM in SWB. This new resolution made eligible every

family of SWB living in the vicinity of the forest patches to become member of a forest protection committee (FPC).

In 1991, the GoWB issued three more orders to bring the North Bengal plains, the Darjeeling hills and the Sunderbans under JFM, (i) In the north Bengal plains and Darjeeling areas FPCs members are allowed to harvest intercrops but there is no provision for sharing of timber. However, 25 percent of the net sale proceeds from firewood and poles are shared with the FPCs. (ii) In the Sunderbans , the crop is to attain 15 years of age before it is harvested as against 10 years in other parts of the state [SPWD 1993: 113-32]. This order also introduced the concept of joint membership for each household, i.e.if the husband becomes a member, the wife automatically becomes a member and either of the two can represent the household.

Hence the political will of the state government, coupled with the supportive legal environment, has succeeded to some extent in making JFM a truly people's forestry programme.

Initially the JFM laws provided the following provisions for the four different forest ecosystems of West Bengal.

**Table 1.5: JFM Resolutions in Different Forest Types of West Bengal**

	South West Bengal	Sundarbans	Darjeeling (DGHC area )	Plains of North Bengal
Forest Type	Dry deciduous Sal forest Coppice origin.	Mangrove forest	Sub-alpine & alpine forests.	Moist deciduous Forest.(High Sal forest & mixed Sal).
Executive Committee (EC) Elected members	6	6	6	6
EC representatives from Panchayats and DGHC <sup>1</sup>	2	2	2	2
Member Secretary of FPC/EDC	Beat Officer	Beat Officer	Beat Officer	Beat Officer
Sharing of Benefits :				
Cashew	25%	---	---	---
Sal seeds and Kendu leaves	To be sold to co-operative	---	---	---
Thinning	25%	25%	25%	25%
Final Harvesting	25%	25%	---	---
Other NTFPs, Dry Branches and Trees.	Free of cost	Free of cost	Free of cost	Free of cost

### 1.6 The Present Status of JFM in West Bengal

The success of Joint Forest Management (JFM) in South West Bengal is moderate and the one-fourth share distributed to the members of the FPCs from the final harvest of the crop exceeded Rs. 3.0 crores for the years 1995-96 and 1996-97, keeping in conformity with the Govt. resolution and commitment to the fringe dwellers who mainly belong to the weaker sections of our community. Table 1.6 shows that the following amounts have been distributed to FPC members :

<sup>1</sup> Darjeeling Gorka Hill Council

**Table 1.6 : Usufruct Distribution in JFM**

Year	Usufruct distributed (Rs.)
1997-98	246,50,485.00
1998-99	196,39,309.00

Source : GoWB, 1999

In addition to this, people living in the fringe areas receive dry leaves, dry sticks, NTFP etc. from the forest for their livelihood free of cost.

The FD has witnessed many changes in the last 50 years. From production forestry, it is now apparently conservation oriented: timber and revenue are not the only criteria : non-timber forest produce (NTFP) is gaining importance which was not hitherto given adequate attention : application of bio-fertiliser in forestry has been introduced : strained relation with the fringe people in several areas has turned into friendship.

The details of forest protection committees (FPC) for protected forests and eco-development committees (EDCS) for reserve forests in West Bengal are given below:

**Table 1.7 : No. of FPCs and EDCs, Area Covered and Number of Members**

Committees	Nos.	Area Covered (ha.)	No. of members.
Forest Protection	3431	4,90,582	4,03,160
Eco-Development	87	74,045	19,887

Source : GoWB , 1999



**Table 1.8 Forest Protection Committees (FPCs) In West Bengal (March '99 )**

Total No. Division	Total No. of FPC	Total No. of Protected (ha.)	FPC Members
EAST MEDINIPUR	294	38658	40117
WEST MEDINIPUR	517	58120	40057
KHARAGPUR S.F.	78	10459	16119
RUPNARAYAN P & S	144	22194	17984
BANKURA (NORTH)	474	44257	39352
BANKURA (SOUTH)	529	43074	49048
PANCHET	220	26802	24230
PURULIA	175	26468	18316
KSC-I	200	15674	17103
KSC-II	289	24521	27171
BURDWAN	57	16382	15671
DURGAPUR S.F.	20	2199	2106
BIRBHUM	114	8413	8289
24-PGs(SOUTH)	21	38879	48917
DARJEELING	41	7827	2699
KALIMPONG	35	15486	1171
KURSEONG	18	2590	906
JALPAIGURI	48	17991	11937
COOCH BEHAR	21	2357	2872
COOCH BEHAR S.F.	25	4884	1745
BAIKUNTHAPUR	60	7657	6323
BTR (EAST) <sup>2</sup>	17	23070	3454
BTR (WEST)	24	15055	3698
STR <sup>3</sup>	10	17565	3875
<b>TOTAL</b>	<b>3431</b>	<b>490582</b>	<b>403160</b>

Source: GoWB , ( 1999).

**Table 1.9: Eco-Development Committees (EDCs ) in West Bengal (March '99 )**

Division	No. of EDC	Area Covered (ha)	No. of members
WILD LIFE I	24	24713	5394
WILD LIFE II	8	5271	969
BTR (E)	14	11878	1617
BTR (W)	7	61	1264
SUNDARBAN	14	20670	4483
TIGER RESERVE			
COOCH BEHAR	20	11452	6160
<b>Total</b>	<b>87</b>	<b>74045</b>	<b>19887</b>

Source : GoWB (1999).

The initial enthusiasm created by the Joint Forest Management (JFM) programme in West Bengal has now started to settle down and dismal reports have already been

<sup>2</sup> Buxa Tiger Reserve

<sup>3</sup> Sunderban Tiger Reserve

appearing in social science research publications (Martin and Chakraborty, 1996 :47 and Mukherjee,1995:3130-3132 ). The retirement of the progressive forest officers who initiated this movement and the resource constraints due to the termination of the World Bank aided West Bengal Forestry Project in 1997 are seen as some of the reasons of apparent stagnation and even decline of JFM movement. This indicates the excessive dependence on external funding for the sustainability of JFM and the problem of institutionalisation and internalisation of the movement among the two major stakeholders - the local communities and the state / forest department. Therefore it is hightime , after a decade of JFM, that we take a fresh look at it - the way it is conducted, its achievements and failures in terms of the regeneration of degraded forests, strengthening of means of subsistence, income generation of dependent population and regarding the question of empowerment and motivation of local communities for decision making in forest conservation and management. In this connection it is also necessary to study the available Common Pool Resource (CPR) management tools and techniques (game theoretic principles, incentives and penalty structure etc.) to explain the system of governance of West Bengal's forests and suggest alternative strategies for the successful co-management of the forests.

### **1.7 Selection of Study Sites**

Table 1.5 shows that there are four forest types in West Bengal and a difference is observed in the method of benefit sharing and nature of participation of forest dependent communities in forest protection and management according to JFM resolutions of the Govt. of West Bengal. The two basic type of local operational institutions are the FPC ( Forests Protection Committee ) for protected forests ( Forests where everything is permitted unless otherwise prohibited ) and EDC ( Eco-development Committee ) for reserved forests ( Forests where everything is prohibited unless otherwise permitted ). For the purpose of our proposed research three districts, Medinipur, Bankura ( representing the plains of South Bengal and FPCs as the local institutions ) and Jalpaiguri ( representing the protected forest of Madarihat with FPCs as the local institutions and Jaldapara Wildlife Sanctuary with EDCs as local institutions ) are selected for a detailed enquiry for South Bengal and a qualitative study for North Bengal.

## Chapter II: OBJECTIVES OF THE STUDY

In the context of a decade of JFM in West Bengal, several questions have cropped up in the minds of the forest bureaucracy, academicians, researchers and NGOs. :

Has JFM in general and FPCs/ EDCs in particular been successful in terms of forest regeneration? Why, and under what conditions, do they fail? What is the relative importance of different socio-economic parameters and institutional parameters for determining the status of the forest? Is the forest department sufficiently equipped in terms of its structure, attitude and functioning to accept grassroots community institutions ( FPCs and EDCs ) as equal partners for the joint management of the forests and Wildlife reserves? What kind of institutional reorientation and incentive structure could ensure ecologically and socio-economically sustainable strategies for a successful JFM with a greater involvement of the local communities?

To answer these questions, the following objectives are identified :

1. To measure the benefits accruing to the forest dependent communities through JFM.

The benefits would include the significant pecuniary (income from felling, consumption and selling of non-timber forest produce etc. ) non-pecuniary (ecological and environmental services extended by forests ) benefits enjoyed by local communities. This would be an indicator of the relative success or failure of JFM for different communities (FPCs).

2. To critically examine the performance of JFM as an institutional system and to identify the conditions responsible for the success or failure of JFM.
3. To identify the issues and problems related to the prevailing benefit sharing pattern, incentive structure and institutional functioning governing JFM and suggest suitable policy alternatives using game theoretic principles for its long term sustainability.

## Chapter III METHODOLOGY

Considering the scope of the study and nature of data associated particularly with institutional aspects of JFM, quantitative methods and also qualitative assessments are used to address the objectives mentioned above. The primary focus of the study is to evaluate the relative performance of FPCs in South Bengal and to suggest strategies for improving the motivation of the villagers and co-operation between the two major stakeholders i.e. the Forest Department and the FPC/forest dependent communities. For this part of the research both quantitative analysis and qualitative assessment methods are applied. The secondary focus is to examine qualitatively the JFM model practiced through eco-development committee (EDC) for reserve forests (Wildlife sanctuary ) and FPC for protected forests in North Bengal.

### 3.1 Selection of study areas and sampling design

A preliminary interaction with the District Forest Offices (DFO) of Medinipur , Bankura and Jalpaiguri was conducted to select the ranges. The selection of the ranges is done on the basis of agroclimatic conditions, forest types (protected and reserve forests ), density , species diversity etc. Table 3.1 shows the six ranges selected for the study.

After the selection of ranges visits were made to these ranges for selection of beats and F.P.C.s / E.D.C.s within those beats. In South Bengal all the beats under four ranges are covered for detailed enquiry. In North Bengal all the beats in Madarihat range and two out of five beats of West Jaldapara have been visited for qualitative assessment In South Bengal (Medinipur and Bankura ) to measure the benefits from JFM and its institutional aspects a stratified random sample of 58 FPCs which constitutes 20% of the total 299 number of FPCs in the four ranges are selected on the basis of forest types ( plantation and natural forest ) , functional efficiency of FPC (goods, moderate, bad), ethnic composition , land-man ratio, exclusive women run FPC etc. To study the benefits accruing to the forest dependent communities in the 58 FPCs 20% of the households (1016 out of 5008) are selected through stratified random sampling on the basis of ethnic composition , village-wise population distribution etc. which is assumed to be representative of the present benefit

accruing scenario in JFM. Table 3.2 and 3.3 show the selected list of beats, FPCs/ EDCs and their salient features.

**Table 3.1 Selected Ranges, Forest Types and Type of Protection Committees.**

For a detailed quantitative and qualitative evaluation in South Bengal :

District	Range	Type of Forest	Type of protection Committees
Medinipur	1. Belpahari	Protected forest, high Density and high diversity	F. P. C
	2. Jhargram	Protected forest, low density and low diversity	F. P. C
Bankura	1. Ranibandh	Protected Forest, high density, high diversity.	F.P.C.
	2. Radhanagar	Protected forest , low density, low diversity.	F.P.C.

For only a qualitative evaluation in North Bengal :

District	Range	Type of Forest	Type of protection Committees
Jalpaiguri	1. Madarihat	Protected Forest, low density, low diversity.	Forest Protection Committee. (FPC)
	2. West-Jaldapara	Reserved Forest, high density, high diversity.	Eco-development Committee. (EDC)

**Table 3.2: List of Selected FPCs and their Salient Features (South Bengal)**

Range	Beat	FPC	Forest Area (ha.)			FPC Ethnic Composition (No. of households)			Total no of hh
			Natural	Plantation	Total	Gen	SC	ST	
Belpahari	Talpokuria	Bhuladhara	164.34	0	164.34	0	0	12	12
		Kendisole	154.87	30	184.87	32	19	44	95
		Joypur	37	15	52	1	0	10	11
	Simulpal	Birmadal	330.17	0	330.17	32	37	37	107
		Dorra	65.13	20	85.13	40	1	29	70
		Jamaimari	63.07	0	63.07	0	21	17	38
Belpahari		Ghagra	173.57	0	173.57	0	0	24	24
		Kadopura	79.31	10	89.31	24	1	26	51
		Kendapara	0	30	30	101	11	59	172
		Natachua	63.71	0	63.71	0	0	32	32
		Sarishabasha	0	103.46	103.46	92	5	5	103
Ranibandh	Ambikanagar	Bekakotcha	29.58	30	59.58	4	14	88	105
		Chalta	38.49	0	38.49	11	0	89	100
		Makhno	142.5	10	152.5	0	0	75	75
		Ramdungri	0	13.98	13.98	47	7	1	55
Ranibandh		Borapotcha	401	0	401	7	5	33	45
		Buriam doluibasa	197	0	197	76	0	30	105
		Chilagara	0	20.42	20.42	0	0	120	120
		Talgora	0	57.58	57.58	3	13	139	155
		Keliapathar	0	7.96	7.96	4	0	51	55
Punsya		Dangorda	61.48	0	61.48	8	0	52	60
		Madankata	108.79	0	108.79	0	1	59	60
		Murkum	184.62	0	184.62	59	0	101	160
		Sindriam	170.62	5	175.62	0	0	95	95
		Sutan	29.48	30	59.48	8	13	39	60

<b>Table 3.2 (contd.)</b>									
Range	Beat	FPC	Forest Area (ha.)			FPC Ethnic Composition (No of Household)			Total No of hh
			Natural	Plantation	Total	Gen	SC	ST	
Jhargram	Jhargram	Bhilaidihi	0	30	30	0	10	20	30
		Basantapur	35	0	35	0	0	15	15
		Dharampur	22	25	47	0	0	32	32
		Dhatkidanga	69	20	89	0	6	39	45
		Nunnunigeria	0	25	25	9	3	28	40
		Piyalgeria	85	0	85	0	0	39	39
		Benegeria bharatpur	0	63	63	0	0	65	65
	Choto Dhabani	Antapati	68	0	68	0	24	31	55
		Birbhanpur	0	29	29	16	24	79	119
	Pukuria	Boringdanga	14	0	14	36	0	3	39
		Kassia	28.34	0	28.34	61	0	0	61
		Khursuli	80	24	104	0	0	105	105
		Petbindi pay.	30.53	7	37.53	5	0	70	75
		Pindora	0	24.29	24.29	84	0	0	84
Pronobpalli		19.29	5	24.29	40	0	1	41	
Radhanagar	Radhanagar	Banskopa	0	105	105	0	0	20	20
		Loharara	0	78	78	0	0	87	87
		Layekbandh	0	182	182	89	197	49	335
	Bhara	Dapanjuri	0	79	79	0	85	0	85
		Gamghadhar Jew	0	136.07	136.07	17	150	0	167
		Gopalpur	55	0	55	21	5	0	26
		Ratanpur	93.71	0	93.71	0	0	12	12
		Panchal	Ichharia	50	50	100	128	235	0
	Panchal	Kanaipur	44	0	44	15	12	1	27
		Panchal bauripara	28	0	28	66	0	0	66
		p.jadabpara	100	0	100	20	26	0	46
		G.mahaprabhu	90	10	100	36	15	0	51
		Sukhsayer	50	0	50	0	0	18	18
		Lokesole	50	120	170	84	351	0	435
Balarampur		Pathormora	323.37	17	340.37	296	0	0	296
	Tilasole	31.52	0	31.52	14	18	0	32	
	Nunesole	168.05	0	168.05	36	31	0	67	
	Nutan bal.	15	50.7	65.7	0	65	0	65	

Source: Divisional Forest Offices and Range Offices

**Table 3.3: List of Selected Beats and their Salient Features (North Bengal)**

Range	Beat	Forest Area (ha.)			No of FPC/ EDC
		Natural	Plantation	Total	
Madarihat	Khaerbari (N)	945.83	0	945.83	3
	Khaerbari (S)	1014.06	0	1014.06	6
	Dhumchi	1245.61	0	1245.61	3
Jaldapara (w)	Holong	246	1000	1264	2
	Torsa East Corner	350	50	400	2

Source: Divisional Forest Offices and Range Offices

### 3.2 Data used and collection methods.

Different sources are approached for collection of the primary and secondary data / information on various parameters of JFM. The History of forest management practices prior to JFM are studied from literature and also collected through interaction with FPC members. The resolutions of JFM and its institutional mechanism are available from Govt. resolution and the literature on JFM. The data on ecological parameters of forest samples under each FPC – no. of trees belonging to different species, GBH (Girth at breast height) etc. are collected through forest inventory.

Household survey is conducted to generate data on socio-economic parameters and benefits accruing to dependent communities from the forests. The parameters include family profile (number of family members, age-sex composition, education status, income from different sources, landholding, livestock holding), yearly collection of NTFP (non-timber forest produce), yearly consumption of forest based fodder, income from felling of trees by forest department, amount of money the household is willing to pay for the environmental and ecological services rendered by the forest etc.

Market value of different NTFP items like food, fuel, fodder, construction items etc. and market value of substitutes of the medicinal, ritual and ornamental forest products (flowers, leafs etc.) are collected from local market.

Participatory Rural Appraisal (PRA) is conducted at the level of each FPC to generate data on their features and functioning. Data is collected on forest area under its jurisdiction, number of households, history of FPC functioning ( year of actual formation, year of registration ,year of fusion/ fission/ dissolution), motivational source and reasons for FPC formation, perceived benefits (benefits



from felling , availability of NTFP, other benefits ), number of members (executive and general body) with male, female composition, frequency of the meetings, attendance in the meetings, problems / issues discussed in meetings according to order of priority, nature of alienation of specific groups within FPC on the basis of caste, class, gender, village etc. maintenance of FPC registrar , yearly formation of executive body, method of formation and composition of executive ,number of meetings in presence of beat officer, awareness of FPC members regarding government resolutions and sale proceeds from felling, provisions given by FD (forest department ) for guarding , efficacy of guarding, participation of FPC members in guarding, procedure of fixation of guarding schedule, nature of sanctions against non-cooperation of FPC members in guarding or illegal felling of trees, awareness of FPC members regarding illegal dealing between forest department and local timber merchants, nature and duration of conflicts (intra FPC, inter FPC and others ) and their resolution mechanism, efficacy of the conflict resolutions, degree of satisfaction regarding functioning of FPC, mutual trust between forest department and FPC, changes required in present form of the JFM regarding benefit sharing, institutional aspects like the question of autonomy etc. The data on attitude and functioning of the forest department – perceived benefits from JFM in terms of the quality of forest regeneration and the participation of forest dependent communities, problems related to the participation of village communities, frequency and reasons of meetings with FPC, initiative taken for registration of FPC, nature of conflicts ( intra FPC inter FPC, FD-FPC ) , resolution mechanism and their efficacy, intensity of illegal felling, understanding about the reasons of forest degradation and conviction about JFM, opinion about sustainability of JFM, incentives felt necessary for more active involvement in JFM etc. are also collected through PRA conducted at various levels of forest department.

### **3.3 Methods of data analysis**

The information on history of forest management practices prior to JFM is used to trace the background of the forest degradation in South Bengal and the reasons of initiation of JFM. An index of ecological status of the forest patches under different FPC is developed from the parameters mentioned in the earlier section. Market

valuation and contingent valuation methods are applied to calculate the benefits derived by the households from forest through JFM by way of consumption and selling of NTFP, return from felling, enjoyment of ecological and environmental services rendered by forests etc. The benefits accruing to all the sample households are added and then divided by the total number of households to calculate the benefits to FPC committees. Regression / correlation studies are conducted to examine the connection between ecological status of the forest and the socio-economic parameters of the households ( consolidated at the level of FPCs ) and the features and operational aspects of FPCs as mentioned in the earlier section. These studies are also helpful to identify the relative importance of different socio-economic variables of the communities and operational variables of FPCs in determining the status of the forest.

The above mentioned steps led to identification of issues related to the policy framework, institutional aspects and existing incentive pattern responsible for success or failure of JFM. The identified issues and different propositions of CPR literature including game theoretic principles are used to evolve ideal institutional arrangements, pattern of benefit sharing and incentive (penalty) mechanism for successful co-management of forests in South Bengal.

Besides the quantitative and structured study for South Bengal , a qualitative evaluation is done for Madarihat (protected forest ) and Jaldapara (reserve forest) to identify the problems and issues related to the policy framework (pattern of benefit sharing, regulation of access, incentive structure etc.) and institutional arrangements governing the JFM in plains of North Bengal.

## Chapter IV THE DATA

### 4.1 Ecological Status of Forest

#### 4.1.1 The sampling of forest patches under each FPC

The range office for each of the forest range that we selected had detailed data regarding the area and characteristics of the forest under each FPC. The forests are classified either as “ **Natural** ”, which have the ability for natural regeneration, or as “ **Plantation**” which have been introduced by the Forest Department under its afforestation programme.

Depending on the forest type as well as the area covered, random sample areas within the forest area under each FPC were chosen. The criteria followed for such selection is given in table 4.1 .

**Table 4.1 Types of Forests and Selected Sample Areas**

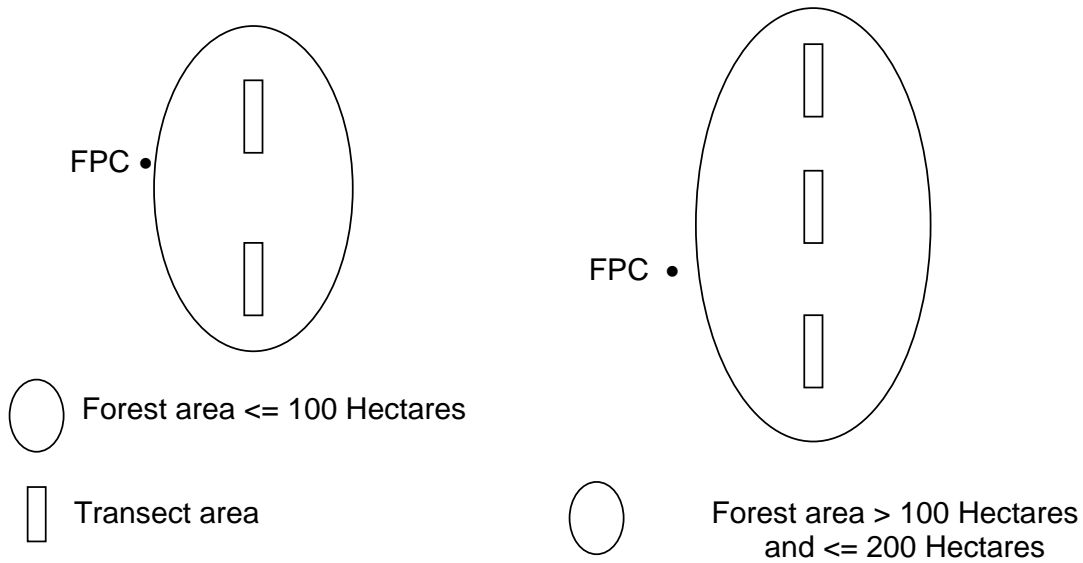
Forest type areas	Sample	Forest area <=100 Hectares	Forest area >100 and <=200 Hectares	Forest area >200 Hectares
Natural	Transect (50mt by 10mt)	2	4	5 or more
		Forest area <=75 Hec.	Forest area >75 and <=150 Hectares	Forest area >150 Hectares
Plantation	Quadrate (40mt by 10mt)	1	2	3 or more

For FPC’s which had both types of forest, sample areas were selected in both natural and plantation forest areas in accordance to the criteria mentioned. The number of sample areas was greater in the natural than in the plantation patches per unit area of the forest under each FPC. Trees in the natural forests are much more randomly distributed than the plantations where they are evenly spaced. Thus, in order to capture the forest characteristics of the natural forests as accurately as possible, a greater number of sample areas were chosen.

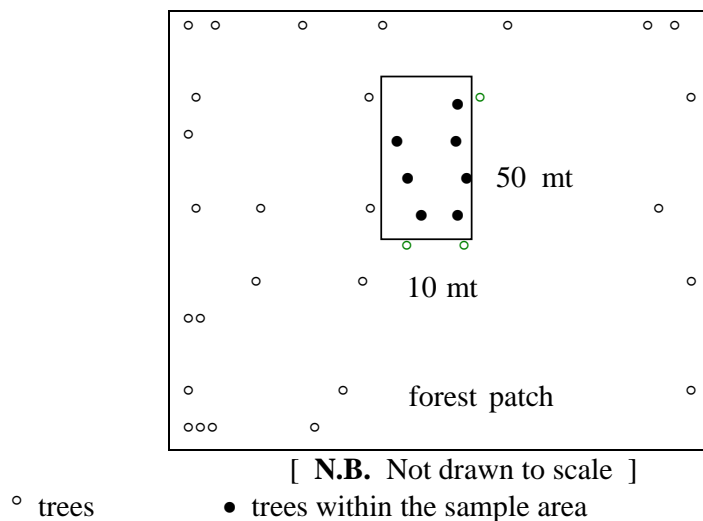
The transect (500 sq. mts.) or the quadrate (400 sq.mts) areas were chosen at random , at least 500 mts. inside the boundaries of the forest areas. The density of trees at the forest boundaries is often greatly disturbed and including those areas in

the sample would have led to erroneous conclusions regarding the condition of the forest under the FPC as a whole.

