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Summaries of Survey Responses of Household Heads in Three Forest Villages in the Midnapore District of West Bengal, India: Use of Forest Resources by Villagers, Forest Sustainability and Managment

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Clem Tisdell, Kartik Roy and Ananda Ghose[†]

[*] We wish to thank Susantu Roy for conducting the surveys using the questionnaire drawn up by the senior authors who also conducted informal interviews with the village heads. This research has been supported by a small ARC Grant and we are grateful for this support. Note that this is purely a working document.

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1. OVERVIEW AND BACKGROUND

In 2000, household heads of three villages located in or near forests in the south of West Bengal, India, were interviewed using a structured questionnaire[1]. The questionnaire is attached as an Appendix to this paper. The questions asked were designed to provide information about the extent of the dependence of households on state forests for their livelihood (cash income and subsistence needs), any differences in the degree of their forest dependence according to gender, threats to the sustainability of forest resources, the expected sustainability of the income of villagers from forest resources, as well as to provide data about forest management practices, such as a joint forest management. The latter involves cooperation between villagers and the West Bengal Forest Department. The villagers undertake to protect trees in their nearby state forest from pilfering in return for a quarter of the net income from sales of commercial timber by the Forest Department.

An overview and assessment and general results of the surveys can be found in Clem Tisdell, Kartik Roy and Ananda Ghose, "Villagers and the Use of Conservation of Indian Forests: The Role of Joint Forest Management", *Social Economics, Policy and Development*, Working Paper No.17, June 2001. The purpose of this present paper is to provide more detailed data summaries. The data are provided firstly for the three villages combined then for each individual village (Atabanda, Barabugpichla and Chandmura). All the villagers surveyed belonged to the Santal scheduled tribe.

These three villages are located in the north Midnapore region north of Salbani, with Chandrakona Road being the nearest township. The general location of the survey area is indicated in Figure 1.1. The total sample consisted of 96 household heads, representing virtually all families in the villages of Atabanda (32 household heads). Barabugpichla (29) and Chandmura (35). The particular location of these villages is shown in Figure 1.2. Of these villages, Chandmura was most closely associated with the Arabari forest that, as mentioned earlier, was the scene of the earliest experiments with joint forest management in India.

[1] Formal interviews based on the questionnaire conducted in 2000 were followed up by informal discussions with village heads by Tisdell and Roy e.g. in January 2001, to answer queries arising from the survey and obtain additional information.

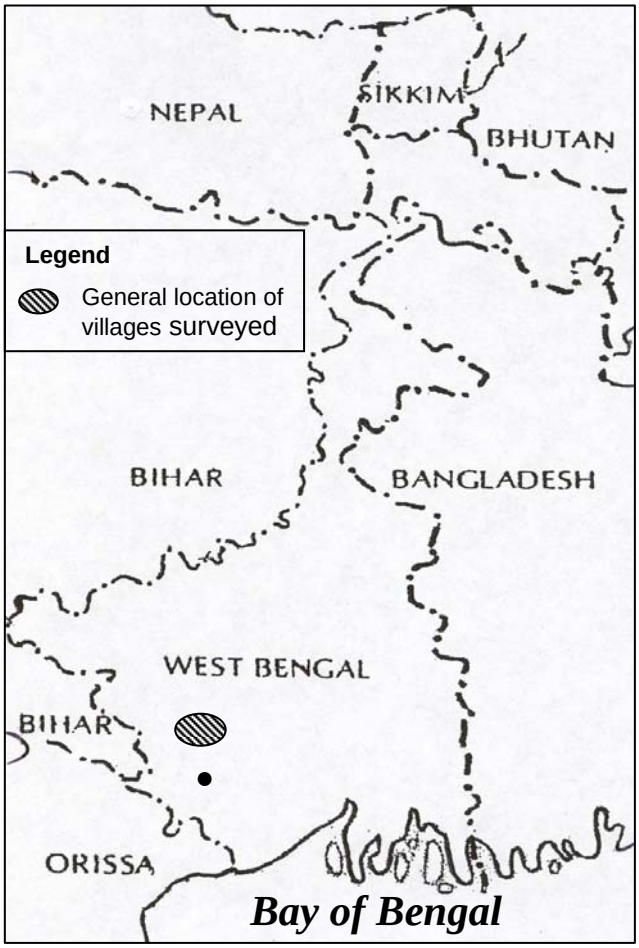


Figure 1.1 General location map for forest villages surveyed in West Bengal

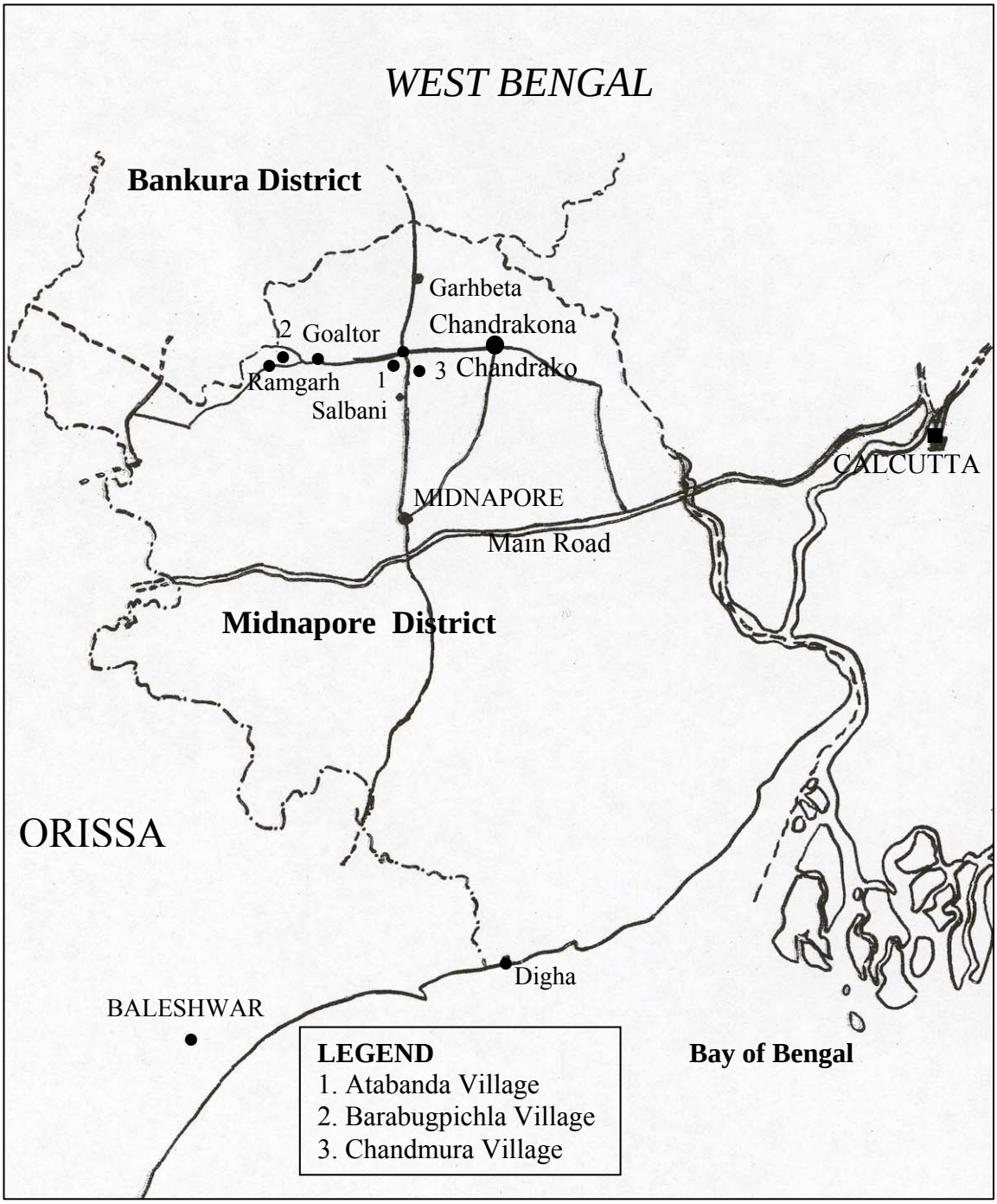


Figure 1.2 Specific locations of the forest villages (Atabanda, Barabugpichla and Chandmura) surveyed.

The socio-economic conditions of these villages were rather similar. All villagers were Santals following the Sari religion and showed a high degree of economic dependence on nearby forests. Most of the villagers perceived that they belonged to the lowest economic group in relation to their community reference group. Table 3 summarises the sample and socio-economic characteristics for the villages surveyed.

Table 1.1 Sample and Socio-economic Characteristics for the Atabanda, Barabugpichla and Chandmura Villages

Parameters	**Atabanda**	**Barabugpichla**	**Chandmura**
Name of the forest(s) used	Ghargra, Arabari	Barabugpichla, Moldangal, Birapatra, Bankumar	Maheshdubai Backamati
Beat and Range	Arabari	Kiyamacha, Nayabasat	Arabari
Tribe (Santal)	Scheduled Tribe	Scheduled Tribe	Scheduled Tribe
Religion	Sari	Sari	Sari
No of sample	32	29	35
Average family size	5.5	4.48	4.4
Average number of children	1.6	1.5	1.7
Families with dependent adults	13 (1each)	7 (1 each)	7 (1 each), 1 (2 dependent adults)
Dependency ratio*	0.86	0.73	0.80
Upper economic status (perceived)	5	3	2
Middle economic status (perceived)	1	12	2
Lower economic status (perceived)	26	14	31

*Dependents in relation to non-dependents.

This report summarises the combined data for the survey of the three forest villages in West Bengal and then reports the results for each of these villages (Atabanda, Barabugpichla and Chandmura) separately. The questionnaire used to interview village heads directly is given in the Appendix.

2. SUMMARY OF COMBINED DATA FROM THE SURVEY OF HOUSEHOLD HEADS IN THE THREE VILLAGES IN WEST BENGAL

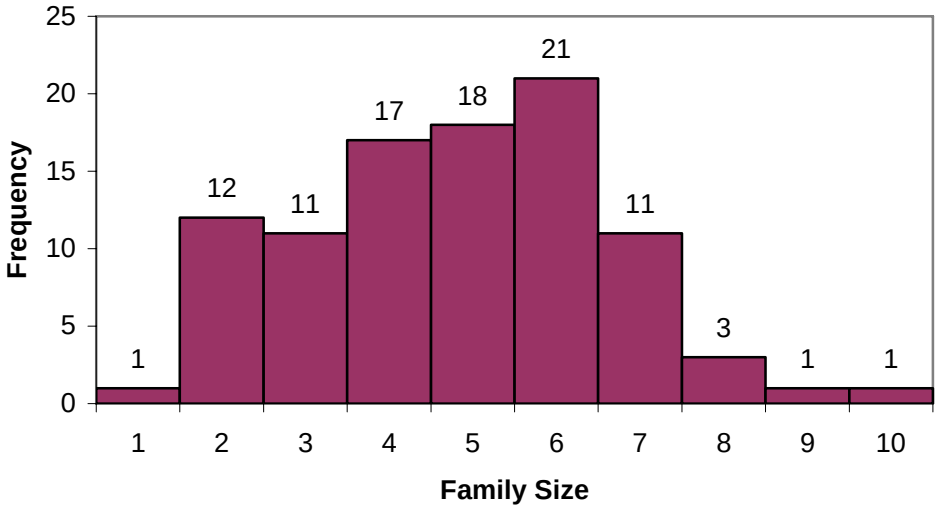
PART A

2.1 Socio-economic characteristics

The comparative socio-economic parameters were presented in Table 1.1. The detailed statistics of Atabanda, Barabugpichla, Chandmura follow.

Family size distribution of the villagers surveyed in Atabanda, Barabugpichla and Chandmura are presented in Figure 2.1. The largest family consists of 10 members and the smallest is a one member family. Among the three villages Atabanda has the highest average family size and Chandmura the lowest. This data was collected as a response to question three in the survey.

Figure 2.1
Distribution of family size of respondents in Atabanda, Barabugpichla and Chandmura, 2000



Note: In total there are 96 observation with Mode = six, Mean = 4.81. Families with one, nine, 10 members are outliers with one observation each.

The survey response in relation to number of dependent children (question 4) and dependent adults (question 5) were presented earlier in Table 1.1.

The villagers were asked to categorize themselves in terms of their relative economic status in the village (question 6). The responses from the three villages are presented in Table 2.1.

Table 2.1
Self-Measurement by respondents of their family economic status in the three villages compared to other families

Position	Frequency	Relative Frequency	No Response
Top one-third	10	0.104	0
Middle one-third	15	0.156	0
Lower one-third	71	0.740	0
Total	96	1	0

Out of the 96 surveyed only 10 respondents classified themselves as top economic class in the villages and 15 as the middle economic class. Out of the 96 villagers, 71 classified themselves to be in the lowest economic category relative to the village population. In terms of relative economic status, it is unlikely that so many of the villagers will be in the lower one-third category. It is possible that villagers misinterpreted the survey question and in general considered themselves poor. The visit of the senior authors to the villages confirm the fact that villagers in general are quite poor.

2.2 Economic dependence of households in Atabanda, Barabugpichla and Chandmura on forest resources

The respondents in the three villages were asked to classify their forest dependency in terms of high, medium or low (question 7). Eighty-six of the surveyed categorized their forest dependency as high and 10 of them categorized as medium. In percentage terms 90 percent of the villagers are highly dependent on the forest and 10 percent have a medium dependency on forests for their livelihood. The self measurement of economic class and forest dependency in this respect is consistent. Except for those who categorized themselves as Top (Table 2.1), the rest are highly dependent on the forest.

2.2.1 Cash dependency

All the villagers in Atabanda, Barabugpichla and Chandmura were asked what percentage of their family's cash dependence was derived from the use of forest products (question 8). The cash dependency of individual village survey results is provided in the individual reports. The overall cash and forest dependency report is given in Table 2.2.

Table 2.2
Forest dependency indicators of village Atabanda, Barabugpichla, and Chandmura

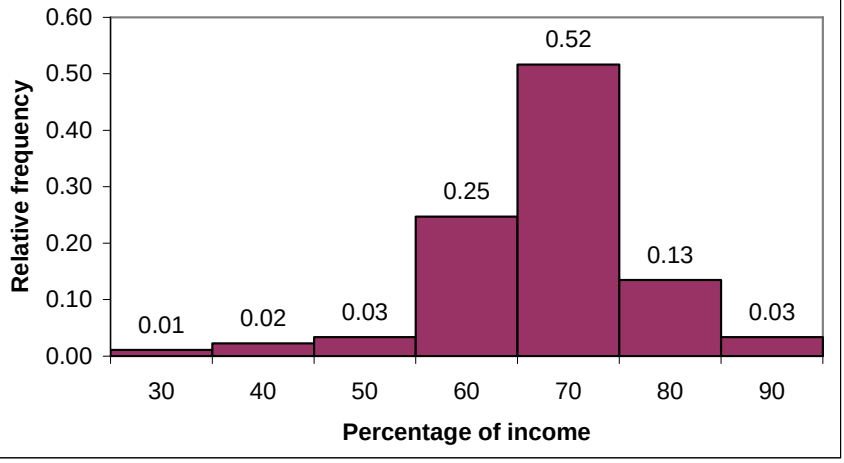
Forest Dependency Indicators	Atabanda	Barabugpichla	Chandamura
Average cash dependency	70%	65-70%	60%
Lowest cash dependency	50%	40%	30%
Highest cash dependency	90%	85%	80%
Families with high forest Dependency	81.25% (26)	93% (27)	94% (33)
Families with medium forest Dependency	18.75% (6)	7% (3)	6% (2)

Note: From Table 5 it can be concluded that average cash dependency of forest villages vary from 60 percent to 70 percent. Chandmura has the lowest cash dependency on forest, which is 60 percent followed by Atabanda and Barabagpichla. Chandmura also has the lowest overall cash dependency of 30 percent, however, only one family has such a low cash dependency in the entire survey.

Atabanda has the highest cash dependency—there are two families that are dependent on the forest for 90 percent of their cash income followed by Barabugpichla with one family whose 85 percent of cash income is based on forest products. Chandmura also has one family whose 80 percent of the cash income comes from selling forest product**.** In the survey of three villages, not a single family was found to have Low Dependency on forest for their family livelihood. Chandmura has the highest percentage of families (94%) that have high dependency on the forest produce. Barabugpichla comes second in high forest dependency followed by Atabanda.

The combined cash dependency data and the relative frequencies have been plotted in Figure 2.2.

Figure 2.2
Percentage of family household cash income from forest resources, relative frequency, Atabanda, Barabugpichla and Chandmura



Note: The relative frequency measures are based on responses—that is out of the 96 surveyed in the three villages there where 89 responses that are used for the above diagram. Five villagers in Atabanda and two in Chandmura did not respond.

The Mode from the above diagram can be seen as 70—and the concentration of dependency are in the 60-80 percent range. In fact, 80 out of the 89 responses lie there implying extremely high forest dependency for cash income. The average forest dependency is around 68 percent.

2.2.2 Dependence on forests to meet basic family needs in the three villages.

The survey undertook a detailed investigation of forest dependency by the villagers. The villagers are dependent on the forest for fuel, food, building material, thatch material, grazing of livestock, herbs, and medicines. The respondents were asked to rank those in high, medium or low order according to their relative importance. The detail of the survey response is provided in the following Table 2.3. For each category of forest product, the frequency and the relative frequency have been calculated and presented in this table.

Table 2.3
Economic dependence (cash and non-cash) on forest for purposes of households surveyed in Atabanda, Barabugpichla, Chandmura, 2000, by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Building Material					
Frequency	84	12	0	96	0
Relative Frequency	0.88	0.12	0	1	0
Thatch Material					
Frequency	62	28	6	96	0
Relative Frequency	0.65	0.29	0.06	1	0
Fuel					
Frequency	51	33	12	96	0
Relative Frequency	0.53	0.34	0.13	1	0
Food					
Frequency	46	48	2	96	0
Relative Frequency	0.48	0.5	0.02	1	0
Grazing of Livestock					
Frequency	20	73	3	96	0
Relative Frequency	0.21	0.76	0.03	1	0
Herbs and Medicine					
Frequency	9	54	32	95	1
Relative Frequency	0.09	0.57	0.34	1	

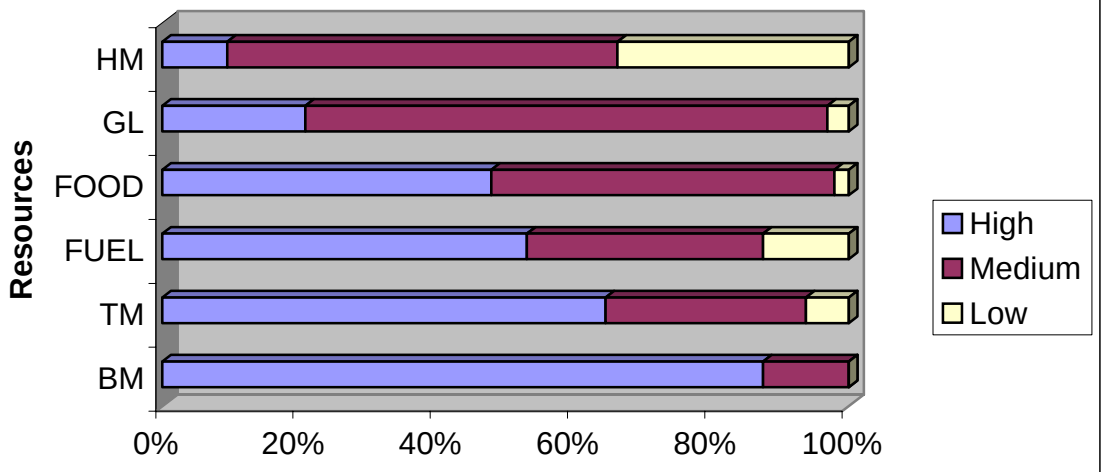
Note: There is only one observation in the no response category for Herbs and Medicine—the rest of the data set is complete. Relative frequencies are calculated based on response. Building and thatch material are the two most important forest products.

In addition to the forest products mentioned above, the villagers collect bamboo and sal leaves to make baskets and plates respectively. They also collect wood for making furniture. The different categories of food they collect include mango, amlaki, cashew

nuts, edible leaves, flowers, honey, roots, wild games and fish. The villagers sell various products like baskets and plate, fuel wood and mushrooms for supplementing their meager income.

The dependence on forest products according to their significance is plotted in the figure below. The various forest products are categorized as High, Medium and Low according to their relative dependence, the frequency of which is given in Table 3.4 above. HM, GL, TM and BM are Herbs and Medicines, Grazing of Livestock, Thatch Material and Building Material respectively. Figure 2.3 follows the ascending order in terms of relative dependence on the forest product. For Example, herbs and Medicine has the lowest relative dependence and Building Material has the highest relative dependence.

Figure 2.3
Relative dependence of families in Atabanda, Barabugpichla and Chandmura on forest resources for different purposes (source:based on Table 4)



The weighted average of relative dependence has been calculated and presented in Table 2.4. The frequency and weights are derived from Table 2.4. High, Medium and Low dependence has been allocated weights of three, two, and one respectively. The weighted average is given in descending order in Table 2.4.

Table 2.4
Weighted average consumption by respondents of forest resource dependence in Atabanda, Barabugpichla and Chandmura, 2000

Resources	Weighted average dependence
Building Material	2.88
Thatch Material	2.58
Food	2.46
Fuel	2.41
Grazing of Livestock	2.18
Herbs and Medicine	1.76

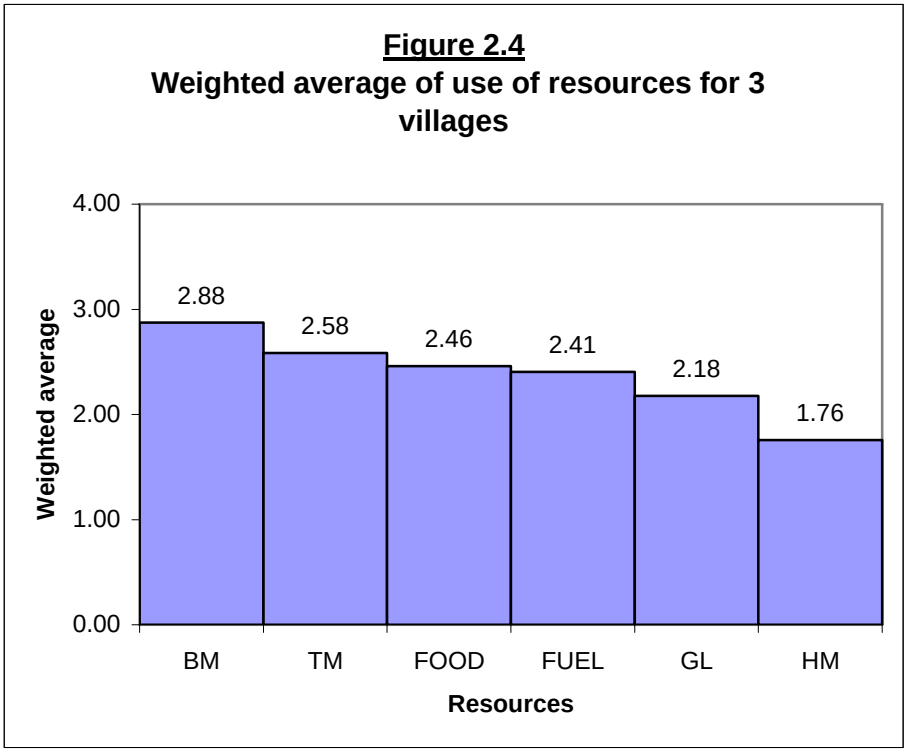


Figure 2.4 above shows the weighted average dependence of forest products in a descending order.

2.2.3 Gender dependence on forests for family needs in the three villages

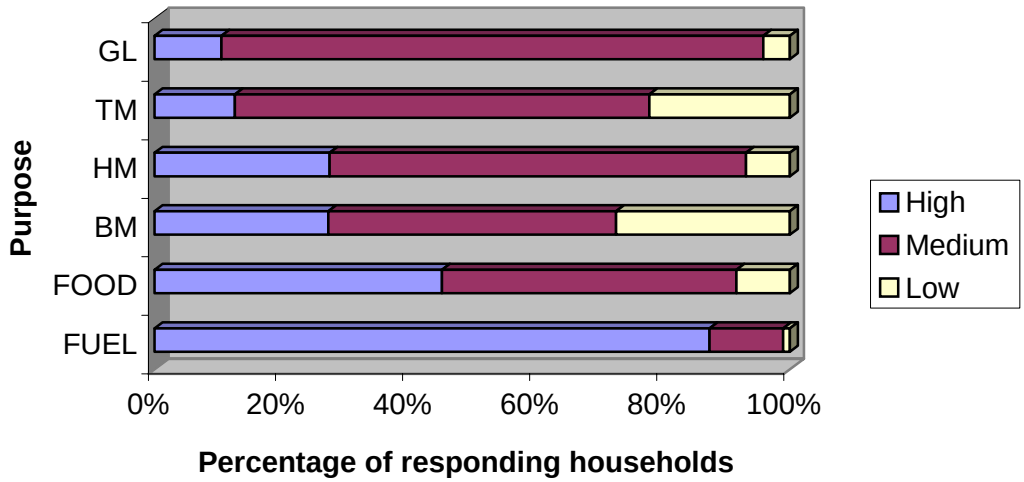
Question 9 of the survey was divided into two parts. The first part consists of economic dependence of the households on the forest, which has been presented above. The second part consists of Women's dependence and use of forest produce, which is described in the same manner as before in the following tables and figures. It is generally agreed, that women are more dependent on the forest compared to men. However, their dependence varies depending on the type of products used for their own purpose. Table 2.5 presents the women's economic dependence on forest.

Table 2.5
Women's economic dependence (cash and non-cash) on forest surveyed in Atabanda, Barabugpichla and Chandmura, 2000 by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	83	11	1	95	1
Relative Frequency	0.87	0.12	0.01	1	
Food					
Frequency	43	44	8	95	1
Relative Frequency	0.45	0.46	0.09	1	
Building Material					
Frequency	26	43	26	95	1
Relative Frequency	0.27	0.46	0.27	1	
Herbs and Medicine					
Frequency	24	57	6	87	9
Relative Frequency	0.28	0.66	0.06	1	
Thatch Material					
Frequency	12	62	21	95	1
Relative Frequency	0.13	0.65	0.22	1	
Grazing of Livestock					
Frequency	10	81	4	95	1
Relative Frequency	0.11	0.85	0.04	1	

Note: Relative frequencies have been calculated based on response only. It is evident that Women's dependence on the forest for collection of fuel is very high. Women's dependence on forest is presented in Figure 2.5.

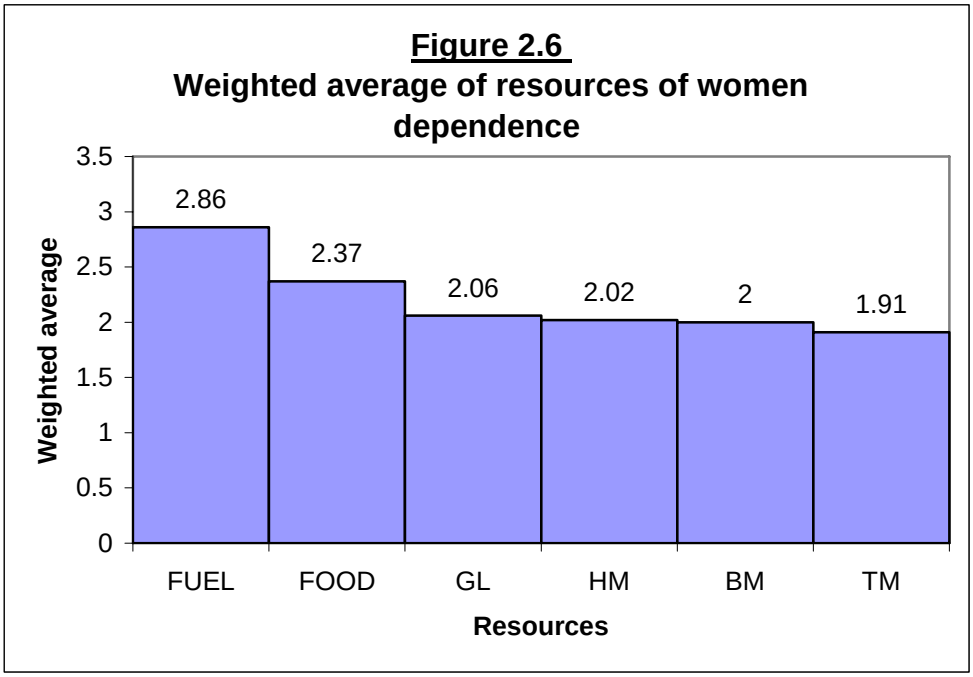
Figure 2.5
Relative use of forests by women for livelihood purpose (source table 2.6)



Note: A comparison between Figure 2.3 and 2.5 provides a clear distinction between household and women's use of forest products. Women are highly dependent on forest for food and fuel whereas men are more dependent for building and thatch material. The weighted average of women's dependence on forest product is given in Table 2.6.

Table 2.6
Weighted average consumption by respondents of women's degree of use of forest resources in Atabanda, Barabugpichla and Chandmura, 2000

Resources	Weighted average dependence
Fuel	2.86
Food	2.37
Grazing of Livestock	2.06
Herbs and Medicine	2.02
Building Material	2
Thatch Material	1.91



The survey conducted an intensive investigation into the use of forest products by both men and women. The response to question 9 in the survey provides a comparison between men and women for the use of forest products.

2.2.4 Comparative male and female dependence on the forest in the 3 villages

The survey asked the villagers to indicate male and female bias of forest activities (question 10). The response was in percentage terms indicating that collection of forest produce for all categories were both male and female activities, although they vary in intensity. The response data has been presented in Table 2.7.

Table 2.7
Domination of sex in collecting various forest resources in Atabanda, Barabugpichla and Chandmura

Resources	F>M	M>F	M=F
Fuel	85 (89.47%)	6 (6.32%)	4 (4.21%)
Food	54 (56.84%)	34 (35.795%)	7 (7.37%)
Herbs & Medicine	30 (31.58%)	51 (53.68%)	14 (14.74%)
Thatch Material	19 (20%)	73 (76.84%)	3 (3.16%)
Building Material	16 (16.84%)	76 (80.00%)	3 (3.16%)
Livestock Grazing	15 (15.79%)	29 (30.53%)	51 (53.68%)

Note: The table indicates whether a particular forest activity has higher Female (F>M) intensity, Male Intensity (M>F) or they are equal (M=F).

The intensity survey is consistent with the previous data tables (question 9 response). Eighty-five respondents stated that fuel collection was mainly the domain of females. Fifty-four of the respondents agreed that food collection was also a female activity. Building material and thatch material collection fell into the male domain as can be seen from Table 2.7. Livestock grazing is shared equally by male and female, where as herbs and medicine collection also falls under female activity, although not as strongly as fuel and food collection.

2.2.5 Women's use of forest in the three villages

Ninety-one out of the 96 respondents agreed that women in the family make much more use of the forest than men and five of them did not answer (response to question 11). The result is presented in Table 2.8.

Table 2.8
Comparative use of forest by women in Atabanda, Barabugpichla and Chandmura; higher for women?

Response	Frequency	Relative Frequency %
Yes	91	100 (94.8)
No	0	0
No answer	5	(5.2)
Total Response	96	100

Note: Values in parentheses indicates relative frequency based on total number of observations by respondents (91).

The respondents were asked whether women command more respect in their family when they contribute to the income by using the forest (question 12). Ninety-one of the 96 surveyed agreed that women command more respect when their forest activities contribute to the family income. Five of the respondents did not answer. The response are presented in Table 2.9.

Table 2.9
Increase in women's status due to their contribution to family sustenance by collecting forest product

Response	Frequency	Relative Frequency %
Yes	91	100 (94.8)
No	0	0
No answer	5	(5.2)
Total Response	96	100

Note: Values in parentheses indicates relative frequency based on total number of observations by respondents (91).

The survey investigated whether it was becoming more difficult for women to contribute to the family income by using the forest (question 13). Forty-six of those surveyed stated that it was becoming more difficult for women to contribute to family income with forest activities, however 48 disagreed, i.e., women did not find it more difficult to contribute to family income with their forest activity. Two of the respondents did not answer. The result is presented in Table 2.10.

Table 2.10
Degree of difficulty in collecting forest product in the 3 villages

Response	Frequency	Relative Frequency %
Yes	46	49(48)
No	48	51 (50)
No answer	2	(2)
Total Response	96	100

Note: Value in parentheses indicates relative frequency for total number of observations by respondents (94).

Those who agreed to the fact that it was becoming more difficult for women to contribute to family income by forest activity were asked whether this affected the women's influence in the family (question 14). Out of the 48 respondents 37 stated that a reduction of contribution to family income did not affect the woman's influence in the family. Six of the 48 respondents did not answer. Three of the respondents agreed that a reduction in women's contribution to the family income, due to a fall in forest activities, lessened their family influence. The result in presented in Table 2.11.

Table 2.11
Relationship between women's contribution and their status in the family

Response	Frequency	Relative Frequency %
Yes	3	7 (7.5)
No	37	80 (92.5)
No answer	6	13
Total Response	46	

Note: Value in parentheses indicates relative frequency for total number of observations by respondents (40).

2.2.6 Livestock ownership in the three villages

The survey investigated the livestock grazing and cattle ownership of the three villages (question 15). The results are given in Table 2.12.

Table 2.12
Average number of livestock ownership in three villages

Livestock	Atabanda	Barabugpichla	Chandamura	Overall Average
None	**3 (10.3%)**	**9 (31%)**	**15 (42%)**	**9 (28.1%)**
Cattle	**5.1**	**3.41**	**3**	**3.48**
Pig	**2.6**	**1.25**	**2.1**	**1.98**
Hen	**5.7**	**3.78**	**4.7**	**4.73**

Note: Table 2.12 provides a comparison for livestock ownership in the three villages. Chandamura has the highest number of families that do not own any livestock, followed by Barabugpichla and Atabanda. The average has been calculated based on the number of villagers who owned livestock.

Cattle ownership is the highest in Atabanda followed by Barabugpichla and Chandamura. From the indicators of livestock it can be concluded that Atabanda has the highest Livestock ownership that includes cattle, pigs and hens. It also has the lowest number of families that do not own any cattle. Compared to the other two villages Atabanda villagers are economically better off. Barabugpichla has the second highest cattle ownership followed by Chandmura.

2.2.7 Seasonal dependence of village households on forest resources

The survey queried whether there was any particular time when the villagers and their families were relatively more dependent on the forest for livelihood and survival (question 16). All the respondents stated that during August and September the village families were more dependent on the forest. During this time there is in general lack of employment opportunities. In addition, they cannot perform their usual trade of selling plates of sal leaves as new leaves come up at this time of the year. However, during April and May they collect and sell cashew nuts and mahua flowers which help them to

sustain their livelihood during August and September. The results are presented in Table 2.13.

Table 2.13
Higher forest dependency due to seasonal factors

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
No answer	0	0
Total Response	96	100

The villagers were asked to categorize their dependence on forests for survival during drought or difficult seasons (question 17). Eighty-six of the 96 surveyed stated that their dependence on the forest for survival during drought or difficult seasons was high and nine stated their dependence to be medium. Only one respondent said stated they had low dependence on the forest. The results are given in Table 2.14.

Table 2.14
Degree of dependence on the forest for survival during drought and difficult season

Response	Frequency	Relative Frequency %
High	86	90
Medium	9	9
Low	1	1
No answer	0	0
Total Response	96	100

PART B

2.3 Sustainability Issues

In this part, sustainability of the forest use along with bio-diversity and the impact of forest use have been investigated. Villagers' suggestions regarding those issues are also presented in this section.

2.3.1 Sustainability of current forest use as perceived by the villagers in Atabanda, Barabugpichla and Chandmura

The survey queried villagers' perception of future income flow from the forest. They were asked whether their forest will contribute less to their family's income in the future (question 18). Seventy-eight of the villagers said that income flow from forests would decline due to declining forest area and greater use of forests by more people. However, 18 of the respondents did not agree to this point of view, i.e. they perceived that income flow from the forest is sustainable due to planting of Kaju trees and forest management. (Seven of the survey responses were unmarked, however, they reasons provided were the same as those who perceived income flow from forests to be sustainable). The results from the survey are given in Table 2.15.

Table 2.15
Villagers' perception regarding sustainability of forest use

Response	Frequency	Relative Frequency %
Yes	78	81
No	18	19
No answer	0	0
Total Response	96	100

2.3.2 Specific threats of identified forest practices to livelihood

The respondents were asked to categorize the various threats that could affect their income from forest use (question 19). The threats were categorized as follows: logging (86 serious, 10 medium); failure to replant trees (67 serious, 29 medium); reduction in forest size (34 serious, 61 medium, 1 low); overgrazing (7 serious, 82 medium, 7 low); and others (5 serious, 33 medium, 4 low). Total response: 42. The results are given in Table 2.16.

Table 2.16
Specific threats to forest use sustainability as identified by villagers in Atabanda, Barabugpichla and Chandmura

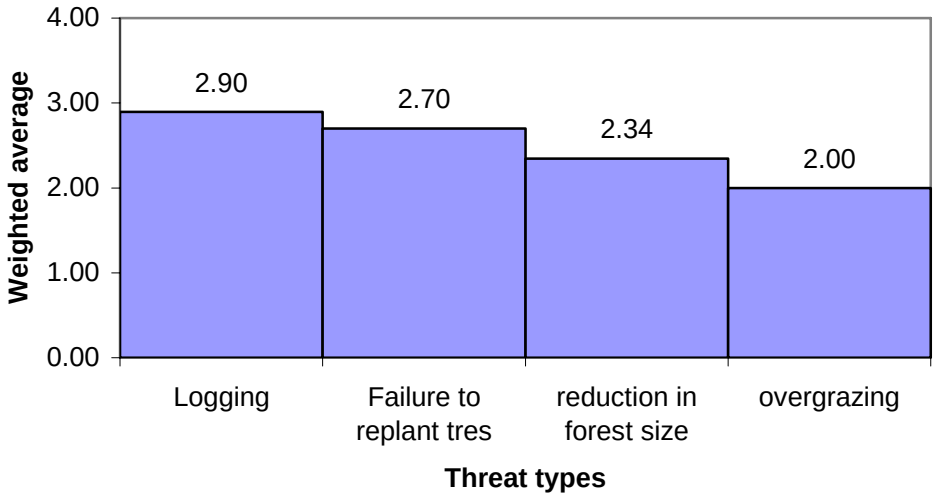
Protection	Different Threats	Frequency	Relative Frequency %
Logging	Serious	86	89.6
	Medium	10	10.4
	Low or None	0	0
	Total Response	96	100
Failure to replant trees	Serious	67	69.8
	Medium	29	30.2
	Low or None	0	0
	Total Response	96	100
Reduction in forest size	Serious	34	35
	Medium	61	64
	Low or None	1	1
	Total Response	96	100
Overgrazing	Serious	7	7.3
	Medium	82	85.4
	Low or None	7	7.3
	Total Response	96	100
Others	Serious	5	12
	Medium	33	78
	Low or None	4	10
	Total Response	42	100

Note: Logging is the main threat to family livelihood in forest village. Failure to replant trees is also quite a serious threat to sustainability of income from the forest

The results of 2.17 have been used to calculate the threat perception of the villagers'. Serious, medium and low have given weights of three, two, one, respectively. Since there were only seven observations in the category of 'others', it has been excluded

from the histogram that is presented in Figure 2.7. The threat perception of the villagers have been depicted in descending order of importance. (Atabanda had seven observations for others, Barabugpichla had no observations, and Chandmura had 35 observations). Due to asymmetric observation in the category of 'others', it has been discounted from the histogram presented below.

Figure 2.7
Threat to family livelihood



Note: It can be seen from the above diagram that logging is perceived as the main threat to villagers' livelihood. Failure to replant trees is also considered a serious threat. However, overgrazing and reduction in forest size are not perceived as serious threats.

The villagers were asked to list two factors that they considered to be the greatest threat to the economic reliance of their family on the forest (question 20). All 96 of the respondents listed logging and failure to replant trees as the two main threats. The results are consistent with the previous results presented above.

2.3.3 Trends and varieties of plants and animals in the forest bio-diversity

The survey investigated the trends and varieties of product to assess the impact on bio-diversity. The villagers were asked whether the variety of products available from the forest declined, increased or remained constant in recent years. Sixty of the respondents agreed that the variety of products have increased in recent years. The main reason stated was plantation of cashew trees. However, 35 of the respondents stated that the variety of products in the forest have declined due to illegal logging and reduction in forest size. One of the respondents did not answer. The results are presented in Table 2.17.

Table 2.17
Trends in biodiversity due to forest use in Atabanda, Barabugpichla and Chandmura

Response	Frequency	Relative Frequency %
Declined	60	62.5(63.16)
Constant	0	0
Increased	35	36.5 (36.84)
No response	1	0
Total Response	96	100

Note: Values in parentheses indicate relative frequencies on responded observations (95)

Further investigations were made about wild animals and plants. The villagers were asked whether the variety of plants and wild animals in the forest declined, remained constant or increased (question 22). All of the respondents from the three villages stated that the variety of plants and wild animals has declined. The main reasons for the decline as stated by the forest villagers are: (1) decline in forest size that led to food shortage for animals; (2) illegal cutting of trees that are a food source for animals; and (3) killing of animals. The results are presented in Table 2.18.

Table 2.18
Trends in wildlife and pants in Atabanda, Barabugpichla and Chandmura

Response	Frequency	Relative Frequency %
Declined	96	100
Constant	0	0
Increased	0	0
No response	0	
Total Response	96	100

Note: Villagers unanimously agreed that plant variety and animals have declined over the years.

2.3.4 Villagers' suggestions for improving forest management

The survey sought villagers' suggestions regarding how the economic contribution of the forest to their livelihood could be made more secure (question 23). The suggestions by the villagers in Atabanda, Barabugpichla and Chandmura are given below:

- Plantation of a variety of valuable trees, egg, sal and amlaki.
- Less plantation of eucalyptus due to its harmful side effects.
- Plantation of more neem trees as it purifies air.
- Increasing vegetation cover for mushroom, potatoes and other vegetables including herbs.
- Developing social forestry.

PART C

2.4 Management Issues

The survey reconfirmed the name of the forest used by villagers in Atabanda, Barabugpichla and Chandmura (question 24). Eighteen villages share the forest areas near Atabnda, nine villages share the forest areas of Barabugpichla, and 11 villages

share the forest areas near Chandmura. The survey looked into various issues of forest management starting with property rights.

2.4.1 Customary rights of villagers in Atabanda, Barabugpichla and Chandmura to use the forest for livelihood

The survey queried whether the villagers had customary right to use the forest (question 25). Out of the 96 respondents, 92 stated that they had customary rights to use the forest village while four respondents did not answer. The results are given in Table 2.19.

Table 2.19
Customary right of villagers to use the forest for sustaining their livelihood in Atabanda, Barabugpichla and Chandmura

Response	Frequency	Relative Frequency %
Yes	92	100 (95.87)
No	0	0
No answer	4	4.13
Total Response	96	100

Note: value in parentheses indicates relative frequency of responded observations (92)

2.4.2 Joint forest management committee issues

The survey conducted a number of queries regarding joint forest management (JFM). It investigated whether the village had a joint forest committee (question 26), and if the villagers were members (question 27) what was the proportion of male and female members in such committees (question 28).

It was found that all the three villages had joint forest committees (confirmed by the senior author during his visit to the villages). The responses were mixed from the villagers, the details of which are presented in individual village reports.

Regarding the ratio of the sexes, in Atabanda, 20 of the respondents said that the joint forest committee had male members only, whereas 12 of them mentioned both male and female members were committee members). Barabugpichla had 24 male members and 2 female members in the joint forest committee according to all respondents. Chandmura's joint forest committee consisted of six male members according to 29 of the 35 respondents. However, four of the respondents mentioned that the committee consisted of four male and two female members.

The survey investigated the effectiveness of the joint forest committee. The villagers in Atabanda, Barabugpichla and Chandmura were asked whether this committee improved the sustainable management of the forest (question 29). Ninety of the respondents stated that the joint forest committee has improved the sustainability of the forest by reducing illegal cutting of trees that lessened the decline of the forest area. The committee has been effective in preventing the killing of wild animal. Three of those surveyed did not answer. Three of the respondents were of the view that the joint forest committee was not effective. The results are presented in Table 2.20.

Table 2.20
Effectiveness of Joint Forest Committee in forest conservation and maintaining biodiversity

Response	Frequency	Relative Frequency %
Yes	90	93.8 (96.8)
No	3	3.12 (3.2)
No answer	3	100
Total Response	93	3.12

Note: value in parentheses indicates relative frequency of responded observations (92)

The respondents were asked to list some of the perceived good and bad decisions of the Joint Forest Committee (Question 30). Some of the good decision by the villagers are:

- Formation of a joint team of forest guards with villagers.
- Providing a share of income from the sale of timber to the villagers.

Some of the bad decision of the joint forest committee as perceived by the villagers are:

- Share of the revenue from the sale of timber did not go to the individual villagers or many did not receive any benefit. (However, this is a misinterpretation which has been clarified by the author from their visit to the villages. The share of the revenue from timber sale is not a regular income for villagers and it happens occasionally).

The survey queried whether there was any limit on the villagers for forest use (question 31). Seventy-five of the respondents stated there was no limit on forest use. However, six stated there was certain limits of forest use and 15 did not answer. The result is presented in Table 2.21.

Table 2.21
Limitations on forest use by villagers in Atabanda, Barabugpichla and Chandmura

Response	Frequency	Relative Frequency %
Yes	6	78.13 (92.6)
No	75	6.25 (7.4)
Total Response	96	100
No answer	15	15.62

Note: Value in parentheses indicates relative frequency on total number of responded observation (81).