The following is a diagrammatic representation of our method of choosing the sample areas for the ecological measurements.



**N.B.:** the above diagram represents the natural forests; the selection of sample area in case of Plantations followed a similar method, depending on the criteria mentioned in the table.



This is a diagrammatic representation of a sample area (marked by • trees that are selected in the sample)

#### **4.1.2 Field measurements**

We chose to measure trees with circumference or GBH (Girth at Breast Height) greater than 10 cm as trees with lower GBH cannot be defined as trees. In each of the sample areas (transect or quadrat) within the forest area demarcated for an individual FPC, the number of trees belonging to different species were enumerated and the individual GBH of each tree noted. This was used to calculate the density of trees.

#### **4.2 Household parameters**

The sampling design for selection of households in each FPC is already discussed. An elaborate questionnaire was designed for collecting data on various household parameters mentioned in the earlier section. The questionnaire is enclosed as Appendix. Data on income and education are collected in detail as they are expected to play an important role in motivating the household to invest in forest protection. Education data is collected for all the members of the household above the age of 5 years. The source of yearly income is divided in four categories – consumption and sale of farm produce ( including agriculture, livestock, fishery ), wage labourer / service/ trade and commerce ,income from felling of trees ( share given by forest department ), consumption and sale of forest produce (NTFP) and handicrafts.

The salient features of the data on NTFP collected include type of species, part of the species, its enduse, yearly collection frequency and quantity collected per effort. To collect data on fodder consumption by livestock the number of grazing days per year in the forest is recorded. Then to estimate daily consumption stall feeding is done for different types of livestock. An enquiry is also made into the type, yearly collection frequency and purpose of medicinal items collected from forests. In some cases where market prices for original items is not available substitute items (allopathic, homeopathic, others ) are identified and their market prices are recorded

for convenience of valuation. To measure the values of ecological and environmental services rendered by the forest to households they are asked to state an yearly sum which they are ready to pay voluntarily for the existence of the forest. The response to this question depends on the education level, income and awareness of the particular family member or the household. However, the amount suggested by the households is at least helpful to capture the relevance of the non-material, (largely environmental and recreational) significance of forests even to the villagers and to prepare a conservative estimate of the benefits derived by local communities. Table 4.4 showing the major NTFP collection profile in South Bengal.

### **4.3 Features and Functioning of FPC**

The data for each FPC is collected by PRA ( participatory rural appraisal ) technique. In each FPC meeting is organized by the team to record the features and functioning of the FPC as perceived by the members of FPC. In some of the meetings the attendance was poor or most of the members maintained silence regarding the critical and contradictory issues in front of influential members within the FPC. In those cases more than one meeting is organised and focussed group interviews are conducted to record the observation of the silent minority groups within the FPC. The data collected in the FPC survey is mentioned in the methodology section. The nature of data is recorded through qualitative description ( e.g. perceived benefits of JFM etc. ) number of events happened last year ( e.g. frequency of meetings / year etc. ), positive or negative response ( e.g. whether guarding is effective, where FPC representatives present during auction of timber ), quantitative data in the form of absolute numbers (e.g. number of people / day involved in guarding etc. ) and also scale (1 to 5) suggested by FPC. Members to express their degree of satisfaction regarding FPC functioning and the mutual trust between FPC and forest department ( 1 represents greatest degree of satisfaction regarding FPC functioning and highest mutual trust between FPC and FD and 5 represents the worst conditions. )

### **4.4 Attitude and functioning of the forest department**

The team met with different strata of forest officials – Chief Conservator of forest, Divisional Forest Officers, Range Officers, Beat Officers and even Forest Guards to

understand attitude and functioning of the forest department at various levels. The data is recorded in the form of qualitative description ( nature of conflicts in JFM and their resolution mechanism , sources of illegal felling, opinion about FPC functioning future of JFM etc. positive or negative response ( Is the action against illegal felling effective) and quantitative data in the form of number of events happened last year ( number of meetings with FPC ).

## Chapter V : DATA ANALYSIS

### 5.1 Benefit Calculations.

Our first objective is to determine the benefits obtained by the forest fringe populations from the forests. It should be clear that we are only talking about the local populations who have a direct connection with the forests. The benefits, then, are in the form of

- a. Non timber forest produce (NTFP) used directly by the collector
- b. NTFP collected for sale after or before processing
- c. The 25% share of timber and intermediate biomass sale by the forest department
- d. Returns from the illegal felling and sale of timber, and
- e. Other intangible benefits.

The main items under (a) are firewood and fodder, followed (not closely) by food (such as potatoes, mushrooms and fruit) and items for household use (such as reeds or grasses that are converted into mats or brooms, or items needed in hut construction). Attempts have also been made to obtain data on the collection of medicinal plants and items used for ritual or ornamental purposes. The main items under (b) are indigenous plates made by stitching the leaves of the sal tree, kendu leaves which are used as wrappers in making biris, an indigenous cigarette, and sal seeds which can be pressed to produce oil. Very little of the sal seeds can be found, because most of the trees are not mature enough. Some woven items such as baskets or mats are also sold. The various kinds of NTFP are listed and discussed in the previous section. (c), as we know, is the share of the returns from felling carried out by the forest department that goes to FPC members.

As already discussed, we have collected data from around 1300 households covering two districts (Medinipur and Bankura and four ranges ( Belpahari and Jhargram in Medinipur and Ranibadh and Radhanagar in Bankura) – for our numerical analyses we are not taking the third district, Jalpaiguri, for which we have



covered the two ranges Madarihata and West Jaldapara. The mode of data collection has been discussed in the earlier section. Each of 58 FPCs have one or more villages under them. Each village has a number of households. As discussed, 20% of all the FPCs in the ranges have been selectively chosen and 20% of the households under each FPC have again been selected so that they are representative of the population. The year for which all the data is applicable is 2000.

A typical household questionnaire is given in Survey Sheet I (see the last section). (a) above is obtained from the 'Measurement of NTFP and Valuation' schedule which obtains the quantity collected in the year and multiplies this by the local price. If the local price is not available, the district-level price is taken. Also, there are items such as certain types of food or flowers which are never sold in a market – for such items the price of a substitute is taken. As fodder may not be collected but may just be consumed by grazing animals, fodder 'use' has been obtained by collecting data on the number of grazing animals in each household (cows, bullocks and goats), on whether they feed on forest fodder, on the number of days in the year that they graze or feed on fodder collected by their owners, and on the average amounts of fodder that they consume (these amounts are of course different for each animal type) when they are stall-fed. We thereby obtain the total value of the NTFP collected for own-use.

The NTFP that is sold ((b) above) is obtained from the income schedule under 'forest produce'. As data for the legal felling share ((c) above) has been obtained at the level of the FPC, we add this at that level. The illegal nature of (d) above prevents us from evaluating it. Moreover, (d) is certainly a benefit, albeit dubious, that the forest provides, but it would not be a benefit in a scenario where protection is the norm. Finally, for (e), we have attempted to evaluate a contingent valuation by asking the respondents what they would be willing to pay for the 'existence' of the forest, quite apart from the tangible benefits they get. They were asked whether, if they were provided with the tangible benefits, they would still want the forest, and if so, how much they would pay for its existence. We admit that such contingent valuation, in great probability, is a gross underestimation of the true existence value, but we feel that such data is better collected than not, and ours is possibly the first attempt to do so. But it must be recognized that the intangible benefits, largely

environmental and recreational, have, in most part, not been evaluated in this particular study – and their evaluation, if at all possible, would be a daunting task.

The benefits for each household are hereby obtained and are summed up to give us the total benefits of the sample under each FPC . This represents 20% of the FPC. Hence the total benefit for the FPC is obtained by multiplying this by a factor of five. Also, the average benefit of each household in an FPC is obtained by dividing the total benefit of the sample by the number of households in the sample. Table 5.1 gives us the total benefit of the sample in each FPC, the estimated total benefit for the FPC and the average benefit of each household in an FPC. The row giving the totals tells us the total benefit of the entire sample, the estimated total benefit of the population (ie. The 58 FPCs) and the average or typical benefit of a household for our population. If, on average, a typical household in South Bengal, in spite of the sub-optimal condition of the forests, makes Rs. 10366.00 per year (see Table 5.1), that is clearly a very substantial amount. Table 5.2 gives the average household size for the four ranges, and the general average, which is 5.02. Thus, the per-person yearly benefit can be stated as Rs. 2073.20.

Table 5.3 gives the benefit data by each range. The benefit per household is lowest in Radhanagore and highest in Belpahari. But on the whole, the variation is not so great.

Moreover, the NTFP returns are presently far greater than the felling returns. It should be added here that we obtained information on felling in the last 10 years, and this information indicates that felling has been very irregular and in as many as 40 FPCs there has been no felling at all. Felling information is given in Table 5.4. Table 5.5 gives the sample household benefits under each type of NTFP, and other categories. We see in this table that NTFP for own use is far greater than what is sold. Within this category, moreover, fuel and fodder are much greater than food whilst food is much greater than the other items. The medicinal or ornamental items have very low values. Finally, the contingent valuation is much less than the NTFP values but closer to the felling returns. These calculations indicate that whereas the greatest benefits that the people have got from the forests, or at least the greatest benefits that they are aware of, are from NTFP, felling and hence felling returns are miserable, and also, the awareness regarding the

**Table 5.2: Average Household Size**

	<u>Range</u>	<u>Avg. Size</u>
Belpahari	5.0	
Ranibandh	4.2	
Jhargram	5.1	
Radhanagar	5.8	
=====		
General :		5.02

**Table 5.3 : Rangewise Benefits**

Range	Total FPC Benefits	Total Sample Benefits	Average Benefit/hh
Belpahari	10006140	2001228	12666
Ranibandh	13616250	2723250	10893
Jhargram	8201905	1640381	9649.3
Radhanagar	20480880	4096176	9352

**Table 5.4: Felling Returns**

Range	SI No	Name of FPC	Number	Total Returns	Returns /hh
<b>Belpahari</b>	B1	Bhuladhara	0	0	0
	B2	Birmadal	0	0	0
	B3	Dorra	1	21000	300
	B4	Ghagra	0	0	0
	B5	Jamaimari	0	0	0
	B6	Joypur	1	22000	1200
	B7	Kadopura	1	61200	1200
	B8	Kendapara	0	0	0
	B9	Kendisole	0	0	0
	B10	Natachua	0	0	0
	B11	Sarishabasha	0	0	0
<b>Ranibandh</b>	R12	Bekakotcha	0	0	0
	R13	Borapotcha	0	0	0
	R14	Buriam dolui	0	0	0
	R15	Chalta	0	0	0
	R16	Chilagara	1	12470	277
	R17	Dangorda	0	0	0
	R18	Keliapathar	1	87400	832
	R19	Madankata	1	88125	1175
	R20	Makhno	0	0	0
	R21	Murkum	0	0	0
	R22	Ramdungri	0	0	0
	R23	Sindriam	0	0	0
	R24	Sutan	1	107000	1019

Range	SI No	Name of FPC	Number	Total Returns	Returns /hh
	R25	Talgora	0	0	0
<b>Jhargram</b>	J26	Antapati	0	0	0
	J27	Basantapur	1	19500	500
	J28	Benegeria	0	0	0
	J29	Bhilaidihi	0	0	0
	J30	Birbhanpur	1	120000	1600
	J31	Boringdanga	0	0	0
	J32	Dharampur	0	0	0
	J33	Dhatkidanga	0	0	0
	J34	Kassia	0	0	0
	J35	Khursuli	1	y, no money	0
	J36	Nunnunigeria	0	0	0
	J37	Petbindi pay.	1	3280	80
	J38	Pindora	0	0	0
	J39	Piyalgeria	0	0	0
	J40	Pronobpalli	1	y,no money	0
<b>Radhanagar</b>	D41	Banskopa	1	31500	1575
	D42	Dapanjuri	0	0	0
	D43	G.mahaprabhu	0	0	0
	D44	Gamghadhar	1	3133	61
	D45	Gopalpur	1	5280	196
	D46	Ichharia	0	0	0
	D47	Kanaipur	0	0	0
	D48	Layekbandh	1	92	1
	D49	Loharara	0	0	0
	D50	Lokesole	1	just felled	0
	D51	Nunesole	0	0	0
	D52	Nutan bal.	0	0	0
	D53	p.bauripara	0	0	0
	D54	p.jadabpara	1	144330	488
	D55	Pathormora	0	0	0
	D56	Ratanpur	0	0	0
	D57	Sukhsayer	0	0	0
	D58	Tilasole	0	0	0

**Table 5.5 : Benefits per Household by Categories (Types of NTFP and other Benefits)**

Range	Fuel	Fodder	Food	Constr/ Articles	Medicina l	Ritual/ Ornamenta l	Total NTFP	WTP*	Felling Returns	NTFP sale
Bel Pahari	2961.6	5077.3	1199.2	869	2.5	13.5	10123	28.9	245.5	2268.7
Rani Bandh	3470.4	3639	2074.4	0	1.5	0	9185.2	101.2	190.4	1415.6
Jhar Gram	2982.3	3907.8	663	14.3	2.8	1.4	7571.6	126.4	239.9	1711.4
Radha Nagar	3110	3417	837	74.7	3	1.4	7443	130.1	109.1	1671
Sample total	3127.6	3888	1122.6	196.2	2.5	3.4	8340.4	104.2	181.1	1740.4

\*WTP: willingness to pay

**Table 5.6: Regression Variables**

	SI	S	E	NI	NFI	T	FHR	AG	IC	OC	M	G	AR	RM	EF	REP
B E L P H A R I	B1	2.9	0.00	14912	10326	1.0	13.70	9	0.44	0.81	3.5	3.8	0.00	0	0	1
	B2	2.9	3.18	12432	12850	0.4	3.09	10	1.94	0.63	0.3	0.0	18.69	0	0	0
	B3	2.3	2.43	10095	12759	0.4	1.22	22	2.86	1.14	14.9	11.3	21.43	0	1	1
	B4	1.7	3.00	16938	10067	1.0	7.23	12	0.22	0.78	1.7	0.0	0.00	0	0	1
	B5	2.7	2.26	13373	12255	0.4	1.66	6	0.33	1.17	0.0	0.0	0.00	1	0	1
	B6	3.2	2.46	16513	10041	0.9	4.73	9	0.11	0.49	6.0	0.0	0.00	1	1	0
	B7	1.5	3.40	7759	16675	0.5	1.75	14	0.43	1.25	1.2	0.0	39.22	1	0	0
	B8	2.0	1.75	7114	12668	0.3	0.17	7	1.29	1.02	0.0	0.0	8.72	0	0	0
	B9	2.9	2.36	14815	10351	0.5	1.95	11	0.67	0.83	0.0	0.0	0.00	1	0	0
	B10	1.7	3.31	14528	16805	1.0	1.99	20	1.00	0.60	0.8	0.0	0.00	0	0	1
	B11	1.6	1.77	7833	21301	0.1	1.00	7	0.67	1.29	8.7	0.0	6.80	0	1	1
R12	2.3	3.92	10136	20781	0.8	0.57	18	0.70	1.2	5.4	24.2	0	1	1	1	
R13	3.2	2.66	12468	12239	0.7	8.91	11	0.00	1.1	22.0	31.4	0	1	0	0	
R14	2.2	5.46	8083	45865	0.3	1.88	16	0.50	1.3	10.4	6.9	0	1	1	0	
R15	2.6	2.80	11732	44428	0.9	0.38	18	0.00	2.6	9.3	233.8	0	0	1	1	
R16	3.1	3.51	14924	29138	1.0	0.17	7	0.10	0.6	7.3	205.7	8.8	1	0	1	
R17	3.1	2.89	9892	16010	0.9	1.02	10	0.40	1.9	0.8	0.0	0	0	1	0	
R18	2.9	4.51	15897	57877	0.9	0.14	5	0.13	1.4	18.7	0.0	0	1	0	0	
R19	2.9	5.77	11876	22354	1.0	1.81	11	0.33	1.1	20.0	29.8	0	1	1	1	
R20	3.4	3.27	13764	17347	1.0	2.03	25	0.27	0.9	25.5	33.0	0	1	1	1	
R21	2.4	3.21	9358	24208	0.6	1.15	10	0.33	1.9	19.2	29.2	0	1	1	0	
R22	2.9	4.92	2	78350	0.0	0.25	7	0.00	2.4	3.9	0.0	0	0	0	0	
R23	2.4	3.66	9079	20328	1.0	1.85	17	1.00	1.8	0.0	0.0	0	0	0	1	
R24	3.0	3.68	12297	16567	0.7	0.99	5	0.17	2.0	19.0	859.1	0	1	1	0	
R25	2.4	4.85	6579	15377	0.9	0.37	15	1.33	1.0	12.2	0.0	0	0	0	1	
J26	2.5	0.44	12165	37563	0.6	1.24	11	1.83	0.7	3.2	0.0	0	0	1	0	
J27	2.7	4.30	11847	12733	1.0	2.33	6	6.00	2.0	32.0	102.9	0	0	1	0	
J28	0.7	2.56	5389	22188	1.0	0.97	1	0.00	1.3	5.5	9.5	0	0	0	1	
J29	2.7	2.11	5070	30399	0.7	1.00	7	3.50	4.4	0.0	0.0	0	0	0	1	
J30	2.2	3.42	9909	36776	0.7	0.24	11	0.83	1.0	4.2	130.3	29.4	1	1	1	
J31	3.0	3.06	13189	21730	0.1	0.36	6	8.00	4.0	8.3	21.4	0	0	1	1	
J32	2.3	3.62	12148	25907	1.0	1.47	12	1.67	0.7	14.5	76.6	0	1	1	1	
J33	2.2	1.79	10064	5517	0.9	1.98	12	0.92	0.3	8.9	121.3	0	0	1	0	
J34	2.5	3.13	11769	20885	0.0	0.46	8	1.00	0.7	21.2	338.7	0	0	1	1	
J35	1.8	2.71	9137	17869	1.0	0.99	9	1.50	0.3	7.7	2.6	0	0	1	1	
J36	1.8	3.47	1116	19195	0.7	0.63	10	0.00	1.5	0.0	0.0	0	0	0	1	
J37	1.7	1.96	8997	17982	0.9	0.50	7	2.63	0.9	8.2	32.0	0	0	0	1	
J38	2.2	3.62	8636	44367	0.0	0.29	5	0.00	0.8	3.3	0.0	0	0	1	0	
J39	2.3	2.42	10717	17216	1.0	2.18	5	3.00	1.5	11.5	275.3	0	0	1	1	
J40	2.1	4.71	9297	21607	0.0	0.59	8	0.64	0.7	11.7	34.6	0	0	1	1	
D41	2.6	1.14	9708	10579	1.0	5.25	9	0.09	0.4	13.0	8.2	0	1	1	1	
D42	2.5	2.75	7186	25671	0.0	0.93	11	0.33	0.5	4.1	3.4	0.000	1	1	1	
D43	2.1	2.41	6852	6788	0.0	1.96	9	0.28	1.0	1.5	5.8	0	0	1	1	
D44	2.6	2.81	7929	19336	0.0	0.81	16	2.00	0.2	4.3	16.1	0.000	1	1	1	
D45	2.2	1.27	13139	26078	0.0	2.12	11	0.00	1.2	3.5	65.5	0	1	1	1	
D46	2.3	3.09	8013	24115	0.0	0.28	10	0.50	1.3	4.8	36.0	8	1	1	1	
D47	2.2	5.13	8007	18900	0.0	1.63	11	0.50	0.8	4.1	61.4	0	0	0	0	
D48	2.4	2.11	6768	17795	0.1	0.54	11	0.88	0.5	2.1	10.5	6.0	0	1	0	
D49	2.5	4.70	7763	46487	1.0	0.90	13	0.20	0.3	10.6	12.3	0.000	1	1	1	
D50	2.1	2.48	7525	20864	0.0	0.39	5	0.75	1.2	0.6	2.3	0	0	0	1	
D51	2.6	2.48	10904	24057	0.0	2.51	13	0.19	0.4	11.2	43.7	0	1	1	0	
D52	2.5	3.41	9866	29217	0.0	1.01	11	0.30	0.6	3.5	12.3	20	1	1	1	
D53	2.1	1.22	7958	9468	0.0	0.42	10	1.40	0.5	3.6	6.9	0	0	0	1	
D54	2.4	1.87	9854	54622	0.0	2.17	10	0.38	0.7	11.0	3.8	0	1	1	0	
D55	2.7	4.68	10166	22963	0.0	1.15	10	0.66	0.1	5.2	14.1	0	1	1	1	
D56	2.0	4.68	10510	60267	1.0	7.81	10	0.44	0.6	5.0	7.7	0	1	1	1	
D57	2.6	1.05	11218	21840	1.0	2.78	12	0.00	0.4	13.3	48.0	0	1	1	1	
D58	2.2	0.78	9479	14457	0.0	0.99	9	0.33	1.0	7.8	91.4	0	1	1	1	
<b>Aver</b>	<b>2.4</b>	<b>3.0</b>	<b>10080.9</b>	<b>23662.1</b>	<b>0.5</b>	<b>1.9</b>	<b>10.5</b>	<b>1.0</b>	<b>1.1</b>	<b>7.9</b>	<b>52.8</b>	<b>2.9</b>	<b>0.5</b>	<b>0.6</b>	<b>0.7</b>	
<b>Min</b>	<b>0.7</b>	<b>0</b>	<b>2</b>	<b>5517</b>	<b>0</b>	<b>0.14</b>	<b>1</b>	<b>0</b>	<b>0.1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Max</b>	<b>3.4</b>	<b>5.77</b>	<b>16938</b>	<b>78350</b>	<b>1</b>	<b>13.7</b>	<b>25</b>	<b>8</b>	<b>4.4</b>	<b>32</b>	<b>859.11</b>	<b>39.22</b>	<b>1</b>	<b>1</b>	<b>1</b>	

Legend: S: Forest Status, E: Educational Level, NI: NTFP Income/ hh, NFI: Non-forest Income/hh, T: Tribal Share, FHR: Forest to hh ratio, AG: Age of FPC, IC: Internal Conflicts, OC: Other Conflicts, M: Meeting Index, G: Guarding per Area, AR: Alienation Ratio, RM: Registrar Maintenance, EF: Execute Formation, REP: Representation

indirect utility of the forests is limited. Further, everyday uses are more important that whatever goes to the market, though the latter is not insignificant.

## 5.2 Analysis of the Factors which Determine Forest Status.

Here we wish to see what is the condition of the forest areas under each FPC, and what are the factors, which determine this condition. This analysis, it is expected, would give us clear indications regarding policies, which encourage forest preservation.

The variables that we are concerned with are all at the level of the FPC, as the FPC is the unit of our sample, and are the following:

Variable	Abbreviation
1. Forest Status	S
2. Educational Level	E
3. NTFP Income Per Household	NI
4. Forest Income Per Household	NFI
5. Tribal Share	T
6. Forest to Household Ratio	FHR
7. Age of the FPC	AG
8. Internal Conflict Factor	IC
9. Other Conflicts Factor	OC
10. Meeting Index	M
11. Guarding per Unit Area	G
12. Alienation Ratio	AR
13. Register Maintenance	RM
14. Executive Committee Formation Mode	EF
15. Representative EC	REP

They are presented in Table 5.6 by each FPC. The minimum, maximum and average values are also given in the last three rows.

We here give a short description of what these variables mean. This will be followed by individual discussions on how these variables have been determined. S refers to the present condition of the forest under the purview of an FPC. This is our dependant variable and its improvement is the ultimate objective. Variables 2 to 6 above are our 'socio-economic' variables. E is a measure of the average educational level of the sample households in an FPC. NI is the average household yearly income made from NTFP . NFI is the non-forest yearly income, per household, for an FPC. T is the share of tribals in total population. Finally, FHR is the ratio of forest area under the FPC to the number of households.

Variables 7 to 15 are those connected with the operation of the FPCs. They are thus our 'operational' variables. AG refers to the number of years since the FPC started functioning, irrespective of the date of registration. IC measures the degree of intra-FPC conflict/problems and OC measures other kinds of conflict/problems, both inter-FPC and those between the FPC and the forest department. M is an index representing meetings held by FPC members. G stands for the total man-hours of forest guarding carried out in the year by the members. AR is the ratio of the alienated (ie., alienated from the FPC's operations) section of the households to total households in an FPC. RM, EF and REP are all dummy variables. RM is 1 if the FPC maintains a register, and 0 if not. EF is 1 if the Executive Committee (EC) is elected democratically every year, and 0 if not. REP is 1 if the EC is representative, in terms of caste, of the FPC members, and 0, if not.

Let us now discuss how the variables are derived.

### 5.2.1 The Dependant Variable, Forest Status

In each of the sample areas (transect or quadrat) within the forest demarcated for an individual FPC, the number of trees belonging to different species were enumerated and the individual girth at breast height (GBH) of each tree noted. We chose to measure trees with circumference or GBH greater than 14 cm.

We calculated the proportion of trees (  $P_i$  ) belonging to each species  $i$  from our sample as

$$P_i = (\text{number of trees belonging to species } i) / (\text{total number of trees})$$

The Basal Area (BA) of a tree indicates the ground area covered by it, and is measured by the GBH using the following relation.

$$BA = (GBH)^2 / 4 \Pi$$

[ As GBH represents the circumference which is given by

$$2 \Pi r = GBH, \quad \text{where } r \text{ is the radius,}$$

$$\text{hence } r = GBH/2\Pi ,$$



$$\text{thus } \Pi r^2 = (\text{GBH})^2 / 4\Pi ]$$

The average BA for the entire forest area under the FPC (  $BA_{\text{FPC}}$  ) was then calculated as

$$BA_{\text{FPC}} = \{ \sum (BA_i) \} / N$$

where,  $BA_i$  = the Basal Area of tree  $i$  (  $i = 1$  to  $N$  )

and  $N$  = number of trees in the entire sample area

$$= \sum n_j$$

where,  $n_j$  = number of trees in sample area  $j$  (with  $j = 1, \dots, K$  )

and  $K$  = total number of sample areas

The status of the forest (  $F$  ) was then estimated using the following composite index:

$$F = \frac{(BA_{\text{FPC}}) \times N}{\underset{\blacklozenge(a)}{\text{( total sample area )}} \times \underset{\blackspade(b)}{(\sum P_i)^2}}$$

In the above relation,  $P_i$  denotes the frequency of the  $i^{\text{th}}$  species and  $(P_i)^2$  is the probability that two individual trees picked at random will belong to the same species (Magurran, 1987). Thus,  $1/(\sum P_i)^2$  is Simpson's Index, measuring here the diversity of species in a given assemblage of trees.

The index  $F$  measures, thus,

◆ (a) The proportion of tree base covering the unit area of forest ground

♠ (b) The degree of species diversity

Hence (a) and (b) together measure the condition of forest areas belonging to different FPC's, both in terms of less dominance by a single species(indicated by a higher  $\{1/(\sum P_i)^2\}$  and greater tree cover { indicated by a higher (a) }.

F lies in the range (0,1) and a higher F indicates a forest area with greater tree cover and/or greater species diversity.

Table 5.7 gives the values of F (columns 7,8). A weighted average (column 9) of F in natural forests and in plantations is taken, where the weights are given by the areas of each, in FPCs that have both types of forest. We can see that in general F is not only in the range (0,1) but very low, with most values having two zeros after the decimal point. We thus took a log transformation given by

$$S_n = \log \{ 10000 \times F / (1-F) \}.$$

The multiplication by 10,000 is in order to make the bracketed value positive.

$$\begin{aligned} \text{[ If } F &= \frac{e^{\alpha + \beta x_i + u_i}}{1 + e^{\alpha + \beta x_i + u_i}} \\ \text{then } \frac{F}{1 - F} &= e^{\alpha + \beta x_i + u_i}, \text{ which makes} \\ \log \frac{F}{1 - F} &= \alpha + \beta x_i + u_i \text{ ]} \end{aligned}$$

### 5.2.2 The Causal Variables.

Given that the soil and weather conditions in the two districts (Medinipur and Bankura) are very similar, we postulate that two sets of variables – socio-economic and those related to the functioning of the FPC – can have an influence on forest status.

#### The Socio-Economic Variables.

Data for these variables are derived from the household survey (Survey Sheet II). As discussed, 58 representative FPCs have been selected, and for each FPC a representative 20% of households have been chosen. It must be noted at the outset that ‘FPC members’ and ‘total households in the FPC’ mean the same thing, as one

member from each and every household automatically becomes an ex-officio member of the FPC.

### **Educational Level, E.**

Data on the level of education for each member of the sample household has been obtained. Each level of education is allotted an index, for example someone who has studied until class 5 is allotted the number 5. Someone who has passed the secondary examination is allotted the number 10 and the one who has passed the higher secondary, the number 12. A B.A. first year student is given 13 and one who has passed the B.A. is given 15 . These numbers are added up for households in an FPC and divided by the number of persons – ie., a simple average is taken. This represents the educational level of the FPC . In general the majority of persons in our sample have not passed the secondary examination - the average level of education is 3 (ie., Class 3)with a maximum of 5.77 in Madankata, Ranibadh and a minimum of 0 in Bhuladhara, Belpahari.

### **NTFP Income Per Household, NI**

The monetary value of the benefits derived from NTFP (both sale and own-consumption) is NI. We have already discussed how we can obtain this. The total NTFP income of an FPC is divided by the households under the purview of that FPC to obtain per household NTFP income. The reason why we have not taken the 25% sale proceeds of the forest department is because we took it separately and had included that as a variable in our analysis. However, sales have been sporadic and there are few cases for 2000 (see Table 5.4), hence this cannot be a very meaningful determinant of S. In initial test regressions we have even included this variable (as a dummy) but without any positive outcome.

In our regression model we are taking NTFP incomes (in conjunction with other variables) as a determinant of forest status. The argument is that NTFP income acts as an incentive for preserving the forest. It could, however, be argued that the causality is in the other direction - in other words, forest status determines the collected NTFP. However, this can only be true in a situation where the forest is so degraded that the amount of NTFP collected is limited by what is available. This may be the case for certain food items including animals. However, if we observe

the fact that the major part of the collected NTFP is fuel and fodder whose collection depends more on **needs** than on the state of the forest, we can conclude status is not a determining variable for NTFP collection. The data (see Table 5.6) on status and NTFP incomes has only two cases of low status (.7 each), for which the NTFP collection actually varies enormously. As such we can structure our regression model with NTFP incomes as one of the independent variables determining forest status.

### **Non-Forest Income Per Household, NFI**

This represents incomes made over the year from all other (non-forest) sources. The most important among these is agricultural income. As true incomes are rarely disclosed in primary data collection, we decided to calculate agricultural incomes from land ownership data. Moreover, this also ensures that own-consumption of agricultural products, which in our case is largely rice, is accounted for. We obtained data on land ownership, and also the products produced on this land. We also obtained the average productivity of each product for each FPC, differentiating between rain-fed and irrigated land. We then multiplied the agricultural area by the applicable productivity to get the agricultural income of each household. Data on other incomes, such as business or service, was obtained directly, as alternative sources of verifying this income are difficult to come by. We thus obtained the total non-forest income of the household. Adding up the incomes of each household gave us the total non-forest income of the sample under one FPC. We then multiplied this by 5, given that the sample constitutes 20% of all the households, to get the NFI of the FPC. This is then divided by the households/FPC members under that FPC to obtain the per household values.

It may be observed that in many cases the average NTFP income is actually greater than the other incomes (see Table 5.6, columns 6 and 7).

### **Share of Tribals, T**

This is simply the percentage of tribal to total FPC members. It should be noted that all households in all villages under an FPC are supposed to be members of that FPC. Hence 'FPC members' and 'total households under the FPC' mean the same thing. T thus represents the tribal 'presence' in an FPC.

### **Forest to Household Ratio, FHR**

This is the ratio of the forest area in hectares to the members/households under an FPC (see Table 5.6). This thus represents the pressure of population on the forest area. The data shows a very high divergence in FHR, with a minimum value of .14 and a maximum of 13.7.

### **The Operational Variables**

Data for these variables have been collected using Survey Sheet III in Appendix VI (see the methodology section, which discusses the mode of data collection). It should be recognized that much of the operational factors are qualitative in nature and obtaining numbers to represent them has not been easy. Our choice of variables has been somewhat influenced by whether they are measurable. Some features have had to be ignored in this quantitative analysis. We try to make up for this in our discussions, though.

### **Age of the FPC, AG**

We decided to take the age of formation in the regression analysis, rather than age of registration, as the FPC really starts functioning when it is formed. Registration takes time, sometimes, and involves red tape which may not be under the control of even the beat officer. However, it should be noted that registration is a very necessary step as that ensures that benefits accrue to the members, especially the sale proceeds. The years of formation and registration are given in Table 5.8. One can see that there is no set rule regarding the gap between these two years.

**Table 5.7: Forest Status**

Range	SI of FPC	Forest Area		Total Area	Values of Status		F	S
		Natural	Plantation		Natural	Plantation		
B E L P H A R I	B1	164.34	0	164.34	0.00713		0.00713	2.9
	B2	330.17	0	330.17	0.00720		0.00720	2.9
	B3	65.13	20	85.13	0.00093	0.00527	0.00195	2.3
	B4	173.57		173.57	0.00049		0.00049	1.7
	B5	63.07	0	63.07	0.00481		0.00481	2.7
	B6	37	15	52	0.02008		0.01429	3.2
	B7	79.31	10	89.31	0.00024	0.00068	0.00029	1.5
	B8	0	30	30		0.00091	0.00091	2.0
	B9	154.87	30	184.87	0.00805	0.00180	0.00703	2.9
	B10	63.71	0	63.71	0.00054		0.00054	1.7
	B11	0	103.46	103.46		0.00041	0.00041	1.6
R A N I B A N D H	R12	29.58	30	59.58	0.00291	0.00074	0.00181	2.3
	R13	401	0	401	0.01510		0.01510	3.2
	R14	197	0	197	0.00143		0.00143	2.2
	R15	38.49	0	38.49	0.00390		0.00390	2.6
	R16	0	20.42	20.42		0.01112	0.01112	3.1
	R17	61.48	0	61.48	0.01294		0.01294	3.1
	R18	0	7.96	7.96		0.00755	0.00755	2.9
	R19	108.79	0	108.79	0.00751		0.00751	2.9
	R20	142.5	10	152.5	0.02394	0.01716	0.02350	3.4
	R21	184.62	0	184.62	0.00252		0.00252	2.4
	R22	0	13.98	13.98		0.01763	0.00751	2.9
	R23	170.62	5	175.62	0.00254		0.00254	2.4
	R24	29.48	30	59.48	0.00856	0.01106	0.00906	3.0
	R25	0	57.58	57.58		0.00253	0.00253	2.4
	J H A R G R A M	J26	68	0	68	0.00297		0.00297
J27		35	0	35	0.00459		0.00459	2.7
J28		0	63	63		0.00005	0.00005	0.7
J29		0	30	30		0.00000	0.00459	2.7
J30		0	29	29		0.00147	0.00147	2.2
J31		14	0	14		0.01000	0.01000	3.0
J32		22	25	47	0.00261	0.00132	0.00220	2.3
J33		69	20	89	0.00250	0.00069	0.00171	2.2
J34		28.34	0	28.34	0.00318		0.00318	2.5
J35		80	24	104	0.00058		0.00058	1.8
J36		0	25	25		0.00059	0.00059	1.8
J37		30.53	7	37.53	0.00048		0.00048	1.7
J38		0	24.29	24.29		0.00171	0.00171	2.2
J39		85	0	85	0.00219		0.00219	2.3
R A D H A N A G A R	J40	19.29	5	24.29		0.00120	0.00120	2.1
	D41	0	105	105			0.00436	2.6
	D42	0	79	79		0.00284	0.00284	2.5
	D43	90	10	100	0.00116	0.00205	0.00125	2.1
	D44	0	136.07	136.07		0.00396	0.00396	2.6
	D45	55	0	55	0.00155		0.00155	2.2
	D46	50	50	100	0.00223	0.00223	0.00223	2.3
	D47	44	0	44	0.00168		0.00168	2.2
	D48	0	182	182		0.00263	0.00263	2.4
	D49	0	78	78		0.00349	0.00349	2.5
	D50	50	120	170	0.00095	0.00139	0.00126	2.1
	D51	168.05	0	168.05	0.00390		0.00390	2.6
	D52	15	50.7	65.7	0.00255	0.00318	0.00303	2.5
	D53	28	0	28	0.00130		0.00130	2.1
	D54	100	0	100	0.00243		0.00243	2.4
	D55	323.37	17	340.37	0.00478	0.00207	0.00464	2.7
	D56	93.71	0	93.71	0.00111		0.00111	2.0
	D57	50	0	50	0.00413		0.00413	2.6
	D58	31.52	0	31.52	0.00163		0.00163	2.2

## **Internal and Other Conflict Factors, IC and OC.**

These values are derived from the box on 'conflicts and resolution mechanism' (see Survey Sheet III). Essentially, IC measures the extent of intra-FPC problems faced in running the FPC, and OC measures both inter-FPC and FPC-Forest Department (FD) problems. These have been clubbed together as inter-FPC problems have to be resolved by the FD, so that their existence reflects inefficiency or ineffectiveness on the part of the FD.

Now the first thing that we have done is to eliminate a few problems which are not serious or do not really represent FPC operational factors. The following is the list of problems we have considered :

### **Intra-FPC Problems**

1. Illegal felling by members
2. Problems related to proper guarding
3. Non-functioning EC members

### **Other Problems**

1. The FD does not take proper steps against offenders
2. Felling by the nearest FPC
3. Lack of transparency between the FD and FPC
4. Insufficient or no compensation for property losses caused by the elephant menace
5. FD is reluctant to fell timber rotationally and distribute the FPC's felling share
6. The FD sometimes makes biased judgements when some sort of conflict arises between two groups in an FPC
7. Type of plantation
8. Registration of the FPC is unduly delayed

The reason why a certain degree of elimination is important is that we are unable, for measurement purposes, in measuring the seriousness of each problem. Hence we take only those problems which appear to be equally and quite serious. Now

$$IC = \frac{\text{Intra-FPC Problem Years} \times \text{Satisfaction Index}}{\text{Total Number of Intra-FPC Problems} \times \text{Age of the FPC}}, \text{ and}$$

$$OC = \frac{\text{Other FPC Problem Years} \times \text{Trust Index}}{\text{Total Number of Other Problems} \times \text{Age of the FPC}}$$

Hence, for example, if two FPCs have the same problems, but the years that these problems lasted are greater for one FPC, its IC/OC will be different. The 'satisfaction index' is a value between 1 and 5 : it is a well-reflected response obtained from the FPC members regarding the quality of internal functioning of the FPC. A value of 1 means 'very satisfactory' and a value of 5, 'very unsatisfactory'. Hence this index gives a qualitative dimension to the total problem years. The product in the numerator of IC, therefore, measures the degree of problems. However, this degree has to be discounted by the total number of problems in the range as this total number differs amongst ranges and this is considered to be the result of the nature of interaction between the field worker and the FPC members. Also, the measure has to be discounted by the age of the FPC because if the FPC is older, the same number of problem years represents a lower degree of problems. Here age is measured from the date of registration, as the relationship and hence problems with the FD begin from this date. Similarly, for OC we have the inter-FPC and FPC-FD problem years, and this is multiplied by the trust index. This index represents the satisfaction level of the members regarding the nature of intervention by the FD. This index, also, varies from 1 to 5 and the higher the value, the lower the level of trust in the functioning of the FD. Again, as in the case of IC, multiplying the extra-FPC problem years by this index gives a qualitative dimension to the numerator. The inter-FPC problems are also considered to be connected with the functioning of the FD, and hence are also multiplied by the trust index. Table 5.9 gives values of these indices , and Table 5.6, which only has the variables used in the regression analysis, has both IC and OC .



### **Meeting Index, M**

There are three variables which characterize meetings held by the FPC : first, the number of meetings held in the year 2000 (MY), second, the number of meetings in which the beat officer was present (MB), and third, the average percentage of attendance of members in the meeting (ATT). These variables are all in Table 5.9. The meeting index M (Table 5.6) includes all these factors and is given by

$$M = (MY + MB) / 2 \times ATT$$

The above gives equal weight to meetings as a whole and those attended by the beat officer – thereby giving greater importance to meetings attended by the beat officer, as these meetings are more effective. This value is multiplied by the percentage attendance, creating a concept of the level of activity of the FPC in terms of meetings.

### **Guarding per Unit Area, G.**

By ‘guarding’ we mean the patrolling of the forest by FPC members. In general, one of the conditions under which the FPC members can obtain benefits (25% of sale and NTFP, largely) is that they make sure that there is no illegal felling of timber. One of the ways in which they are supposed to do this is to take turns in patrolling the forest area under their purview. In certain cases guarding schedules are arranged and each member

**Table 5.8: Formation and Registration Year of Selected FPCs**

			Formation	Registration		SI No	Name fo FPC	Formation	Registration
B E L P H A R I	B1	Bhuladhara	1991	1994	R A D H A N G A R	D41	Banskopa	1991	1992
	B2	Birmadal	1990	1994		D42	Dapanjuri	1989	1991
	B3	Dorra	1978	1993		D43	G.mahaprabhu	1991	1992
	B4	Ghagra	1988	*		D44	gamghadhar	1984	1991
	B5	Jamaimari	1994	1994		D45	Gopalpur	1989	1994
	B6	Joypur	1991	1991		D46	Ichharia	1990	1996
	B7	Kadapura	1986	1990		D47	Kanaipur	1989	1994
	B8	Kendapara	1993	1993		D48	Layekbandh	1989	1990
	B9	Kendisole	1989	1994		D49	Loharara	1987	1990
	B10	Natachua	1980	1990		D50	Lokesole	1995	1996
	B11	Sarishabasha	1993	1993		D51	Nunesole	1987	1991
R A N I B A N D H	R12	Bekakotcha	1982	1990	D52	nutan bal.	1989	1990	
	R13	Borapotcha	1989	1989	D53	p.bauripara	1990	1995	
	R14	Buriam dolui	1984	1992	D54	p.jadabpara	1990	1992	
	R15	Chalta	1982	1995	D55	Pathormora	1990	1992	
	R16	Chilagara	1993	1993	D56	Ratanpur	1990	1991	
	R17	Dangorda	1990	1995	D57	Sukhsayer	1988	1991	
	R18	Keliapathar	1995	1996	D58	Tilasole	1991	1994	
	R19	Madankata	1989	1992					
	R20	Makhno	1975	1982					
	R21	Murkum	1990	1992					
	R22	Ramdungri	1993	1994					
	R23	Sindriam	1995	1995					
	R24	Sutan	1985	1994					
	R25	Talgora	1995	1995					
J H A R G R A M	J26	Antapati	1989	1994					
	J27	Basantapur	1994	1999					
	J28	Benegeria	1999	No					
	J29	Bhilaidihi	1993	No					
	J30	Birbhanpur	1989	1994					
	J31	Boringdanga	1994	1999					
	J32	Dharampur	1988	1991					
	J33	Dhatkidanga	1988	1994					
	J34	Kassia	1992	1996					
	J35	Khursuli	1991	1996					
	J36	Nunnunigeria	1990	No					
	J37	Petbindi pay.	1993	1996					
	J38	Pindora	1995	1998					
	J39	Piyalgeria	1995	1999					
	J40	Pronobpalli	1992	1993					

has to patrol the forest on some day in the month. G, then, is the total man-hours of guarding in the year, obtained by taking into account the number of men who go on a patrol, the number of days in the year that guarding does take place (there are busy eg. harvesting seasons when there is no guarding), and the average number of hours in the day that guarding takes place.

It should, however, be noted here that much of the guarding is actually informal. Moreover, night-shifts are largely absent whereas major illegal activities occur in the night. There is night patrolling only when there are reports of a possible theft or there

have been a number of consecutive thefts. The aspect of informality will be discussed in detail in a later section. It is sufficient to mention here that the formal guarding data G does not reflect informal forms of guarding.

### **Alienation Ratio, AR.**

We wanted to numerically measure the incidence of an alienated group, which does not come to any meeting or take part in any kind of guarding. In general, we discovered, the women are largely alienated from the FPC's operations : as we saw that this is an universal phenomenon, we have not considered it (we will discuss this aspect later, however). The other groups that may be alienated are those affiliated with a political party which is not favoured by members of the Executive Committee, or those belonging to a particular caste or income group or locality.

AR is the percentage of the alienated households to the total. In Table 5.6 we see that in the majority of FPCs it is 0 but is positive in 10 FPCs.

### **Register Maintenance, RM**

This is a dummy variable, and is 1 if the FPC maintains a register and 0 if it does not. The register usually has a list of members and EC members. It may record dates of meetings, attendance and minutes. There may be a separate register for recording guarding schedules. Exactly 50% of the sample FPCs maintain a register and the rest do not. We will subsequently see that this is a formality that does not have any major implication in terms of FPC functioning.

### **Mode of Executive Committee Formation, EF.**

In certain FPCs the EC is elected democratically every year, but in others the same committee remains for years, in spite of the discontent on the part of the members. EF is 1 in the former case and 0 in the latter. A little more than 50% of FPCs have regular and democratic elections (see Table 5.6).

### **Representative EC, REP.**

This, too, is a dummy variable. We take the ratio of non-general caste members to total members, and the ratio of non-general caste EC members to total

EC members. We then take the ratio of these two ratios. If it is between .7 and 1, the EC is representative of the FPC members (REP is 1) and otherwise, it is not representative (REP is 0). We see in Table 5.6 that more EC's (70%) are representative than not (the average value being .7).

### 5.2.3 The Analysis

Our analysis, then, is as follows :

#### A. Correlations

The correlation coefficients (both ordinary and rank) and the corresponding t-statistic between S and the other variables, and between all the (non-dummy) variables are obtained. This, firstly, indicates possible correlations amongst the independent variables which might lead to multicollinearity problems, and secondly, initial indications of which variables may turn out to be the explanatory ones are obtained.

#### B. Regressions.

The following step-regressions are carried out, identifying the most significant regression equation :

S against the five socio- economic variables

S against the nine operational variables

S against all the variables

S against NI and all operational variables

S with NI and different combinations of operational variables, but keeping IC and M

S with combinations of variables, leaving out one of NI, IC and M

As the analysis proceeds, it will become obvious why we keep the variables NI, IC and M in mind.

### C. Average S for Different Groups.

Many of the variables have turned out to be statistically insignificant in the regressions. However, we have tried to see whether these variables may have had at least a marginal impact on forest status, by arranging the values of the variables into groups and checking the average S for each group. We see whether or not a certain pattern in the average values emerges. Taking into consideration the nature of the data, the following groupings have been made:

1. Satisfaction indices : 1,2,3,4,5.
2. Trust Indices : 1,2,3,4,5.
3. FPC Age : 25-13 years, 12-8 years and 7-1 years
4. Tribal Percentages : greater than 70%, less than or equal to 70%
5. Forest to Member Ratio : <1, 1-2, >2
6. Alienation Ratio : 0, not 0.
7. Register Maintenance : 0,1
8. Executive Committee Formation Mode : 0,1.
9. Representative EC : 0,1.
10. Felling within the last 10 years : Yes, No.
11. Availability of information regarding sales : Yes, No

The average value of S for each group has been determined. The following section discusses the results.

## Chapter VI RESULTS

### 6.1 Correlations

The matrix of **ordinary correlation coefficients** is given in Table 6.1. We have to remember that in this kind of analysis, each variable may be influenced by all kinds of factors, so that correlation coefficients would typically not be very high. In fact, none of the correlation coefficients exceed .5, but there are a number, which are equal to or exceed .3 and are significant according to the t-statistic. They are between the following variables :

- a. S and NI : .4
- b. S and M : .33
- c. E and NFI : .39
- d. T and NI : .43
- e. NI and FHR : .4
- a. T and NFI : -.3
- b. IC and OC : .3
- c. AR and IC : .35
- d. S and IC : -.57
- e. S and OC : -.33
- f. M and G : .36

The first two correlations indicate that in the best fit equation NTFP incomes and the meetings index may be present. The next four correlations indicate that there may be some connection between the socio-economic variables. The connections all appear reasonable : education and 'other' incomes may be related; tribals tend to collect more NTFP: the greater the forest area for the same members, the greater may be the NTFP income per member; and a greater tribal presence tends to imply a lower

household income from 'other' sources. The correlations between internal and external conflicts and between alienation and internal conflicts are also quite plausible.

As there is some connection, direct or otherwise, between all the socio-economic variables, it appears that only one variable should be taken in the regression analysis. This variable might be NTFP income, given the first correlation, but we do not know for sure. As regards the relationship between alienation, internal and external conflicts, perhaps two of the three have to go for the regression analysis, but again, at this point we do not know which.

**Rank correlations** between the variables were also carried out, and the coefficients and t-statistics are given in Table 6.2. The difference between ordinary and rank correlations is, of course, that for the latter the rank is the only important factor, not the exact value of the variable. Here, in addition to what we have already obtained, some other possible connections emerge. The following are the significant correlations :

- a. S and NI : .47
- b. E and NFI : .38
- c. T and NI : .47
- d. T and NFI : -.3
- e. NFI and FHR : -.36
- f. NI and FHR : .42
- g. M and G : .45
- h. M and NFI : .3
- i. M and FHR : -.37
- j. AR and AG : .34
- k. AR and IC : .39

I. AR and M : .37

This shows an even stronger relationship between S and NTFP incomes. Similar connections (as revealed in the ordinary correlation exercises) between the socio-economic variables exist. An additional result here is between other incomes and the forest-member ratio, but this appears to be a spurious connection, as there seems to be no logic behind such a correlation. The two variables may both be related to the fact of a larger agricultural area per household. The meeting index has a significant rank correlation with guarding, a very plausible relationship as both indicate the level of activity of the FPC, and one of the objectives of organizing a meeting is to plan guarding activities or fix schedules. M shows a small correlation with NFI and a negative one with FHR. Finally, AR has some correlation with AG, IC and M. But these last correlations do not appear to have any theoretical basis. One must therefore be wary of a final regression equation which has more than one socio-economic variable and which has M with G.