2.4.3 Forest management rules and customs in Atabanda, Barabugpichla and Chandmura

As stated earlier the forest areas in Atabanda, Barabugpichla and Chandmura are shared by several other villages. The villagers were asked how the resources are shared amongst them for example whether it was shared by customary rules or otherwise (question 32). The survey did not get any response regarding customary rules of sharing forest resources from respondents in Atabanda and Barabugpichla. Instead, villagers mentioned their particular village custom—that is the celebration of the forest god on 15 January (Atabanda) and on 2 June (Barabugpichla). However, Chandmura

respondents mentioned some customary rules regarding sharing of forest resources in addition to the Shikar day which they celebrate every year.

The respondents in Chandmura stated that a dispute arose between villages (question 33) regarding share of forest resources. For example disputes regarding illegal logging and collection of building material took place among villages. In the case of disputes, the joint forest committee settled disputed matters. They either settled disputes as per agreed teams and conditions or allowed a particular family to cut trees as much as they wished.

2.4.4 Revenue sharing arrangement between villagers and the forest department for the sale of timber

The respondents where asked whether they received income from timber sold commercially from their forest and in what proportion (question 34). Ninety-five of the respondents stated that they received a 25 percent share of the income obtained by the sale of timber. However, one of the respondents said he did not receive any share of the income. (This point has been clarified by a village visit as well—only one member of the family receive the share of the timber sale (the family member in the joint forest committee) The results are presented in Table 2.22.

Table 2.22
Villagers' share of revenue from the sale of timber under JFM in the 3 villages

Response	Frequency	Relative Frequency %
Yes	95	99
No	1	1
Total Response	96	100
No answer	0	

2.4.5 Villager's share of revenue and sustainability of the forest

The villagers were asked whether they consider their share of income from the sale of timber to be fair (question 35). Ninety-three of the respondents stated that they did not consider the share of income to be fair. Three of them did not provide any answer and no explanation was provided. The results are presented in Table 2.23.

Table 2.23
Villagers' perception regarding the fairness of revenue sharing arrangement

Response	Frequency	Relative Frequency %
Yes	0	0
No	93	100 (97)
Total Response	96	100
No answer	3	

Note: Value in parentheses indicates relative frequency on total number of observation (93).

In response to the question as to whether the villagers considered their share of income from sale of timber to be adequate for them to be willing to protect the forest from illegal harvesting of timber (question 36), 83 of the respondents stated the income was not sufficient for them to want them to protect the forest. However, 10 of them stated

that their share of income was adequate for them to want to protect the forest from illegal harvesting of timber. Three of the villagers did not answer. No explanation was provided for their affirmative or negative answer. The results are presented in Table 2.24.

Table 2.24
Share of revenue and villagers' willingness to participate in forest protection

Response	Frequency	Relative Frequency %
Yes	10	10.42 (10.75)
No	83	86.46 (89.25)
Total Response	96	100
No answer	3	3.12

Note: Value in parentheses indicates relative frequency on total number of observation (93).

2.4.6 Women's participation in joint forestry management in Atabanda

The survey investigated some gender issues as well. Villagers were asked whether they think there should be more women in the joint forest committee (question 37). Ninety-four of the respondents stated that they think there should be more women in the JFM and two did not answer. The reason for supporting (by respondents) more women participation in JFM are as follows:

- Women cut down overgrowth of forest and usually do not cut down valuable trees.
- They assist forest guards in curbing illegal harvesting of timber.

The results are presented in Table 3.26

Table 2.25
Support for higher women's participation in JFM

Response	Frequency	Relative Frequency %
Yes	94	100 (98)
No	0	0
Total Response	96	100
No answer	2	2

Note: Value in parentheses indicates relative frequency on total number of responding observation (94).

2.4.7 Villagers' perception of returns from joint forestry management

The villagers were asked whether forest under the joint forestry committee provided higher returns from logging compared to non-protected forests (question 38). All the respondents stated that forests under JFM provided more benefits compared to non-protected forests. The results are presented in Table 2.26.

Table 2.26
Higher return from JFM as compared to non-protected forest

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
Total Response	96	100
No answer	0	

The survey investigated whether planted trees were more protected in a state-controlled forest in comparison to non-protected forest (question 39). All respondents stated planted trees were more protected under state controlled forests compared to non-protected forests. The results are presented in Table 2.27.

Table 2.27
Higher protection of planted trees under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
Total Response	96	100
No answer	0	

It was investigated whether the capacity of the forest to sustain poor families increased more in a state controlled forest compared to a non-protected forest (question 40). All the respondents stated that poor families were sustained better under state controlled forests. The results are presented in Table 2.28.

Table 2.28
Higher contribution to sustenance of poor families under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
Total Response	96	100
No answer	0	

2.4.8 Decision making in forestry management and the village women's influence

The survey investigated whether decisions were made by forest officers, by the majority of members of the JFM or by the villagers (question 41). All the respondents stated that decisions in JFM were taken by villagers. The results are presented in Table 2.29.

Table 2.29
Decision-making apparatus under JFM

Response	Frequency	Relative Frequency %
Forest Officer	0	0
Management Committee	0	0
Villagers	96	100
Total Response	96	100
No answer	0	

Women's decision-making power in JFM was investigated in response to the query of whether they had any influence in decision-making (question 42). Eighty-four of the respondents stated that women did exercise influence on decision-making in JFM. However, 12 of the respondents stated that women did not influence decision-making in the JFM. The results are presented at Table 2.30.

Table 2.30
Women's influence in decision making under JFM

Response	Frequency	Relative Frequency %
Yes	84	87.5
No	12	12.5
Total Response	96	100
No answer	0	

Three main reasons were cited by the five respondents as to why women could not influence decision-making (question 43). These are as follows:

- Women members are in a minority
- Male members take the decision and do not ask for the opinions of female members
- Forest officers set the agenda and make the decisions.

2.4.9 Deficiencies of current practice of forest management

The villagers were asked about the deficiencies of the current practice of forest management (question 44). All the respondents agreed with the four deficiencies in the questionnaire in addition to some other deficiencies. They are as follows:

- Corruption (bribes) etc
- Failure to completely prevent illegal operators
- Lack of proper training for forest protection and management
- Lack of honest effort and cooperation by government officials
- Other reasons—lack of proper education for social forestry, lack of skills in social forestry
- No replantation of valuable fruit trees and herbs.

The villagers were asked if the above-mentioned deficiencies were removed, whether they perceived that the forest would provide greater benefits to females and their families on a long-term basis (question 45). All the respondents stated that the removal of deficiencies would benefit females and their families on a long-term basis. The results are presented in Table 2.31.

Table 2.31
Removal of management deficiencies would lead to higher benefits from JFM

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
Total Response	96	100
No answer	0	

2.4.10 Villagers' perception about the role of NGOs in joint forestry management

The survey queried whether the villagers thought if the above-mentioned deficiencies would be removed and the forest would be better protected if managed jointly by an NGO and the villagers (question 46). All the respondents stated that forest could be better managed and deficiencies removed by joint management of NGO and villagers. The results are presented in Table 2.32.

Table 2.32
Villagers' perception of NGO's potential in JFM

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
Total Response	96	100
No answer	0	

The villagers were asked whether they thought that the returns to families also would be higher under an NGO management than what would be obtained under government management (question 47). All the villagers stated that they thought returns would be better under NGO management compared to government management. The results are presented in Table 2.33.

Table 2.33
Villagers' perception of return under JFM compared to NGO participation

Response	Frequency	Relative Frequency %
Yes	96	100
No	0	0
Total Response	96	100
No answer	0	

Discussion and Conclusion.

The survey of the three villages provides a number of interesting facts about community involvement in forestry and sustainable forestry management. In addition to investigating a number of key socio-economic indicators, various other issues like property rights, gender participation in forestry activities, sustainability and bio-diversity have been investigated. Future income expectations and villagers' views have been documented in this report.

Villagers in all the three villages in general are poor except for 10 households who categorized themselves in the higher economic class and 15 in the middle economic class. Except for the 10 families in the higher economic class, the rest of the villagers are highly dependent on the Arbari forest for their livelihood. On average 70 percent of the cash income of the villagers is derived out of the forest products in addition to various non cash forest resources like fuel, food, building and thatch material, grazing of livestock and herbs and medicine.

It has been established from the survey that women in all three villages use the forest mostly for fuel and food collection and men are more dependent for collection of

building and thatch material. Both men and women use the forest for grazing of their livestock. Women also collect most of the herbs and medicine from the forest. Women in general agreed that reduction of their contribution to the family income by collecting forest product does not affect their influence in the family.

Most of the villagers, 81 percent, were of the view that income generation from the forest is sustainable due to planting of Kaju trees. However, 19 percent of the villagers believed that income flow from the forest would decline due to reduction of forest area and greater use of forests by more people. Logging and failure to replant trees were considered the main threats to income sustainability from the forest in addition to reduction in forest size and overgrazing.

Villagers in all three villages unanimously agreed that varieties of plants and animal have declined in recent years. There is a clear declining trend in bio-diversity due to illegal logging and killing of animals.

The villagers agreed (later confirmed by a senior author's visit) that there is a joint forest management committee in the village. Almost all the villagers were of the view that this committee has improved the sustainability of the forest by reducing illegal logging and preventing the killing of wild animals. The decisions regarding forestry management, in this committee was made by the villagers as established by the survey. Although there are women members in the committee, they have little or no influence in decision making. Most villagers supported increased women's participation in this committee.

A number of deficiencies of the joint forest management committee, as perceived by the villagers have been documented. The villagers' suggestions regarding improvement of joint forestry management is also presented in the report. Villagers unanimously agree that joint forestry management is better than unprotected forest, however, they are of the belief that sustainability of the forest would improve and return to the villagers would increase if joint management is conducted with NGOs rather than the government.

3. SUMMARY OF DATA OBTAINED FROM ATABANDA VILLAGE

3.1 Introduction

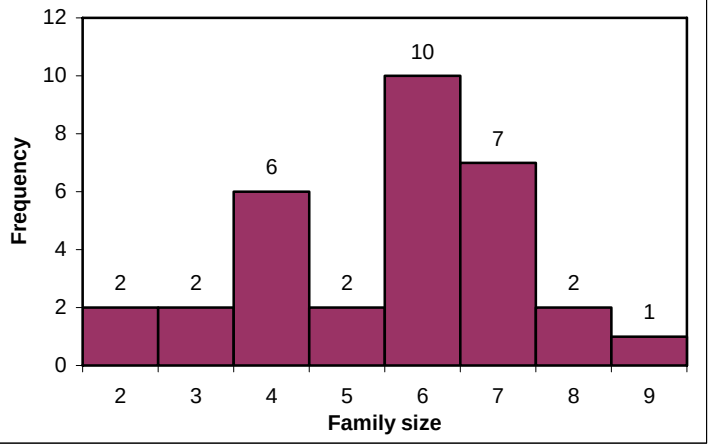
The summary data report follows the same outline as in the questionnaire, i.e., each report has three main sections for forest dependency, sustainability and management issues respectively. Prior to the three main sections, the questionnaire surveyed various socio-economic characteristics of each village.

3.1.1 Socio-Economic Characteristics

Village Atabanda is situated in the Northern part of Midnapore in West Bengal. The village is near Shalboni, which in Bengali means a forest of sal trees *Shorea Robusta*, and is clearly depicted in the map by legend 1. The entire village, a total of 32 households, was surveyed to assess the impact of Joint Forestry Management (JFM) program on villagers, all of whom are Santals (tribals) and practice the Sari religion.

The first two questions in the survey are related to religion and caste. The third question is about the size of the family. The data collected in response to the third question is presented below in Figure 3.1.

Figure 3.1
Distribution of family size of respondents in Atabanda, 2000.



The average family size is 5.5 although, if a modal value is considered the family size will be six as can bee seen from Figure 1. The largest family consists of nine members and the smallest family has two members only. In addition to family size, the survey investigated the number of children in each family and the average dependency ratio. Questions 4 and 5 in the survey related to the number of dependent children and adults. The following Table 3.1 provides the frequency distribution of dependent children in Atabanda.

Table 3.1
Frequency of dependent children in the family

Number of dependent children	Frequency per family
0	11
1	2
2	11
3	6
4	1
6	1

Note: Average number of dependent children is 1.6. Eleven of the families did not have any children at all.

3.1.2 Dependency Ratio

The dependency ratio was calculated based on the ratio of the number of dependents over the number of independents in the family, which includes both dependent adults and children. In the first stage, the dependency ratio of each family has been calculated by considering both dependent adult and children. There are 13 families in Atabanda all of which have one dependent adult. The overall dependency ratio of Atabanda is 0.8687.

3.13 Economic status

The villagers were asked to categorize themselves in terms of their relative economic status in the village (Question 6). Twenty-six off the villagers classify themselves to be in the lowest economic class. Five of those surveyed consider themselves to be in the top economic class and only one family consider themselves to be in the middle class. In terms of relative economic class, it is unlikely that so many of the villagers would be in the lowest economic category. It is likely that the villagers misinterpreted the survey question and in general considered themselves poor. The visit by the authors to the village confirmed the fact that villagers generally are quite poor.

Table 3.2
Self—measurement by respondents of their family economic status in the village compared to other families

Position	Frequency	Relative Frequency	No Response
Top one Third	5	0.156	0
Middle one third	1	0.812	0
Lower One Third	26	0.031	0
Total	32	1	0

Note: Table 3.2 provides the economic class frequencies and relative frequencies for village Atabanda.

3.2 Economic dependence of households in Atabanda on forest resources

The respondents in Atabanda were asked to classify their forest dependency in terms of high, medium or low (question 7). Twenty-six of those surveyed categorized their forest dependency as high and six of them categorized it as medium. In percentage terms, 81.25 percent of the villagers are highly dependent on the forest and 19.75 percent have a medium dependency on forests for their livelihood. The self-

measurement of economic class and forest dependency in this respect is consistent. Except for those who categorized themselves as the Top or Middle one third (Table 3.2 above), the rest are highly dependent on the forest.

3.2.1 Cash dependence

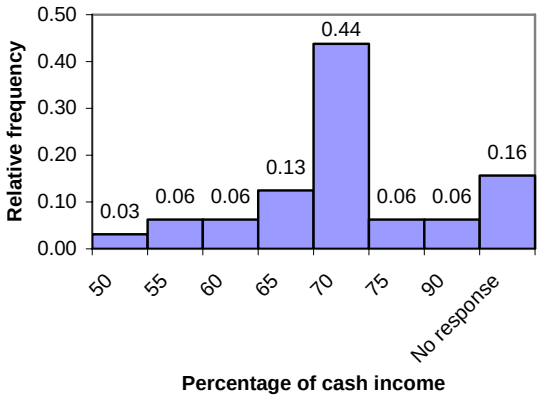
The respondents were asked about the percentage of their income derived from the use of forest products (question 8). The percentage of income derived from forest products for villagers in Atabanda varies from 50 to 90 percent. There were 27 responses to this question (the top economic class refraining from answering). The result of this survey question is given in Table 3.3.

Table 3.3
Percentage of family cash income obtained from forest resources, frequency

Cash income (percentage)	Frequency
50	1
55	2
60	2
65	4
70	14
75	2
90	2
Not available	5
Total	32

Note: Considering the Modal value as average we can conclude on average 70% of cash income for villagers in Atabanda comes from forest products, even the lowest cash dependence on forest products is 50%. Relative frequencies of forest dependence of villagers in Atabanda has been calculated from Table 3.3 and presented in Figure 3.2.

Figure 3.2
Percentage of family household cash income obtained from forest resources, relative frequency, Atabanda, 2000



3.2.2 Dependence on forests to meet basic family needs directly

The survey undertook detailed investigation about forest dependency of the villagers. The villagers are dependent on the forest for fuel, food, building material, thatch material, grazing of livestock, herbs and medicines. The respondents were asked to rank those in high, medium or low order according to their relative importance. The detail of the survey response is provided in the following Table 3.4. For each category of forest product, the frequency and the relative frequency have been calculated and presented in the Table 3.4.

Table 3.4
Economic dependence (cash and non-cash) on forests for households purposes surveyed in Atabanda, 2000 by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	4	17	11	32	0
Relative Frequency	0.125	0.531	0.343	1	0
Food					
Frequency	3	27	2	32	0
Relative Frequency	0.093	0.843	0.0625	1	0
Building Material					
Frequency	25	7	0	32	0
Relative Frequency	0.781	0.218	0	1	0
Thatch Material					
Frequency	19	13	0	32	0
Relative Frequency	0.593	0.406	0	1	0
Grazing of Livestock					
Frequency	2	30	0	32	0
Relative Frequency	0.062	0.937	0	1	0
Herbs and Medicine					
Frequency	1	26	4	31	1
Relative Frequency	0.032	0.838	0.129	1	1

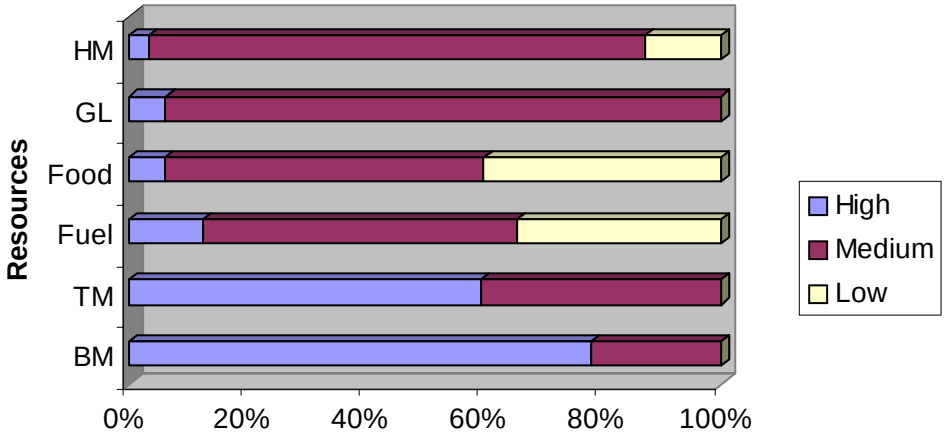
Note: From table 3.4 above it can be observed that dependency on forests for collecting building and thatch material is quite high.

In addition to the forest products mentioned above, the villagers collect bamboo and sal leaves to make baskets and plates respectively. They also collect wood for making furniture. The different categories of food they collect include mango, amlaki, cashew nuts, edible leaves, flowers, honey, roots, wild games, and fish. The villagers sell various products like baskets and plates, fuel wood and mushrooms to supplement their meager incomes.

The dependence on forest products according to their significance is plotted in the figure below. The various forest products are categorized as High, Medium, and Low according to their relative dependence, the frequency of which is given in Table 3.4 above. HM, GL, TM, and BM are Herbs and Medicines, Grazing of Livestock, Thatch

Material and Building Material respectively. Figure 3.3 follows the ascending order in terms of relative dependence on the forest product. For Example, herbs and medicine has the lowest relative dependence and building material has the highest relative dependence.

Figure 3.3
Relative dependence of families in Atabanda on forest resources for different purposes (source: based on table 3.4)



The weighted average of relative dependence has been calculated and presented in Table 3.5 below. The frequency and weights are derived from Table 3.4. High, Medium and Low dependence has been allocated weights of three, two, and one respectively. The weighted average is given in descending order in the table below.

Table 3.5
Weighted average consumption by respondents of forest resource dependence, Atabanda, 2000

Resources	Weighted average dependence
Building Material	2.78
Thatch Material	2.59
Food	2.09
Grazing of Livestock	2.06
Herbs and Medicine	1.84
Fuel	1.74

Note: Building material has the highest weighted average dependence and Fuel the least dependence. The data in Table 3.5 is plotted in the same order in Figure 3.4 below.

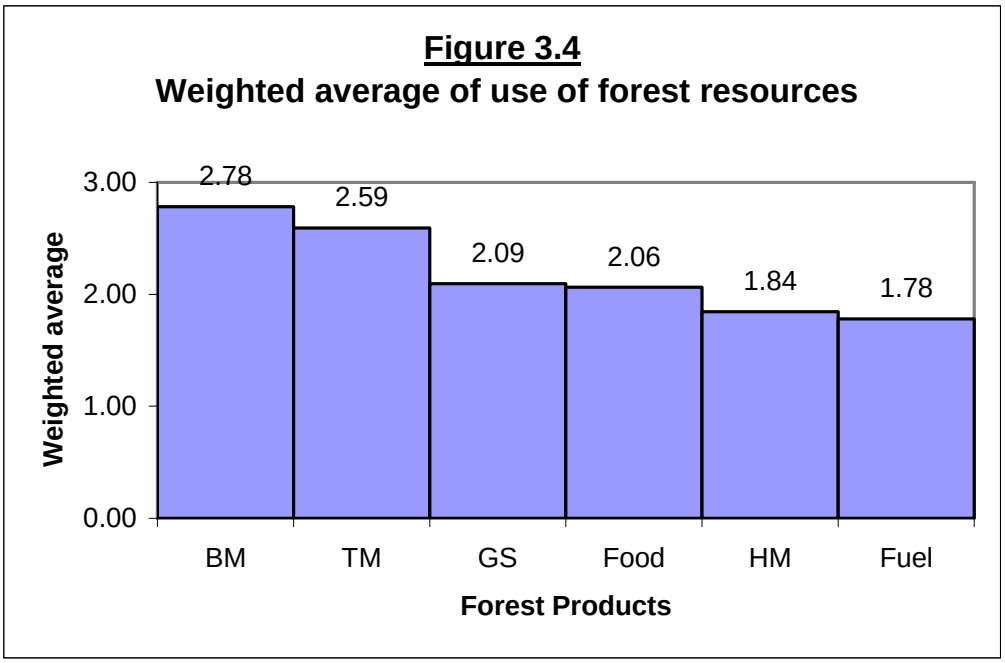


Figure 3.4 above shows the weighted average dependence on forest products in a descending order.

3.2.3 Gender dependence on forests for family needs in Atabanda

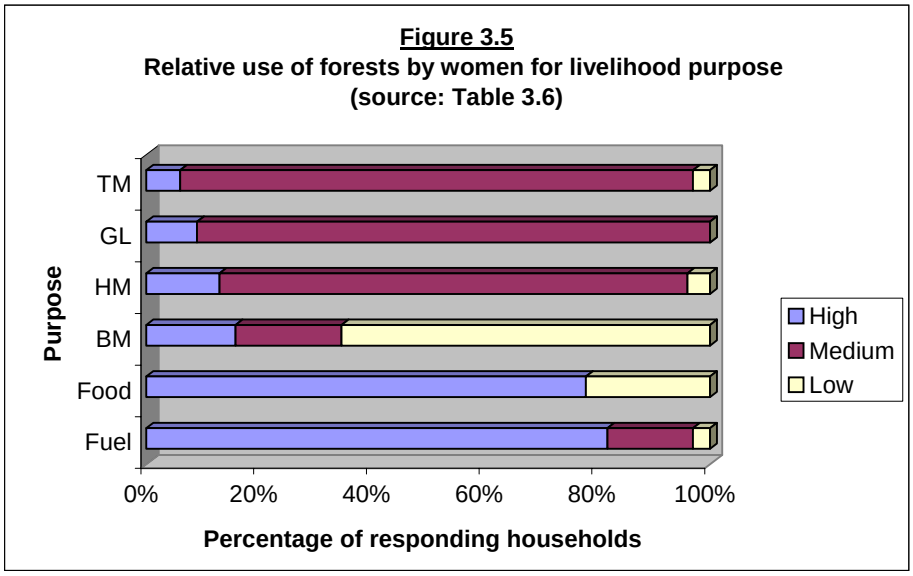
Question 9 of the survey was divided into two parts. The first part consists of economic dependence of the households on the forest, which has been presented above. The second part consists of women's dependence and use of forest produce, which is described in the same manner as before in the following tables and figures. It is generally agreed that women are more dependent on the forest compared to men. However, their dependence varies depending on the type of products used for their own purpose. Table 3.6 presents the women's economic dependence on forests.