## 6.2 Regression Analyses

We have to remember that our analysis is cross sectional and will therefore not yield very high  $R^2$  or adj.  $R^2$ s. The degrees of freedom is (58 minus the number of independent variables), as we have 58 FPC's, ie. sample size is 58. As the number of independent variables is a maximum of 14, the degrees of freedom are at a reasonable minimum of 44. Our objective is to identify the variables that do determine S with a reasonable level of significance (10%). We have often started with a set of independent variables which may be correlated, but as we shall see, that ultimately does not matter because we end up with a set of significant variables that have no connection with each other. <sup>4</sup> The test criteria used is as follows :

The observed value of the t-statistic corresponding to a coefficient or F-statistic corresponding to an equation should be higher than the table value of that statistic at the relevant degrees of freedom.

In our case, in general, if  $t > 1.8$  (approximately) and

$$F > 4$$



implies a significant derivation.

The Durbin-Watson (DW) statistic, for our case, should be close to 2 for zero autocorrelation and in general it should be in the range

$$1.5 \leq DW \leq 2.5.$$

**a. S with the socio-economic variables.**

Table 6.3 gives the results of the step-regression. It is significant only in the last row, with NI (NTFP income) remaining. The rest of the variables in descending order of importance are other incomes, education, the tribal percentage and forest-member ratio. Their coefficients are very low at all stages of the step-regression. The correlation studies predicted this result.

The beta coefficient of NI is .4, with an intercept of 1.812, the t-statistic is 3.24, hence significant at 57 degrees of freedom. The F-statistic is significant at 10.51, and the DW is also within the required range.

This regression is carried out to determine which socio-economic variable has to be included in all general regressions.

**b. S against the operational variables.**

The results are given in Table 6.4. The last row is significant, with IC and M as the remaining variables. The intercept is 2.493, the coefficient of IC is -.539 and the coefficient of M is .275. The t, F and DW are all reasonable in the last row.

The remaining variables, in descending order of importance, are OC, REP, AG, G, EF, RM and AR. Note that the beta coefficients are less than .2 for all these variables. The coefficients of age, guarding and register maintenance (in addition to the NTFP income and meetings index) are positive, as expected, and the coefficients of external conflicts and alienation (along with that of internal conflicts) are negative, also as expected. The interesting signs, however, are the negative ones for democratic executive committee formation and the representative executive committee – these could not have been predicted. This will be discussed later.

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<sup>4</sup> The results are usually not different with a 5% level of significance

**c. S against all (14) variables.**

The results are in Table 6.5. Once again, the last row is significant. We see that the remaining variables are NI, IC and M, which were the variables that came out in the regressions where the socio-economic and operational variables were taken individually.  $R^2$  and  $\text{adj.}R^2$  are .46 and .43 respectively, with an F of 15.3 and DW of 1.77, hence satisfactory. The intercept is 2.128, the coefficients of NI, IC and M are .26, -.5 and .21 respectively. The other variables, in descending order of importance, are REP, OC, AG, G, EF, FHR, T, E, NFI, AL and finally RM. This order is only slightly different from (b) above.

**d. S against NI and all the operational variables.**

The results are in Table 6.6. They are consistent with our earlier results, hence they need not be discussed separately. The final step is identical to the result in (c), and the sequence of importance of the remaining non-significant variables is the same as in (c), except that the socio-economic variables are absent.

**e. S with other combinations**

If NI, IC and M are retained, any kind of combination of variables yield the same result, that is, at the significant level only NI, IC and M remain, with, of course, the same coefficients and the same statistical properties. Hence these are not presented here.

Moreover, it is not advisable to carry out regressions leaving out any of the variables that have come out significant in the 'separate' regressions. Hence regressions without any of NI, IC and M are not presented, although they were conducted. In particular, as all the socio-economic variables seem to be related (to a small extent) we have replaced NI by the other variables, and as IC and OC have some connection and M and G are correlated we have used these alternatively. These regressions have all led to the elimination of all socio-economic variables other than NI at the significant level. OC turns out significant (with M) if IC is left out, but G has generally not emerged as significantly related to S. The final step of six such regressions are presented in Table 6.7.

We may thus conclude that all our regressions are consistent and yield a best fit which looks like

$$S = 2.128 + .26 NI - .504 IC + .21M.$$

### 6.3 Grouping Results

- Table 6.8 gives the average forest status corresponding to the '**satisfaction**' **index** which ranges from 1 to 5. As the degree of satisfaction goes down, the average status also goes down, except in the last stage (4 to 5) when it actually goes up and in fact the average status is the highest for the lowest satisfaction level. This is because the status of one of the forests (Ramdungri in Ranibandh) under the FPCs in this group (totaling only 3) was evaluated just before the forest was actually razed to the ground (illegally) – hence the average status of 2.649 is a gross overestimation. In general, however, there is a clear relationship between the satisfaction index and forest status. We also see that a relatively small number of FPCs are very dissatisfied with the functioning.
- The grouping according to the **trust index**, on the other hand, gives us anomalous results. Table 6.9 shows that the number of FPCs not happy with the FD are quite significant. Secondly, status improves from 1 to 2, goes down from 2 to 3, is nearly constant in the next stage and then goes up again from 4 to 5. We can thus say that there is no clear connection between a good relationship with the FD and status. One reason for this is definitely that the beat or range officer who initiated the formation of the FPC and who put it on its feet is no longer posted there and the present officer/officers are indifferent or non-cooperative. In other words, the impact of an ineffective FD is lagged. We will bring this up later.
- FPC **age** (of formation) has been grouped in the following manner : 1-7, 8-12 and 13-25 (see Table 6.10). There has been an improvement in status as we move from the first to the second group. Note that the majority of FPCs belong to the second group. However, the older FPCs, belonging to the third group, have a lower average status. This is possibly because those FPCs that were formed before 1989 had enterprising FD officers at that time, but those

officers are retired or have been transferred, and now the FPCs are not functioning well. This is confirmed by field observations in a number of circumstances. On the other hand the post-1989 FPCs were formed on a stronger footing and hence here age only improves their effectiveness. The same kind of result holds for status according to the age of registration, given in Table 6.11.

- FPCs are now grouped according to **ethnicity**. We see in Table 6.12 that FPCs which are only non- general caste (21 of them) have the highest average status and those with only tribals (15 of them) are a close second. The all-general caste FPCs have the lowest status. Moreover, if the FPCs are categorized in terms of tribal percentage ( $T > .7$ ,  $.3 \leq T \leq .7$  and  $T < .3$ ), the lowest average status is for FPCs with less than 30% tribals, and the highest for those with more than 70% tribals. Thus the tribal presence has a positive connection with forest status.
- Table 6.13 gives the grouping according to **forest to household ratio**. As expected,
- with a decline in FHR the status declines. Hence the pressure of population *does* have an impact on the condition of the forest. The reason that this has not been reflected in the regression analysis is because of the strong correlation between FHR and NTFP collection, with NTFP collection having a stronger relationship with status.
- Table 6.14 groups FPCs according to the presence or absence of **alienation**. As mentioned before, alienation (other than that of women) is not very common; 11 out of 58 have any kind of alienation. The presence of alienation does indicate a lower forest status. But this variable has not had much of an impact in the regression analyses because most of the FPCs have zero alienation.

- For ‘**register maintenance**’ we get a similar result (see Table 6.15). Those which do not maintain a register<sup>5</sup> have a lower status. Nearly as many FPCs maintain a register, as do not.
- Table 6.16 gives the status according to whether the **EC is elected every year, and democratically**. Here we see that ‘yes’ has a higher status than ‘no’.
- If the executive committee is **representative** of the members in terms of ethnicity,
- the status is lower. This matches with the result obtained in our regressions. One explanation for this is that when care is taken to make the EC representative in ethnic terms, the EC may not have the influential or educated members. Yet such members perhaps tend to make the FPC more effective – at least this is the impression we gathered on the field. Table 6.17 gives the average S for representative and non-representative FPCs.
- Table 6.18 gives status according to whether the FPC members have **information regarding the sales** proceedings of the FD. It shows that the status is higher where the information is present.

**Table 6.8 : Average Forest Status Grouped by Satisfaction Index**

<u>Degree of Satisfaction</u>	<u>No.of FPCs</u>	<u>Avg. Status of Forest</u>
1	15	2.529
2	17	2.460
3	15	2.266
4	8	2.181
5	3	2.649

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<sup>5</sup> to list the EC and other members, to record the minutes of meetings and to schedule guarding

**Table 6.9 : Average Forest Status Grouped by Trust Index**

<u>Trust</u>	<u>No. of FPCs</u>	<u>Avg. Status of Forest</u>
1	3	2.223
2	10	2.414
3	15	2.306
4	17	2.304
5	13	2.656

**Table 6.10 : Average Forest Status According to Age of Formation**

<u>Age of Formation</u>	<u>No. of FPC</u>	<u>Avg. Status of Forest</u>
1—7 Yrs. (1993-94 to 2000 )	15	2.360
8—12 Yrs. (1989 –90 to 1992—93)	31	2.428
13—25 Yrs. prior to JFM (1989-90)	12	2.368

**Table 6.11 : Average Forest Status According to Age of Registration :**

<u>Age of Registration</u>	<u>No. of FPCs</u>	<u>Avg. Forest Status</u>
Age ≥1989	2	2.120
1995 ≤ Age < 1989	37	2.422
Age ≤1995	19	2.380

**Table 6.12 : Average Forest Status of Different Ethnic Groups**

<u>Ethnicity</u>	<u>No. of FPCs</u>	<u>Avg. Status of Forest</u>
all T	15	2.4867
all G	6	2.4244
all C	10	2.4601
only C & G	16	2.447
only C & T	21	2.4926
T>.7	25	2.446
.3≤T≤.7	12	2.379
T<.3	21	2.351

=====  
*T : Scheduled Tribe ; G : General Castes ; C : Scheduled Castes*

**Table 6.13 : Average Forest Status According to Forest to Household Ratio**

<u>FHR</u>	<u>No. of FPC</u>	<u>Avg. Forest Status</u>
FHR >2	14	2.616
1 ≤ FHR ≤ 1.99	19	2.357
FHR <1	25	2.307

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**Table 6.14 : Average Forest Status According to the Presence or Absence of Alienated Groups**

<u>Alienation</u>	<u>No. of FPCs</u>	<u>Avg. Forest Status</u>
None	47	2.4238
Alienation present	11	2.2871

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**Table 6.15 : Average Forest Status by the Maintenance or Non-Maintenance of Registers**

<u>RM</u>	<u>No. of FPCs</u>	<u>Avg. Forest Status</u>
Yes	28	2.5576
No	30	2.2488

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**Table 6.16 : Average Forest Status According to the Yearly and Democratic Election of the Executive Committee (EC)**

<u>EF</u>	<u>No. of FPCs</u>	<u>Avg. Forest Status</u>
1	37	2.4578
0	21	2.2923

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**Table 6.17 : Average Forest Status According to Representativeness of the EC**

<u>REP</u>	<u>No. of FPCs</u>	<u>Avg. Forest Status</u>
Yes	38	2.3151
No	20	2.5552

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**Table 6.18 : Average Forest Status According to the Knowledge or the Absence of Knowledge Regarding Sales Proceedings**

<u>Sales Information</u>	<u>No. of FPC</u>	<u>Average Status of the Forest</u>
Yes	25	2.491
No	33	2.341

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## Chapter VII: DISCUSSION

### 7.1 Benefits

Forest Protection Committees, we have seen, are a major organ of Joint Forest Management and in the South of West Bengal and they have proliferated in large numbers over the last 10 to 12 years. They are certainly alive and working, but in a number of ways their functioning is far from optimal.

Currently, the factor which is really the most major incentive to the villagers in order to retain the forests is the forest produce. Yet this is something which they have always collected, whether or not they were allowed to do so. Hence, although NTFP collection is projected as one of the incentives provided by the forest department in return for protecting the forest, this would not have been an incentive if the forests had not been threatened. It is only because the state of the forests in South Bengal reached a critical stage, that the villagers understand that timber felling would have disastrous consequences in terms of the availability of NTFP. Thus NTFP collection is definitely a major incentive – though it is not one that is actually seen as provided by the FD.

We see that in spite of the sub-optimal state of the South Bengal forests, NTFP collection is quite significant, its returns sometimes exceeding that from other occupations. Firewood and fodder are the main items, and the collection of leaves (kendu and sal, to make biris and plates) is also a common feature. The other items such as food or construction items are relatively insignificant. Medicinal items are rarely collected with more and more people depending on doctors and allopathic medicines. Moreover, the forests, in their present state, cannot really provide a vast variety of NTFP. Thus it is the need for free fuel (if one ignores the time and effort taken to collect it, which has a zero or low value given the degree of underemployment) and the need for free food for the animals that forces the villagers to depend on the forest, whether or not they are allowed to do so.<sup>6</sup>

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<sup>6</sup> For example the villagers around the reserved forests in Jaldapara collect firewood even though, strictly speaking, they are not allowed to. It is also not clear what other option they might have, given that they cannot afford kerosene or gas, nor are these items available in the vicinity

The benefits from NTFP as well as other forest benefits ( Table 5.1) have been calculated on a per household basis (Rs.10366.00) over two districts and four ranges. Such a calculation has been done earlier , but only for Jamboni Range in Medinipur and gives a value of Rs 2231.00 per household (Malhotra, Deb, Dutta, Vasulu, Yadav and Adhikari, 1992). This amount has to be enhanced to account for the inflation over the 8-year period between 1992 and 2000, and for the increase in population.<sup>7</sup> But even if these are accounted for, there has been an increase in NTFP collection and that appears to be the result of JFM, as in 1992 JFM had just begun.

Rangewise benefit data (Table 5.3) show that there is some difference between the ranges but the difference is not significant. Thus the benefit from JFM has been more or less evenly distributed between ranges.

What is the most startling observation in this survey is the infrequent and erratic nature of felling or the provision of the 25% share of the felling to the villagers. Of our 58 FPCs, only 15 reported the receipt of money from felling in the last 10 years. Two FPCS actually said that felling had occurred but no money had been received. Even when felling occurs, the timber is kept in depots for long periods and when the auction actually occurs, it takes at least a year for the villagers to get their share. The share itself amounts to very little per household (see Table 5.4) – ranging from Rs. 80 to Rs. 1600 in a period of 10 years. Clearly, the record in terms of felling returns cannot be a serious protection-incentive for the people.

We have also made an attempt to assess the ‘willingness to pay’ of the households for the ‘existence’ of the forest, independent of the produce that these forests provide. The WTP method has many inherent weaknesses. The respondent is afraid that he will then be actually charged that amount and so does not reveal his true valuation; the expressed value is at least constrained by the income of the respondent. The respondent may not be aware of the true environmental or other intangible benefits. Thus the data collected is, in all probability, a gross underestimation. As such, the true benefits should actually be far higher than calculated and later studies can undergo the complicated analyses involved in

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<sup>7</sup> If we assume an 8% inflation rate, the value compounds to around Rs. 4129.00.

evaluating health impacts or impacts on agricultural productivity. As the purpose of this study is limited and concentrates on FPC operation, we have not pursued the matter. But this study does indicate the limitations of contingent valuation for this kind of work and all we have done is to add this valuation to total benefits. We cannot say, from this study, whether the true intangible benefits are greater or less than the tangible ones. But we can definitely say that the *revealed* intangible benefits are rarely zero (see Table 5.5) but are less than the tangible benefits.

Thus it may be safe to say that the only strong incentive for forest preservation is currently the NTFP, in particular the fuelwood and fodder. Yet the strict preservationists are in favour of complete reservation, for they feel that the collection of NTFP may have long-term impacts on the forests and also, illegal felling may occur in conjunction with NTFP collection. Our observation is that reservation is not feasible – the collection of fuelwood and fodder goes on – unless alternative sources of fuel and animal-feed are provided. Further, reservation alienates the people from the forests and takes away the only significant incentive to preserve them. Even if alternative sources of the NTFP are provided, as long as there is unemployment and poverty, who can stop the theft of timber?

The absence of a clear connection between features such as education or other incomes with forest status is possibly a reflection of the generally low level of these variables. Had education levels varied significantly with some FPCs having very high values, that may have had an impact in terms of environmental awareness or awareness regarding resource depletion and good planning for preservation. Moreover, formal education, especially at the primary school level, does not imply awareness or planning capabilities. The same holds for other incomes – very affluent communities may not have the need to collect fuelwood or can stall-feed their animals – but none of our FPCs are like that.

We considered the presence of tribals because of the prevalent theory that tribals have the inherent cultural capability of using the forests sustainably. Our analysis shows that although the tribal presence does make a difference (note the grouping results in the last section), it is not marked (note the regression results). This is only to be expected, given that the tribals are presently either marginalized or have merged totally with the general population.

The population pressure, as reflected in the forest-household ratio, does appear to have an impact on the condition of the forest. But this difference is not marked for the lower values (see Table 6.13) and also not very significant for the higher values. This, too, is probably because FHR is mostly low, with 44 FPCs having values less than 2.

Hence economic factors (other than NTFP values) have little impact on forest status, as the economic condition of the villages we have covered is not in the range that would make a significant difference.

## **7.2 FPC Operation.**

If we think of how the FPCs *could* have operated, there may be ample reason for discontent, but the data gives reason for hope (see Tables 5.6 and 5.9). What we see is that the FPCs are quite operational, with only six FPCs which are not operating at all. An executive committee is in force, and meetings take place – frequently in some FPCs, less in others. The level of attendance is mixed. Some FPCs maintain a register and some others do not, but this feature need not always be a reflection of the level of seriousness on the part of the members. In general, the alienation of certain households is not absent, but the data indicates that the total degree of alienation in our sample is not high.

We see that the critical operational variables influencing forest status are the composite ‘meeting’ index and the degree of conflicts within the FPC, where these conflicts are essentially related to theft by FPC members, guarding and non-functioning EC members. The conflict factor is more critical in determining status compared to meetings. Amongst the other variables, ‘other conflicts’ and caste-representative ECs have some importance, with both negatively affecting status. The second relationship is confirmed by the grouping exercise. It is interesting that representation actually harms status – it appears that an influential and efficient EC is more important than caste representation. The grouping results also show the greater relevance of the internal factors (satisfaction index, Table 6.8) relative to the external (trust index, Table 6.9).

It is not necessarily true that an older FPC has a better forest – the early FPCs are worse off. The best ones are the ones formed in the intermediary years (early 1990s) as observed in Tables 6.10 and 6.11.

There are some discrepancies between the grouping results and the regression coefficients (in the regression with all variables) of the non-significant variables RM and EF ( the coefficients are negative but the grouping shows a positive impact on status – see Tables 6.5 and 6.10) In these cases it would be better to rely on the grouping results as the regression result is non-significant and the coefficients are very low. Hence we can say, from the grouped S's, that the maintenance of a register or the regular election of an EC, factors which say something about the way the FPC works, do have a positive impact on status. Also, the knowledge of sales is better than not, and the alienation of a group of persons from the FPC has a negative impact.

In what follows we shall discuss certain features in greater detail, bringing in aspects that are not so obvious from the quantitative analysis.

### **7.2.1 The Executive Committee**

Most of the EC members are middle aged – between 35 and 50 years. Hence those who are otherwise active become EC members. The education level of EC members is close to the sample average (which is low at 3.0, see Table 5.6). There is a dominance of the middle and upper income classes – if a low-income person is an EC member, he is usually chosen because he is loyal to another member or to some influential person. Representation in terms of caste is given some importance (in Table 5.6 we see that more FPCs are representative than not with an average of .7). But after a semblance of representativeness is maintained, the critical factor which determines the selection of the EC is political affiliation. The local panchayat has a strong influence. The beat officer may also have a political leaning and there have been many instances in which the beat officer has favoured ECs whose members belong to his party, at the cost of ECs affiliated with rival parties. At the same time, the EC may not cooperate with the beat officer if it is connected with a rival party. As regards cooperation within the EC, this, to, is determined by whether it is a one-party EC or the members belong to opposing parties.

### 7.2.2 Meetings

If we delve deeper, ignoring the numbers and looking more at the nature of the meetings, we see that those in which all members are summoned are in order to convey certain decisions made by the beat officer, or 'emergency' meetings, taking place *after* something has gone wrong. Even in such organized meetings, the attendance is not high (see Table 5.9), ranging around 30-40%. Hence members of the EC deliver a lecture, or the meeting discusses an emergency. In either case, there is little or no scope to discuss minor issues, unless the population size is very low. Some of the meetings are organized informally and are only attended by the EC. In the few meetings in which the beat officer is present (see, again, Table 5.9), it is more like a picnic with a speech thrown in. Food is served to the members, and the beat officer delivers a sermon on the benefits of forest preservation. Hence some awareness is certainly created but the methods of going about such preservation are rarely discussed. In particular, there is no discussion on the tree species to be planted, or alternatives to extraction from the forest, or ways to enhance the benefits from protecting the forests. There is no scope for the members to bring up the issue of increasing the 25% felling returns, or felling cycles. There is also no discussion on the persons to be contractually employed as labour for certain forest-related jobs – this matter is usually an arrangement between the FD and the EC and is hence not a democratic decision.

### 7.2.3 Guarding

The performance in terms of formal guarding, moreover, is not very satisfactory. It is generally low and differs greatly between FPCs. It is rare to keep a guarding roster and most guarding arrangements are not very organised. The record is particularly bad for Belpahari for a number of ECs there belong to a political party opposed to the local panchayat, and there is a general atmosphere of non-cooperation.. But it must be remembered that much of the guarding is informal in nature. Women and men who go to the forests for fuelwood collection or to graze the animals can report any untoward incident; their presence impedes theft. If the forest is just next door, one can keep watch without having to enter the forest. In the night, the sound of felling, even if at a distance, can be heard. Often the guarding occurs after there are reports of possible theft or theft has been occurring frequently. Hence formal

guarding data may not adequately reflect the true level of protection. Moreover, villagers are not eager to patrol the forest because they do not really know what they can do if an offender is observed. They have asked for some kind of identification (eg. badges) and for arms (such as lathis) and torches, but the first has never been provided and the second is rarely provided by the FD. If offenders are armed, the situation can even be life-threatening. When the culprit is a woman, the situation is complicated by the fact that the patrollers (who are always men) cannot touch the women for fear of being accused of molestation. On top of all this, if the culprit is caught and taken to the beat or range office, there is no guarantee that he or she would actually be punished – political influence often saves the culprit.<sup>8</sup>

Violation of guarding schedules is rarely (if at all) punished by charging a fine – usually the schedule is changed to suit the violator, and he is warned. Social norms discourage such punishment. On the other hand, social sanction also acts as a discouraging factor for potential timber-thefts. In other words, informal rather than formal mechanisms are more effective in terms of FPC operation. Perhaps this is why guarding has not turned out as significant in any of the regression operations. This will be discussed further in the section on game theory.

#### **7.2.4 The Forest Department**

The FD had some initiative in the years when the majority of FPCs were formed (ie. 1989 – 1995), but presently the attitude of most officers, especially at the lower levels, is one of indifference. There is little direct interaction with the villagers or a careful planning of protection- related activities. Now that the responsibility of guarding has been shifted to an extent to the villagers, guards are rarely seen in the forests. Yet forest officers are neither ensuring by various means (these means will be discussed in our final section) that protection takes place, nor are they complementing the activities of the village ‘guards’ – for example, they often do not punish offenders who are taken to the beat office by FPC members. There is a standing complaint by members that they are not provided with equipment such as

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<sup>8</sup> There is one case of the villagers employing a ‘guard’, who is paid for his work by collecting a fee from all the households.

torches or *lathis* or with any identification such as badges. Technical advice or support systems are also largely absent. The beat officer is present in 0 to 4 meetings in the year (see Table 5.9) with the average at only 1. Very often he tells the members to come to the beat office for the meeting, instead of visiting the village himself. In such meetings he delivers a monologue instead of engaging in a dialogue.

The total picture that emerges is one of tepid involvement on the part of the FD. The situation is made worse by the fact that scientific principles of rotational harvesting are not followed strictly. Harvesting is not regular and the lag between harvesting and the disbursement of the 25% share is usually long. Hence the most publicized incentive offered by the FD is actually nearly non-existent.

### **7.2.5 The Role of Women**

One of the most disappointing observations of our survey is that women have no direct role in the FPC. In a few cases, a woman may represent her family if her husband is no longer alive. Most women are not aware of joint membership, which is a rule stipulating that both husband and wife should be members of the FPC. Women are aware of the amounts of money obtained from felling or clearing by their men folk, but they have little control over how this money is to be used. The alienation of women is of course the inevitable consequence of their social position, and is exacerbated by the fact that women have housework in the evenings, when the meetings usually take place.