Table 3.6
Women's economic dependence (cash and non-cash) on forests – surveyed in Atabanda, 2000 by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	26	5	1	32	0
Relative Frequency	0.812	0.156	0.031	1	0
Food					
Frequency	25	0	7	32	0
Relative Frequency	0.781	0	0.218	1	0
Building Material					
Frequency	5	6	21	32	0
Relative Frequency	0.156	0.187	0.656	1	0
Thatch Material					
Frequency	2	29	1	32	0
Relative Frequency	0.063	0.906	0.031	1	0
Grazing of Livestock					
Frequency	3	29	0	32	0
Relative Frequency	0.094	0.906	0	1	0
Herbs and Medicine					
Frequency	3	20	1	24	8
Relative Frequency	0.125	0.833	0.042	1	.25

Note: It can be concluded from Table 3.6 that women have a very high dependence on the forest for fuel and food. Herbs and medicine had 24 responses out of 32.

Figure 3.5 presents women's use of forest products in ascending order. It can be observed that fuel and food are the main two forest products which women use.



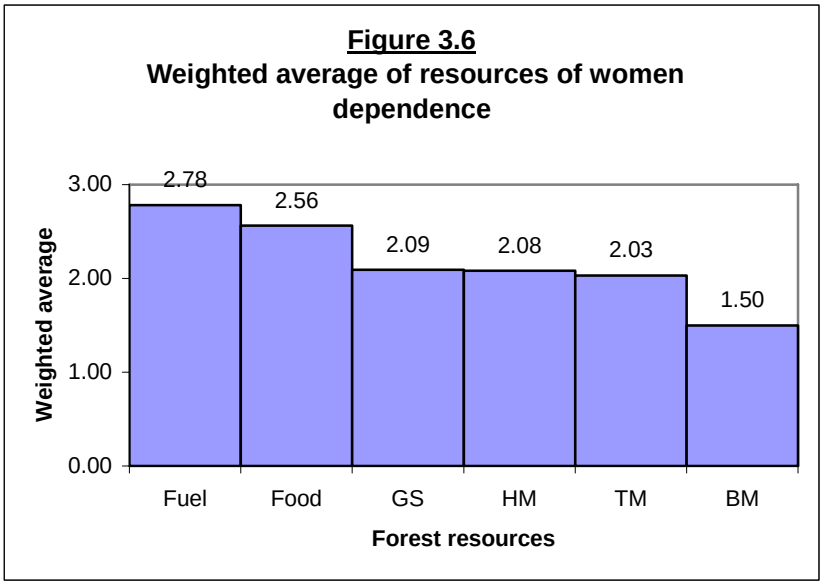
Note: A comparison between figure 3.3 and 3.5 provides a clear distinction between men and women's use of forest products. Women are highly dependent on forest for food and fuel whereas men are more dependent for Building and Thatch material. The weighted average of women's dependence on forest product is given in Table 3.7.

Table 3.7
Weighted average consumption by respondents of women's degree of use of forest resources, Atabanda, 2000 (source Table 3.6)

Resources	Weighted average dependence
Fuel	2.78
Food	2.58
Grazing of Livestock	2.09
Herbs and Medicine	2.08
Thatch Material	2.03
Building Material	1.50

Note: Weighted average of herbs and medicine is calculated on 24 observations (source: Table 3.6)

Table 3.7 has been plotted in Figure 3.6 below in the same order. Fuel and food have the highest weights as far as women's use is concerned.



The survey investigated in the use of forest products by both men and women. The response to question 9 in the survey provides a comparison between men and women for the use of forest products.

3.3.4 Comparative male and female dependence on the forest in Atabanda

The survey asked the villagers to indicate male and female bias of forest activities (question 10). The response was in percentage terms indicating that collection of forest produce for all categories were both male and female activities, although they vary in intensity. The response data has been presented in Table 3.8.

Table 3.8
Domination of sex in collecting various forest resources

Resources	F>M	M>F	M=F
Fuel	31 (96.88%)	1 (3.12%)	0 (0%)
Food	21 (65.63%)	10 (31.25%)	1 (3.13%)
Building Material	4 (12.5%)	26 (81.25%)	2 (6.25%)
Thatch Material	1 (3.13%)	30 (93.75%)	1 (3.13%)
Livestock Grazing	6 (18.75%)	0 (0%)	26 (81.25%)
Herbs & Medicine	18 (56.25%)	10 (31.25%)	4 (12.5%)

Note: The table indicates whether a particular forest activity has higher Female (F>M) intensity, Male Intensity (M>F) or they are equal (M=F).

The intensity survey is consistent with the previous data tables (question 9 response). Thirty-one respondents stated that fuel collection was mainly the domain of females. Twenty-one of the respondents agreed that food collection was also a female activity. Building material and thatch material collection fell into the male domain as can be seen from Table 3.8. Livestock grazing is shared equally by male and female, where as herbs and medicine collection also falls in female activity, although not as strongly as fuel and food collection.

3.2.5 Women's use of forests in Atabanda

Twenty-seven out of the 32 the respondents agreed that women in the family make much more use of the forest than men and five of them did not answer (response to question 11). The result is presented in Table 3.9.

Table 3.9
Comparative use of forest by women in Atabanda; higher for women?

Response	**Frequency**	**Relative Frequency %**
Yes	27	100 (84)
No	0	0
No answer	5	16
Total Response	27	

Note: Total response is 27, as five of the respondents did not answer. The values in parentheses are the relative frequency based on total number of households (32).

The respondents were asked whether women command more respect in their family when they contribute to the income by using the forest (question 12). Twenty-seven of the 32 surveyed agreed that women command more respect when their forest activities contribute to the family income. Five of the respondents did not answer. The responses are presented in Table 3.10.

Table 3.10
Increase in women's status due to their contribution to family sustenance by collecting forest product

Response	Frequency	Relative Frequency %
Yes	27	100 (84)
No	0	0
No answer	5	(16)
Total Response	27	

Note: Total response is 27 as five of the respondents did not answer. The values in parentheses are the relative frequency based on total number of respondents (32).

The survey investigated whether it was becoming more difficult for women to contribute to the family income by using the forest (question 13). Eight of those surveyed stated that it was becoming more difficult for women to contribute to the family income through forest activities, however 22 disagreed, i.e., women did not find it more difficult to contribute to family income through their forest activity. Two of the respondents did not answer. The result is presented in Table 3.11 below.

Table 3.11
Degree of difficulty in collecting forest product in Atabanda

Response	Frequency	Relative Frequency %
Yes	8	26.6 (25)
No	22	73.3 (69)
No answer	2	6
Total Response	30	

Note: Values in parentheses indicate relative frequency based on the total number of respondents (32).

Those who agreed to the fact that it was becoming more difficult for women to contribute to family income by forest activity were asked whether this affected the women's influence in the family (question 14). Of the eight respondents, three stated that a reduction in contribution to family income did not affect the woman's influence in the family. Five out of the eight respondents did not answer. The result in presented in Table 3.12 below.

Table 3.12
Relationship between women's contribution and their status in the family

Response	Frequency	Relative Frequency %
Yes	0	0
No	3	38
No answer	5	62
Total Response	3	

The survey investigated the livestock grazing and cattle ownership of the villagers in Atabanda (question 15). Three families in the entire village did not own anything. However, most families owned cows, goats, pigs, or hens. Livestock grazing (cows and goats) is done in the forest . The results of the survey are presented below in Table 3.13. Cattle, goats, pigs, and hens indicate the number owned by each family. Frequency indicates number of families.

3.2.6 Livestock ownership in the village

Table 3.13
Ownership of livestock in Atabanda

Cattle	Frequency	Goats	Frequency	Pigs	Frequency	Hens	Frequency
1	1	2	2	1	1	2	3
2	10	3	2	2	8	4	4
3	6	4	5	3	7	5	3
4	4	5	4	4	3	6	7
5	1	6	5			8	3
		8	1			9	1
		9	1			10	5
						11	1
						12	1

Note: Two families own 10 head of cattle (cows or oxen). Twelve families own more than two head of cattle. In total, 22 families own cattle. Twenty families in the village own two or more goats, 16 of these families own four or more goats. Both cows and goats reflect the economic status of the villagers. Most families in forest villages own hens, in Atabanda 28 families owned hens. In addition, 19 families owned pigs.

3.2.7 Seasonal dependence of village households on forest resources

The survey queried whether there was any particular time when the villagers and their families were relatively more dependent on the forest for livelihood and survival (question 16). All the respondents stated that during August and September the village families were more dependent on the forest. During this time, there is a general lack of employment opportunities. In addition, they cannot perform their usual trade of selling plates of sal leaves as new leaves come up at this time of the year. However, during April and May they collect and sell cashew nuts and mahua flowers which help them to sustain their livelihood during August and September. The results are presented in Table 3.14 below.

Table 3.14
Higher forest dependency during August and September

Response	**Frequency**	**Relative Frequency %**
Yes	32	100
No	0	0
No answer	0	0
Total Response	32	100

The villagers were asked to categorize their dependence on forest for survival during drought or difficult session (question 17). Twenty-five of the 32 surveyed stated that their dependence on the forest for survival during drought or difficult seasons was high and seven stated their dependence to be medium. The results are given below in Table 3.15.

Table 3.15
Degree of dependence on the forest for survival during drought and difficult season

Response	Frequency	Relative Frequency %
High	25	78
Medium	7	22
Low	0	0
No answer	0	0
Total Response	32	100

PART B

3.3 Sustainability Issues

In this part sustainability of the forest use along with biodiversity and impact of forest use have been investigated. Villagers' suggestions regarding those issues are also presented in this section.

3.3.1 Sustainability of current forest use as perceived by the villagers in Atabanda

The survey queried about villagers' perception of future income flow from the forest. They were asked whether their forest will contribute less to their family's income in the future (question 18). Fourteen of the villagers said, that income flow from forest would decline due to a decline in forest area and greater use of forests by more people. However, seven of the respondents did not agree to this point of view, i.e., they perceived that income flow from the forest is sustainable due to planting of kaju trees and forest management. Eleven of those surveyed did not respond, however, they provided the same reason as those who perceived that income flow from forests was sustainable. The results from the survey are given below in Table 3.16.

Table 3.16
Villagers perception of regarding sustainability of forest use

Response	Frequency	Relative Frequency %
Yes	14	66.6 (44)
No	7	33.3 (22)
No answer	11	(34)
Total Response	21	

Note: Values in parentheses indicate relative frequency for total number of observations (32). The no-answer category in this table provides the same reasoning as those who answered no (indicating there are 21 no answers)—that is, 21 of the respondents perceived that income flow from the forest was sustainable.

3.3.2 Specific threats of identified forest practices to livelihood

The respondents were asked to categorize the various threats that could affect their income from forest use (question19). The threats were categorized as follows: logging (24 serious, 8 medium); failure to replant trees (4 serious, 28 medium); reduction in forest size (1 serious, 30 medium, 1 low); overgrazing (1 serious, 31 medium); and others (7 medium, no example provided). These results are presented in Table 3.17.

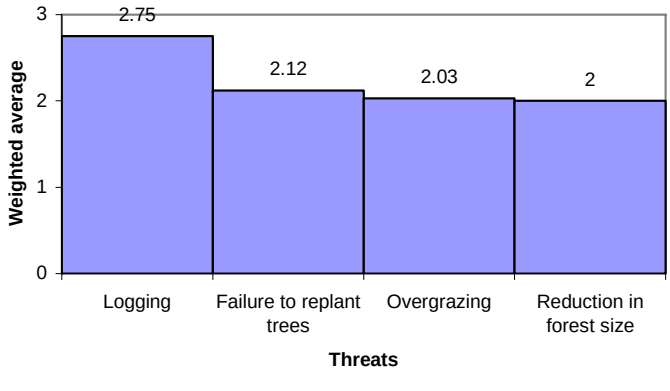
Table 3.17
Specific threats to forest use sustainability as identified by villagers in Atabanda

Protection	Different Threats	Frequency	Relative Frequency %
Logging	Serious	24	75
	Medium	8	25
	Low or None	0	0
	Total Response	32	100
Failure to replant trees	Serious	4	12.5
	Medium	28	87.5
	Low or None	0	0
	Total Response	32	100
Reduction in Forest Size	Serious	1	3
	Medium	30	94
	Low or None	1	3
	Total Response	32	100
Overgrazing	Serious	1	3
	Medium	31	97
	Low or None	0	0
	Total Response	32	100
Others	Serious	0	0
	Medium	7	22
	Low or None	0	0
	Total Response	7	

Note: Logging is the main threat to family livelihood in forest village.

The result of 3.17 has been used to calculate the threat perception of the villagers. Serious, medium and low have given weights of 3,2,1, respectively. Since there were only seven observations in the category of 'others', it has been excluded from the histogram that is presented below in figure 3.7. The threat perception of the villagers has been depicted in descending order of importance.

Figure 3.7
Threat to family livelihood



Note: It can be seen from the above diagram that logging is perceived as the main threat to villagers' livelihood. Failure to replant trees is also considered a serious threat. However, overgrazing and reduction in forest size are not perceived as serious threats.

The villagers were asked to list two factors that they considered the greatest threat to the economic reliance of their family on the forest (question 20). All 32 of the respondents listed logging and failure to replant trees as the two main threats. The results are consistent with the previous results presented above.

3.3.3 Trends and varieties of plants and animals in the forest biodiversity

The survey investigated the trends and varieties of product to assess the impact on biodiversity. The villagers were asked whether the variety of products available from the forest declined, increased, or remained constant in recent years. All the respondents agreed that the variety of products has increased in recent years. The main reason stated was plantation of cashew trees. The response is not very clear for this question. The results are presented in table 3.18.

Table 3.18
Trends in biodiversity due to forest use in Atabanda

Response	Frequency	Relative Frequency %
Declined	0	0
Constant	0	0
Increased	32	100
No response	0	0
Total Response	32	

Note: Villagers generally agreed varieties of forest product have increased.

Further investigations were made about wild animals and plants. The villagers were asked whether the variety of plants and wild animals in the forest declined, remained constant or increased (question 22). All of the respondents (32) stated that varieties of plant and wild animal have declined. The main reasons for the decline as stated by the forest villagers are: (1) decline in forest size that led to food shortage for animals; (2) illegal cutting of trees that are food sources for animals; and (3) killing of animals. The results are presented in Table 3.19.

Table 3.19
Trends in wildlife and pants in Atabanda

Response	Frequency	Relative Frequency %
Declined	32	100
Constant	0	0
Increased	0	0
No response	0	0
Total Response	32	

Note: Villagers unanimously agreed that plant variety and animals have declined over the years.

3.3.4 Villagers' suggestions for improving forest management

The survey sought villagers' suggestion regarding how the economic contribution of the forest to their livelihood could be made more secure (question 23). The suggestions by the villagers are given below:

- Plantation of varieties of valuable trees, e.g. sal and amlaki.
- Less plantation of eucalyptus due to its harmful side effects.

- Plantation of more neem trees as it purifies air.
- Increasing vegetation cover for mushroom, potatoes, and other vegetables including herbs.
- Developing social forestry.

PART C

3.4 Management Issues

The survey reconfirmed the name of the forest used by villagers in Atabanda (question 24). The survey looked into various issues of forest management starting with property rights. The respondents stated that 18 villages use the same forest area for their livelihood.

3.4.1 Customary rights of villagers to use the forest for livelihood

The survey queried whether the villagers had customary right to use the forest (question 25). Out of the 32 respondents 29 stated that they had customary rights to use the forest village while three of them said they did not have any such right. The results are given in Table 3.20.

Table 3.20
Customary right of villagers to use the forest for sustaining their livelihood

Response	Frequency	Relative Frequency %
Yes	29	90
No	3	10
No answer	0	0
Total Response	32	100

3.4.2 Joint forest management issues

The survey conducted a number of queries regarding joint forest management (JFM). They investigated whether the village had a joint forest committee (question 26), and if the villagers were member of such committee (question 27) and what was the proportion of male and female members in such a committee (question 28).

It was found that there is a joint forest committee in the village, that is, 28 of the villagers stated so and four of them did not answer. Regarding the second query of whether villagers were members of such committee, 15 of the respondents stated that villagers belong to the joint forest committee but 17 did not answer. However, a later visit by the authors confirmed the fact that villagers belong to the joint forest committee; in fact, every family had one member in such committee.

Regarding the ratio of the sexes, 20 of the respondents said that joint forest committee had male members only, whereas 12 of them mentioned both male and female members to be committee members (needs clarification).

The survey investigated the effectiveness of the joint forest committee. The villagers were asked whether this committee improved the sustainable management of the forest

(question 29). Thirty-one of the respondents stated that the joint forest committee has improved the sustainability of the forest by reducing illegal cutting of trees which lessened the decline of the forest area. The committee has been effective in preventing the killing of wild animals. One of those surveyed did not answer. The results are presented in Table 3.21.

Table 3.21
Effectiveness of Joint Forest Committee in forest conservation and maintaining biodiversity

Response	Frequency	Relative Frequency %
Yes	31	97
No	0	0
No answer	1	3
Total Response	31	0

The respondents were asked to list some of the perceived good and bad decisions of the joint forest committee (Question 30). Some of the good decisions by the villagers are:

- Formation of joint team of forest guards with villagers.
- Providing a share of income from the sale of timber to the villagers.

Some of the bad decisions of the joint forest committee as perceived by the villagers are:

- Share of the revenue from the sale of timber did not go to the individual villagers or many did not receive any benefit. (However, this is a misinterpretation which has been clarified by the authors from their visit to the villages. The share of the revenue from timber sales is not a regular income for villagers and it happens occasionally).

The survey queried whether there was any limit on the villagers for forest use (question 31). Twenty of the respondents stated there was no limit on forest use. However, two stated there were certain limits on forest use and 10 did not answer. The result is presented in Table 3.22.

Table 3.22
Limitations on forest use by villagers in Atabanda

Response	Frequency	Relative Frequency %
Yes	20	91 (63)
No	2	9 (6)
No answer	10	31
Total Response	22	

Note: Values in parentheses indicate relative frequency on total number of observation (32).

3.4.3 Forest management rules and customs in Atabanda

As stated earlier several villages share the forest. The villagers were asked how the resources are shared amongst them for example whether it was shared by customary rules or otherwise (question 32). The survey did not get any response regarding customary rules of sharing forest resources. Instead, villagers mentioned their particular

village custom—that is the celebration of forest god on 15 January each year. (This point needs to be clarified about Atabanda in particular).

As forest use is shared among villages there are possibilities of dispute regarding the collection of forest products. The survey investigated whether disputes arise between villages (question 33). Fourteen of the respondents stated that disputes occurred between villages, however, 18 of the respondents said disputes between villages did not occur. No example was provided about how disputes were settled.

3.4.3 Revenue sharing arrangement between villagers and forest department from sale of timber

The respondents where asked whether they received income from timber sold commercially from their forest and in what proportion (question 34). Thirty-one of the respondents stated that they a received 25 percent share of the income obtained by the sale of timber. However, one of the respondents said he did not receive any share of the income. (This point has been clarified by village visit as well—only one member of the family receives the share of the timber sale (the family member in the joint forest committee) The results are presented in Table 3.23.

Table 3.23
Villagers' share of revenue from the sale of timber

Response	Frequency	Relative Frequency %
Yes	31	97
No	1	3
Total Response	32	100
No answer	0	

3.4.4 Villager's share of revenue and sustainability of the forest

The villagers were asked whether they consider their share of income from the sale of timber to be fair (question 35). Twenty-nine of the respondents stated that they did not consider their share of income to be fair. Three of them did not provide any answer and no explanation was provided. The results are presented in Table 3.24.

Table 3.24
Villagers' perception regarding the fairness of revenue sharing arrangement

Response	Frequency	Relative Frequency %
Yes	0	0
No	29	100 (91)
Total Response	29	100
No answer	3	

Note: Values in parentheses indicate relative frequency on total number of observations (32).

In response to the question as to whether the villagers considered their share of income from sell of timber to be adequate for them to be willing to protect the forest from illegal harvesting of timber (question 36), 23 of the respondents stated the income was not sufficient for them to want them to protect the forest. However, seven of them stated that their share of income was adequate for them to want to protect the forest from illegal harvesting of timber. Two of the villagers did not answer. No explanation

was provided for their affirmative or negative answer. The results are presented in Table 3.25 below.

Table 3.25
Share of revenue and villagers' willingness to participate in forest protection

Response	Frequency	Relative Frequency %
Yes	23	77 (71.88)
No	7	23 (21.88)
No answer	30	100
Total Response	2	

Note: Values in parentheses indicate relative frequency on total number of observation (32).

3.4.5 Women's participation in joint forestry management in Atabanda

The survey investigated some gender issues as well. Villagers were asked whether they think there should be more women in the joint forest committee (question 37). Thirty of the respondents stated that they think there should be more women in the JFM and two did not answer. The reason for supporting (by respondents) more women participation in JFM are as follows:

- Women cut down overgrowth of forest and usually do not cut down valuable trees.
- They assist forest guards in curbing illegal harvesting of timber.

The results are presented in Table 3.26.

Table 3.26
Support of higher women's participation in JFM

Response	Frequency	Relative Frequency %
Yes	30	100 (93.75)
No	0	0
Total Response	30	100
No answer	2	

Note: Values in parentheses indicate relative frequency on total number of observations (32).

3.4.6 Villagers' perception of returns from joint forestry management

The villagers were asked whether forests under the joint forestry committee provided higher return from logging compared to non-protected forests (question 38). All of the respondents stated that forests under JFM provided more benefits compared to non-protected forests. The results are presented in Table 3.27.

Table 3.27
Higher return from JFM as compared to non-protected forest

Response	Frequency	Relative Frequency %
Yes	32	100
No	0	0
Total Response	32	100
No answer	0	

The survey investigated whether planted trees were more protected in state-controlled forests in comparison to non-protected forests (question 39). All respondents stated planted trees were more protected under state controlled forests compared to non-protected forests. The results are presented in Table 3.28.

Table 3.28
Protection of planted trees under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	32	100
No	0	0
Total Response	32	100
No answer	0	

It was investigated whether the capacity of the forest to sustain poor families increased more in state controlled forests compared to non-protected forests (question 40). All the respondents stated that poor families were sustained better under state controlled forests. The results are presented below in Table 3.29.

Table 3.29
Higher contribution to sustenance of poor families under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	32	100
No	0	0
Total Response	32	100
No answer	0	

3.4.7 Decision-making in forestry management and the village women's influence

The survey investigated whether decisions were made by forest officers, by the majority of members of the JFM or by the villagers (question 41). All the respondents stated that decisions in JFM were taken by villagers. The results are presented in Table 3.30.

Table 3.30
Decision-making apparatus under JFM

Response	Frequency	Relative Frequency %
Forest Officer	0	0
Management Committee	0	0
Villagers	32	100
Total Response	32	100
No answer	0	

Women's decision-making power in JFM was investigated. In response to the query whether they had any influence in decision-making (question 42), twenty-seven of the respondents stated that women did exercise influence on decision-making in JFM. However, five of the respondents stated that women did not influence decision-making in the JFM. The results are presented in Table 3.31.

Table 3.31
Women's influence in decision making under JFM

Response	Frequency	Relative Frequency %
Yes	27	84
No	5	16
Total Response	32	100
No answer	0	

Three main reasons were cited by the five respondents as to why women could not influence decision-making (question 43). These are as follows:

- Women members are in a minority
- Male members take the decisions and do not ask for the opinions of female members
- Forest officers set the agenda and make the decisions

3.4.8 Deficiencies of the current practice of forest management

The villagers were asked about the deficiencies of the current practice of forest management (question 44). All the respondents agreed with the four deficiencies in the questionnaire in addition to some other deficiencies. They are as follows:

- Corruption (bribes) etc
- Failure to completely prevent illegal operators
- Lack of proper training for forest protection and management
- Lack of honest effort and cooperation by government officials
- Other reasons—lack of proper education for social forestry, lack of skills in social forestry
- No replantation of valuable fruit trees and herbs.

The villagers were asked if the above-mentioned deficiencies were removed, whether they perceived that the forest would provide greater benefits to females and their families on a long-term basis (question 45). All the respondents stated that the removal of deficiencies would benefit females and their families on a long-term basis. The results are presented in Table 3.32.

Table 3.32
Removal of management deficiencies would lead to higher benefits from JFM

Response	Frequency	Relative Frequency %
Yes	32	100
No	0	0
Total Response	32	100
No answer	0	

3.4.9 Villagers' perception about the role of NGOs in joint forestry management

The survey queried whether the villagers' thought that the abovementioned deficiencies would be removed and the forest would be better protected if managed jointly by an

NGO and the villagers (question 46). All the respondents stated that forest could be better managed and deficiencies removed by joint management of NGO and villagers. The results are presented in Table 3.33.

Table 3.33
Villagers' perception of NGO's potential in JFM

Response	Frequency	Relative Frequency %
Yes	32	100
No	0	0
Total Response	32	100
No answer	0	

The villagers were asked whether they thought that the returns to families also would be higher under an NGO management than what would be obtained under government management (question 47). All the villagers stated that they thought returns would be better under NGO management compared to government management. The results are presented below in Table 3.34.

Table 3.34
Villagers' perception of return under JFM compared to NGO participation

Response	Frequency	Relative Frequency %
Yes	32	100
No	0	0
Total Response	32	100
No answer	0	

Discussion and Conclusion.

The survey of villagers from Atabanda provides a number of interesting facts about community involvement in forestry and sustainable forestry management. In addition to investigating a number of key socio-economic indicators, various other issues like property rights, gender participation in forestry activities, sustainability, and biodiversity have been investigated. Future income expectations, and villagers' view have been documented in this report.

Villagers in Atabanda in general are poor except for five households who categorized themselves in the higher economic class and one in the middle economic class. Except for these six families, the rest of the villagers are highly dependent on the Arbari forest for their livelihood. On average, 70 percent of the cash income of the villagers is derived out of the forest products in addition to various non cash forest resources like fuel, food, building and thatch material, grazing of livestock and herbs and medicine.

It has been established from the survey that women in Atabanda use the forest mostly for fuel and food collection and men are more dependent for collection of building and thatch material. Both men and women use the forest for grazing of their livestock. Women also collect most of the herbs and medicine from the forest.

Eighty-four percent of the respondents agreed that women command more respect in their family when they contribute to the income by using the forest, and 16 percent did not answer. However, this 16 percent falls in the higher economic category and only have a medium level of dependency on the forest products. Women in general agreed

that the reduction of their contribution to the family income by collecting forest products does not affect their influence in the family.

Most of the villagers, 56 percent, were of the view that income generation from the forest is sustainable due to the planting of kaju trees. However, 44 percent of the villagers believed that income flow from the forest would decline due to the reduction of forest area and greater use of forests by more people. Logging and failure to replant trees were considered the main threats to income sustainability from the forest in addition to reduction in forest size and overgrazing.

Although villagers agreed that varieties of forest products have increased, they unanimously agreed that varieties of plants and animals have declined in recent years. There is a clear declining trend in biodiversity due to illegal logging and killing of animals.

The villagers agreed (later confirmed by a senior author's visit) that there is a joint forest management committee in the village. Almost all of the villagers were of the view that this committee has improved the sustainability of the forest by reducing illegal logging and preventing killing of wild animals. The decisions regarding forestry management in this committee were made by the villagers, as established by the survey. Although there are women members in the committee, they have little or no influence in decision-making. Most villagers supported increased women's participation in this committee.

A number of deficiencies of the joint forest management committee, as perceived by the villagers have been documented. The villagers' suggestions regarding improvement of joint forestry management is also presented in the report. Villagers unanimously agree that joint forestry management is better than unprotected forest, however, they are of the belief that sustainability of the forest would improve and returns to the villagers would increase if joint management were conducted with NGOs rather than the government.

4. SUMMARY OF DATA OBTAINED FROM SURVEY

PART A

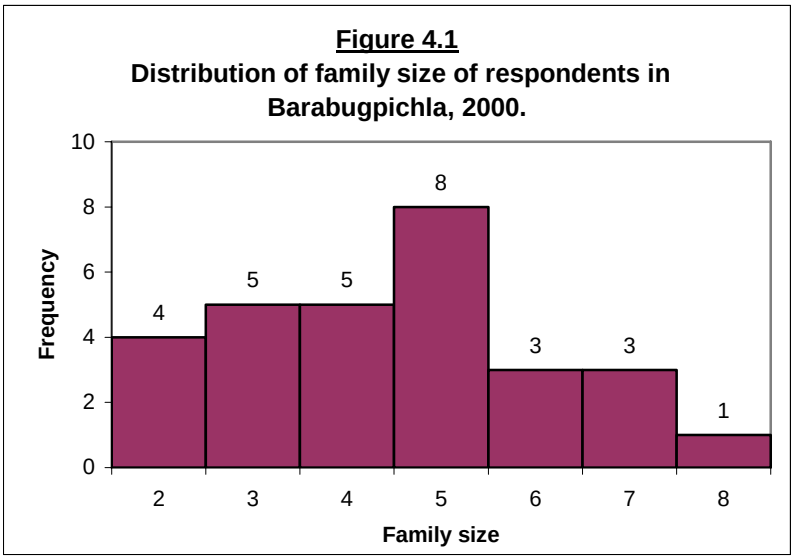
4.1 Introduction

Village Barabugpichla is situated in North Midnapore and is clearly depicted on the map by Legend 2. All the village households were surveyed, which is a village population of 29 families. All the people surveyed are Santals and practice the Sari religion.

Village Barabugpichla falls within the Arabari region. The forest areas used by villagers are called Barabugpichla, Moldanga, Birpatra, and Bankumari. All these areas fall under the forest Beat Kyamacha, the Rage office of which is Nayabasat.

4.1.1 Socio-economic characteristics

The survey collected information on various socio-economic indicators that include family size, dependent children and adults' and villagers' perceived economic status. The first two questions in the survey are related to religion and caste. The third question is about the size of the family. The data collected in response to the third question is presented below in Figure 4.1.



Note: The average family size is 4.48, however, a modal average puts the average at five per family. The largest family consists of 8 people. In addition to family size, the survey investigated the number of children each family has, and the average dependency ratio. Question 4 and 5 in the survey related to the number of dependent children and adults respectively. The following Table 4.1 provides the frequency distribution of dependent children in Barabugpichla.

Table 4.1
Frequency of dependent children per family

Number of dependent children	Frequency per family
0	6
1	9
2	7
3	6
4	1

Note: Average number of dependent children is 1.5. Seven families have one dependent adult each.

4.1.2 Dependency Ratio

The dependency ratio is based on the number of dependents over number of independents and provides a socio-economic indicator for the forest villagers. Dependency ratio was calculated by including both dependent adults and children. In the first stage, dependency ratio for each family was calculated which was later averaged for the whole village. The overall dependency ratio of the village Barabugpichla is 0.7327.

4.1.3 Economic status of the villagers

The villagers were asked to categorize themselves in terms of their relative economic status in the village (Question 6). Fourteen off the villagers classify themselves to be in the lowest economic class. Three of the surveyed consider themselves to be in the top economic class and 12 families consider themselves to be in the middle class. In terms of relative economic class it is unlikely that so few of the villagers would be in the highest economic category. It is likely that villagers misinterpreted the survey question and in general considered themselves to be poor or middle class rather than relative to the village economic conditions. The visit by the authors to the village confirms the fact that villagers generally are quite poor. The results from the survey are given below in Table 4.2.

Table 4.2
Self-measurement by respondents of their family economic status in the village compared to other families

Position	Frequency	Relative Frequency	No Response
Top one Third	3	0.1034	0
Middle one third	12	0.4138	0
Lower One Third	14	0.4828	0
Total	29	1	0

Note: The economic status of the villagers and relative frequency for village Barabugpichla has been presented in Table 4.2.

4.2 Economic dependence of households in Barabugpichla on forest resources

The respondents in Barabugpichla were asked to classify their forest dependency in terms of high, medium or low (question 7). 27 of the households categorized their forest dependency as high and 2 of them categorized their forest dependence as

medium. In percentage terms 93 percent of the villagers are highly dependent on the forest and 7 percent have a medium dependency on forests for their livelihood.

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4.2.1 Cash Dependency of villagers on the forest

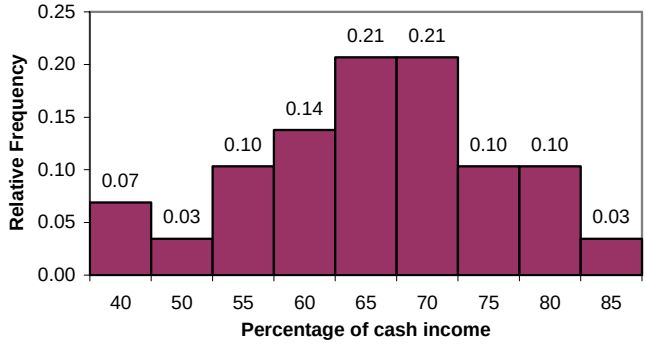
The households were asked about the percentage of their income derived from the use of forest products (question 8). The percentage of income derived from the forest products for villagers in Barabugpichla varies from 40 to 85 percent. The result of the survey is presented in Table 4.3 below.

Table 4.3
Percentage of family cash income obtained from forest resources, frequency.

Cash income (percentage)	Frequency
40	2
50	1
55	3
60	4
65	6
70	6
75	3
80	3
85	1
Total	29

Note: Considering the Modal value as average we can conclude on average 65% -70%of cash income for villagers in Barabugpichla comes from forest products, even the lowest cash dependence on forest products is 40%. The data points out the high level of forest dependence of cash income in forest villages. The relative frequencies of the percentage of cash dependence has been calculated by using Table 4.3 and has been presented in Figure 4.2 below.

Figure 4.2
Percentage of family household cash income obtained from forest resources, relative frequency, Barabugpichla, 2000.



4.2.2 Dependence on forest to meet basic family needs directly

The survey undertook detailed investigation about forest dependency of the villagers (question 9). The villagers are dependent on the forest for fuel, food, building material, thatch material, grazing of livestock and herbs and medicines. The respondents were asked to rank those in high, medium, or low order according to their relative

importance. The detail of the survey response is provided in the following Table 4.4. For each category of forest product, the frequency and relative frequencies have been calculated and presented in the table.

Table 4.4
Economic dependence (cash and non-cash) on forest for –purposes of households surveyed in Barabugpichla, 2000, by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	27	1	1	29	0
Relative Frequency	0.931	0.034	0.034	1	0
Food					
Frequency	28	1	0	29	0
Relative Frequency	0.966	0.034	0	1	0
Building Material					
Frequency	27	2	0	29	0
Relative Frequency	0.931	0.069	0	1	0
Thatch Material					
Frequency	20	8	1	29	0
Relative Frequency	0.690	0.276	0.034	1	0
Grazing of Livestock					
Frequency	16	12	1	29	0
Relative Frequency	0.552	0.414	0.034	1	0
Herbs and Medicine					
Frequency	7	19	3	29	1
Relative Frequency	0.241	0.655	0.103	1	1

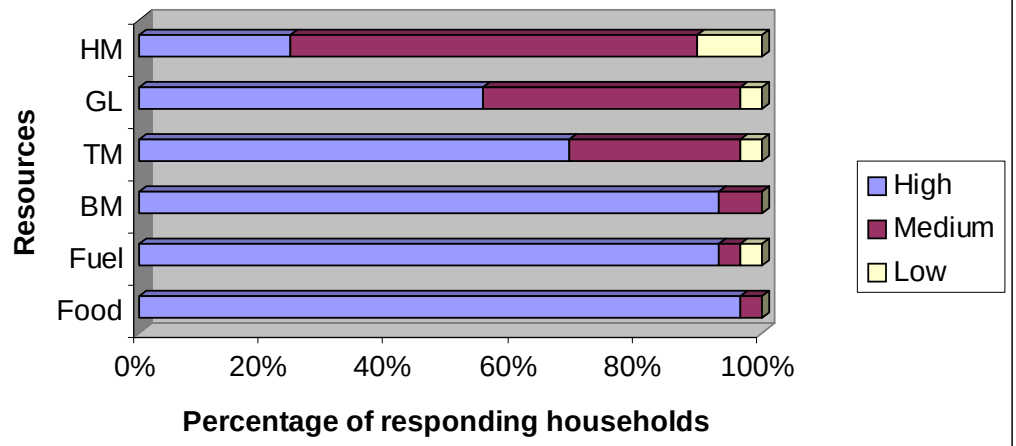
Note: From table 4.4 above it can be seen, that dependency on forests for collecting fuel, food, building, and thatch material, use of forest for grazing of livestock is quite high.

In addition to the forest products mentioned above, the villagers collect bamboo and sal leaves to make baskets and plates respectively. They also collect wood for making furniture. The different categories of food they collect include mango, amlaki, cashew nuts, edible leaves, flowers, honey, roots, wild games, and fish. The villagers sell various products like baskets and plates, fuel wood and mushrooms for supplementing their meager incomes.

The dependence on forest products according to their significance is plotted in the figure below. The various forest products are categorized in High, Medium, and Low

according to their relative dependence, the frequency of which is given in Table 3.4 above. HM, GL, TM, and BM are Herbs and Medicines, Grazing of Livestock, Thatch Material and Building Material respectively. Figure 4.3 below follows the ascending order in terms of relative dependence on the forest product. For Example, herbs and Medicine has the lowest relative dependence and Building Material has the highest relative dependence.

Figure 4.3
Relative dependence of families in Atabanda on forest resources for different purposes (Source: based on Table 4.4)

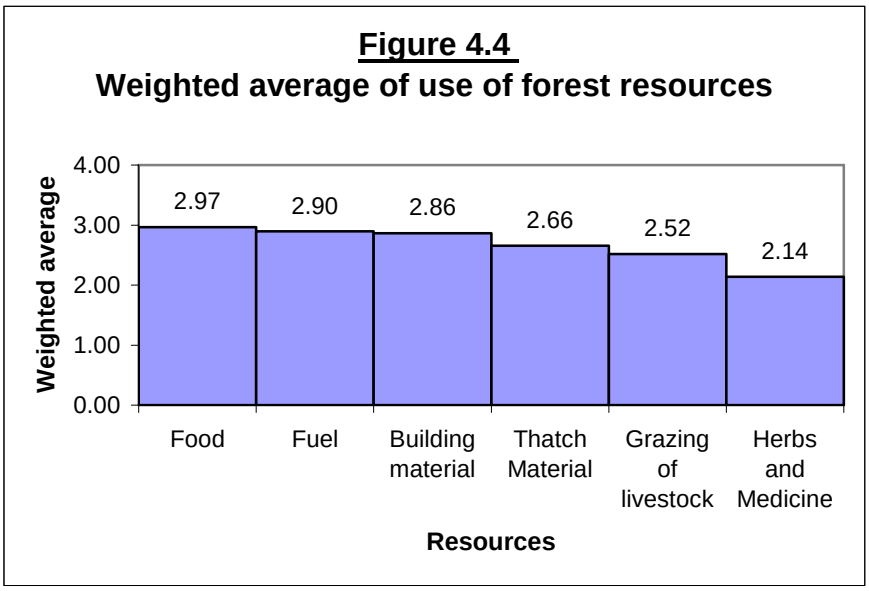


The weighted average relative dependence has been calculated and presented in Table 4.5 below. The frequency and weights are derived from Table 4.4. High, Medium and Low dependence has been allocated weights of 3, 2, and 1 respectively. The weighted average is given in descending order in the table below.

Table 4.5
Weighted average consumption by respondents of forest resource dependence, Barabugpichla 2000

Resources	Weighted average dependence
Food	2.97
Fuel	2.90
Building Material	2.86
Thatch Material	2.66
Grazing of Livestock	2.52
Herbs and Medicine	2.14

The weighted average of various forest resources is given in Table 4.5. Fuel and food has the highest weights respectively. However, most of the forest products have relatively high weights in the village Barabugpichla. The weighted average is given in descending order and has been plotted in Figure 4.4.



4.2.3 Gender dependence on forests for family livelihood in Barabugpichla

Question 9 of the survey was divided into two parts. The first part consists of the economic dependence of the family on the forest, which has been presented above. The second part consisted of women's dependence and use of forest produce, which is described in the same manner in the following tables and figures. It is generally agreed, that women are more dependent on the forest compared to men. However, their dependence may vary depending on the use of forest products for their own purpose. Table 4.6 below presents the women's economic dependence on forests.

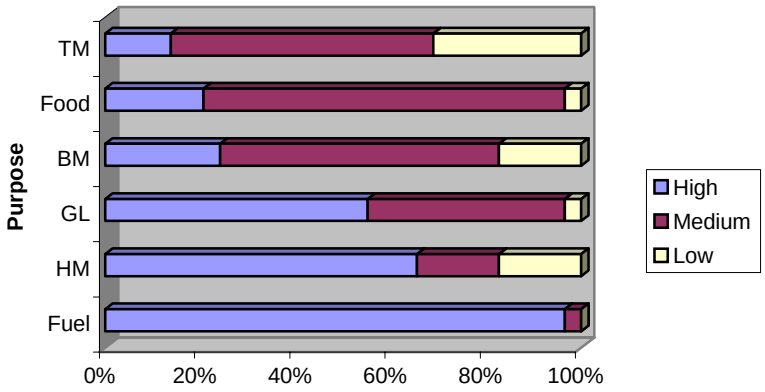
Table 4.6
Women's economic dependence (cash and non-cash) on forest – surveyed in Barabugpichla, 2000, by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	28	1	0	29	0
Relative Frequency	0.966	0.034	0	1	0
Food					
Frequency	6	22	1	29	0
Relative Frequency	0.207	0.759	0.034	1	0
Building Material					
Frequency	7	17	5	29	0
Relative Frequency	0.241	0.586	0.172	1	0
Thatch Material					
Frequency	4	16	9	29	0
Relative Frequency	0.138	0.552	0.310	1	0
Grazing of Livestock					
Frequency	3	24	2	29	0
Relative Frequency	0.103	0.828	0.069	1	0
Herbs and Medicine					
Frequency	19	5	5	29	0
Relative Frequency	0.655	0.172	0.172	1	0

Note: It can be observed from Table 4.6 that women in Barabugpichla have a very high dependence on the forest for collection of fuel and herbs and medicine.

Figure 4.5 below presents women's use of forest products in the ascending order. It can be seen collection of fuel and herbs and medicines have the greatest priority for females.

Figure 4.5
Relative use of forests by women for livelihood purpose (Source: Table 4.6)



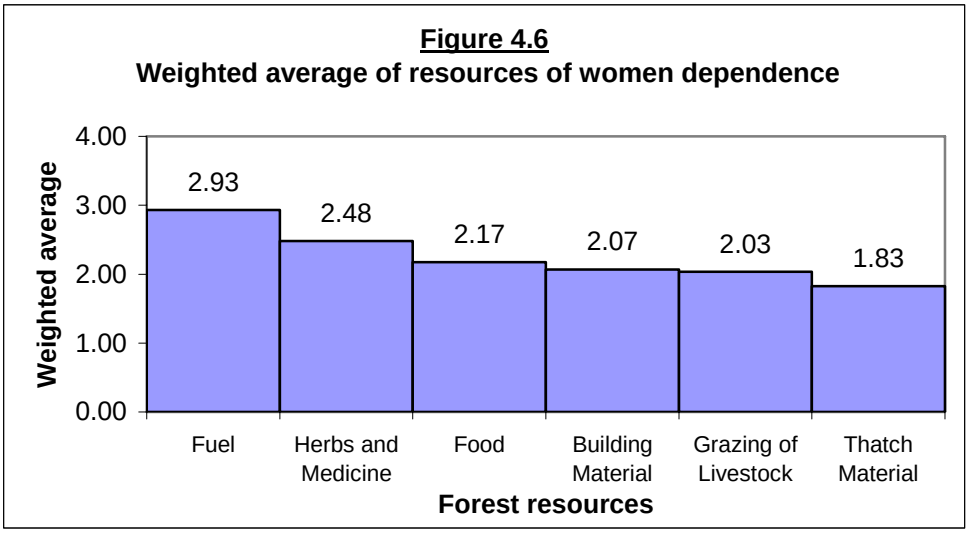
Note: A comparison between Figures 4.3 and 4.5 provides a clear distinction between men and women's use of forest products. Women are highly dependent on the forest for collection of fuel and herbs and medicine whereas men are highly dependent for almost every product. The weighted average of women's dependence on forest products is given in Table 4.7.

Table 4.7
Weighted average consumption by respondents of women's degree of use forest resource, Barabugpichla, 2000

Resources	Weighted average dependence
Fuel	2.96
Herbs and Medicine	2.48
Food	2.17
Building Material	2.07
Grazing of Livestock	2.03
Thatch Material	1.87

Note: Weighted average is given in descending order. Fuel has the highest weight for women's purpose.

Weighted average values from Table 4.7 have been plotted in figure 4.6.



The survey investigated the use of forest products by both men and women. The response to question 9 in the survey provides a comparison between men and women for the use of forest products.

4.2.4 Comparative male and female dependence on the forest in Barabugpichla

The survey asked the villagers to indicate male and female bias of forest activities (question 10). The response was in percentage terms indicating that collection of forest produce for all categories was both male and female, although they vary in intensity. The response data has been presented in Table 4.8.

Table 4.8
Domination of sex in collecting various forest resources

Resources	F>M	M>F	M=F
Fuel	25 (86%)	2 (6%)	2 (6%)
Food	27 (93.10%)	1 (3.45%)	1 (3.45%)
Building Material	3 (10.34%)	25 (86.21%)	1 (3.45%)
Thatch Material	7 (24.14%)	21 (72.41%)	1 (3.45%)
Livestock Grazing	6 (20.69%)	5 (17.24%)	18 (62.07%)
Herbs & Medicine	8 (27.595%)	17 (58.62%)	4 (13.79%)

Note: The table indicates whether a particular forest activity has higher Female (F>M) intensity, Male Intensity (M>F) or they are equal (M=F). The result from Table indicates that fuel and food is the main domain of the women. Building material, thatch material and herbs and medicine in general fall in male forest activities. The results are not consistent with previous response (question 9).