The only exceptions in our sample (of 62 FPCs) are 3 all-woman FPCs which have been initiated by female DFOs, or by NGOs. They are Chilagara in Ranibandh Range and Dhatkidanga and Basantapur in Jhargram Range. These FPCs started to show distinctly better results in terms of afforestation after they were taken over by women. The present value of S is 2.67 for the women run FPCs compared to the average status of 2.39 for the sample. One of the advantages of policing by women is that they do it while they are collecting firewood in the forest. If they need the help of men to catch offenders, they usually get it. Our study has not delved deeply into the issue of women-run FPCs; this is a matter that needs to be explored in great depth.



### **7.2.6 A Summing Up**

This section basically looks at the present state of JFM and what sort of impact it has in terms of forest status. We have seen that forest income is a major incentive in forest protection, whilst other economic factors do not really make a difference. As regards the operation of the FPCs, we see that perhaps each of the various features we have chosen have an impact but the really critical ones are the smoothness of the internal mechanisms in FPC operation and the frequency of and attendance in meetings. Given the present level and nature of operation of the FD, the relationship that the FPC has with it, has become less important.

There is much scope for improvement. The role of the FD has to change, and the EC has to be chosen with effectiveness in mind. Meetings have to be more interactive and productive, and some of the more formal features of the FPC given greater importance. But the aspect that has been totally ignored yet promises great returns, is the involvement of women in FPC operation.

### **7.3 Addendum-I : The Issue of Sustainability**

Although the issue of sustainability is implicit in this study, as it is in any research on environment, we have not directly addressed this issue. Let us in this section bring up the various aspects of sustainability that may be the central focus of future research in this area.

#### **Ecological Sustainability**

To test for ecological sustainability we have to determine the optimal or desired status of the forest area. We then have to see whether the current status is better or worse than this, and the direction in which it is going.

The change in the status of the forest depends on the activities of the villagers and the FD (Forest Department) : more specifically, (a) legal timber felling (b) illegal felling and (c) NTFP collection. Firstly, the collection of NTFP should be done in such a manner that the forest status is not affected in any manner. This aspect has to be looked into. Secondly, of course, all illegal felling has to be eliminated or at least minimized. Thirdly, legal timber felling has to be conducted in such a manner

as to not affect the long-term status- this can be ensured with the scientific planning of felling cycles.

Sustainability can be studied with both one-time and time-series data. Sustainability at a point of time would involve looking at the rate of extraction and the current status, determining what rate would sustain the forest in the long run, and seeing whether the current rate is higher or lower . Again, with time series data one can simply look at both status and extraction and the direction in which they are going. It may be noted that obtaining time series data or data on illegal felling are both very difficult: perhaps the former can be organised if the research project is a long-term one.

Let us also discuss the issue of sustainability from the social, financial and technical angles.

### **Social Sustainability**

It is the motivation of the people involved in a system that determines its social sustainability. The society of “ Forest Protection Committees ” is made up of individuals – although decisions are taken by the society, the problem are faced by the individuals who constitute this society, including the women folk and the weaker sections – the silent groups. Unless the concept of JFM addresses individual problems it cannot get integrated with the social structure of the community. Each group has its own needs and perceptions of the institution. The fulfillment of at least a part of those varied needs is required to sustain the level of motivation of the different interest groups. But the present model of JFM does not allow such a flexibility – it basically works on the assumption that “ people react to a problem collectively ”. While interacting with the FPC, the FD and other parities should recognize it as a collection of heterogeneous interest groups which have to be addressed separately and the different interests have to be incorporated within a common plan. For example, in any FPC the interest of members dependent on cattle rearing will be different from the interest of members dependent on land based activities. Their relationships with or dependencies on the forest are also different. The JFM programme should address the requirements of both these interest groups.

Social sustainability should also recognize the cultural structure of the society. In this respect,, substantial progress has been made in South Bengal, where the tribal community's spirit of identification with the forest ecosystem and their inherent love and respect for nature in Bankura & Midnapore districts provide us with a solid base for sustaining the foundations of the FPC.

The 'Rule of law' is basic for sustaining any human/ social institution, especially if it can be enforced by the local community itself. Our research shows that people are evolving their own legal system to punish the forest offenders. The penalties include fining, debarring the person from the committee and handing over the guilty person to the forest staff for prosecution. The natural evolution of such a punishable system is a positive aspect as it enforces better compliance. Possibilities of legitimizing the system can be explored to give it legal sanctity. Such a system is being followed in U.P. where (Ban) Panchayats exist at the village level.

The integration of the womenfolk into the system is an essential ingredient for the survival of the FPC as an institution. It is observed that whenever the commitment of the womenfolk to the cause is substantial as in the women run F.P.C.s , the committee has been more effective. But there are very few women run FPCs. This issue has to be adequately addressed for the future sustainability of JFM.

The present structure also does not involve those who are below 18 years, constituting around 40% of the village population. Motivation programmes may be carried out in schools to ensure a certain degree of awareness and commitment amongst children.

The successful implementation of JFM may lead to subtle changes in the occupation pattern of the village community. In a survey done by Ramkrishna Mission in Midnapur, it was seen that the time invested in fuel wood collection by the villagers has come down with the regeneration of the forests, and the time spent on NTFP collection has gone up due to better availability. A constant monitoring of the social change and taking into account this change while formulating the specifics of JFM is essential.

Transparency increases the conviction of the society in the system - transparency in planning ,procedures and accounting are a basic requisite for the villagers to identify

themselves with the FPC. Some progress has been made in this regard in Bankura. An integrated plan with the beat as the basic unit has been prepared. The demands / needs of the FPCs are plotted (with the help of PRA) on a grid table. The resources available with the FD are made known to the committees the work is distributed to different committees in consultation with the executive committee members and with the help of technical guidance from forest department staff. The work is sanctioned by the D.F.O. ( Divisional Forest Officer ) on the grid table and this is displayed in the range office for the consultation of committee members. However, a great deal remains to be done to ensure total transparency in the system : in several cases the auction of timber after clear felling takes place in the absence of FPC members creating serious doubts and mistrust amongst them regarding the F.D.

### **Financial Sustainability**

Financial independence is a basic criteria for the success of any programme with a long time perspective. The programme should be capable of generating its own resources to maintain the level of investment and to provide an income to the members that is sufficient to sustain their level of commitment. In the last few years, a lot of assets have been created for JFM with external aid and it is necessary to evolve a system of income generation from these assets so that they are sustained in the absence of any further flow of external aid.

A revolving common fund or what is popularly called the 'Community Fund' can provide the fulcrum on which such planning can be done. In Bankura (South division) ,there has been some progress in this direction . It is obvious that the creation of community funds through personal contribution is much more difficult than when done from common sale proceeds. Moreover, if a choice is given to individuals to withdraw the money, few resist. Hence, only a compulsory community fund can be a viable option for creating a pool of funds for assets maintenance by the community. The system can be further strengthened by government recognition and regularization. At present, the 25% of the sale proceeds are being distributed individually and the quantities are meager. As such, it is difficult to motivate them to part with the money for the formation of a common fund. The option of reserving another 25% of the sale proceeds to be paid into the community fund can be

explored. This helps in the immediate formation and regular flow of funds into the system.

Besides the creation of a community fund, other methods should also be explored for the financial sustainability of JFM. For example, the present external funding of thinning operations can be made self financing by changing the existing sharing and sale pattern of the intermediate product. At present the work cost is borne by the FD. The labour expenditure goes to the FPC members. 25% of the produce extracted is given free of cost to the FPC and the remaining 75% is sold to the FPCs at scheduled rates. FPCs can in turn use or sell them in the local market, thus earning some income. By either bringing down the rate at which thinned produce is sold to the villagers or by giving it free of cost to them, sufficient finances can be raised by the members to obviate the required external funding.

With a little modification and innovation, this model can be adopted in many other situations. In Haryana's JFM some innovations have been tried. The model commercialized the assets to the extent that 'HRMS' ( Hill Resource Management Society ) collects cess for supplying water from the earthen dams which have been created by the Forest Department, for the fodder being cut from the grasslands and bamboo taken from the forest areas they are protecting. The income can in turn be used for the maintenance of community assets, thus prolonging their viability. A similar attempt has been made in Bankura. A few years back, some irrigation pumpsets, Sal leaf plate making machines and paddy threshing machines were given the FPCs. Charges are being collected by some committees from individual members using these machines, and these are kept in the common fund. These are then used for maintaining hand repairing the machines and other community assets. The NTFP, too, are a major source for income generation. If a substantial community fund develops in the village, it can be used to finance business in NTFP. The denationalisation of the kendu leaf and Sal seeds trade can generate substantial funds for the committees. Trade in NTFP is slowly developing both in Bankura and Midnapore. New markets for new products are being explored by the people themselves.

## Technological Sustainability

The success of JFM in the long run depends upon the productivity of the forests which in turn depends on the technological capabilities of the management system. The technology should be acceptable to the villagers and at the same time should not be detrimental to the silvicultural principles of forestry.

In recent years many instances have been found where the interests of the beneficiaries and the forest department are contradictory. At the time of initiation of JFM, people protecting forests were assured of monetary returns from the final harvest. But many of the FPCs surveyed where felling is due were denied the benefit of felling. This is resulting in a loss of motivation in the JFM program, particularly among the deprived sections of the population. An interesting observation by a senior forest officer gives some clue regarding the issue of sustainability of the felling cycles followed in JFM. He observed that “ The basic guidelines of the working plan in some instances are found to be based on certain presumptions of the past , which sometimes are no longer applicable in the present context. For example, the rotation of sal coppice forests in the area is fixed as 10 years on the basic assumption that the sal pole is the main product of the forests and it takes around 10 years for it to attain the marketable girth of 4 inches. It is assumed that there exists one correct rotational age for sal. But people is different FPCs have different requirements. For instance in Mahesmura FPC in the Jhilimili range of Bankura the people are basically woodcutters and sell fuelwood in the market for a living. No alternate source of income, except seasonal agriculture is available to them. The FPC has been given around 212 ha.. of forest for protection but protection is not effective. The people indicated in one meeting that they had been living on the forests for generations and protecting it for 10 years without any income in beyond their comprehension. They need a continuous supply of firewood for sale in the local market and the production of pole has no attraction for them. In this case, one can think reducing the rotation age to 5-6 years and allowing the people to harvest the produce in felling cycles so that they can get what they need.

Any operation of peoples' choice unless it is detrimental to the interests of the ecosystem and silvicultural principles should be acceptable. The rotational age can

be very flexible and within the acceptable limits without affecting the viability of the rootstock”.

The present plantation models also do not reflect the peoples’ choice. They can choose from the existing models : the scope for deviation from prescribed species and spacing does not exist. The common plantation models hold no attraction for them. In such cases a better idea would be giving the people freedom to draw up their own plantation models with some technical guidance from the foresters.

## **7.4 Addendum II : The North Bengal Case**

### **7.4.1 Fundamental Differences with South Bengal**

#### **Rights and Benefits**

- In case of Madarihat, felling is legally prohibited and thus the benefits from timber (25% in South Bengal (SB)) is not applicable; however the FPC members have access to minor (non-timber) forest produce.
- Jaldapara being a Reserved Forest the people, including EDC members, are barred from entering the forest. Thus technically the people have no access to collect/use forest produce. Because of administrative problems, this is never strictly implemented.

In both the cases, timber benefits accruing to the FD is only from the logs seized, which are sent to the sawmills of the Forest Development Corporation.

#### **Forest Characteristics**

The forests of Jaldapara and Madarihat do not have the same regenerative capacity as do the coppice sal forests of SB. This has two implications:

1. Rotational harvesting is possible in SB unlike North Bengal (NB)
2. Trees are seldom big enough in SB to be lucrative for illegal felling

The first point indicates that EDC/FPC members of NB cannot have the same kinds of incentives to participate in the management process, which initially had been the most important strategy of the FD to motivate the people of SB to participate in JFM.

The latter point indicates that felling in NB is more damaging to the ecological health of the region as compared to SB, since the stock is replenished at a slower rate in NB.

### **History of Forest Management and JFM**

The formation of an FPC or EDC are relatively new concepts in NB. Taking into account the fact that it took more than 15 years for JFM to be formally recognized and implemented since its inception in SB, it still is in a very premature state in NB. Unlike SB, because of the ecological, historical and regional differences that NB has, and more importantly because of the absence of a model to emulate, forest management in this part is still under a phase of experimentation. It needs more time to evolve a system tailored to the needs of this region.

The relative success of JFM in SB is attributed to two factors :

1. The people themselves realized the importance of forests to their livelihood and were eager to participate in JFM. All the FPC's surveyed were unanimous in pointing out that post JFM, the ease of fuel availability and easy procurement of agricultural implements have been a huge benefit for them. The people of NB do not, as yet, have their backs against the wall and conservation efforts appear to be more top-down at certain places. The spontaneity with which the people of SB had embraced JFM is still not a general feature in the people's involvement in forest conservation and protection in NB.
2. The nature of coppice forests in SB has also been an important factor as regeneration of degraded forests is much faster and ensures that the supposed 25% benefits from FD-instructed rotational harvesting can actually happen theoretically. Such incentives are not legally allowed in NB and the FD need to provide the people here with other kinds of benefits, like undertaking village development work, improving agricultural infrastructure, providing alternative income generating options etc.

In both Jaldapara as well as Madarihath, the primary concern of the FD is protection and well being of wildlife. Therefore, any management system for forest protection will accord lesser priority to the human needs which, makes the issue of participatory



management even more sensitive and tricky. The most crucial point of conflict between the people and the FD is the loss of life, property due to elephant depredation and the unsettled terms of compensation to the sufferers of such attacks. This problem is not unique to NB as elephant migration to the southern districts of WB has increased of late and reported cases of loss of life and property are growing. But being a wildlife sanctuary, and Madarihat range being contiguous to Jaldapara, protection of wildlife is paramount to the FD in NB.

#### **7.4.2 The Perception of Forest Officials and Villagers**

##### **Grazing**

This has been unanimously identified as the most critical anthropogenic disturbance in both the ranges in NB. It is difficult to generalize without further investigation, but the evidence gathered from the 2 EDC's extensively surveyed suggest that the increase in bovine population is largely due to the rise in human population around the Reserve forest and Madarihat range. One of the contributing factors to this population increase has been the migration of people from Bangladesh. 1970 onwards, there has been steady infiltration across the borders from Bangladesh. Political parties, in order to get political mileage, have hastily rehabilitated a large section of these people in and around the forested areas. This has had two fallouts: firstly, these settlers have occupied the open areas around the villages, which used to be free grazing areas for cattle. Secondly, they have had their own contribution in increasing the cattle population. This has inevitably aggravated the pressure on the forest resources. FD blames excessive grazing in the forest for the dwindling amounts of food available to the elephant and rhino population.

\_The FD believes fodder plantations within the village area and replacing the domestic cattle with the Jersey variety (concentrating more on quality and quantity; also jersey cows can only be stall-fed) is an effective solution to the problem of over grazing. However, there are important considerations that need to be looked into. Firstly, no villager is willing to give private land to FD for the fodder plantation. Unless there are substantial benefits from such a move, it remains uncertain if there will be anyone willing to make this sacrifice. Secondly, domestic cattle cannot be entirely dispensed with as they have a very important role in traditional agricultural

practices. Thirdly, this shift involves an investment that the villagers will be reluctant, if not incapable, to make, which throws the onus back on the FD.

But the fact remains that thousand of cows are grazing in the forest areas, destroying the habitats of elephants and rhinos, and thus, paradoxically, increasing the threats of wildlife (especially elephant) attacks in the villages. As a result, the FD and the villagers are ending up blaming each other for their respective losses, increasing acerbity and conflict between the two.

According to the "Jaldapara Management Plan", there are 40482 cows and bulls, 2394 buffaloes in the 32 fringe villages and 4 forest villages around the reserve forest.

### **Fuelwood Collection**

As in the case of grazing or collection of other non-timber forest produce within the RF, it continues unabated. The FD acknowledges the dependence of villagers on firewood and believes that it is actually the sale of firewood in the nearby markets that is more harmful to the forest. The FD has tried taking energy conserving measures such as providing smokeless chullahs and gobar gas plants but none of them have succeeded. Our observation has been that such provisions have been too piecemeal and the villagers were not trained enough to adapt to these changes. Of course the villagers are short of enthusiasm in accepting these changes too. The gobar gas plants in the village of Pradhanpara have all been given to villagers who are not part of the EDC (which appear to be politically motivated decisions as it was up to the panchayat pradhan to choose beneficiaries in the absence of any EC). Moreover none of them have started functioning till date. There has also been discussions of creating firewood selling centers from where villagers would be asked to buy firewood at a nominal rate (30-40 paisa/kg in place of market rate of more than Re.1/kg) which have not materialized.

A feasible option, as suggested by few of the forest officials as well, is to encourage villagers to plant appropriate species within the villages which would reduce the need to go to the forest to meet domestic fuel demands. The FD has a very important responsibility in this regard to supply villagers with the necessary saplings and ensure that such activities are taken up by all. Unlike SB, where a substantial

proportion of the population use dry leaves of Eucalyptus and Akashmoni as fuel, people in this region do not use leaves as domestic fuel and depend entirely on firewood.

With no alternative domestic fuel to firewood available, and when a significant section of the population (the poorest section) depend on selling firewood at the nearby market to earn a living, one of the important measures to reduce the pressure on the forest would be to control this indiscriminate sale. Alternative sources of income generation for this section of the people have to be introduced to prevent them from indulging in such practices. The innumerable teashops and eateries, the households in Madarihat town and other such urban settlements spread around the RF provide an easy market to these people. As long as the lure of these ready markets exist, it would be impossible to prevent the economically weak from resorting to taking advantage of these opportunities and reduce the pressure on the forests. The FD would need the co-operation of the local police department too in this regard. The point is that one should not blame the hungry when he tries to grab at the piece of food being dangled in front of him. One cannot teach a hungry person the etiquette of dining.

### **Illegal Felling**

The forest officials of Jaldapara Wildlife Sanctuary are of the opinion that illegal felling and poaching have greatly reduced since the activities of EDC have been initiated. For JWS, the monsoon months are most crucial as that is when the miscreants take advantage of the turbid waters of the rivers and transport the logs on makeshift rafts downstream to evade the forest guards. Strangely, the Beat Officer of Madarihat range complains of felling being on the rise as compared to 1993/4, when the FPC's started to come into existence. (It is pertinent that Madarihat range is more well connected with roads as compared to JWS, and most of the illegal timber trade actually makes use of the highways connecting these forested areas with the urban settlements with their insatiable demand for timber).

The mushrooming of sawmills around the entire region is alarming. Most of them are unauthorized and enjoy support of the panchayats. The FD officials claim that they are helpless as all the sawmill owners enjoy patronage of the political

establishments. Complaints to the police department seldom result in affirmative action. It is evident that forest protection and wildlife conservation is as much a question of fostering co-operation amongst the stakeholders, as is a matter of political will. There is an extremely powerful timber mafia in operation, and it demands a lot of courage, probity and respect for nature on the part of the establishment to be able to deal with it severely.

### **Collection of Minor Forest Produce**

The present attitude of the FD is to allow the EDC members to collect NTFP for own consumption (in JWS). Certain items like, odhal, simul floss, thatch grass that they sell have been restricted. The FD designates specific days in a year when the collection of these are permissible. At times, the FD, either itself or through the EC of the EDC, issue permits for collection of the above mentioned items. Recently, according to the accounts of the villagers, the availability of these items has had a sharp fall. A grass variety that villagers use to thatch the roofs of their houses (Chhon) has been heavily depleted due to over extraction. This used to be an integral part of elephant habitat in the forests of Jaldapara. FD officials realize that fuel demands of villagers have to be met from the forest itself, unless other arrangements can be made. However to keep the pressure at the lowest possible level, the indiscriminate sale of firewood in nearby townships and settlements have to stop, as mentioned before. Like SB, the people here are heavily dependent on the forest for their agricultural implements. Recent house constructions use cement and mortar and comprise a significant proportion. Old houses are of course, made of wood.

### **Tea Gardens**

A trend working against the interests of forest protection and conservation has been the growing number and size of tea gardens in the region. The villagers, under threat of elephant attacks which inflict heavy damage to crop and property, aggravated by the uncertainty surrounding compensation provided by FD, thought it prudent to sell off their land to the tea gardens in lieu of money and employment. As the tea gardens keep swelling in size, the labour force that it supports keeps growing. A substantial proportion of them is migrant labours, which pose a big threat to the well

being of the forest and wildlife. Devoid of the cultural bonding that the locals have with the forest, they are deemed to be indiscriminate and insensitive in using forest resources. The leopards prefer the cool trenches within the tea gardens as a refuge during summer or during giving litter, when they fall prey to poachers from the labour barracks of the tea gardens. Economically, besides bringing temporary respite to poor villagers, who, to meet the present financial crisis forego the opportunity to ever be independent again, tea gardens contribute little to the overall development of the region. Its ecological sustainability could be assessed only with time.

### **Provisions by the FD**

The FD has shown special attention towards the 2 EDC's of Umacharanpur-Khauchandpara (UK) and Dhai-dhai Ghat (DD) and most of the funds have been spend here. The irrigation canals in UK have been much appreciated by the members of these two villages. As was pointed out by the members of DD during our discussions with them, the relative success of their EDC is because majority of the members is economically better off than the rest of the population around JWS. The single most factor that has led to the creation of this relatively well off class has been their recent improvements in agriculture, supplemented by the construction of irrigation channels, dug-wells, spray machines which have been provided by the FD. The major occupation of the people in this region remain agriculture and assistance to improve the returns from agriculture will be highest in the list of requirements that the villagers will provide the FD with in the course of Micro Planning.

Pradhanpara EDC members were given pigs, ducks, rabbits etc. to rear as a part of an effort to help them develop alternative sources of revenue. Similar provisions were also given to UK, with the addition of apiaries. None of these efforts have succeeded so far. The reasons for failure have been:

1. No training or counseling was imparted to the villagers and there was very little effort spared by the FD in monitoring.
2. The villagers are not used to rearing the breeds that were given to them and were left clueless when the animals were struck by some disease. They complained that the treatment was very expensive and the FD could not be of much help either.

The handlooms that were given to a few families in UK also met with the same fate. It was thought that the Bodo women, traditionally exceptional weavers, married to members within the EDC could make good use of these provisions. However, there was no training to use the looms, initial promise by FD of forming a co-operative to facilitate marketing of the produce never materialized and the people lost interest.

The lessons coming out of these experiences should be critical in formulation of Microplans. The motives are noble and can have far reaching impacts, only if certain preconditions are met.

Firstly, it is extremely important that sufficient attention is given to "capacity building" of the villagers. Unless the people are equipped to invest their own expertise and enterprise to sustain productivity of an asset, it would be of little use to pump in money and resources, which is limited and has its own constraints. There has to develop a feeling of belonging that would ensure that people make judicious use of the resources at their disposal and enjoy a non-diminishing flow of returns.

Secondly, identification of groups with similar endowments and skill is necessary. The initial investment that the FD can make is limited. Thus for the optimal allocation of resources, efforts must be spent to maximize societal benefits, rather than individuals. Formation of such groups would have the added advantage of having an inbuilt set of informal ethics that would discourage any attempts at non co-operation or self-aggrandizement. Identification of such groups would also help to isolate the specific necessities of certain sections and appropriate measures, in accordance with the level of skill that they share and the endowments that they have can be introduced.

Thirdly, given the complexity of the situation and the divergent needs of the villagers that have to be taken care of, all the government departments need to synchronize their respective activities. It is unfair to throw the entire responsibility on the shoulders of the FD. Under the circumstances, co-ordination between the agriculture, irrigation, livestock, electricity (PWD) seem essential.

## Political Interference

All FD officials are unanimous regarding the adverse consequences of political interference in forest protection and conservation. Right from the BO at the lowest rung of the hierarchy to the AWLW, all share the view that EDC's have become unnecessarily politicized, much to its detriment. The political heavyweights within the villages have this tendency to monopolize the Executive Committee of the EDC, the weak liaison between the villagers and the FD. We have discovered during our survey that the provisions given by the FD, in most occasions have found its way into a select group of people within the village --- either the EC members themselves, or friends, relatives or political associates of them. For instance, most of the people in UK, who benefit from the supplies they provide either to the Holong Tourist Lodge or for the elephants maintained by the FD (for guarding and tourist rides) are closely related to few of the EC members. Considering that the people within the UK EDC directly benefiting from tourism are less than 8% of the total members, such (mis) appropriation of opportunities militate against the objective of fostering co-operation between FD and the EDC members in general. Since the forests are such an integral part of one's existence in these regions, the control over taking decisions and the distribution of rights and access to these resources (both from forest and given by FD) automatically vests a lot of power and importance in the hands of EC members. This is the clout that political parties look to take advantage of.