Twenty-five of the 29 surveyed stated that fuel collection from forests was generally a female activity. Twenty-seven of those surveyed said food collection in general falls into female activity as well. This is in contrast to the results of Table 4.6 (although it is generally agreed that both fuel and food collection is done by females in the forest village). The response for the category of herbs and medicine is not consistent with Table 4.6 as well. However, the male activities involving building and thatch material collection are consistent.

3.2.5 Women's use of forest in Barabugpichla

All the respondents agreed that women in the family make much more use of the forest than men (question 11). The results are given in Table 4.9.

Table 4.9
Comparative use of forest by women in Barabugpichla; higher for women?

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
No answer	0	0
Total Response	29	100

The respondents were asked whether women command more respect in their family when they contribute to the income by using the forest (question 12). All the respondents stated that women command more respect when their forest activities contribute to the family income. The results are presented in Table 4.10 below.

Table 4.10
Increase in women's status due to their contribution to family sustenance by collecting forest product

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
No answer	0	0
Total Response	29	100

The survey investigated whether it was becoming more difficult for women to contribute to the family income by using the forest (question 13). Three of those surveyed stated that it was becoming more difficult for women to contribute to family income by forest activities, however 26 disagreed, i.e., women did not find it more difficult to contribute to family income by their forest activity. The results are presented in Table 4.11.

Table 4.11
Degree of difficulty in collecting forest product in Barabugpichla

Response	Frequency	Relative Frequency %
Yes	3	10.34
No	26	89.66
No answer	0	0
Total Response	29	100

Those who agreed to the fact that it was becoming more difficult for women to contribute to family income by forest activity were asked whether this affected the women's influence in the family (question 14). All three respondents stated that a reduction in contribution to family income lessened the woman's influence in the family. The results are presented in Table 4.12.

Table 4.12
Relationship between women's contribution and their status in the family

Response	Frequency	Relative Frequency %
Yes	3	3
No	0	0
No answer	0	0
Total Response	3	100

Note: All the respondents agreed reduction in income contribution led to a reduction in women's influence in the family.

The survey investigated the livestock grazing and cattle ownership of the villagers in Barabugpichla (question 15). Nine families in the village did not own anything. However, most families owned cows, goats, pigs, or hens. Livestock grazing (cows and goats) is done in the forest. The results of the survey are presented in Table 4.13.

Table 4.13
Ownership of Livestock in Village Barabugpichla

No of Cattle	Frequency	No of Goat	Frequency	No of Pig	Frequency	No of Hen	Frequency
1	4	1	1	1	6	1	1
2	8	2	7	2	2	2	5
3	2	3	3	Total	8	3	1
4	2	4	3			4	3
6	2	Total	14			5	8
Total	18					6	1
						Total	19
Nine out of 29 surveyed did not own any cattle, goats, pigs, or hens.							

Note: Nine families out of the 29 surveyed did not own any kind of cattle, goats, pigs, or even hens. From Table 4.13, we can see 18 families owned cattle—which is the bigger animal and is a considerable indicator of socio-economic status. Of those, 14 families that owned cattle owned goats as well. 8 of the families owned pig in Barabugpichla and, 19 families owned hens out of the 29 surveyed.

The survey queried whether there was any particular time when the villagers and their families were relatively more dependent on the forest for livelihood and survival (question 16). All the respondents stated that during August and September the village families were more dependent on the forest. During this time there is in general lack of employment opportunities. The results are presented in Table 4.14.

Table 4.14
Higher forest dependency during August and September

Response	Frequency	Relative Frequency %
Yes	29	29
No	0	0
No answer	0	0
Total Response	29	100

The villagers were asked to categorize their dependence on forest for survival during drought or difficult session (question 17). All the respondents stated that their dependence on the forest for survival during drought or difficult session was high. The results are given below in Table 4.15.

Table 4.15
Degree of dependence on the forest for survival during drought and difficult season

Response	Frequency	Relative Frequency %
High	29	100
Medium	0	0
Low	0	0
No answer	0	0
Total Response	29	100

PART B

4.3 Sustainability Issues

In this part, sustainability of the forest use along with biodiversity and impact of forest use have been investigated. Villagers' suggestions regarding those issues are also presented in this section.

4.3.1 Sustainability of current forest use as perceived by the villagers in Barabugpichla

The survey queried villagers' about their perception of future income flow from the forest. They were asked whether their forest will contribute less to their family's income in the future (question 18). All the villagers said that income flow from forest would decline due to like declining forest area, greater use of forests by more people and population pressure. The results from the survey are given in Table 4.16.

Table 4.16
Villagers' perception regarding sustainability of forest use

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
No answer	0	0
Total Response	29	100

4.3.2 Specific threats of identified forest practices to livelihood

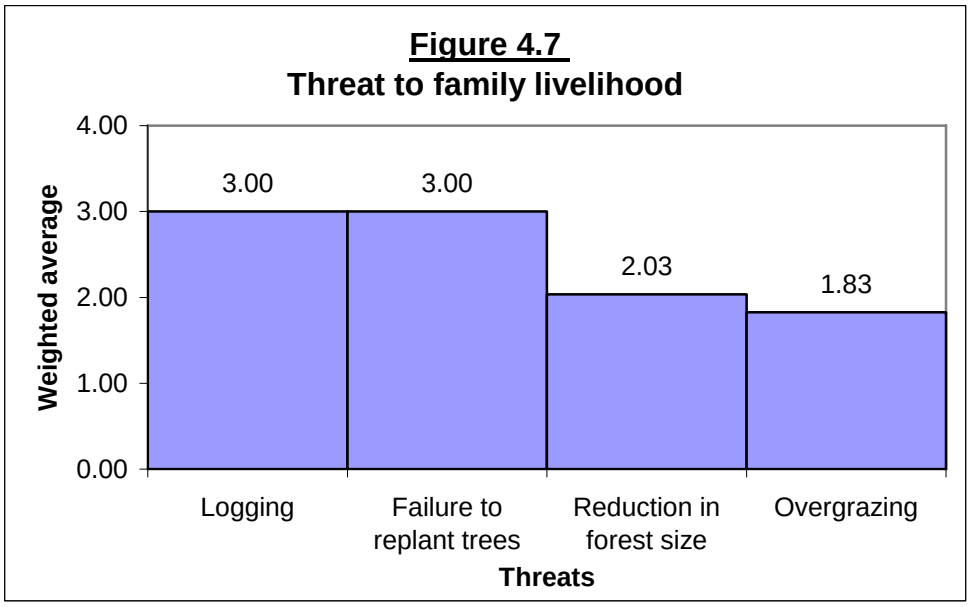
The respondents were asked to categorize the various threats that could affect their income from the forest use (question 19). The threats were classified as follows: logging (29 serious); failure to replant trees (29 serious); reduction in forest size (one serious, 28 medium); overgrazing (two serious, 23 medium, four low). The results are presented in Table 4.17.

Table 4.17
Specific threats to forest sue sustainability as identified by villagers in Barabugpichla

Protection	Different Threats	Frequency	Relative Frequency %
Logging	Serious	29	100
	Medium	0	0
	Low or None	0	0
	Total Response	29	100
Failure to replant trees	Serious	29	100
	Medium	0	0
	Low or None	0	0
	Total Response	29	100
Reduction in Forest Size	Serious	1	3.4
	Medium	28	96.6
	Low or None	0	0
	Total Response	29	100
Overgrazing	Serious	2	6.9
	Medium	23	79.31
	Low or None	4	13.79
	Total Response	29	100
Others	Serious	0	0
	Medium	0	0
	Low or None	0	0
	Total Response	0	0

Note: Logging and failure to replant trees are the main threats to family livelihood in the forest village Barabugpichla.

The results from Table 4.17 have been used to calculate the weighted average threat perception of the villagers. Serious, medium and low have been allocated weights of three, two, one respectively. There was no observation on the 'others category' and is therefore excluded from Figure 4.7. The threat perception of the villagers has been depicted in descending order of importance.



Note: It can be seen from the above diagram that logging and failure to replant trees are perceived to the main threats to villagers' livelihood. Overgrazing and reduction in forest size are not considered to be as serious threats as the other two.

The villagers were asked to list two factors which where the greatest threat to the economic reliance of their family on the forest (question 20). All 29 of the respondents listed logging and failure to replant trees as the two main threats. The results are consistent with the previous results presented above.

4.3.3 Trends and varieties of plants and animals in the forest—bio-diversity

The survey investigated the trends and varieties of product to assess the impact on biodiversity. The villagers were asked whether the variety of products available from the forest declined, increased, or remained constant in recent years. All the respondents agreed that variety of products have declined in recent years. The main reasons as stated by the villagers are illegal logging, overgrazing, and reduced soil fertility due to illegal timbering. The results are presented in table 4.18 below.

Table 4.18
Trends in biodiversity due to forest use in Barabugpichla

Response	Frequency	Relative Frequency %
Declined	0	0
Constant	0	0
Increased	29	100
No response	0	0
Total Response	29	100

Further investigations were made about wild animals and plants. The villagers were asked whether the variety of plants and wild animals in the forest declined, remained constant or increased (question 22). All of the respondents stated that varieties of plant and wild animal have declined. The main reason for the decline as stated by the forest villagers are: (1) decline in forest size which led to food shortage for animals; and (2) illegal cutting of trees which are a food source for animals. The results are presented in Table 4.19.

Table 4.19
Trends in wildlife and plants in Barabugpichla

Response	Frequency	Relative Frequency %
Declined	29	100
Constant	0	0
Increased	0	0
No response	0	
Total Response	29	100

Note: Villagers unanimously agreed that plant variety and animals have declined over the years.

The survey sought villagers' suggestions regarding how the economic contribution of the forest to their livelihood could be made more secure (question 23). The suggestions by the villagers are given below:

- Plantation of varieties of valuable trees, e.g. sal and amlaki.
- Less plantation of eucalyptus due to its harmful side effects.
- Plantation of more neem trees as it purifies air.
- Increasing vegetation cover for mushroom, potatoes, and other vegetables including herbs.
- Developing social forestry.

PART C

4.4 Management Issues

The survey reconfirmed the name of the forest used by villagers in Barabugpichla (question 24). The survey looked into various issues of forest management starting with property rights. The respondents stated that nine villages use the same forest area for their livelihood.

4.4.1 Customary rights of villagers to use the forest for livelihood

The survey queried whether the villagers had customary right to use the forest (question 25). All 29 respondents stated that they had customary rights to use the forest village. The results are given in Table 4.20 below.

Table 4.20
Customary right of villagers to use the forest for sustaining their livelihood

Response	Frequency	Relative Frequency %
Yes	29	100
No	3	10
No answer	0	0
Total Response	29	100

4.4.2 Joint forest management issues

The survey conducted a number of queries regarding joint forest management (JFM). They investigated whether the village had a joint forest committee (question 26), and if

the villagers where members (question 27) and the proportion of male to female members in such a committee (question 28).

It was found that there is a joint forest committee in the village, that is, all 29 of the villagers stated so. Regarding the second query of whether villagers were members in such committee all the respondents stated that villagers belong to the joint forest committee. The joint forest committee consists of 24 male and 2 female members according to all the 29 respondents.

The survey investigated the effectiveness of the joint forest committee. The villagers were asked whether this committee improved the sustainable management of the forest (question 29). Twenty-five of the respondents stated that the joint forest committee has improved the sustainability of the forest by reducing illegal cutting of trees that lessened the decline of the forest area. The committee has been effective in preventing the killing of wild animals according to the same respondents. However, two of the respondents stated that the joint forest committee has not been effective and two of those surveyed did not answer. The results are presented in Table 4.21.

Table 4.21
Effectiveness of Joint Forest Committee in forest conservation and maintaining biodiversity

Response	Frequency	Relative Frequency %
Yes	25	96.59 (86.20)
No	2	7.4(6.9)
No answer	2	7.4(6.9)
Total Response	27(29)	100

Note: Value in parenthesis indicates relative frequency on total number of observation (29).

The respondents were asked to list some of the perceived good and bad decisions of the joint forest committee (Question 30). Some of the good decisions by the villagers are:

- Formation of joint team of forest guards with villagers
- Providing a share of income from sale of timber to the villagers.

Some of the bad decisions of the joint forest committee as perceived by the villagers are:

- Share of the revenue from the sale of timber did not go to the individual villagers or many did not get any benefit. (However, this is a misinterpretation which has been clarified by the authors from their visit to the villages. The share of the revenue from the sale of timber is not a regular income for villagers and it happens occasionally).

The survey queried whether there was any limit on the villagers for forest use (question 31). Twenty-five of the respondents stated there was no limit on forest use. However, three respondents stated there were certain limits of forest use and one villager did not answer. The result is presented in Table 4.22.

Table 4.22
Limitations on forest use by villagers in Barabugpichla

Response	Frequency	Relative Frequency %
Yes	3	10.71 (10.34)
No	25	86.29(86.21)
Total Response	28	100
No answer	1	3.44

Note: Value in parenthesis indicates relative frequency on total number of observation (29).

4.4.3 Forest management rules and customs in Barabugpichla

As stated earlier the forest is shared by several villages. The villagers were asked how the resources are shared amongst them, for example, whether it was shared by customary rules or otherwise (question 32). The survey did not get any response regarding customary rules of sharing forest resources. As forest use is shared among villages there are possibilities of dispute regarding the collection of forest products. The survey investigated whether disputes arise between villages (question 33). Eight of the respondents stated that disputes occurred between villages the rest did not answer. No example was provided about how disputes were settled. Village Barabugppichla holds the celebration of the forest god on 2 June. On that particular day, no one is allowed to go to the forest.

4.4.4 Revenue sharing arrangement between villagers and forest department for sale of timber

The respondents where asked whether they received income from timber sold commercially from their forest and if yes in what percentage (question 34). All 29 of the respondents stated that they received a 25 percent share of the income obtained from the sale of timber. The results are presented in Table 4.23.

Table 4.23
Villagers' share of revenue from the sale of timber under JFM

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

4.4.5 Villagers' share of revenue and sustainability of the forest

The villagers were asked whether they consider their share of income from the sale of timber to be fair (question 35). All 29 of the respondents stated that they did not consider their share of income to be fair. The results are presented in Table 4.24 below.

Table 4.24
Villagers' perception regarding the fairness of revenue sharing arrangement

Response	Frequency	Relative Frequency %
Yes	0	0
No	29	100
Total Response	29	100
No answer	0	

It was surveyed whether the villagers considered their share of income from sale of timber to be adequate for wanting them to protect the forest from illegal harvesting of timber (question 36). Twenty-eight of the respondent stated the income was not sufficient to make them want to protect the forest. However, one of them stated that his share of income was adequate for them to want to protect the forest from illegal timber gathering. No explanation was provided for positive or negative answers. The results are presented in Table 4.25.

Table 4.25
Share of revenue and villagers' willingness to participate in forest protection

Response	Frequency	Relative Frequency %
Yes	1	3.44
No	28	96.56
Total Response	29	100
No answer	0	

4.4.6 Women's participation in joint forestry management in Barabugpichla

The survey investigated some gender issues as well. Villagers were asked whether they think there should be more women in the joint forest committee (question 37). All 29 of the respondents stated that they think there should be more women in the JFM. The reason for more women participation in JFM are as follows:

- Women cut down overgrowth of forest and usually do not cut down valuable trees
- They assist forest guards in curbing illegal timber gathering.

The results are presented in Table 4.26.

Table 4.26
Support for higher women's participation in JFM

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

4.4.7 Villagers' perception of returns from joint forestry management

The villagers were asked whether forest under the joint forestry committee provided higher returns from logging compared to non-protected forests (question 38). All the

respondents stated that forests under JFM provided more benefits compared to non-protected forests. The results are presented in Table 4.27.

Table 4.27
Higher return from JFM as compared to non-protected forest

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

4.4.8 Decision-making in -forestry management and the village women's influence

The survey investigated whether planted trees were more protected in a state-controlled forest in comparison to non-protected forest (question 39). All respondents stated that planted trees were more protected under state-controlled forests compared to non-protected forests. The results are presented in Table 4.28.

Table 4.28
Protection of planted trees under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

It was investigated whether the capacity of the forest to sustain poor families increased more in a state-controlled forest compared to a non-protected forest (question 40). All the respondents stated that poor families were sustained better under state-controlled forests. The results are presented in Table 4.29.

Table 4.29
Higher contribution to sustenance of poor families under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

The survey investigated whether decisions were made by forest officers, by the majority of members of the JFM or by the villagers (question 41). All the respondents stated that decisions were made by villagers. The results are presented in Table 4.30.

Table 4.30
Decision-making apparatus under JFM

Response	Frequency	Relative Frequency %
Forest Officer	0	0
Management Committee	0	0
Villagers	29	100
Total Response	29	100
No answer	0	

Women's decision-making power in JFM was investigated. In response to the query of whether they had any influence in decision-making (question 42), 28 of the respondents stated that women exercised influence on decision-making in JFM. However, one of the respondents stated that women did not influence decision in the JFM. The results are presented at Table 4.31.

Table 4.31
Women's influence in decision making under JFM

Response	Frequency	Relative Frequency %
Yes	28	96.56
No	1	3.44
Total Response	29	100
No answer	0	

Three main reasons were cited by one respondent as to why women could not influence decision-making (question 43). They are as follows:

- Women members are in a minority
- Male members take the decisions and do not ask for the opinions of female members
- Forest officers set the agenda and make the decisions.

4.4.9 Deficiencies of current practice of forest management

The villagers were asked about the deficiencies of the current practice of forest management (question 44). All the respondents agreed with the four deficiencies in the questionnaire in addition to some other deficiencies. These are as follows:

- Corruption (bribes) etc
- Failure to completely prevent illegal operators
- Lack of proper training for forest protection and management
- Lack of honest effort and cooperation by government officials
- Plantation of eucalyptus reduced soil fertility.

The villagers were asked if the abovementioned deficiencies were removed, whether they perceived that the forest would provide greater benefits to females and their families on a long-term basis (question 45). All the respondents stated that the removal of deficiencies would benefit females and their families on a long-term basis. The results are presented below in Table 4.32.

Table 4.32
Removal of management deficiencies would lead to higher benefits from JFM

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

4.4.10 Villagers' perception about the role of NGOs in joint forestry management.

The survey queried whether the villagers thought that if the abovementioned deficiencies were removed would the forest would be better protected if managed jointly by an NGO and the villagers (question 46). All the respondents stated that forest could be better managed and deficiencies removed by joint management of NGO and villagers. The results are presented in Table 4.33.

Table 4.33
Villagers' perception of NGO's potential in JFM

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

The villagers were asked whether they thought that the returns to families also would be higher under an NGO management than what would be obtained under government management (question 47). All the villagers stated that they thought returns would be better under NGO management compared to government management. The results are presented in Table 4.34.

Table 4.34
Villager's perception of return under JFM compared to NGO participation

Response	Frequency	Relative Frequency %
Yes	29	100
No	0	0
Total Response	29	100
No answer	0	

Discussion and Conclusion

Villagers in Barabugpichla in general are poor except for three households who categorized themselves in the higher economic class and 12 in middle economic class. Except for these 13 families the rest of the villagers are highly dependent on the forest for their livelihood. On average 65 to 70 percent of the cash income of the villagers is derived out of the forest products in addition to various non cash forest resources like fuel, food, building and thatch material, grazing of livestock and herbs and medicine.

It has been established from the survey that women in Barabugpichla use the forest mostly for fuel and herbs and medicine collection and men are more dependent for all

the forest products. However, in later section (Table 4.8) forest dependency is not consistent with prior results. If the results of Table 4.8 are accepted, then women use the forest for fuel and food whereas men use it for building and thatch material. Livestock grazing is shared equally. (This is consistent with generally agreed forestry literature). However, according to these results Men, more than women, collect herbs and medicine in Barabugpichla.

All of the villagers agreed that women command more respect in their family when they contribute to the income by using the forest. Ten percent of those surveyed stated that a reduction of women's contribution to the family income by collecting forest product lessens women's influence in the family.

All villagers believed that income flow from the forest would decline due to reduction of forest area and greater use of forests by more people. Logging and failure to replant trees were considered the main threats to income sustainability from the forest in addition to reduction in forest size and overgrazing.

All respondents agreed that forest products and varieties of plants and animal have declined in recent years. There is a clear declining trend in biodiversity due to illegal logging and killing of animals.

The villagers agreed (later confirmed by a senior author's visit) that there is a joint forest management committee in the village that consists of 24 male and two female members. Eighty-six percent of the villagers were of the view that this committee has improved the sustainability of the forest by reducing illegal logging and preventing the killing of wild animals. The decisions regarding forestry management in this committee were made by the villagers, as established by the survey. It was established that women members in the committee had an influence on decision-making. All villagers supported increased women's participation in this committee.

A number of deficiencies of the joint forest management committee, as perceived by the villagers have been documented. The villagers' suggestions regarding improvement of joint forestry management are also presented in the report. Villagers unanimously agree that joint forestry management is better than unprotected forest, however, they are of the belief that sustainability of the forest would improve and return to the villagers would increase if joint management were conducted with NGOs rather than the government.

5. SUMMARY OF DATA OBTAINED FROM CHANDMURA VILLAGE

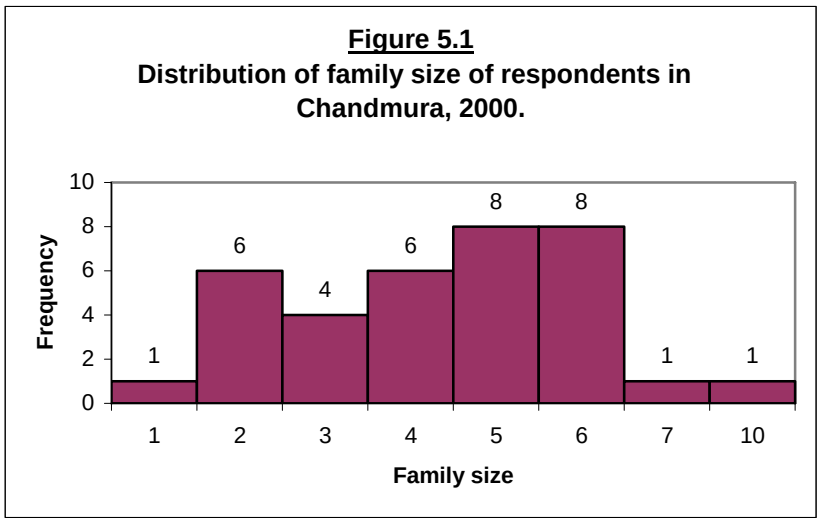
5.1 Introduction

Village Chandmura is situated in North Midnapore and is depicted in the Map by Legend 3. All the village households were surveyed to asses the impact of the joint forest management system (JFM). In total, 35 of households were surveyed all of which are Santals and practice the Sari religion.

Chandmura falls in the Arbari region. The villagers use parts of the forest, which are known as Mahesh Dubai and Backamati, that fall under the beat and range office of Arabari.

5.1.1 Socio-economic characteristics

The survey collected various socio-economic indicators that include family size, dependent children and adults and economic status. The first two questions in the survey are related to religion and caste, which has been specified in the introduction. The data collected in response to the third question is presented below in Figure 5.1



The average family size is 4.4; a modal value estimates the family size to be five or six. The largest family consists of 10 people and the lowest has only one family member. In addition to family size the survey investigated the number of children in each family and the average dependency ratio of Village Chandmura. Question 4 and 5 in the survey relate to the number of dependent children and adults. Table 5.1 provides the frequency distribution of the number of dependent children in Chandmura.