Formation of Pradhanpara EDC was way back in 1996, but they still do not have an Executive Committee. All the political fractions that exist within the village want to maximize their representation in the EC and as a result, there has been a lack of consensus regarding the composition of the EC. Till date, whatever discussions and decisions have been taken concerning the EDC have been among the FD and the Pradhan of the village. As a result, the 6 gohar gas plants that have been sanctioned by the FD for Pradhanpara EDC have been given to families who do not fall within the zone demarcated as EDC. There have been complains of nepotism from sections of the villagers against the present panchayat and how they flagrantly maintain an inequitable policy of distributing resources given by the FD (like saplings of Supari, coconut etc., livestock), favouring those living nearby or having similar political affiliations.

### **Ambiguities in the Management Process:**

On certain issues, the lack of a vision or plan is apparent as far as the FD is concerned. The FD is at a complete loss as far as dealing with menace of grazing is concerned. It would be an extremely volatile situation if the villagers were forcefully restricted from taking their cattle to graze in the forest floor. At the same time, higher officials are extremely critical of the range officials. As a matter of fact, some range officials, requesting anonymity, expressed their displeasure at the way they are treated by higher officials who have "little idea of ground reality". There is no fixed rule of punishing offenders, whether caught having left their cows untethered, or cutting trees. It is up to the discretion of the concerned BO/RO to fine him or hand him over to the court of law.

The same lack of communication and planning is evident in the drafting of the "Microplan" that is on the anvil. Till late, the range officials were under the impression that the UNDP funds were to be utilized in the 2 EDC's of UK and DD. Then all of a sudden, they have received orders to draft microplans for 16 EDC's. As a result, they are being drafted in the most mechanical and stereotyped fashion, defeating the very objective of "Microplanning".

Unlike South Bengal, the Jaladapara Wildlife Sanctuary is not divided amongst individual EDC. The demarcations are imprecise, which makes it difficult for EDC members to guard "their" respective forest areas from illegal activities. Our surveys in the EDC's reflected this confusion in the minds of the members, when each village was blaming the other of trespassing in their forest to collect NTFP (say, odhal or simul or chhon).



## Chapter VIII : A GAME THEORETIC PRESENTATION

The forest areas are owned by the FD, and there are state laws specifying how and to what extent they can be used. But because of their hugeness and accessibility vis-à-vis the fringe villagers, and also because of the non-implementation of regulations, they are 'open access' and hence qualify as 'commons' be used. Hence Hardin's 'tragedy of the commons' applies. That is, extraction occurs where the marginal private gain of each 'herder' (in our case, the villager who uses the forest resources) is equal to the marginal cost of extraction. But there may be a negative externality in the form of resource depletion at non-sustainable levels, and if this cost is not taken into account, the extraction is inefficiently high. As a result, the forests disappear and everyone loses out in the long run. This conclusion is akin to the case of the Prisoners' Dilemma where each prisoner tells on the other, because he assumes that the other will tell on him, that is, he assumes the worst possible action on the part of the other. For our commons, each herder thinks that the others will follow their own private interest, hence he does the same.

There are reasons why the commons story may not be one of total defection, but the fact of overexploitation of resources cannot be denied. We shall look into this later, and discuss how the problem can be resolved. But for the present moment, let us present our particular case in the game theoretic framework.

Let us begin with an FD that is all-powerful : the central authority that knows everything and can do whatever it wishes to do. If the FD knows the optimal, sustainable rate of resource extraction and can competently identify and penalize those who extract more than their fair share, it runs the system efficiently and there is no long term depletion of resources. This is the 'Leviathan' solution offered by many for all problems involving negative externalities. The problem with this setup is that the FD may not know the optimal extraction capacity, and it may not be able to identify or penalize the offenders correctly. This has been the case for our forests – in particular, as already mentioned, policing or punishing has been seen to be a very difficult proposition, and this is why the FD has started thinking of other methods of forest preservation. Moreover, the efficient solution of the state control system assumes that there are no costs of such control, but this is not the case.

However, in spite of the fact that the FD talks about 'joint' management, the relationship between the FD and the villagers is far from equal and the FD is still the central authority that dictates the rules. We cannot, thus, talk about the FD as a player in a possible 'game'. However, what it has done is to introduce elements of a game, by offering payoffs to the villagers and expecting that the consideration of alternative payoffs would induce the villagers to use the forests in a sustainable fashion. Thus the role of the FD has shifted to that of a referee – one who dictates the rules and tries to make sure they are followed, but who allows a game to take place within the boundaries of the rules. We cannot, exactly, call the FD the 'facilitator' in the way that the term is used in game theoretic parlance, as a facilitator only encourages a game to take place, contributes the necessary information and helps in conducting the game. In our case the FD is far more powerful. But after a point, we can say, when it has ensured that the basic guidelines are being followed, it wishes to play the role of facilitator. As a matter of fact it has done this in a very inefficient and lacklustre fashion, but that is a separate matter that we shall discuss subsequently.

The villagers under an FPC are our players. They are a non-homogeneous group, consisting of the Executive Committee and other influential persons, the ordinary FPC members, the women (who have no obvious function in the operation of the FPC) and other alienated villagers (who do not take part in any kind of co-operative process but do use the resource). Each individual villager (including the women and alienated villagers) is actually a player as long as he/she extracts forest products, with his/her own independent payoffs and actions. But the relationships between players are not uniform – family members may act as a group, for example; persons of the same ethnic or political group may feel close to each other, the 'alienated' persons may act in conjunction and may feel distant from the rest of the community. The EC, an elected body, represents the villagers and the FD does most of its interaction with this body. But this interaction cannot, at present, be called a negotiation. The EC is essentially a mediator between the FD and the villagers, and is thus a partner of the FD in the facilitating process. But members of the EC, like the other villagers, are players. The EC, thus, has two identities.

Thus, as is the case for most real situations, the picture is somewhat complex, with a mix of state impositions at one level and free play at another, and with different roles played by the same individual or organization. We shall later discuss some of the other forms that JFM could have taken up.

Moreover, JFM involves communication between the actors and is repeated - these are the two features which distinguish the game from the 'Prisoners' Dilemma' outcome. Thus the players can explore the possibility of co-operation and whether the co-operative outcome is better than the non-cooperative, and they can learn from the outcomes of past actions. And finally, knowledge is imperfect, both on the part of the FD and on the part of the villagers, but this may be corrected to a large extent.

Now, if the level of sustainable extraction of forest resources is known, if an opportunity is given to the players to discuss modes of co-operation so that equal amounts of the resource go to each player and if individual payoffs under co-operation are greater than under non-cooperation, the players will clearly prefer to cooperate. In case payoffs are not fixed and there are uncertainties regarding future payoffs, the historical experience of past payoffs is very crucial in determining the probability of future payoffs in a dynamic setting. Hence the payoffs or the probable payoffs are very crucial. If these are large enough, the game being discussed here should have a stable equilibrium with all players conforming.

Let us therefore look at the payoffs that are involved. The payoff of any strategy would be the difference between the benefits and costs of that strategy. If the villager 'defects', which in our case is the illegal felling of trees for timber or the extraction of firewood or fodder or construction materials in a destructive fashion, the benefit-cost structure is given by

### **Benefits of Defection.**

1. Returns from the sale of timber
2. Returns from the sale or use of firewood or fodder that is extracted in a non-sustainable fashion
3. Saving the time or labour required to guard the forest

## Costs of Defection.

1. Less NTFP
2. No share (25%) from the FD's felling
3. Less employment opportunities with the FD for plantation or other regenerational activities
4. Cost of time and labour spent in illegal activities
5. The possibility of being jailed or fined for illegal felling or exploitation
6. Social sanctioning of illegal felling
7. Indirect impacts of a worse environment
8. Elephant menace<sup>9</sup>

The costs and benefits of 'conforming', ie., not exploiting the forests unsustainably and hence following the regulations set up by the FD, are exactly the reverse, ie., equal to the benefits and costs, respectively, of defecting.

Hence, it is important in terms of policy to reduce the payoff of defection (and hence enhance the payoff from conformation) by reducing the benefits and increasing the costs of defection. It is therefore important to study these benefits and costs in greater detail.

Interestingly, the benefits of defection are all material benefits, whereas the costs are material, legal, social and environmental (though the last three may have material implications). It is crucial to note that there is less recognition of the non-material costs in comparison to the obviously material benefits and costs. There

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<sup>9</sup> It is difficult to say whether the elephant menace is a cost of forest degradation – for a certain degree of degradation has caused the elephants to intrude into the villages, but no forests would mean no elephants. Thus in certain areas such as North Bengal villagers often show reluctance to protect the forest because they feel that the forest produces this menace – in other words, they identify a reduction in the elephant menace as a benefit of defection, ie., the increased menace is a cost of conforming.

may be little knowledge of environmental impacts, perhaps due to the erosion of old ecology-conserving practices and the absence of a new knowledge base that replaces the old. Moreover, social sanctions may be unimportant in the face of abject poverty. We should mention here that the recent literature on managing the commons stresses the great importance of social sanctions at the decentralized level as the factor that has the greatest strength in countering the economic benefits of defection (Uphoff and Langholz, 1998, Sethi and Somanathan, 1996, Ostrom, 1990).

Secondly, some of the costs may have low effective values. If the legal system is weakly implemented, if offenders are not caught, the probability of being jailed or fined is very low. In a changing social structure, with the intrusion of mass media and the spread of a secular culture, social control systems weaken. They are also weak in heterogeneous communities with mixed ethnic groups. The 'alienated' villagers, for example, or even the women who are not included in FPC operations, may be oblivious to sanction.

As regards the material benefits or costs, the monetary returns from illegal timber sale are high because of a high demand for timber – interestingly, there are a huge number of sawmills and furniture shops around Jaldapara Sanctuary, where any kind of extraction is illegal and even the FD's legal felling has been stopped. As long as there is a demand, supply becomes inevitable, particularly due to high unemployment and underemployment levels. This benefit from defection, on the other hand, is largely absent in the South Bengal forests because they have little of valuable timber. Firewood extractions are high because there is really no alternative cooking fuel, and to some extent because of population pressures. Fodder extraction, again, depends largely on the cattle population which is high because of agriculture's dependence on cattle. Behind all these factors, of course, lies the fact of poverty, which forces the villager to think of even minor gains at the cost of losing one's respectability.

Item 3 in benefits and item 4 in costs refer to labour time – both these items are not very important in our context as the opportunity cost of labour is very low given the degree of unemployment and underemployment in the rural sector.

We have seen that NTFP benefits are very significant and act as a strong incentive in forest preservation – thus this is a major cost of defection. On the other hand, we have also seen that legal timber sales by the FD are very infrequent and even when that occurs, the returns to each household is generally low. The erratic and infrequent nature of organized felling means that the villagers would generally assign very low probabilities to obtaining the 25% share of felling in the near future. And they certainly do not have any knowledge of when felling would occur, as the FD normally does not think it necessary to inform them. Moreover, if future returns are heavily discounted, as is the case for those who live from hand to mouth, the present value of these returns would be even lower. Hence this cost of defection or benefit of cooperation is largely absent, in spite of the fact that this has been publicized as a major incentive for preservation. As regards labour employed for forest-related work, this would also be an important cost of defection if it is regularly done and only conforming FPC members are given work. Although this incentive does exist, it is not very strong.

It is therefore evident that the perceived benefits of defection may be higher compared to the costs, especially in a situation where policing is difficult and laws are lax – even when an offender is apprehended he is allowed to go for political or other reasons. The pecuniary benefits of unsustainable felling are backed up by weak social and legal barriers and a lack of awareness of environmental costs, or even costs in terms of lower NTFP yields in the near or not-so-near future.

There are some groups that would have a greater tendency to defect, as their benefits are higher or cost lower. Greater poverty and lower employment opportunities encourage defection. For women, defection may be greater because they have the responsibility of somehow collecting the firewood that would be required for cooking the day's meal. These communities would also not feel the social compulsion of conforming, especially if they are not included in FPC meetings and decision making.

Now, if some of the players defect, there would be a tendency on the part of others who were earlier cooperating to also defect in later periods, on the basis of past experience. This is because they do not obtain the same payoffs that they would have, had everyone conformed, and expectations of future payoffs are even lower.

Hence the system becomes unstable. It is therefore essential to ensure that none of the villagers defect by ensuring that the net benefits are more or less equal and reasonably high. We will discuss later the various ways in which this can be ensured.

But let us first discuss the weaknesses of the present game structure, as distinct from the payoffs involved. Most importantly, the FD introduced JFM because they realized that centralized control was not possible, yet they retained their position of authority. This position requires, first, that they know the optimal level of extraction. It is not clear that this is known, and it is doubtful whether the FD's felling is based on scientific management. But our work has not investigated this matter – hence let us assume that the FD is fully knowledgeable regarding the carrying capacity and conducts its felling cycles on that basis. But it is quite clear that for a variety of reasons the FD has no control over the extraction by the villagers. Yet on the one hand it retains the illusion of control and spends a significant quantity of resources on such control. On the other, it admits the impossibility of control and hence asks the FPC to monitor itself. The FD's position, thus, is very unclear. If it is necessary to retain some control, the areas of control should be well defined and should not overlap the area of operation of the FPC. If a 'game' is a must, the ground rules of the game should be specified and then the game should be allowed to proceed.

Secondly, if the creation of the FPC is in order to facilitate a game, the members and the rest of the villagers should operate with as much information as possible which requires much greater interaction amongst themselves as well as support from others – the FD, and those who can give technical information regarding the possible level of extraction and how this limit can be adhered to. In other words, there should be complete transparency and the players should be equipped with as much information as possible.

Third, if the objective of the FD is to retain the environment and not to profit from timber sales, the revenues retained by it should be based on what it costs to monitor and facilitate the process of preservation. In particular, it is not clear why the FD should retain 75% of felling returns. Moreover, as long as the villagers feel that the division is grossly unequal, they will not develop the responsibilities that go with rights. It is true that the NTFP returns should also be accounted for, but in a situation where they do not feel that the right of NTFP extraction has been handed over by the

FD, there has to be at least an equal division of the timber benefits. Further, if another organization can carry out the operation of monitoring and facilitating at lower costs, the work should be given to such an organization.

Let us, then, look at other possible ways in which the game of JFM can be structured.

### **Other Alternatives**

#### **A. A Two Stage Game**

We can think of the process as a two-stage game where, in the initial stage, the players are the FD on the one hand and the villagers on the other. At the second stage, the FD, with the help of the EC, becomes a facilitator in a game where the villagers are the players. In the first stage, then, the villagers are an aggregate body with a single objective. At this stage some essential rules may be imposed (such as the minimum desirable status of the forest) but otherwise the FD and FPC are equal players and they chalk out a strategy that allows both to benefit more in comparison with a non-cooperative strategy. Thus here we assume that both these parties have rights over the forests, as well as responsibilities. Once these rights and responsibilities are chalked out, we enter the second phase of the game where the FD has a certain role as facilitator and monitor (what it monitors is well-decided in the first round), but the game is now between the villagers. Or, the FD may simply facilitate the process and let the players mutually monitor each other.

The advantage of such an arrangement over the existing one is that the FD and FPC interact at the same level, and the roles are well defined. The initial negotiation ensures a fairer division of returns. Yet the FD is present to supply valuable information and ensure that the environmental needs are not ignored

#### **B. The FD as a Paid Facilitator**

An alternative to the above may be the payment of a fee to the FD to cover its costs as a facilitator – this fee is then equally divided amongst the players and gets included as a cost in the payoff structure. This system thus transfers all rights and responsibilities to the people. They get together and arrive at a contract that is



acceptable by all. Only after this contract is decided upon, does the facilitating process begin, and the facilitator does nothing that has not already been agreed upon in the contract. This model, if it is to give desirable results, assumes a total understanding of the costs, including the environmental costs.

#### C. A Least-Cost Facilitator

A system that is more efficient than the above would be to choose the facilitator that provides the service at least cost. This may be an NGO, for example. The choice of the facilitator may also be based on the level of service provided, if we accept that this service need not always be perfect.

#### D. Privatization

An alternative to all of the above would be to privatize the system and allow market forces to determine the solution. Privatization of the commons, naturally, eliminates its tragedy. It internalizes the negative externality of long-term degradation. However, one problem remains – the private landowner need not be concerned with the larger environmental impacts.

#### E. Privatization with Legislation / Preservation Incentives.

One way of solving the above problem would be to legislate that the forest cannot be converted to some other use, and has to retain a minimum status. But this would require a degree of supervision. Legislation may be substituted by incentives to preserve, such as tax and other incentives in the private wildlife refuges of Cost Rica ( Uphoff and Langholz, 1998).

#### F. Use Rights

Instead of transferring the ownership totally, the FD may retain the forest but allocate plots of forest land to each villager – the villager enjoys use-rights but with the condition of non-conversion. The user forfeits his rights if he converts. The use rights may or may not be inherited. If inheritance rights are not given, incentives for long term preservation are absent. Hence it would be desirable to grant rights of inheritance. A possible problem with this kind of a situation is that villagers might fell trees from areas owned by others.

All of the above arrangements would yield efficient results, without the overexploitation of the forest resources, if the assumptions hold. The question, therefore, is which assumptions can be implemented.

## Chapter IX : R E C O M M E N D A T I O N S

### 9.1 A Change in the Paradigm

That the paradigm is important, is obvious from the analysis of the data. Whilst NTFP returns are significant and are a strongly connected to forest status, we find that factors related to FPC operation are more important in determining this status. Hence it is very necessary to look at the structure of JFM, for this is what determines the operational efficacy of the FPC .

We have already discussed the pitfalls of the present structure of JFM. Hence one suggestion is to change this structure in favour of a more clear-cut game, or privatize the system. Privatization (see the game theoretic part in the discussion section) seems very improbable under the present circumstances, and the monitoring that has to accompany it may be very difficult. If we choose the first, we can move from the two-stage game to a completely facilitating role of the FD or an NGO. A significantly non-authoritarian role of the FD does assume that the larger environmental interest is served if the villagers take care of their own local interest in preserving the forests. If we do not accept this assumption, we can stick to the two stage game where some aspects are dictated by the FD, but its role is more well defined and there are no overlapping functions, as is true in the current scenario.

At a more practical level, the FD can clearly dictate certain conditions but should hand over greater rights to the villagers through legislation. If the people are being asked to police themselves, why does the FD go on policing them, and that too in a most inefficient manner? It is thus necessary to provide legal identity and status to FPCs by ensuring their registration under the Societies Registration Act (1860) and to involve FPC members in all aspects of decision making with regard to forest protection & management including local microplanning and eco-development schemes. Official delays in registration (as has been observed in many cases) should certainly be eliminated.

Instead of wasting resources on controlling that which it cannot control, it should concentrate on educating the people and strengthening the social norms on the one hand, and finding ways of enhancing their returns from preserving the forests on the other.

One of the more necessary functions of the FD, for example, is to determine the sustainable quantity of extraction of the various NTFP or timber. A question that is often addressed is whether the collection of NTFP degrades the forest or affects its diversity. This aspect should be carefully studied and arrangements arrived at. For example, certain areas of the forest or time periods can be designated for fuel collection or for grazing, and other areas or time periods left alone.

The need of the hour is to increase the efficacy of the FD as a facilitator. Many of the officials at the beat and range levels are indifferent to the whole exercise and are more concerned about the dilution of the policing laws. The concept of being 'equal partners' in forest conservation is bandied about but is by no means practised. One of the ways in which the FD flaunts its superior position is to conceal as much information as possible from the people.<sup>10</sup>

We have discussed the specific deficiencies of the FD, and shall not repeat them here. On the whole, what is truly critical is to scrutinise the present composition of the FD and try to bring about a number of changes. Only those who show some amount of dedication in preserving and regenerating the forests should be taken into service and elaborate training sessions should be conducted so that foresters can operate with full knowledge and efficiency.

Women foresters have shown a great deal of initiative in motivating villagers – moreover, they can interact with the village women and can perhaps convince village heads to allow FPCs with at least 50 per cent women members or perhaps all-women FPCs. Female guards would be able to apprehend female offenders more easily. Thus there should be women at all levels of the FD .

The EC, as we have seen, is an organ of the FD in its role as a facilitator. In fact, the FD really only interacts with the EC and no one else in the village or FPC. The efficiency of the EC is also, therefore, important – it should be a true representative of the people and at the same time have a strong influence on the people. It should also be able to interact well with the FD. The EC should therefore be carefully chosen. For example, representation and influence may not go hand in hand – in

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<sup>10</sup> For example, note that we have grouped forest status according to the sales information available to the FPC members – when such information is unavailable, the status is worse (Table 5.27).

which case the choice should be more in the direction of influence and leadership qualities. This is confirmed by our regression results which show a negative beta-coefficient of the EC dummy with respect to forest status – ie., an EC chosen every year in a democratic fashion may not be the best EC. Moreover, the possibility of training or motivating members of the EC should be explored, so that they can act as motivators and provide critical information to the villagers.

Once the best possible EC is chosen, it is important to ensure that communication between the FPC members is frequent, and for that meetings should be frequent. It is in these meetings that the exchange of information and negotiations take place. Even when there is a lot of disagreement in a meeting and the meeting is inconclusive, the close interaction has positive long term implications. We have already seen the connection between meetings (frequency and attendance) and forest status. We have also seen that the resolution of internal conflicts, leading to the smoother operation of preservation activities, is very critical. Once again, we would stress the need to involve all villagers (and especially the women) in the meetings.

Our study has not looked at the political angle – but we have felt the influence of politics in the behaviour of both the FD and the people. One, the bon-o-bhumi sthayee samiti of the local panchayat has a representative in the EC , and the panchayat pradhan or his representative is also an EC member. Two, there are other informal political influences. Those belonging to the non-dominant political groups are marginalized. The FD, also, by their own admission, are bullied by the political bosses who tell them, for example, who should be punished and who allowed to go.

It is not very clear whether the political presence in the EC or FPC always has a negative impact. For, political groups are also representatives of the people and would therefore try to keep the people (as a whole) happy. As Shubik says, the 'political decision maker must consider interpersonal comparisons of welfare' (Shubik, 1986 )But it is definitely true that the influence of politics complicates the game and this area needs thorough investigation.

## 9.2 Improving Payoffs.

The suggestions that we shall make here are implied by our discussion of the costs and benefits of flouting the norms. What we will attempt to add here, are ways in which these costs and benefits may be increased and decreased, respectively.

Women and other alienated groups have to be involved in the whole act of preservation. Unless all villagers, male and female, are in an equal position in terms of both rights and responsibilities, the game cannot yield a cooperative solution. Thus women, most importantly, have to have a major role in the FPCs, and perhaps an even greater role than the men, as they are usually the 'herders'. The alienation of women is perhaps the single most important defect of JFM. Unless all herders have significant net payoffs, no attempts to increase these payoffs would work

We will not delve into all the possible ways in which women can be involved. But some of the obvious methods are to increase the female staff in the FD, to involve NGOs dealing with women, to try to change the attitudes of the husbands/fathers, to fix meeting timings so that women can attend and to give women direct access to some of the benefits. .

Similarly, ensuring equity in benefit sharing is an essential prerequisite for building up confidence amongst the socio-economically backward sections . For example, benefits in ecotourism (eg. the supply of food and other amenities to forest lodges) should be distributed uniformly.

The question of equity also arises in terms of the forest to household ratio. The FD presently assigns the forest patches to adjacent communities without any scientific delineation criteria based on the sustainable density holding capacity. Therefore the above ratio varies significantly for different FPCs leading to a greater possibility of unsustainable extraction levels in some areas.

A critical measure would be to reduce the returns from and increase the difficulty of illegal felling. This would require the elimination of the channels through which such illegal timber is sold. One obvious move would be to close the sawmills or furniture shops and to apprehend the timber Mafia. The fines of illegal acts should be prohibitive and jailing should be a common punishment. Political intervention is one

important reason why these activities continue. One approach would be to remove the political influence, another would be to educate the powerful groups in an area and involve them in conservation.

The fines can also be imposed by the FPC. Alternatively, the FPC may not allow the offender to take his/her share of the 25% felling returns or may bar him/her from entering the forest to collect NTFP for a certain period of time.

To eliminate the over-extraction of firewood or fodder, it would first be necessary to know what the maximum levels of extraction should be, and design the behaviour of the villagers accordingly. But if such over-extraction is absolutely necessary, it will go on. Thus it would be important to try to develop alternative sources of fuelwood and fodder. Villagers can be encouraged to grow supplies in their own homestead or agricultural land or village commons. Some of the forest land can also be used to grow fodder plants. When planting trees, attention should be given to the needs (mainly fuelwood and fodder) of the people.

Substitutes of wood as fuel (eg. CNG or kerosene) or of cattle (eg. tractors) would help – but neither are very feasible in the present scenario. There have been attempts to introduce stall feeding cattle (Jersey cows) but they have only turned out to be expensive propositions. However, economizing on fuel use is quite possible (such as with the use of smokeless *chullahs*).