Table 5.1
Frequency of dependent children per family

Number of dependent children	Frequency per family
0	10
1	6
2	9
3	4
4	6

Note: Average number of dependent children is 1.7. There are 10 families without any children.

5.1.2 Dependency Ratio

The dependency ratio was calculated based on the ratio of the number of dependents over the number of independents in the family, which includes both dependent adults and children. In Chandmura, seven families have one dependent adult each and one family has two dependent adults. In the first stage, family dependency ratio has been calculated by considering both dependent adult and children. The overall dependency ratio of the village Chandmura is 0.8042.

5.1.3 Economic status

The villagers were asked to categorize themselves in terms of their relative economic status in the village (Question 6). Thirty-one villagers classify themselves in the lowest economic class. Two of those surveyed consider themselves to be in the top economic class and only two families consider themselves to be in the middle class. In terms of relative economic class it is unlikely that so many of the villagers would be in the lowest economic category. It is likely that villagers misinterpreted the survey question and in general considered themselves poor. The visit by the authors to the village confirms the fact that villagers generally are quite poor. The results are given in Table 5.2 below:

Table 5.2
Self-measurement by respondents of their family's economic status in the village compared to other families

Position	Frequency	Relative Frequency	No Response
Top one Third	2	0.571	0
Middle one third	2	0.571	0
Lower One Third	31	0.886	0
Total	35	1	0

Note: Table 5.2 provides the economic class frequencies and relative frequencies for village Atabanda.

5.2 Economic dependence of households in Chandmura on forest resources

The respondents in Chandmura were asked to classify their forest dependency in terms of high, medium or low (question 7). Thirty-three of those surveyed categorized their forest dependency as high and two of them categorized it as medium. In percentage terms, 94 percent of the villagers are highly dependent on the forest and 6 percent have a medium dependency on forests for their livelihood. The self-measurement of economic class and forest dependency in this respect is consistent. Except for those

who categorized themselves as the Top or Middle one third (Table 5.2 above), the rest are highly dependent on the forest.

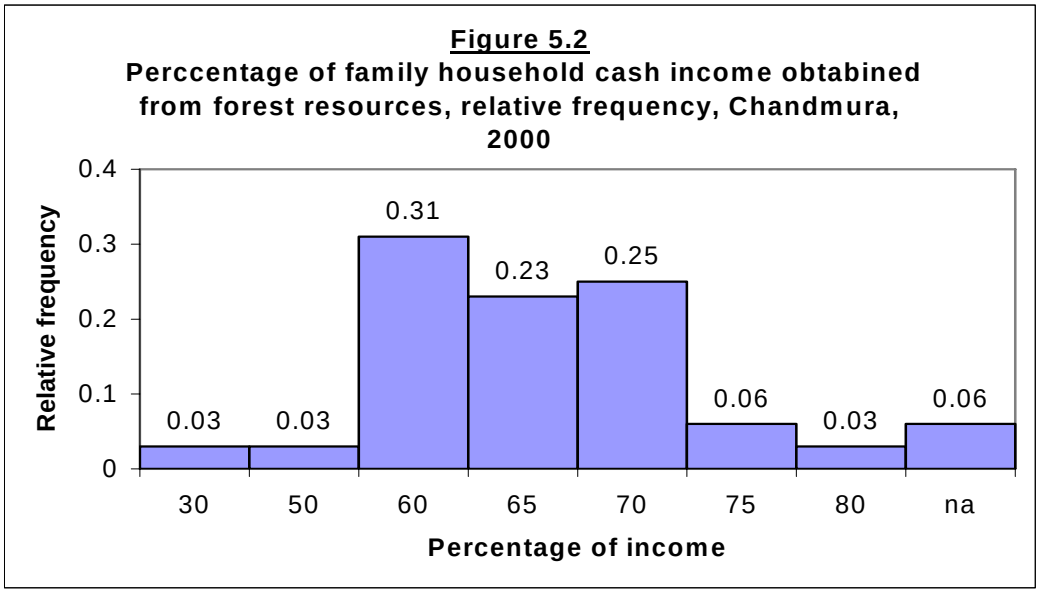
5.2.1 Cash dependency

The respondents were asked about the percentage of their income derived from the use of forest products (question 8). The percentage of income derived from forest products for villagers in Chandmura varies from 50 to 90 percent. There were 33 responses to this question (the top economic class refraining from answering). The result of this survey question is given in Table 5.3 below.

Table 5.3
Percentage of family cash income obtained from forest resources, frequency.

Cash income (percentage)	Frequency
30	1
50	1
60	11
65	8
70	8
72	1
75	2
80	1
Not available	2
Total	35

Note: Considering the modal value as average we can conclude on average 60% of cash income for villagers in Chandamura comes from forest products, even the lowest cash dependence on forest products is 30%. The data points out the high level of forest dependence of cash economy in forest villages.



5.2.2 Dependence on forest to meet basic family needs directly

The survey involved a detailed investigation of forest dependency by the villagers. The villagers are dependent on the forest for fuel, food, building material, thatch material, grazing of livestock, herbs, and medicines. The respondents were asked to rank those in high, medium or low order according to their relative importance. The details of the survey responses are provided in the Table 5.4. For each category of forest product the frequency and relative frequencies have been calculated and presented in the Table 5.4.

Table 5.4
Economic dependence (cash and non-cash) on forest for purposes of households surveyed in Chandmura, 2000, by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	20	15	0	35	0
Relative Frequency	0.57	0.43	0	1	0
Food					
Frequency	15	20	0	35	0
Relative Frequency	0.43	0.57	0	1	0
Building Material					
Frequency	32	3	0	35	0
Relative Frequency	0.91	0.09	0	1	0
Thatch Material					
Frequency	23	7	5	35	0
Relative Frequency	0.66	0.20	.14	1	0
Grazing of Livestock					
Frequency	2	31	2	35	0
Relative Frequency	0.06	0.88	0.06	1	0
Herbs and Medicine					
Frequency	1	9	25	35	1
Relative Frequency	0.03	0.26	0.71	1	1

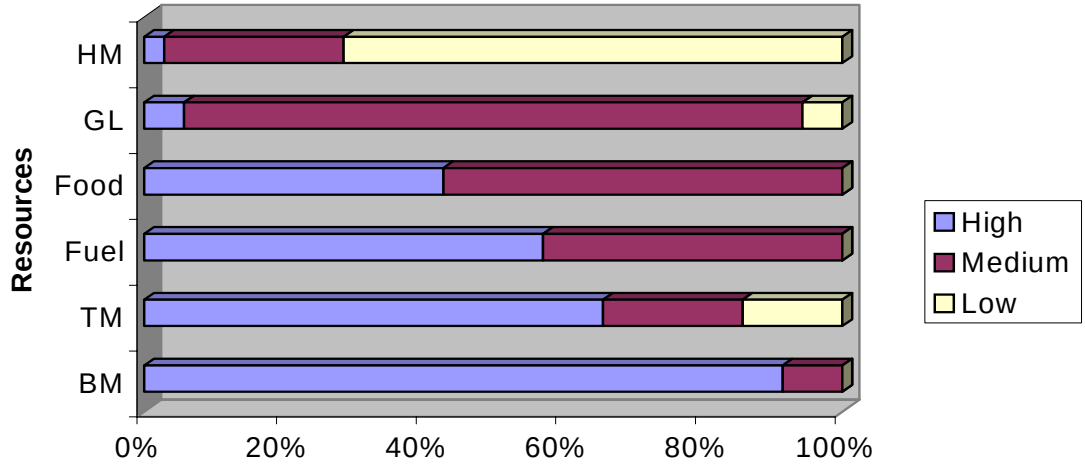
Note: From table 5.4 above it can be observed that dependency on forests for collecting building and thatch material is quite high. Food and fuel collection consist a major part of forest activity as well.

In addition to the forest products mentioned above, the villagers collect bamboo and sal leaves to make baskets and plates respectively. They also collect wood for making furniture. The different categories of food they collect include mango, amlaki, cashew

nuts, edible leaves, flowers, honey, roots, wild game and fish. The villagers sell various products like baskets and plates, fuel wood and mushrooms to supplement their meager income.

The dependence on forest products according to their significance is plotted in the figure below. The various forest products are categorized as High, Medium and Low according to their relative dependence, the frequency of which is given in Table 5.4 above. HM, GL, TM and BM are Herbs and Medicines, Grazing of Livestock, Thatch Material and Building Material respectively. Figure 5.3 below follows the ascending order in terms of relative dependence on the forest product. For example, Herbs and Medicine has the lowest relative dependence and Building Material has the highest relative dependence.

Figure 5.3
Relative dependence of families in Chandmura on forest resources for different purposes (source: based on Table 5.4)



The weighted average relative dependence has been calculated and presented in Table 5.5 below. The frequency and weights are derived from Table 5.4. High, Medium and Low dependence has been allocated weights of three, two, and one respectively. The weighted average is given in descending order in the table below.

Table 5.5
Weighted average consumption by respondents of forest resource dependence, Chandmura, 2000

Resources	Weighted average dependence
Building Material	2.91
Fuel	2.57
Thatch Material	2.51
Food	2.43
Grazing of Livestock	2.00
Herbs and Medicine	1.26

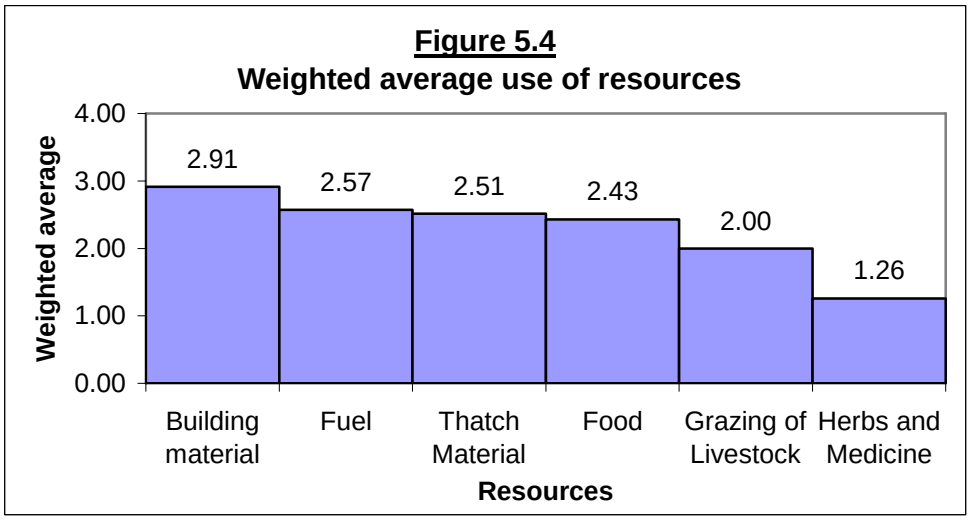


Figure 5.4 shows the weighted average dependence of forest products in a descending order.

5.2.3 Women's dependence on forests for livelihood in Chandmura

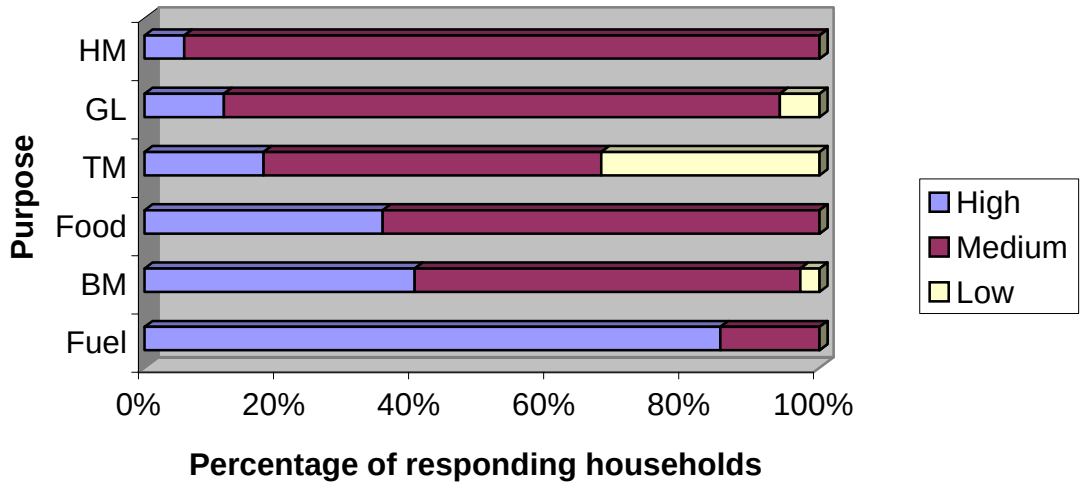
Question 9 of the survey was divided into two parts. The first part consists of economic dependence by the family on the forest, which has been presented above. The second part consisted of women's dependence and use of forest produce, which is described in the same manner in the following tables and figures. It is generally agreed, that women are more dependent on the forest compared to men. However, their dependence may vary depending on the type of products used for their own purpose. Table 5.6 presents the women's economic dependence on forest.

Table 5.6
Women's Economic dependence (cash and non-cash) on forest – surveyed in Chandmura, 2000, by frequency and relative frequency of responses

Purpose (Resource Provided)	High	Medium	Low	Total Response	No Response
Fuel					
Frequency	29	5	0	34	1
Relative Frequency	0.828	0.142	0	1	0.0285
Food					
Frequency	12	22	0	34	1
Relative Frequency	0.342	0.628	0	1	0.0285
Building Material					
Frequency	14	20	1	34	1
Relative Frequency	0.4	0.0.576	0.285	1	0.0285
Thatch Material					
Frequency	6	17	11	34	1
Relative Frequency	0.171	0.486	0.314	1	0.0285
Grazing of Livestock					
Frequency	4	28	2	34	1
Relative Frequency	0.114	0.8	0.057	1	0.0285
Herbs and Medicine					
Frequency	2	32	0	34	0
Relative Frequency	0.057	0.914	0	1	0.0285

Note: It is evident from the above table women in general have a high dependence on forest for fuel collection. Women's dependence in the forest is presented in Figure 5.5.

Figure 5.5
Relative use of forests by women for livelihood purpose (source: Table 5.6)



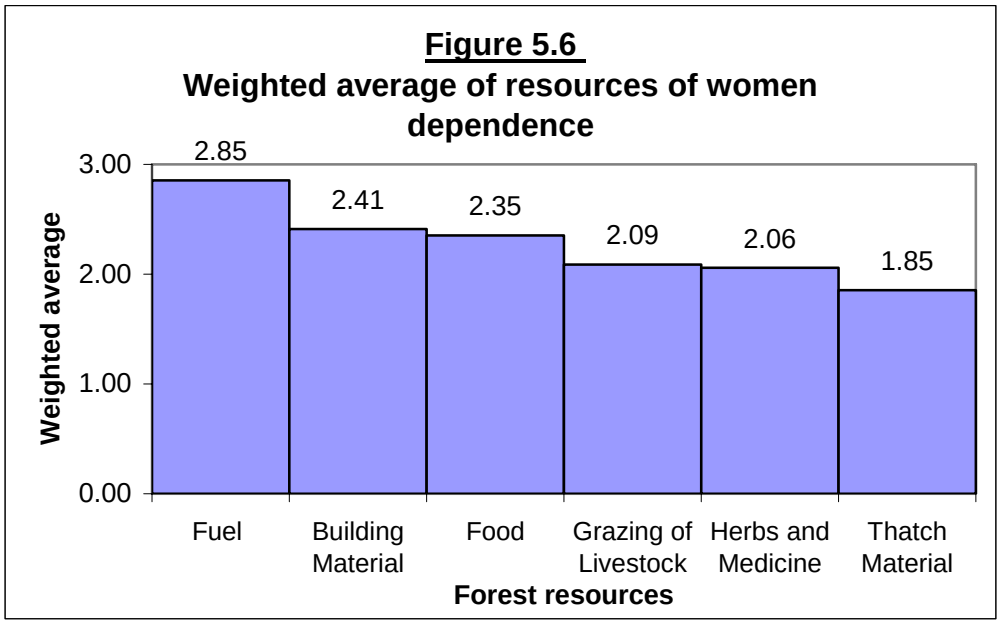
Note: A comparison between figure 5.3 and 5.5 provides a clear distinction between men and women's use of forest products. Women are highly dependent on forest for fuel collection whereas men are more dependent for building material and thatch material collection. The weighted average of women's dependence on forest product is given in Table 5.7 below.

Table 5.7
Weighted average consumption by respondents of women's degree of use forest resource, Chandmura, 2000(source: Table 5.6)

Resources	Weighted average dependence
Fuel	2.85
Building Material	2.41
Food	2.35
Grazing of Livestock	2.09
Herbs and Medicine	2.06
Thatch Material	1.85

Note: weighted average is calculated based on 34 observations.

Figure 5.6 is the weighted average of resources of women dependence in a descending order.



The survey conducted intensive investigation in the use of forest products in general and by women specifically. The response to question 9 in the survey provides a comparison between general use and dependence of villagers on the forest and women's use for the same purpose.

5.2.4 Comparative male and female dependence on the forest in Chandmura

The survey asked the villagers to indicate male and female bias of forest activities (question 10). The response was in percentage term indicating that collection of forest produce for all categories were both male and female activities, although they vary in intensity. The response data has been presented in Table 5.8 below.

Table 5.8
Domination of sex in collecting various forest resources

Resources	F>M	M>F	M=F
Fuel	29 (85.29%)	3 (8.82%)	2 (5.88%)
Food	6 (17.64%)	23 (67.64%)	5 (14.70%)
Building Material	9 (26.47%)	25 (73.53%)	0
Thatch Material	11 (32.35%)	22 (64.70%)	1 (2.94%)
Livestock Grazing	3(8.82%)	24(70.59%)	7 (20.59%)
Herbs & Medicine	4 (11.76%)	24 (70.59%)	6 (17.65%)
Others	1 (3.03%)	25(75.76%)	7 (21.21%)

Note: Table 5.8 indicates whether a particular forest activity has higher female intensity (F>M), male intensity (M>F) or they have equal intensity (M=F). *Others* has 33 observations (except for Chandmura, the response for *others* is negligible). The rest of the resources have 34 observations each.

The intensity survey is consistent with the previous data tables (question 9 response). Twenty-nine of the respondents stated that fuel collection was mainly the domain of females. Building material and thatch material collection fell into the male domain as can be seen from Table 5.8. Livestock grazing and herbs and medicine collection is shared equally by male and female.

5.2.5 Women's forest use in Chandmura

All 35 respondents agreed that women in the family make much more use of the forest compared to men (response to question 11). The result is presented in Table 5.9 below:

Table 5.9
Comparative use of forest by women in Chandmura; higher for women?

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
No answer	0	0
Total Response	35	100

The respondents were asked whether women command more respect in their family when they contribute to the income by using the forest (question 12). All 35 surveyed agreed that women command more respect when their forest activities contribute to the family income. The results are presented in Table 5.10.

Table 5.10
Increase in women's status due to their contribution to family sustenance by collecting forest product

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
No answer	0	0
Total Response	35	100

The survey investigated whether it was becoming more difficult for women to contribute to the family income by using the forest (question 13). All the respondents stated that it was becoming more difficult for women to contribute to family income by forest activities. The result is presented in Table 5.11 below.

Table 5.11
Degree of difficulty in collecting forest product in Chandmura

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
No answer	0	0
Total Response	35	100

Those who agreed to the fact that it was becoming more difficult for women to contribute to family income by forest activity were asked whether this affected the women's influence in the family (question 14). Out of the 35 respondents, 34 stated that reduction of contribution to family income did not affect the woman's influence in the family. However, one of the 35 respondents did not answer. The result in presented in Table 5.12 below.

Table 5.12
Relationship between women's contribution and their status in the family

Response	Frequency	Relative Frequency %
Yes	0	0
No	34	100 (97.24)
No answer	1	2.86
Total Response	34	

Note: Value in parenthesis indicates relative frequency for total number of observation (35).

5.2.6 Livestock ownership in the village

The survey investigated the livestock grazing and cattle ownership of the forest villagers in Chandmura (question 15). Fifteen families out of 35 did not own any kind of animal. However rest of the 20 families owned cow, goat pig or hen. The result of the survey is presented in Table 5.13.

Table 5.13
Ownership of Livestock in Village Chandmura

No of Cattle	Frequency (no of families)	No of Goat	F (no of families)	No of Pig	F (No of families)	No of Hen	F (No of families)
1	1	2	2	1	6	2	4
2	3	3	4	2	1	3	2
3	5	4	3	3	1	5	3
4	2	6	1	4	1	6	1
5	1	Total	10	6	1	10	1
6	1			Total	10	12	1
Total	13					14	1
						Total	13
Fifteen out of the 35 surveyed did not own any cattle, pigs or hens.							

Note: 13 families owned cattle—which is the bigger animal and is a considerable indicator of socioeconomic status. Of those 13 families that owned cattle, eight owned goats as well. In total, 10 families owned goats. Ten families owned hens and 13 families owned pigs.

5.2.7 Seasonal dependence of village households on forest resources

The survey queried whether there was any particular time when the villagers and their families were relatively more dependent on the forest for livelihood and survival (question 16). All the respondents stated that during August and September the village families were more dependent on the forest. During this time there is in general lack of employment opportunities. In addition they can not perform their usual trade of selling plates of Sal leaves as new leaves come out at this time of the year. However, during April and May they collect and sell Cashew nuts and Mahua flowers which help them to sustain their livelihood during August and September. The results are presented in Table 5.14 below.

Table 5.14
Higher forest dependency during August and September

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
No answer	0	0
Total Response	35	100

The villagers were asked to categorize their dependence on the forest for survival during drought or difficult seasons (question 17). Thirty-two of the 35 surveyed stated that their dependence on the forest for survival during drought or difficult seasons was high and two stated their dependence to be medium and one had low dependence. The results are given below in Table 5.15.

Table 5.15
Degree of dependence on the forest for survival during drought and difficult season

Response	Frequency	Relative Frequency %
High	32	91.42
Medium	2	5.71
Low	1	2.86
No answer	0	0
Total Response	35	100

PART A

5.3 Sustainability Issues

In this part, sustainability of the forest use along with bio-diversity and impact of forest use have been investigated. Villagers' suggestions regarding improvement of forest sustainability are also presented in this section.

5.3.1 Sustainability of current forest use as perceived by the villagers in Chandmura

The survey queried villagers' perceptions of future income flow from the forest. They were asked whether their forest will contribute less to their family's income in the future (question 18). All 35 villagers said that income flow from forest would decline due to declining forest area and greater use of forests by more people. The results from the survey are given in Table 5.16.