Enhancing employment opportunities would reduce the number of people taking on the risk of wood theft. Opportunities connected to a certain forest area should be provided to members of the FPC that takes care of that area, so that the link between preservation and its ensuing benefit is obvious. Ecotourism is one such area which is developing but is still largely unexplored. Other than employment, various kinds of support may be given to the village to improve its agricultural productivity. If the FD does spend money on the development of the village, it should not be doled out individually (as has happened sometimes in the past) but should go towards developing the village as a whole. Part of the payoffs received by FPC members can also be used for the creation and maintenance of community assets. Hence irrigation facilities may be provided, or there may be other infrastructural improvements. It is more important, from a long run perspective, to provide technical

assistance in the areas of earthen dams, irrigation engineering, agroforestry, pisciculture, roads etc. Technical assistance would also be valuable in handling the elephant menace. We would like to stress that all these developmental activities are related in some way to forest preservation. Care should be taken to not introduce anything that improves the economic condition of the village but has a negative impact, however indirect, on preservation.

To enhance the returns from NTFP, which we have found is one of the three major variables (other than internal conflict resolution and the meetings index) determining forest status, it is essential to plan the species mix with the needs of the villagers in mind. In combination, processing units for marketable NTFP can be set up for each FPC in easily-accessible places and the marketing of the goods arranged for. There are numerous ways in which this market can be improved, yielding lucrative occupations for many villagers. LAMP<sup>11</sup>, a tribal co-operative, does purchase and market some items but the purchase prices are very low and it generally does not look into processing. Moreover, LAMP appears to be in a moribund state. But other NGOs or government departments can be involved in processing and marketing activities.

The (25%) share that the FPC members get from the FD's felling operations is too low – if for no other reason, then because there is a symbolic implication that the villagers are 'lesser amongst equals'. But even if they had got this lesser share, it would not have been so bad. The fact is, as we have seen, that there are no systematic sales and the returns are very small. Very few FPCs have experienced a sale and got their percentage, which has amounted to very little money. The amount and probability of a payoff are thus both low – resulting in an expected payoff that is close to zero.

This state of affairs should be totally altered. Ideally each FPC should have a felling each and every year, so that the payoffs are regular. The selection of the patch to be felled should be based on its age and other factors. The total forest area can be organized in such a way as to allow for such yearly felling. Once this is ensured, the question of raising the share to 50% or more arises. One way of deciding what the

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<sup>11</sup> Large Scale and Multipurpose Cooperative Society



share should be is to calculate the costs of a rationalized FD and determine the FD's share.

There is a great need to educate and inform the people regarding the present status of the forest , what the ideal status should be, why this is the ideal (ie., discuss the environmental implications), the need to reach and maintain the ideal, what has to be done to stick to the ideal and various technical knowhow related to this. In other words, there should be a holistic environmental education. This can be done by the FD, or by NGOs who have the skill to communicate and impart education. Although traditional communities had their own systems of resource preservation, these systems have eroded and they need to be replaced by new systems. These educational sessions can be held during FPC meetings.

Finally, social sanctioning, which already exists but perhaps at a mild level, should be seen as the greatest priority in present forest policy. This, too, can be strengthened through education and by involving all extractors in JFM. The poorest groups whose desperate needs force them to ignore such sanctioning can be targeted specially and provided with alternative economic means. The FPC and its EC have a major role to play in such sanctioning. Enhancing the powers of this body and ensuring that this body meets frequently would therefore contribute towards a greater role played by social disapproval.

A few points may be added for North Bengal. It is interesting that reserved forests in this area are surrounded by sawmills and furniture shops : these, clearly, have to be banned. Secondly, microplanning has been introduced in the villages adjacent to these reserved forests as a benefit of forest preservation by the EDCs. Such microplanning should involve other government departments and NGOs for training and implementation of the projects and should take the needs of the villagers into account. The factors that should be kept in mind are long run sustainability, indigenoussness technology and equity in benefit disbursement. For example, the distribution of Supari saplings has been one of the more successful measures, whilst there have been many expenditures which have gone down the drain. And finally, it is highly undesirable that the villagers extract whatever NTFP they need while the FD looks the other way. The flouting of laws has such a negative impact that it is worse than a scenario where the laws are absent. Hence the FD should seriously

consider allowing the use of certain NTFPs, with, of course, more stringent restrictions for those which are currently reserved. For example, certain periods in the year or certain patches of the forest may be demarcated for NTFP collection.

### 9.3 Summary

In sum, JFM has had some impact in the South of West Bengal, but it can be far more effective if the policy makers

1. Redefine and bring clarity to the role of the FD as a facilitator and increase its efficiency in this role
2. Introduce equity in the sharing of both rights and responsibilities : between men and women and between socio-economic groups
3. Increase the payoffs to forest protection by (amongst other things) enhancing NTFP returns and regularizing as well as enhancing felling returns
4. Look at the factors which are connected to illegal timber felling or the over-extraction of NTFP and try to eliminate those which encourage such behaviour while at the same time enhance those which discourage such behaviour
5. Improve the operations of the FPC, in particular, ensure frequent meetings for the resolution of conflicts as well as the dissemination of knowledge
6. Are conscious of the political factor and take this into account as a motivating factor in whatever strategy each FPC member or the EC adopts, and
7. Strengthen the role of social sanction as a strong disincentive for potential offenders.

## APPENDIX – I

### GOVT. OF INDIA GUIDELINES FOR PARTICIPATORY FOREST MANAGEMENT

NO.- 6 21/89-P.P.

GOVERNMENT OF INDIA

*Ministry of Environment and Forests*

*Department of Environment, Forests and Wildlife*

*Paryavaran Bhavan, C.G.O. Complex, B-Block*

Lodi Road, New Delhi

Dated 1<sup>st</sup> June, 1990

To  
The Forest Secretaries  
(All States / UTs)

**Subject :** Involving of village communities and voluntary agencies for regeneration of degraded forest lands.

Sir,

The National Forest Policy, 1988 envisages people's involvement in the development and protection of forests. The requirements of fuelwood, fodder and small timber such as house building material, of the tribals and other villagers living in and near the forests, are to be treated as first charge on forest produce. The policy document envisages it as one of the essentials of forest management that the forest communities should be motivated to identify themselves with the development and protection of forests from which they derive benefits.

1.. In a D.O. letter No. 1/188-TMA dated 13<sup>th</sup> January, 1989 to the Chief Secretary of your State, the need for working out the modalities for giving to the village communities, living close to the forest land, usufructory benefits to ensure their participation in the afforestation programme, was emphasized by Shri K.P. Geethakrishnan, the then Secretary (Environment and Forests).

2. Committed Voluntary Agencies/ NGOs, with proven track record, may prove particularly well suited for motivating and organising village communities for protection, afforestation, and development of degraded forest land, especially in the vicinity of habitations. The State Forest Department's Social Forestry Organisation ought to take full advantage of their expertise and experience in this respect for building up meaningful people's participation in protection and development of degraded forest lands. The Voluntary Agencies/ NGOs may be associated as interface between State Forest Departments and the local village communities for revival, restoration and development of degraded forests in manner suggested below

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- i) The programme, should be implemented under an arrangement between the Voluntary Agency / NGO, the village community (beneficiaries ) and the State Forest Department.
- ii) No ownership of rights over the forest land should be given to the beneficiaries or to the Voluntary Agency / NGO. Nor should the forest land be assigned in contravention of the provisions contained in the Forest (conservation ) Act, 1980.
- iii) The beneficiaries should be entitled to a share in usufructs to the extent and subject to the conditions prescribed by the State Government in this behalf. The Voluntary Agency / NGO should not be entitled to usufructory benefits.
- iv) Access to forest land and usufructory benefits should be only to the beneficiaries who get organised into a village institution, specifically for forest regeneration and protection. This could be the panchayat or the Co-operative of the village, with no restriction on membership. It could also be a Village Forest Committee. In no case should any access or tree pattas be given to individuals.
- v) The beneficiaries should be given usufructs like grasses, lops and tops of branches and minor forest produce. If they successfully protect the forests, they may be given a portion of the proceeds from the sale of trees when they mature. The government of West Bengal has issued orders to give 25% of the sale proceeds to the Village Forest Protection Committees. Similar norms may be adopted by other States.
- vi) Areas to be selected for the programme should be free from the claims (including existing rights, privileges, concessions ) of any person who is not a beneficiary under the scheme. Alternatively, for a given site the selection of beneficiaries should be done in such a way that any one who has a claim to any forest produce from the selected site is not left out without being given full opportunity of joining.
- vii) The selected site should be worked in accordance with a Working Scheme, duly approved by the State Government. Such scheme may remain in operation for a period of 10 years and revised / renewed after that. The Working Scheme should be prepared in consultation with the beneficiaries. Apart from protection of the site, the said Scheme may prescribe requisite operations, eg. inducement to natural regeneration of existing root stock, seeding gap filling, and wherever necessary, intensive planting, soil-moisture conservation measures etc. The Working Scheme should also prescribe other operations eg. fire-protection, maintenance of boundaries, weeding, tending, cleaning, thinning etc.
- viii) For raising nurseries, preparing land for planting and protecting the trees after planting, the beneficiaries should be paid by the Forest Department from the funds under the Social Forestry Programme. However, the village community may obtain funds from other Government agencies and sources for undertaking these activities.

- ix) It should be ensured that there is no grazing at all in the forest land protected by the village community. Permission to cut and carry grass free of cost should be given so that stall feeding is promoted.
- x) No agriculture should be permitted on the forest land.
- xi) Along with trees for fuel, fodder and timber, the village community may be permitted to plant such fruit trees as would fit in with the overall scheme of afforestation, such as anola, imli, mango, mahua, etc. as well as shrubs, legumes and grasses which would meet local needs, help soil and water conservation, and enrich the degraded soils/ land. Even indigenous medicinal plants may be grown according to the requirements and preference of beneficiaries.
- xii) Cutting of trees should not be permitted before they are ripe for harvesting. The forest dept. also should not cut the trees on the forest land being protected by the village communities except in the manner prescribed in the Working Scheme. In case of emergency needs, the village communities should be taken into confidence.
- xiii) The benefit of people's participation should go to the village communities and not to commercial or other interests which may try to derive benefit in their names. The selection of beneficiaries should, therefore, be done from only those families which are willing to participate through their personal efforts.
- xiv) The Forest Department should closely supervise the works. If the beneficiaries and / or the Voluntary Agency/ NGO fail or neglect to protect the area from grazing , encroachment or do not perform the operations prescribed in the Working Scheme in a satisfactory manner, the usufructory benefits should be withdrawn without paying compensation to anyone for any work that might have been done prior to it. Suitable provisions in the Memorandum of Understanding (MOU) for this purpose should be incorporated.

Yours faithfully,

Sd/-  
(Mahesh Prasad )  
Secretary of Government of India.

## A P P E N D I X - I I

### GUIDELINES FOR STRENGTHENING OF JOINT FOREST MANAGEMENT (JFM ) PROGRAMME

*Circular No. 22-8/2000-JFM (FPD), Forest Protection Division, Ministry of Environment & Forests, Govt. of India, New Delhi dated 21<sup>st</sup> February, 2000.*

As per the provisions of National Forest Policy 1998, the Government of India, vide letter No. 6.21/89-PP dated 1<sup>st</sup> June 1990, outlined and conveyed to State Governments a framework for creating massive people's movement through involvement of village committees for the protection, regeneration and development of degraded forest lands. This gave impetus to the participation of stakeholders in the management of degraded forests situated in the vicinity of villages. The joint forest management programme in the country is structured on the broad framework provided by the guidelines issued by the Ministry. So far, during the last ten years, 22 State Governments have adopted resolutions for implementing the JFM programme in their respective states. As on 1.1.2000, 10.24 million ha of forest lands are being managed under JFM programme through 36,075 committees.

The JFM programme in the country was reviewed by Government of India from time to time in consultation with State Governments, NGOs and other stakeholders in view of several emerging issues. In order to further strengthen the programme, the State Government may take action on the following suggested lines.

#### A) **Legal backup to the JFM committees**

- i) At present, the JFM committees are being registered under different names in various States as per the provisions contained in the resolutions. Except in a few States where the committees are registered under the relevant acts, in most of the states there is no legal back up for these committees. It is, therefore, necessary that all the States Governments register under the JFM or Village committees under the Societies Registration Act, 1860 to provide them with legal back up. This may be completed by 31<sup>st</sup> March, 2000. Completion of such formation of existing JFM committees may please be reported to this Ministry.
- ii) There are different nomenclatures for the JFM committees in different States. It would be better if these committees are known uniformly as JFM committees (JFMC) in all the States. Memorandum of Understanding, with clearly defined roles and responsibilities for different work or areas should be separately assigned and signed between the State Governments and the committees. All adults of the village should be eligible to become members of the JFM Committees.

## **B) Participation of women in the JFM programme :**

Considering the immense potential and genuine need for women's participation in JFM programme, following guidelines are suggested for ensuring meaningful participation of women in JFM.

- i) At least 50% members of the JFM general body should be women. For the general body meeting, the presence of at least 50% women members should be a prerequisite for holding the general body meeting.
- ii) At least 33% of the membership in the JFM Executive Committee / Management Committee should be filled from amongst the women members. The quorum for holding a meeting of such Executive / Management Committee should be one-third of women executive members or a minimum of one whichever is more. One of the posts of office bearer i.e. president / Vice-President /Secretary be filled by a woman member of the Committee.

## **C) Extension of JFM in good forest areas**

For better resources planning and collective management distance from the village and dependency on forests should be the main criteria for allowing JFM programme to operate. Therefore, JFM programme should cover both the degraded as well as good forests ( except the protected area network). The microplan or treatment plan and memorandum of understanding should be different for degraded forests and good forest (crown density above 40%). In good forest areas, the JFM activities would concentrate on NTFP management and no alternation should be permitted in the basic silvicultural prescription prescribed in the Working Plan but to promote regeneration, development and sustainable harvesting of NTFP which can be given free or on concessional rates as per existing practice in degraded areas under JFM. The benefit sharing mechanism will also be different for the good forest areas. The JFM committees will be eligible for benefit sharing for timber, only if they have satisfactorily protected the good forests for a minimum period of at least 10 years and the sharing percentage should be kept limited to a maximum of 20% of the revenue from the final harvest. The felling of trees and harvesting of timber will be as per the provisions of the working plan. A certain percentage of revenue from final harvest should be ploughed back in the silvicultural & management of the forests. The extent of good forest areas to be restricted to a maximum limit of 100 ha and generally limited to 2 Km. from the village boundary. For degraded forests also as far as possible JFM in good forest areas shall be done in a phased manner on pilot basis. The pilot areas may be monitored closely of a few years and based on the feedback and success achieved the programme can be extended further in consultation with the Central Government. Before allowing the good forests on pilot basis, all the degraded forests of that locality should be covered simultaneously.

## **D) Preparation of microplan in JFM areas**

- i) In case of new working plans a JFM overlapping working circle should be provided to incorporate broad provisions for micro plans. To achieve this flexible guidelines should be evolved for preparation of local need based

micro plans. For this purpose, the working plan officer will work in tandem with the territorial DFO and CF for finalisation of the prescriptions of the JFM overlapping working circle. The micro plans should be prepared by the Forest officers and Village Forest Protection Committees after detailed PRA exercise and should reflect the consumption and livelihood needs of the local communities as well provisions for meeting the same sustainably. It should utilise locally available knowledge as well as aim to strengthen the local institutions. It should also take into account marketing linkages for better return of NTFPs to the gatherers and should also reflect the needs of local industries/ markets. This should be done with due regards to the environmental functions and productive potential of the forests and their carrying capacity as also their conservation and biodiversity.

- ii) In areas where the existing working plans are in force (till their revision in future,) for incorporation of micro plans in the working plans, a special order may be issued by the PCCFs for implementation of the micro plan. In these areas, micro plan should aim at ensuring a multi product and more NTFP oriented approach. Without changing the basic principles of silviculture, deviations may be approved in the existing working plans if necessary. To ensure this, the concerned DFO and CF should dovetail the requirements of micro plans with the working plans.
- iii) The micro plan should also take into consideration and provide suitable advice for areas planted / to be planted on community lands outside the notified forest areas including in the district council areas of North East.
- iv) Infrastructure / Ecodevelopment under micro plan should form a separate entity for funding it through concerned development agencies.

#### **E) Conflict resolution**

In order to resolve conflicts in the functioning of JFM committees and to maintain harmony among different groups participating in the JFM, State Governments may constitute divisional and state level representatives forums or working groups. This forum / group should include representatives from all the stakeholders including NGOs. The model prescribed by the Andhra Pradesh Government for this purpose is a case in point for consideration.

#### **F) Recognition of Self-initiated groups :**

The community groups in many places in Orissa, Bihar, Gujrat, Andhra Pradesh and Karnataka are performing the essential functions of forest protection and regeneration. These groups need to be identified, recognised and registered as JFM committees after proper verification of records and enquiry. The period of their existence and duties performed for protection and regeneration should be suitably assessed and proper weightage given to them for deriving benefits under the JFM programme.

#### **G) Contribution for regeneration of Resources .**



For long term sustainability of resources, it is essential that a mechanism is created for ploughing back certain percentage of the revenue earned from final harvest. For this purpose, no less than 25% of the share of village community should be deposited in the village development fund for meeting conservation and development needs of the forests. A matching contribution may be made by the forest department for its share of such sales. There should be transparent mechanisms for computation of income for sharing the benefits between different stakeholders.

#### **H) Monitoring and Evaluation**

Concurrent monitoring of progress and performance of this programme should be undertaken at Division and State level. Evaluation of the programme should be planned at an interval of 3 years and 5 years at Division and State level respectively.

## **A P P E N D I X - I I I**

### **Resolutions of West Bengal Government on Joint Forest Management**

*Resolution No. 4461- For/ D/ Is/ 16/ 88 (covering South West Bengal) of 12.7.89*

Whereas the Forest Department has taken up a massive programme for “ Resuscitation of Sal Forest of South-West Bengal ” with the objective to re-establish moribund land other hardwood forests in the districts of Midnapore, Bankura, Purulia, Burdwan and Birbhum for converting the areas into productive forests :

Whereas active participation and involvement of local people are vital for regeneration, maintenance and protection of aforesaid forest/ plantations and successful implementation of the programme.

Now, therefore, the Governor is pleased to decide that Forest Protection Committees shall be constituted for this purpose and beneficiaries acting as members of such committees shall be allowed, as a measure of incentive , 25 per cent of the usufructs subject to observance of the conditions provided in the Resolution.

The composition, duties and functions, the usufructuary benefits and restrictive measure pertaining to such protection committees shall be as follows :

#### **Composition**

- 1.i) The Divisional Forest Officer in consultation with “ Bon-O-Bhumi Sanskar Sthayee Samiti ” of the concerned Panchayat Samiti shall select beneficiaries for construction of Forest Protection Committee(s), within their jurisdictions, and within the framework of this Resolution:
- ii) The beneficiaries shall be identified from amongst the economically backward people living in the vicinity of forests concerned;
- iii) The concerned Gram Panchayat(s) shall extend necessary support and help to such committees (s) to ensure their smooth and proper functioning;
- iv) Each Forest Protection Committee shall have an Executive Committee to carry out the various activities assigned to the Committee;
- v) The composition of the Executive Committee shall be as follows :

- a) Sabhapati or any member of the Bon-O-Bhumi Sanskar Sthayee Samiti of the local Panchayat Samiti. -- Member
- b) Gram Pradhan or any member of local Gram Panchayat(s) -- Member
- c) Elected representatives of the beneficiaries (not exceeding 6) -- Member
- d) Concerned Beat Officer -- Member-Secretary

The Members of the Executive Committee shall elect the president in each meeting.

- vi) Constitution of the Forest Protection Committee including Executive Committee will be approved by the Divisional Forest Officer concerned on recommendation of the "Bon-O-Bhumi Sanskar Sthayee Samiti " to the concerned Panchayat Samiti;
- vii) The "Bon-O-Bhumi Sanskar Sthayee Samiti " of the respective Zilla Parishad will monitor, supervise and review functions of the Forest Protection Committee;
- viii) If any inclusion or change in the Committee /Executive Committee is necessitated after constitution, the Executive Committee shall make suitable recommendation to the Divisional Forest Officer concerned, duly endorsed by the "Bon-O-Bhumi Sanskar Sthayee Samiti " of local Panchayat Samiti, for approval;
- ix) The Beat Officer, as Member-Secretary shall convene the meetings of the Executive Committee as well as Forest Protection Committee, as per scheduled procedure;
- x) The representatives of the beneficiaries to the Executive Committee shall be elected in each year in annual general meeting of the Committee, where the concerned Range Officer shall be the observer.

### **Duties**

- 2. i) The Forest Protection Committee shall maintain a register showing necessary particulars of beneficiaries as well as members of the Committee, e.g. name, father's name, address, age, number of family members, name of nominee, etc. The nomination forms duly filled in and approved by the Executive Committee should be pasted in the register. Such registers are also to be maintained in the concerned Range Offices of the Forest Department for permanent record;
- ii) The Forest Protection Committee shall maintain a minutes book wherein proceedings of the meetings of the executive Committee held from time to time as well as the proceedings of the annual general meeting of the Forest Protection Committee will be recorded under the signature of the president of

- the Committee and such minutes duly attested shall be sent to the concerned Range Officer for record;
- iii) The Forest Protection Committee shall hold an annual general meeting once every year where activities of the Committee as well as details of distribution of usufructuary benefits are to be discussed, besides electing representatives of the beneficiaries to the Executive Committee.

### **Functions**

3. a) i) To ensure protection of forest(s)/ plantation(s) through members of the Committee;
- ii) To protect the said forest(s) / plantation(s) with the members of the Committee;
- iii) To inform forest personal of any person or persons attempting trespass and willfully or maliciously damaging the said forest(s)/ plantation(s) or commit theft thereon;
- iv) To prevent such trespass, encroachment, grazing, fire, theft or damage.
- v) To apprehend or assist the forest personnel in apprehension of such person or persons committing any of the offences mentioned above.'
- vi) To ensure smooth and timely execution of all forestry works taken up in the area under protection by the Committee;
- vii) To involve every member of the Committee in the matter of protection of forest(s)/ plantation(s) as well as other duties assigned to the Committee;
- viii) To assist the concerned forest official in the matter of selecting / engaging of labourers required for forestry works;
- C) i) To ensure smooth harvesting of the forest produce by the Forest Department;
- ii) To assists the concerned Forest Official in proper distribution of the earmarked portion (i.e. 25% of net sale proceeds ) among the members of the Committee (as per list maintained by " Sthayee Samiti ");
- iii) To ensure that usufructuary rights allowed by the government is not in anyway misused by any of the members and forest / plantation sites are kept free from any encroachment whatsoever;

- D) i) To prevent any activities in contravention of the provisions of Indian Forest Act of 1927 and any Acts and Rules made thereunder;
- ii) To report about activities of a particular member which are found prejudicial and detrimental to the interest of particular plantation and/ or forest to the concerned Beat Officer/ Range Officer, which may result in cancellation of membership of the erring member;
- iii) To assist the Forest Officials to take action or proceed under Indian Forest Act of 1927 and any Acts and Rules made thereunder, against the offenders, including any erring member of the Committee found to be violating the Act or damaging the forest / plantation.

### **Usufructuary Benefits**

4. i) The members will have to protect the forest/ plantation for at least 5 years to be eligible for sharing of usufructs under this programme;
- ii) The Forest Official in consultation with the Executive Committee and with the approval of the "Bon-O-Bhumi Sanskar Sthayee Samiti" of the concerned Panchayat Samiti will distribute to the eligible members his proportionate share of usufructs from the harvesting, not before 10 years, upon satisfactory performance of functions detailed herein before;
- iii) The members shall be entitled to collect following items free of royalty without causing any damage to forests/ plantations;
- a) fallen twigs, grass, fruits, flowers, seeds (excluding cashew), etc.
- b) one-fourth of the produce obtained as intermediate yield from R.D.F. coppicing, multiple shoot cutting, thinning etc. and also 25 percent of the net sale proceeds of cashew where available to be shared proportionately;
- This will not in any manner, extinguish the rights and privileges already granted to the members of the scheduled tribes by the State Government in their order no. 2001-For.dated 20.4.81 and/ or may be granted in future.
- iv) Entire sal seeds and kendu leaves so collected shall have to be deposited with the West Bengal Tribal Development Co-operative Corporation Ltd. through the local LAMPS and LAMPS will pay the members, in approved tariff, against their individual collection;
- v) The concerned Forest Official shall set apart 25 percent of the net sale proceeds at every final harvesting of the concerned plantation/ forest (i.e. timber, pole, etc.) and shall pay to all eligible members or his

nominee their proportionate share out of the said earmarked funds as per para 4(ii) of the resolution.

### **Termination of Membership, Dissolution of Committee, Appeal etc.**

5. i) Failure to comply with any of the conditions laid down hereinbefore as well as contravention of provisions of the Indian Forest Act of 1927, or Acts and/ or Rules made thereunder, may entail cancellation of individual membership and/ or dissolution of the Executive / Forest Protection Committee, as the case may be, by the Officers of the Forest Department as stated below :
- ii) The concerned Divisional Forest Officer, shall be entitled to take appropriate action, even dissolution of any Executive /Forest Protection Committee, on the grounds stated above, on the recommendation of the 'Bon-O-Bhumi Sanskar Sthayee Samiti' of the concerned Panchayat Samiti;
- iii) The concerned Range Officer may be authorised by the Divisional Forest Officer to take proper action, even termination of an individual membership , on the above mentioned grounds, on the recommendation of the Executive Committee of Forest Protection Committee;
- iv) Appeal against any such penal action by the Range Officer may be referred to the concerned Divisional Forest Officer through local Panchayat Samiti;
- v) Appeal against any such penal by Divisional Forest Officer may be referred to the concerned Circle Conservator of Forests, through the concerned Panchayat Samiti and the Zilla Parishad, whose decision shall be final.