Table 5.16
Villagers' perception regarding sustainability of forest use

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
No answer	0	0
Total Response	35	100

5.3.2 Specific threat to forest sustainability as identified by villagers

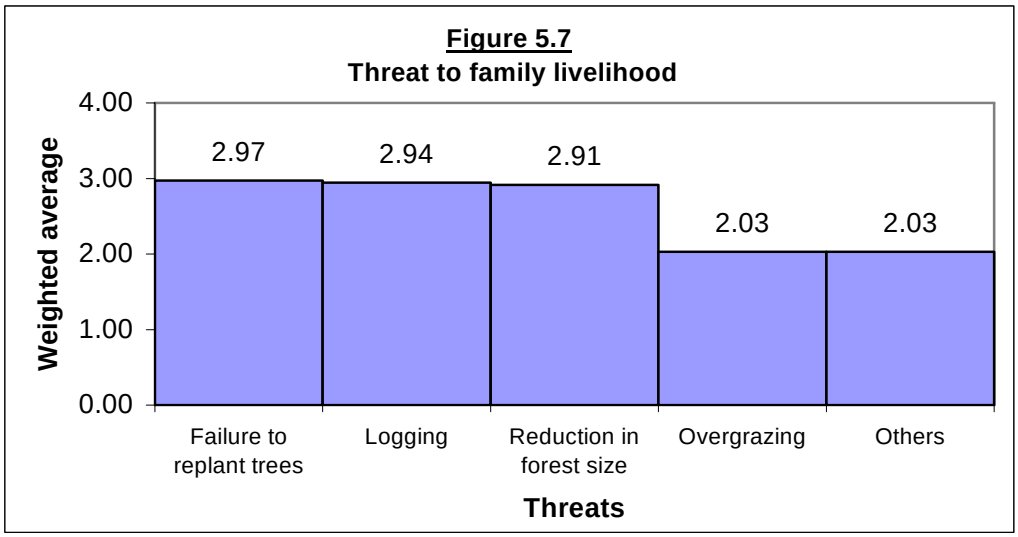
The respondents were asked to categorize the various threats that could affect their income from forest use (question 19). The threats were categorized as follows: logging (33 serious, 2 medium), failure to replant trees (34 serious, 1 medium), reduction in forest size (32 serious 3 medium), overgrazing (4 serious, 28 medium, 3 low) others (5 serious, 26 medium, 4 low - no example provided). These results are presented in Table 5.17.

Table 5.17
Specific threats to forest use sustainability as identified by villagers in Chandmura

Protection	Different Threats	Frequency	Relative Frequency %
Logging	Serious	33	94.29
	Medium	2	5.71
	Low or None	0	0
	Total Response	35	
Failure to replant trees	Serious	34	97.14
	Medium	1	2.86
	Low or None	0	0
	Total Response	35	
Reduction in Forest Size	Serious	32	91.42
	Medium	3	8.58
	Low or None	0	0
	Total Response	35	
Overgrazing	Serious	4	11.42
	Medium	28	80
	Low or None	3	8.58
	Total Response	35	
Others	Serious	5	14.29
	Medium	26	74.29
	Low or None	4	11.42
	Total Response	35	

Note: Failure to replant trees, logging and reduction in forest size are the main threats to family livelihood in forest village

The results from Table 5.17 has been used to calculate the threat perception of the villagers. Serious, medium and low have given weights of 3,2,1, respectively. The threat perception of the villagers has been depicted in descending order of importance in Figure 5.7.



Note: It can be seen from the above diagram that failure to replant trees, logging and reduction in forest size are perceived as the main threats to villagers' livelihood. However, overgrazing and reduction in forest size are perceived as less serious threats.

The villagers were asked to list two factors which where the greatest threat to the economic reliance of their family on the forest (question 20). All 35 of the respondents listed logging and failure to replant trees as the two main threats. The results are consistent with the results presented above.

5.3.3 Trends and varieties of plants and animals in the forest—bio-diversity

The survey conducted investigation into the trends and variety of products to assess the impact on biodiversity. The villagers were asked whether the variety of products available from the forest declined, increased or remained constant in recent years. Thirty-one of the respondents agreed that the variety of products has declined in recent years. The main reason for such decline was stated to be the reduction in soil fertility and reduction in forest area. However, three of the respondents say that the variety of products has increased due to plantation of cashew trees and a reduction in illegal cutting of trees. One of the respondents did not answer. The results are presented in table 5.18.

Table 5.18
Trends in biodiversity due to forest use in Chandmura

Response	Frequency	Relative Frequency %
Declined	3	8.82(8.57)
Constant	0	0
Increased	31	91.18(88.57)
No response	1	0
Total Response	34	100

Note: Value in parenthesis indicates relative frequency on total number of observation (35).

Further investigations were made about wild animals and plants. The villagers were asked whether the variety of plants and wild animals in the forest declined, remained constant or increased (question 22). All of the respondents stated that the variety of plants and wild animals has declined. The main reasons for the decline as stated by the

forest villagers are (1) decline in forest size which led to food shortage for animals, (2) illegal cutting of trees which provide food for animals and (3) killing of animals. The results are presented in Table 5.19.

Table 5.19
Trends in wildlife and plants in Chandmura

Response	Frequency	Relative Frequency %
Declined	35	100
Constant	0	0
Increased	0	0
No response	0	
Total Response	35	100

The survey sought villagers' suggestions regarding how the economic contribution of the forest to their livelihood could be made more secure (question 23). The suggestions given by villagers are listed below:

- Plantation of varieties of valuable trees, e.g. Sal and Amlaki.
- Less plantation of Eucalyptus due to its harmful side effects.
- Plantation of more Neem trees as it purifies air.
- Increasing vegetation cover for mushroom, potatoes and other vegetables including herbs.
- Developing social forestry.

PART C

5.4 Management Issues

The survey reconfirmed the name of the forest used by villagers in Chandmura (question 24). The survey looked into various issues of forest management starting with property rights. The respondents stated that 11 villages use the same forest area for their livelihood.

5.4.1 Customary rights of villagers to use the forest for livelihood

The survey queried whether the villagers had customary rights to use the forest (question 25). Out of the 35 respondents, 34 stated that they had customary rights to use the forest village while one of them did not answer. The results are given in Table 5.20 below.

Table 5.20
Customary right of villagers to use the forest for sustaining their livelihood

Response	Frequency	Relative Frequency %
Yes	34	100 (97.14)
No	0	0
No answer	1	2.86
Total Response	34	100

Note: Value in parenthesis indicates relative frequency on total number of observation (35).

5.4.2 Joint forest management issues

The survey conducted a number of queries regarding joint forest management (JFM). They investigated whether the village had a joint forest committee (question 26), and whether the villagers were members of such a committee (question 27) and what was the proportion of male and female members in such a committee (question 28).

It was found that there is a joint forest committee in the village, that is, 34 of the villagers stated so and one of them did not answer. Regarding the second query that whether villagers were member to such committee; 31 of the respondents stated that villagers belong to the joint forest committee and four did not answer. However, later visits by the authors confirmed the fact that villagers belong to the joint forest committee; in fact, every family had one member in such a committee.

Regarding the ratio of sexes, 29 of the respondents said that joint forest committee had six male members only where as four of the respondents mentioned that the committee consisted of four male and two female members. Two of those surveyed did not answer (needs clarification).

The survey investigated the effectiveness of the joint forest committee. The villagers were asked whether this committee improved the sustainable management of the forest (question 29). Thirty-four of the respondents stated that the joint forest committee has improved the sustainability of the forest by reducing illegal cutting of trees which lessened the decline of the forest area. The committee has been effective in preventing killing of wild animal. One of those surveyed did not answer. The results are presented in Table 5.21.

Table 5.21
Effectiveness of Joint Forest Committee in forest conservation and maintaining biodiversity

Response	Frequency	Relative Frequency %
Yes	34	100 (97.14)
No	0	0
Total Response	34	100
No answer	1	2.86

Note: Value in parenthesis indicates relative frequency on total number of observation (35).

The respondents were asked to list some of the perceived good and bad decisions of the Joint Forest Committee (Question 30). Some of the good decision by the villagers are:

- Formation of joint team of forest guards with villagers.
- Providing a share of income from the sale of timber to the villagers.
- Presence of women in the joint committee.
- Joint committee in reality working with the villagers for forest management.

Some of the bad decision of the joint forest committee as perceived by the villagers are:

- Share of the revenue from the sale of timber did not go to the individual villagers or many did not get any benefit. (However, this is a misinterpretation which has been clarified by the author from their visit to the villages. The share of the revenue

from the sale of timber s not a regular income for villagers and it happens occasionally).

- Women who are the daily user of the forest do not get any share of the income from the sale of timber. (Only one family member gets the share as confirmed by the senior author)

The survey queried whether there was any limit on the villagers for forest use (question 31). Three of the respondents stated there was no limit on forest use. However, one villager stated there was certain limits on forest use and four did not answer. The results are presented in Table 5.22.

Table 5.22
Limitations on forest use by villagers in Chandmura

Response	Frequency	Relative Frequency %
Yes	1	96.77 (85.71)
No	30	3.23 (2.86)
Total Response	31	100
No answer	4	11.43

Note: Value in parenthesis indicates relative frequency on total number of observation (35).

5.4.3 Forest management rules and customs in Chandmura

As stated earlier, several villages share the forest. The villagers were asked how the resources are shared amongst them for example whether it was shared by customary rules or otherwise (question 32). The survey did not get any response regarding customary rules of sharing forest resources. Instead, villagers mentioned their particular village custom—that is the celebration of Shikar day each year. On this day they are allowed to hunt in the jungle and collect timber according to their necessity.

As forest use is shared among villages there are possibilities of dispute regarding forest product collection. The survey investigated whether disputes arise between villages (question 33). All respondents stated that disputes arose between villages regarding sharing of forest resources. For example, disputes regarding illegal logging and collection of building materials took place between villages. In the case of disputes, the joint forest committee settled matters. The either settled disputes as per agreed terms and conditions or allowed a particular family to cut trees as much as they like.

5.4.3 Revenue sharing arrangement between villagers and forest department from sale of timber

The respondents where asked whether they received income from timber sold commercially from their forest and in what proportion (question 34). All respondents stated that they received a 25% share of the income obtained by the sale of timber. Table 5.23 presents the survey results.

Table 5.23
Villagers' share of revenue from the sale of timber under JFM

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

5.4.4 Villagers share of revenue and sustainability of the forest

The villagers were asked whether they consider their share of income from the sale of timber to be fair (question 35). All respondents stated that they did not consider their share of income to be fair. The results are presented in Table 5.24.

Table 5.24
Villagers' perception regarding the fairness of revenue sharing arrangement

Response	Frequency	Relative Frequency %
Yes	0	0
No	35	100
Total Response	35	100
No answer	0	

It was surveyed whether the villagers considered their share of income from sale of timber to be adequate for them to be willing to protect the forest from illegal timber harvesting activities (question 36). Thirty-two of the respondent stated the income was not sufficient for them to want to protect the forest. However, two of them stated that their share of income was adequate for them to want to protect the forest from illegal logging. One of the villagers did not answer. No explanations were provided for affirmative or negative answers. The results are presented in Table 5.25.

Table 5.25
Share of revenue and villagers' willingness to participate in forest protection

Response	Frequency	Relative Frequency %
Yes	2	5.88 (5.71)
No	32	94.12 (91.43)
Total Response	34	100
No answer	1	2.86

Note: Value in parenthesis indicates relative frequency on total number of observation (35).

5.4.5 Women's participation in joint forestry management in Chandmura

The survey investigated some gender issues as well. Villagers were asked whether they thought there should be more women in the joint forest committee (question 37). All of the respondents stated that they think there should be more women in the JFM. The reason for supporting (by respondents) more women's participation in JFM are as follows:

- Women cut down overgrowth of forest and usually do not cut down valuable trees.
- They assist forest guards in curbing illegal timber gathering.

The results are presented in Table 5.26 below

Table 5.26
Support for higher women's participation in JFM

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

5.4.6 Villagers' perception of returns from joint forestry management

The villagers were asked whether forests under the joint forestry committee provided higher returns from logging compared to non-protected forests (question 38). All the respondents stated that forests under JFM provided more benefits compared to non-protected forests. The results are presented in Table 5.27.

Table 5.27
Higher return from JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

The survey investigated whether planted trees were more protected in state-controlled forests in comparison to non-protected forests (question 39). All respondents stated planted trees were more protected under state controlled forests compared to non-protected forests. The results are presented in Table 5.28 below.

Table 5.28
Protection of planted trees under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

It was investigated whether the capacity of the forest to sustain poor families increases more in a state controlled forest compared to a non-protected forest (question 40). All the respondents stated that poor families were sustained better under state controlled forest. The results are presented in Table 5.29.

Table 5.29
Higher contribution to sustenance of poor families under JFM as compared to non-protected forests

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

5.4.7 Decision making in the forestry management and the village women's influence

The survey investigated whether decisions were made by forest officers, by the majority of members of the JFM or by the villagers (question 41). All the respondents stated that villagers made decisions in JFM. The results are presented in Table 5.30.

Table 5.30
Decision-making apparatus under JFM

Response	Frequency	Relative Frequency %
Forest Officer	0	0
Management Committee	0	0
Villagers	35	100
Total Response	35	100
No answer	0	

Women's decision-making power in JFM was investigated. In response to the query whether they had any influence in decision-making (question 42), 27 of the respondents stated that women influenced decisions in JFM. However, eight of the respondents stated that women did not influence decisions in the JFM. The results are presented at Table 5.31.

Table 5.31
Women's influence in decision making under JFM

Response	Frequency	Relative Frequency %
Yes	27	77.14
No	8	22.86
Total Response	35	100
No answer	0	

All eight respondents cited three main reasons as to why women could not influence decision-making (question 43). They are as follows:

- Women members are in a minority
- Male members take the decision and do not ask for the opinions of female members
- Forest officers set the agenda and make the decisions

5.4.8 Deficiencies of current practice of forest management

The villagers were asked about the deficiencies in the current practice of forest management (question 44). All the respondents agreed with the four deficiencies in the questionnaire in addition to some other deficiencies. They are as follows:

- Corruption (bribes) etc.
- Failure to completely prevent illegal operators.
- Lack of proper training for forest protection and management.
- Lack of honest effort and cooperation by government officials.
- Plantation of Eucalyptus reduced soil fertility.

The villagers were asked if the above-mentioned deficiencies were removed, whether they perceived that the forest would provide greater benefits to females and their families on a long term basis (question 45). All the respondents stated that removal of the deficiencies would benefit females and their families on a long-term basis. The results are presented below in Table 5.32.

Table 5.32
Removal of management deficiencies would lead to higher benefits from JFM

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

5.4.9 Villagers' perception about the role of NGOs in the joint forestry management.

The survey queried whether the villager's thought if the above-mentioned deficiencies would be removed and the forest would be better protected if managed jointly by an NGO and the villagers (question 46). All the respondents stated that the forest could be better managed and deficiencies removed by joint management of NGO and villagers. The results are presented in Table 5.33 below.

Table 5.33
Villagers' perception of NGO's potential in JFM

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

The villagers were asked whether they thought that the returns to families would be higher under an NGO management than what would be obtained under government management (question 47). All the villagers stated that they thought returns would be better under NGO management compared to government management. The results are presented in Table 5.34.

Table 5.34
Villagers' perception of return under JFM compared to NGO participation

Response	Frequency	Relative Frequency %
Yes	35	100
No	0	0
Total Response	35	100
No answer	0	

Discussion and Conclusion.

Villagers in Chandmura in general are poor except for two households who categorized themselves in the higher economic class and two in middle economic class. Except for the two families in the higher economic class, the rest of the villagers are highly dependent on the Arbari forest for their livelihood. On average 60 percent of the cash income of the villagers is derived out of the forest products in addition to various non cash forest resources like fuel, food, building and thatch materials, grazing of livestock and herbs and medicine.

It has been established from the survey that women in Chandmura use the forest mostly for fuel collection and men are more dependent for collection of building and thatch materials and food. Both men and women use the forest for grazing of their livestock. Women also collect most of the herbs and medicine from the forest.

All the respondents agreed that women command more respect in their family when they contribute to the income by using the forest. Households in general agreed that the reduction of women's contribution to the family income by collecting forest product does not affect their influence in the family.

All the villagers believed that income flow from the forest would decline due to reduction of forest area and greater use of forests by more people. Logging and failure to replant trees were considered the main threats to income sustainability from the forest in addition to reduction in forest size and overgrazing. They unanimously agreed that the variety of plants and animals has declined in recent years. There is a clear declining trend in biodiversity due to illegal logging and killing of animals.

The villagers agreed (later confirmed by a senior author's visit) that there is a joint forest management committee in the village. Almost all of the villagers were of the view that this committee has improved the sustainability of the forest by reducing illegal logging and preventing the killing of wild animals. The villagers, as established by the survey, made decisions regarding forestry management in this committee. Although there are women members in the committee, they have little or no influence in decision-making. Most villagers supported increased women's participation in this committee.

A number of deficiencies of the joint forest management committee, as perceived by the villagers, have been documented. The villagers' suggestions regarding improvement of joint forestry management are also presented in the report. Villagers unanimously agree that joint forestry management is better than unprotected forest, however, they are of the belief that sustainability of the forest would improve and

returns to the villagers would increase, if joint management were conducted with NGOs rather than the government.

APPENDIX A: QUESTIONNAIRE

Forest Use and Management: Survey of Villagers (ARC Small Grant 2000)

Name of the
village…….

Name of forest/forests used
……
……

Is there a Joint Forest Committee?
Yes/No

Family Details
1. Name of the
respondent……..age…….sex……

Religion……...caste……...
Santal yes/no; Scheduled tribe yes/no; Upper Caste yes/no; Scheduled caste yes/no

2. Relation to Head of the family……

3. Total family members……No.

4. Number of dependent children……

5. Number of dependent adults……

6. Compared with the economic situation of other families in your village, do you believe your family is in
   (a) the top
   (b) the middle
   (c) the lower one-third
   Answer……

PART A

Dependence on Forests

7. Does your family have a

   High
   Medium
   Low or Zero reliance on forest products for its economic survival?

8. What percentage of your family's cash income is derived from the use of forest products?……...

9. Indicate the economic dependence of your family on the forest for the following

	Dependence	**Women's Use For this purpose**
(a) Fuel -	High Medium Low or Zero	High Medium Low or Zero
(b) Food -	High Medium Low or Zero	High Medium Low or Zero
(c) Building materials -	High Medium Low or Zero	High Medium Low or Zero
(d) Thatch materials -	High Medium Low or Zero	High Medium Low or Zero
(e) Grazing of livestock -	High Medium Low or Zero	High Medium Low or Zero
(f) Herbs and Medicines -	High Medium Low or Zero	High Medium Low or Zero

(g) List any other forest activities that are important for the economic situation of your family

……
……
……
……

10. Indicate whether the following forest activities are mainly female or male activities.

	Female	Male
Fuel collection		
Food collection		
Building timber collection		
Thatch material collection		
Grazing of livestock		
Herbal medicine collection		
Any items mentioned in question 9(g)		

11. Do women in your family make much more use of the forest than men? Yes/No

12. Do you agree that when women are able to make use of the forest to contribute more to the family's livelihood, they command more respect in their family?
Yes/No

13. Has it become more difficult for women in your family to contribute to your family's income by using the forest?
Yes/No

14. If yes to 13, would you say that the influence of women in your family is reduced?
Yes/No

15. What types of your family's livestock use the forest for grazing?

Cattle – Number of head ……

Goats – Number of head ……

Buffalo – Number of Head ……

Other (specify) …….Number of head…….

16. Are there any times of the year when your family is more dependent on the forests for its survival or livelihood than others?
Yes/No

If yes, specify…….

17. In terms of drought or a difficult season, is your dependence for survival or livelihood on the forest

High
Medium
Low or Zero

PART B
Sustainability Issues

18. Do you think that your forest will contribute less to your family's income in the future?

Yes/No

Why?……

19. How do you rank or rate the following as a threat to your family's livelihood?

Logging	Serious Medium Low or None
Failure to replant trees	Serious Medium Low or None
Reduction in forest size	Serious Medium Low or None
Overgrazing	Serious Medium Low or None
Other forms of over-use (Please specify) …….	Serious Medium Low or None

20. List the two factors which are the greatest threat to the economic reliance of your family on the forest.

(a)……
……
(b)……
…..……

21. Has the variety of products available from your forest declined in recent years, increased or remained constant?

……..
Why and in what respect?
……
……
……

22. Has the variety of plants and wild animals in your forest declined, remained constant or increased?

……
……

Why and in what respect?

……

……

……

23. Do you have any suggestions about how the economic contribution of the forest to your livelihood can be made more secure?

……

……

……

……

PART C
Management Issues

24. What is the name of the forest(s) you use?……
How many villages use this forest? No……

25. Do you have customary rights to use this forest?
Yes/No

26. Is there a Joint Forest Committee for your forest?
Yes/No
Why?……
……

27. Do any of your village members belong to the Joint Forest Committee?
Yes/No/ Not applicable

28. Who belongs to such a Committee, if it exists?……..
What is the composition?
……
What is the number of members? No.……..
Of its members, how many are females? No……...

29. Has the Joint Forest Committee (where it exists) improved the sustainable management of the forest? Yes/No Not applicable

Please explain

……

……

30. Where applicable, list the types of decisions of the Joint Forest Committee which in your view and good and those that are bad.

<u>Some Good Decisions</u>

……

……

……
……
Some Bad Decisions
……
……
……
……

31. Does your village limit the use of the forest by individual families?
Yes/No

If yes, in what ways and how does it do it?

Types of limitations
……..
……
……
……
……
How enforced or determined ……
……
……
……
……

32. Where more than one village uses your forest, how do they share the resources of the forest? Are there any rules customary or otherwise?
……
……
……
……
……
……

33. Do disputes about forest use arise between villages? Yes/ No

How are they usually settled when they arise?……
……
……

If yes, give some examples of these disputes.
……
……
……
……
……

34. Do you get income from timber sold commercially from your forest? Yes/No

If yes, how is your share in this income determined?……
……
……

35. Do you think you get a fair share of the income from timber sold from your forest? Yes/No

Explain……
……
……

36. Is the income just mentioned enough for you to want to protect the forest from illegal timber gathering activities? Yes/No

Explain……
……
……

37. Do you think there should be more women in your Joint Forestry Committee? Yes/No

Why?……
……
……

38. Do you think that the forest under the Joint forestry Committee gives higher return from logging and more benefits than the non-protected forest?

Yes/No

39. Are the planted trees more protected in a state-controlled forest than in a non-protected forest? Yes/No

40. Does the capacity of the forest to sustain poor families increase more in a state-controlled forest than in a non-protected forest? Yes/No

41. In the Joint Forest Committee, who makes the decisions?

(a) Forest Officer
(b) Majority of members
(c) Villagers

42. Do women members have any influence on the decision-making by the Joint Forestry Committee? Yes/No

43. If not, what are the reasons?

(a) Women members are in a minority.
(b) Male members take the decisions and do not ask for the opinions of female members.
(c) Forest officer sets the agenda and makes the decision.

44. What are other deficiencies of the current practice of forest management?

(d) Corruption (bribes), etc.
(e) Failure to completely prevent illegal operators.
(f) Lack of proper training for forest protection and management.
(g) Lack of honest effort and cooperation by government officials.
(h) Other……
……

45. If these deficiencies are removed, do you think that the forest would provide greater benefit to females and their families on a long-term basis?

Yes/No

46. Do you think that these deficiencies would be removed and the forest would be better protected if managed jointly by an NGO and the villagers?

Yes/No

47. Do you think that the returns to families also would be higher under an NGO management than what would be obtained under government management? Why?

Yes/No

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