*The State Government modified its July 1989 orders with a new Resolution (No. 5062-For/D/IS-16/88 ) dated 27th July, 1990. It is as follows :*

In partial modification of this Department's Resolution No. 4461-For.D/IS-16/88 dated the 12th July 1989, the Governor has been pleased to direct that the composition, duties and functions, the usufructuary benefits and restrictive measure pertaining to Forest Protection Committees shall be as follows :

### **Composition**

1. i) The Divisional Forest Officer in consultation with "Bon-O-Bhumi Sanskar Sthayee Samiti " of the concerned Panchayat Samiti shall select beneficiaries for constitution of the Forest Protection

Committee(s), within their jurisdictions, and within the framework of this Resolution.

- ii) The beneficiaries ordinarily shall be economically backward people living in the vicinity of the forests concerned. Every family living in the vicinity of the forests shall, however, have the option of becoming member of the Forest Protection Committee, if such family including the female members is interested in the work of protection;
- iii) The concerned Gram Panchayat(s) shall extend necessary support and help to such Committee(s) to ensure their smooth and proper functioning;
- iv) Each Forest Protection Committees shall have an Executive Committee to carry out the various activities assigned to the Committee;
- v) The composition of the Executive Committee shall be as follows :
  - a) Sabhapati or any member of the Bon-O-Bhumi Sanskar Sthayee Samiti of the local Panchayat Samiti as may be nominated by the Sabhapati. -- Member
  - b) Gram Pradhan or any member of Local Gram Panchayat(s), as may be nominated by the Pradhan(s). -- Member
  - c) Elected representatives of the beneficiaries(not exceeding 6); -- Member
  - d) Concerned Beat Officer. – Member Secretary

The members of the Executive Committee shall elect the president in each meeting.

- vi) Constitution of the Forest Protection Committee including Executive Committee will be approved by the Divisional Forest Officer concerned on recommendation of the “Bon-O-Bhumi Sanskar Sthayee Samiti ” of the concerned Panchayat Samiti;
- vii) “Bon-O-Bhumi Sanskar Sthayee Samiti ” of the respective Zilla Parishad will monitor, supervise and review functions of the Forest Protection Committee;
- viii) If any inclusion or change in the Committee / Executive Committee is necessitated, after initial constitution, the Executive Committee shall make suitable recommendation to the Divisional Forest Officer concerned, duly endorsed by the “Bon-O-Bhumi Sanskar Sthayee Samiti ” of the local Panchayat Samiti, for approval;

- ix) The Beat Officer, as Member-Secretary shall convene the meetings of the Executive Committee as well as Forest Protection Committee, as per scheduled Procedure;
- x) The representatives of the beneficiaries to the Executive Committee shall be elected each year in Annual General Meeting of the Committee, where the concerned Range Officer shall be the observer.

### **Duties**

- 2. i) The Forest Protection Committee shall maintain a register showing necessary particulars of beneficiaries who are Members of the Committee, e.g. name, father's name, address, age, number of family members, name of nominee, etc. The nomination forms duly filled in and approved by the Executive Committee should be pasted in the register. Such registers are also to be maintained in the concerned Range Offices of the Forest Department for permanent record;
- ii) The forest Protection Committee shall maintain a minutes book wherein proceedings of the meetings of the Executive Committee held from time to time as well as the proceedings of the Annual General Meeting of the Forest Protection Committee will be recorded under the signature of the President of the Committee and such minutes duly attested shall be sent to the concerned Range Officer for record.
- iii) The Forest Protection Committee shall hold a general body meeting once every year where activities of the Committee as well as details of distribution of usufructuary benefits are to be discussed, besides electing representatives of the beneficiaries to the Executive Committee.

### **Functions**

- 3. a) i) To ensure protection of forests(s)/ plantation(s)/wildlife through members of the Committee.
- ii) To protect the said forests(s)/ plantation(s)/ wildlife with members of the Committee;
- iii) To inform forest personnel of any person or persons attempting trespass and wilfully or maliciously damaging the said forest(s)/plantation(s)/ wildlife or committing theft thereon;
- iv) To prevent such trespass, encroachment, grazing, fire, poaching,. theft or damage;



- v) To apprehend or assist the forest personnel in apprehension of such person or persons committing any of the offences mentioned above.
- b) taken
    - i) To ensure smooth and timely execution of all forestry works up in the area under protection by the Committee;
    - ii) To involve every member of the Committee in the matter of protection of forests(s)/ plantation(s)/wildlife as well as other duties assigned to the Committee;
    - iii) To assist the concerned forest officials in the matter of selecting/ engaging of labourers required for forestry works.
- c) Forest
    - i) To ensure smooth harvesting of the forest produce by the Department ;W.B. Forest Development Corporation;
    - ii) To assist the concerned forest officials in proper distribution of the earmarked portion( of the net sale proceeds) among the members of the Committee.
    - iii) To ensure that usufructuary rights allowed by the Government is not in any way misused any of the members and forest/ plantation sites are kept free from any encroachment whatsoever.
- d)
    - i) To prevent any activities in contravention of the provision of Indian Forest Act of 1927 and any Acts and Rules made thereunder and the Wildlife ( Protection) Act, 1972 as amended from time to time;
    - ii) To report about activities of a particular member which are found prejudicial and detrimental to the interest of particular plantation and/ or forest/ wildlife to the concerned Beat Officer/ Deputy Range Manager/ Range Officer/ Range Manager, which may result in cancellation of membership of the erring member;
    - iii) To assist the Forest Officials to take action or proceed under Indian Forest Act of 1927 and the Wild Life (Protection) Act, 1972 and any Acts and Rules made thereunder, against the offenders, including any erring member of the Committee found to be violating the Act or damaging the forest/plantation/wildlife.

#### **Usufructuary Benefits**

- 4. i) The members will have to protect the forests plantation/wildlife

for at least 5 years to be eligible for sharing of usufructs under this programme;

- ii) The members shall be entitled to collect following items free of royalty without causing any damage to forests/ plantations :
  - a) Fallen twigs, grass, fruits , flowers, mushroom seeds, leaves and intercrops raised by FPCs, subject to any restrictions imposed from time to time provided however such collection will not be allowed in National Park, core area of Tiger reserve and sanctum sanctorum of sanctuary.
  - b) Medicinal plants in North Bengal will be permitted to be collected by the FPC members free on the basis of approved micro-plans, except in National Park , core area of Tiger reserve and sanctum sanctorum of sanctuary.
  - c) Members of the FPC will receive a 25 percent of net sale proceeds of firewood and poles which are harvested during thinning and cultural operations. The poles for the purpose of this order will be upto 90 cm. bhg for all species except teak. For teak the upper limit of bhg is 60 cm.
  - d) Timber would not be subject to revenue sharing. However, lops and tops derived out of clear felling as per approved working plan which comes under a category of firewood would be shared on 25 per cent net sale proceeds basis.
- iii) Entire sal seeds so collected shall have to be deposited with the West Bengal Tribal development Co-operative Corporation Ltd. through the local LAMPS (where LAMPS are functioning) and LAMPS will pay the members, in approved tariff, against their individual collection;
- iv) The concerned Forest Official will distribute to the eligible members their proportionate share of the usufructs from the harvesting after satisfactory performance of functions detailed as hereinbefore.

#### **Termination of Membership, Dissolution of Committee, Appeal etc.**

- 5. i) Failure to comply with any of the conditions laid down hereinbefore as well as contravention of provisions of the Indian Forest Act of 1927, and Wildlife (Protection) Act or Acts and/ or Rules made thereunder, may entail cancellation of individual membership and/ or dissolution of the Executive /Forest Protection Committee, as the case may be, by

the officers of the Forest Department/ West Bengal Forest development Corporation as stated in clauses (ii) & (iii) below;

- ii) The concerned DFO or Divisional Manger; W.B. Forest Development Corporation Ltd. shall be entitled to take appropriate action, even dissolution of any Executive /Forest Protection Committee, on the grounds stated above, on the recommendation of the Range Officer/ Range Manager concerned;
- iii) The concerned Range Officer/ Range Manager maybe authorised by the Divisional Forest Officer/ Divisional Manager to take proper action, even termination of an individual membership, on the above mentioned grounds, on the recommendation of the Executive Committee of Forest Protection Committee.
- iv) Appeal against any such penal action by the Range Officer/ Range Manager may be referred to the concerned DFO/ Divisional Manager, W.B. Forest Development Corporation Ltd.
- v) Appeal against any such penal action by the DFO/ Divisional Manager, W.B. Forest Development Corporation Ltd. may be referred to the concerned Circle Conservator of Forests/ General Manager, W.B., Forest Development Corporation Ltd. through the concerned Councillor of the Darjeeling Gorkha Hill Council and the decision of Conservator of Forests/ General Manager, W.B., Forest Development Corporation Ltd. shall be final.

#### **Resolution No. 8556-For.of 15.11.1991 covering the Sunderbans**

Whereas the Forest Department has taken up a massive programme for resuscitation of the degraded forests of the State as a whole for converting the areas into productive forests;

And whereas active participation and involvement of local people are vital for regeneration, maintenance and protection of aforesaid forests/ plantations and successful implementation of the programme;

And whereas necessary resolution in this connection has already been passed covering the districts in South-West Bengal;

Now, therefore, the Governor is pleased to decide that Forest Protection Committees shall be constituted for the purpose of *development of degraded forests in the Sunderbans* and beneficiaries acting as members of such committee shall be allowed, as a measure of incentive a share of the usufructs subject to observance of the conditions provided in the Resolution.

The composition, duties and functions, the usufructuary benefits and restrictive measure pertaining to such protection committees shall be as follows :

### Composition

1. i) The Divisional Forest Officer in consultation with “Bon-O-Bhumi Sanskar Sthayee Samiti ” of the concerned panchayat samiti shall select beneficiaries for constitution of the Forest Protection Committee within their jurisdictions, and within the framework of this Resoltuion;
- ii) The beneficiaries ordinarily shall be economically backward people living in the vicinity of the forests concerned. Every family living in the vicinity of the forests shall , however, have the option of becoming a member of the Forest Protection Committee, if such family including the female members is interested in the work of protection;
- iii) There shall be normally a joint membership for each household (husband becoming a member, wife automatically becoming a member). Either of the two can exercise rights to represent the household;
- iv) The concerned gram panchayat(s) shall extend necessary support and help to such Committee(s) to ensure their smooth and proper functioning;
- v) Each Forest Protection Committee shall have an Executive Committee to carry out the various activities assigned to the Committee;
- vi) The composition of the Executive Committee shall be as follows :
  - a) Sabhapati or any member of the Bon-O-Bhumi Sanskar Sthayee Samitit of the local Panchayat Samitit as may be nominated by the Sabhapati.  
--- Member
  - b) Gram Pradhan or any member of Local Gram Panchayat(s),  
as  
may be nominated bythe Pradhan(s). ---  
Member
  - c) Elected representatives of the beneficiaries  
(not exceeding 6) ---  
Member

d) Concerned Beat Officer  
Member

---

The members of the Executive Committees shall elect the President in each meeting.

- vii) Constitution of the Forest Protection Committee including Executive Committee will be approved by the Divisional Forest Officer concerned on recommendation of the “ Bon-O-Bhumi Sanskar Sthayee Samiti ” of the concerned panchayat samiti;
- viii) The “ Bon-O-Bhumi Sanskar Sthayee Samiti” of the respective Zilla Parishad will monitor, supervise and review functions of the Forest Protection Committee;
- ix) If any inclusion of change in the Committee/Executive Committee is necessitated , after initial constitution, the Executive Committee shall make suitable recommendation to the Divisional Forest Officer concerned, duly endorsed by the “ Bon-O-Bhumi Sanskar Sthayee Samiti”of local Panchayat Samiti, for approval;
- x) The Beat Officer, as Member-Secretary shall convene the meetings of the Executive Committee as well as Forest Protection Committee, as per agreed procedure;
- xi) The representatives of the beneficiaries to the Executive Committee shall be elected each year in annual general meeting of the Committee, where the concerned range Officer shall be the observer;
- xii) The duties, functions and usufruct sharing under this Government order will be subject to restriction that may be imposed from time to time on account of silvicultural and management requirements and from wildlife point of view.

**Duties**

- 2. i) The Forest Protection Committee shall maintain a register showing necessary particulars of beneficiaries as well as members of the committee, e.g. name, father’s name, address, age, number of family members, name of nominee, etc. The nomination forms duly filled in and approved by the Executive Committee should be pasted in the register. Such registers are also to be maintained in the concerned Range Offices of the Forest Department for permanent record;
- ii) The Forest Protection Committee shall maintain a minutes book wherein proceedings of the meetings of the Executive Committee held

from time to time as well as the proceedings of the annual general meeting of the Forest Protection Committee will be recorded under the signature of the president of the committee and such minutes duly attested by the member secretary shall be sent to the concerned range Officer for record;

- iii) The Forest Protection Committee shall hold an annual general meeting once every year where activities of the Committee as well as details of distribution of usufructuary benefits are to be discussed besides electing representatives of the beneficiaries to the Executive Committee.

### **Functions**

- 3. a)
  - i) To ensure protection of forest(s)/ Wildlife through members of the Committee.
  - ii) To protect the said forest(s) plantation(s) with the members of the Committee.
  - iii) To inform forest personnel of any person or persons attempting trespass and wilfully or maliciously damaging the said forest(s)/ plantation(s) /Wildlife of committing theft thereon.
  - iv) To prevent such trespass ,encroachment , grazing ,fire, poaching , theft or damage.
  - v) To apprehend or assist the forest personnel in apprehension of such person or persons committing any of the offences mentioned above.
- b)
  - i) To ensure smooth and timely execution of all forestry works taken up in the area under protection by the Committee.
  - ii) To involve every member of the Committee in the matter of protection of forest(s) /plantation(s)/Wildlife as well as other duties assigned to the committee.
  - iii) To assist the concerned forest official in the matter of selecting / engaging of labourers required for forestry works.
- c)
  - i) To ensure smooth harvesting of the forest produce by the Forest Department.
  - ii) To assist the concerned forest official in proper distribution of the earmarked portion of the net proceeds among the members of the Committee (as per list maintained by "Sthayee Samiti ").

- iii) To ensure that usufructuary rights allowed by the government is not in any way misused by any of the members and forest/ plantation sites are kept free from any encroachment whatsoever.
- d) i) To prevent any activities in contravention of the provisions of Indian Forest Act of 1927 and any Acts and Rules made thereunder and the Wildlife (protection) Act, 1972 as amended from time to time.
- ii) To report about activities of any member which are found prejudicial and detrimental to the interest of particular plantation and/or forest/ Wildlife to the concerned Beat Officer/ Range Officer, which may result in cancellation of membership of the erring member.
- iii) To assist the Forest Officials to take action or proceed under Indian Forest Act of 1927 and the Wildlife ( Protection) Act, 1972 and any Acts and Rules made thereunder , against the offenders, including any erring member of the Committee found to be violating the Act or damaging the forest/ plantation.

#### **Usufructuary Benefits**

- 4. i) The member will have to protect the forest/ plantation for at least 5 years to be eligible for sharing of usufructs under this programme.
- ii) The forest official in consultation with the Executive committee and with the approval of the " Bon-O-Bhumi Sanskar Sthayee Samiti " of the concerned panchayat samiti will distribute to such eligible member his proportionate share of usufructs from the final harvesting as may be done as per orders of Govt. in force from time to time , not before the crop attaining the age of 15 years, upon satisfactory performance of functions detailed herein before.
- iii) The members shall be entitled to collect following items free of royalty without causing any damage to forests/ plantations:-
  - a) Fallen twigs, grass, fruits, flowers, seeds (excluding cashew) etc. and leaves;
  - b) One-fourth of the produce obtained as intermediate yield from R.D.F. coppicing, multiple shoot cutting, thinning etc. to be shared proportionately.

This will not in any manner, extinguish the right and privileges already granted to the members of the Scheduled Tribes by the State Government in their order no. /2001-For of 20.4.81 and /or may be granted in future.
- iv) Entire collection of honey and bee-wax from forest plantation shall have to be deposited with the Forest Department through the local

Range Officer or his authorised representative who will pay the members, in approved tariff, against their individual collection.

- v) The concerned Forest Official shall set apart 25 per cent of the net sale proceeds at every final harvesting of the concerned plantations/forests (i.e. timber, pole, etc.) as will be done as per orders of Govt. in force from time to time and shall pay to all eligible members or his nominee their proportionate share out of the said earmarked funds, as per para 4(ii) of the resolution.

**Termination of Membership, Dissolution of Committee, Appeal etc.**

- 5. i) Failure to comply with any of the conditions laid down herein before as well as contravention of provisions of the Indian Forest Act of 1927, Wildlife Protection Act or Acts and/ or rules made thereunder, may entail cancellation of individual membership and/or dissolution of the Executive/ Forest Protection Committee, as the case may be, by the Officers of the Forest Department as stated below- vide Clause (ii) and (iii) below.
- ii) The concerned Divisional forest Officer, shall be entitled to take appropriate action, even dissolution of any Executive /Forest Protection Committee, on the grounds stated above, on the recommendation of the “ Bon-O-Bhumi Sanskar Sthayee Samiti ” of the concerned panchayat samiti.
- iii) The Range Officer concerned may be authorised by the Divisional Forest Officer to take proper action over termination of an individual membership, on the above mentioned grounds, on the recommendation of the Executive Committee of Forest Protection Committee.
- iv) Appeal against any such penal action by the Range Officer may be preferred to the concerned Divisional Forest Officer through local panchayat samiti.
- v) Appeal against any such penal action by the Divisional Forest Officer may be preferred to the concerned Circle conservator of Forests, through the concerned panchayat samiti and the Zilla Parishad, whose decision shall be final.



**APPENDIX – IV**

**SURVEY SHEET - I**

**Ecological Measurement**

**Range:**

**Beat:**

**FPC:**

**Patch:**

<u>Species Diversity Chart</u>			
Sl. No.	Species Name	GBH	Number

**APPENDIX – V**  
**SURVEY SHEET II (Household)**

**Range :**

**Beat :**

**FPC:**

1. Name of the head of the household:

2. Family profile:

Member	Relation with Head	Sex	Age	Education

Father-F; Mother-M; Daughter-D; Son-S; Wife-W; Husband-H; Brother-B; Sister-C

3. Income from Agriculture

Total Land Area	Fellow Land	Crop Type	Area under each crop	Productivity	Price/Unit	Income

4. No. of Livestock holding:

- a) Cattle:
- b) Buffalo:
- c) Goat:
- d) Sheep:
- e) Pig:

5. Income from other sources

<u>Other Sources of income</u>	<u>Season</u>	<u>Wage / Salary / Income</u>
<u>Farming (excluding Agriculture)</u>		
<u>Wage/ Service</u>		
<u>Forest</u>		
<u>Crafts</u>		

#### 6. NTFP Collection Profile

SI No	Species	Parts	End Use	Collection Frequency	Season	Qty./ effort	Local Market Price

*Legend of Parts Used:*

Leaf – L; Flower – B; Seed – S; Root – R; Tuber – T; Bark – K; Bulb – U; Brashwood – W; Stem – M;

*Legend of the end use:*

Fuel – f; Food – o; Fodder – d; Medicinal – m; Ritual – r; Ornamental – n; Construction – c; Implements – i; Household Articles – h. Collection Frequency

#### 7. Collection of Medicinal / Ritual / Ornamental Items

Item	Purpose	Amount/day	No of days/yr.	Substitute Item	Equivalent Quantity		Market Price	
					Original	Substitute	Original	Substitute

8. Contingent Valuation:  
Willingness to pay for existence of forest:

9. Remarks of Investigator:

## APPENDIX - VI

### SURVEY SHEET - III (FPC)

#### A. Institutional Profile

1. a) Name of the F.P.C: \_\_\_\_\_ b) Name of village: \_\_\_\_\_

2. No. of Households: \_\_\_\_\_

3. History of F.P.C:

- Year of actual formation:
- Year of registration:
- Year of fusion/ fission/ dissolution:

4. History of forest management (prior to JFM/ post JFM):

- Motivation source:
- Grounds of motivation:

5. Perceived benefits from JFM:

6. Number of members:

	Male	Female
Executive		
General body		

7. Composition of EC (If possible, since start):

Name	Caste	Age	Education	Membership duration	Profession	Household income	Political affiliation	Remarks

8. (a) Do they maintain FPC register (Y/N):

(b) Year they obtained the register:

(c) Is there an elections/ nomination for FPC executive every year (Y/N):

(d) If Y, then is executive formed by (1) popular vote (2) Secret vote

9. (a) No. of meetings in which Beat Officer is present:

- (b) Whether FPC representatives present during auction of timber (Y/N):
- (c) Are they aware of current sales proceeds regulations (Y/N):
- (d) Any provisions given by FD for guarding (Y/N):
- (e) Is there any illegal dealing between the FD and local timber merchants (Y/N):

**B. Profile of FPC Meetings and Conflict Resolution**

1. Issues discussed in Meetings (If possible, rank them):

2. Investigate if these issues are problems/ conflicts of any kind – whether solution to the problem available? What solution?

Problem	Solution

3. Frequency of FPC meetings / year:

- Executive:
- General body:

4. Attendance in GB meeting:

Male:                                      Female:

5. Extent of Participation in meeting:

	Participation in Meeting		
Attendance	Gen	SC	ST
Male			
Female			

6. Specify if any particular section is alienated / not co-operating (location, Caste, Women, others and also specify nature of their involvement in JFM):

### 7. Conflicts and resolution mechanism

	Intra FPC	Inter FPC	FD – FPC	Panch – FPC	Panch – FD	Pan-FD-FPC
Type of problem						
No. of meeting						
Duration of problem						
Method of resolution (N/A)						
Was it effective (Y/N)						

Negotiation: N; Arbitration: A

Remarks on type of problem:

8. Degree of satisfaction regarding the functioning of the FPC (scale of 1 – 5):

9. Mutual trust between FD and FPC (scale of 1 to 5):

10. Money received by each household from last felling, if any:

11. Changes in JFM thought necessary:

### C. Forest Condition

1. History of Forest condition when JFM started:

2. Changes in Forest cover:

3. Changes in NTFP availability:

**D. Guarding Details**

- 1. History of Guarding (Y/N):
- 2. Years of guarding (since when):
- 3. Did it ever stop? (In which period and reasons)

- 4. Participation in Guarding:
  - (i) all FPC members: only, (who):
  - (ii) Some members

- 5. Procedure of Guarding:
  - (i) No. of People /day:
  - (ii) Hours covered: Day: Night:
  - (iii) Participants/day: male: female:
  - (iv) No. of days/year:
  - (v) Any other (specify):

- 6. How is the guarding procedure decided?
  - (i) Formal meeting:
  - (ii) Informally among a few FPC members:
  - (iii) FD instructed:
  - (iv) Any other (Specify):

- 7. Do they maintain register/ duty roster for guarding? (Y/N):
- 8. Any penalty imposed against those who fail in duty:
- 9. Any equipment used for guarding? If yes, who provides?

10. Problems in guarding:

Sl. No.	Problems faced in guarding	Duration



**E. Women's Participation (ask women)**

1. Any involvement in guarding? What type (including passive guarding)?
2. Joint membership – are they aware? (If yes, specify percentage):
3. Do they know about payment from MS cutting / felling by FD to the members of FPC?
4. Hindrances to participate in meeting:

**F. Utilization of Money earned by FPC from felling**

1. How is the Money used?
2. Whether it is used to built Community Assets?
3. Whether everybody is satisfied in the way money was used?
4. Any other way that FPC earns money (If yes, specify amount):

**A P P E N D I X - V I I**  
**SURVEY SHEET - IV ( Forest Department)**

**Range:** \_\_\_\_\_ **Beat:** \_\_\_\_\_ **FPC:** \_\_\_\_\_

1. Frequency and reason of meetings with FPC:
2. No. of meetings in presence of :  
 a) Range office: \_\_\_\_\_ b) Beat Office: \_\_\_\_\_

3. Nature of conflicts:

	Intra FPC	Inter FPC	FD-FPC	Panchyat-FD
Nature of Conflict				
Duration of Conflict				
Method of Resolution				
Was it Effective (Y/N)				

Methods of conflict resolution - Negotiation: N; Arbitration; A; Legal proceedings: L

4. Whether guarding is effective by FPC (y/n)--
5. Intensity of illegal felling: non-existent / occasional / frequent
6. Source of illegal felling:
8. Action against illegal felling:  
 \* Penalty: \_\_\_\_\_ amount:  
 \* Other measures:
9. Future course of JFM:
10. Remarks of investigator:

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