Environmental Sustainability and Tribal Livelihood: A Case Study on Sabar Community in Purnapani Village, Binpur-II, Jhargram, West Bengal

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ABSTRACT

The scheduled tribes are the country's indigenous inhabitants, who are geographically isolated in the difficult terrain and forest areas and so are socially and economically backward. Forest plays the pivotal role as their livelihood circulates around the timber and non-timber forest products (NTFP) for food, fuel, fodder, medicine and other economic and socio-religious needs. Present study aims to examine the man-nature relationship between forest and tribal livelihood. Present study concentrates on tribe dominated forest fringe Purnapani village of Binpur-II block, Jhargram. Forest dependency of the Sabar community is assessed through detail inspection into their occupation, seasonal nature of forest product collection, house types and forest-based building materials, types of illness and dependency on medicinal plants, etc. 23 households of Sabar community have been studied with semi-structured questionnaire. The study reveals that Sabar community depends mostly on forest and local environment to fulfil basic needs. Sabar households with lower education, having no agricultural land, less income, live below poverty line and absolutely depend on NTFPs collection. 65 % Sabar household have kuccha house, for which mud, grass, wood, thatch and associated building materials are collected from nearby forest. They use medicinal plants collected from forest for their healing process.Traditional knowledge-based forest management seems to be more effective in forest conservation and bio-diversity protection.

1. Introduction

Schedule tribes are termed as "backward tribes" living in the excluded and partially excluded areas in India (Census-1931). Article 366 (25) defined scheduled tribes as "such tribes or tribal communities or parts of or groups within such tribes or tribal communities as are deemed under Article 342 to be Scheduled Tribes for the constitution". Sabar community is one of the

primitive vulnerable tribal groups of India. The Sabar is the Adivasi of the Munda ethnic group, live in Odisha and West Bengal. They live around the jungle areas of Paschim Medinipur and Jhargram district of West Bengal. During the colonial period they were termed as one of the "criminal tribe" under Criminal Tribes Act 1871. The Sabar tribe includes 1,08,707 population in West Bengal which is only 1 % of the entire tribal population (Census, 2011). They speak in Bengali but Lodhi is their ethnic language. Sabar families eat rice when they can afford it; sometimes, they have to survive on different forest products. They have own admission of traditional drink, called "*Handia*" (rice beer). The traditional food of the Sabar community contained varieties of fruits and tubers collected from the jungle, meat of animals hunted in the forest. They are traditionally forest-dwelling tribe. Due to lack of experience in agriculture these people depend on the forests and non-timber forest products for their livelihood.

Indigenous people and forests have evolved in a symbiotic manner for thousands of years. The forest is like a home to the people who partially or entirely depend on the forest for their life and livelihood. Forest plays an important role for supporting the livelihood necessities of tribal people like 'Sabar' in rural India. The livelihood of tribal people circulates around the timber and non-timber forest products (NTFP) for food, fuel, fodder, medicine and other economic and socio-religious needs (Ghosal, 2011; Shit & Pati, 2012; Dolui *et al*., 2014; Das, 2014; Tripathi, 2016 and Saha *et al*., 2022). Non-timber forest products (aromatic and medical plants, leaves, flowers, seeds, gums, resins, bamboo, waxes and some food including wild fruits, nuts, and honey) are vital in reducing poverty, particularly for forest-dependent people. NTFPS provides cash income to millions of tribal people in India (Hegde, 1996; Golam *et al*., 2008). In the tribal areas, more than 60% of households depend on NTFPS, which also helps in the healthcare system (Golam *et al*., 2008). Non-timber forest products, medicinal herbs and forest-based building materials are very significant contributors to the livelihood as well as the well-being of villagers (Shit & Pati 2012).Present study aims to examine the man-nature relationship between forest and tribal livelihood, and biodiversity conservation through traditional knowledge.

2. Study Area:

The study area is geographically situated at the fringe part of Chotonagpur plateau region. Average elevation in this area is 85 m from sea level and slope direction is from south-east to northward direction. Tarafeni and Dulung rivers are passing through this region, which are slightly meandering in nature. Maximum area of the village is covered by the forest with rugged

topography. Purnapani is a medium size village, located in Shimulpal gram panchayat of Binpur -II Block of Jhargram district, West Bengal. The latitudinal and longitudinal extension of Purnapani village is 22°37′N to 22°37′N and 86°39 E to 86°39 30″ E respectively. The total area of the village is about 111.62 hectares. There are 51 houses in Purnapani village (2011) with a.Total population of 166, out of which 49 % are male and 51 % are female. Sex Ratio of Purnapani Village is 1049 while, literacy rate of the village is 58.43%. Silda is the nearest town of this village for all major type of economic activities, which is located approximately 20 km away from the village.

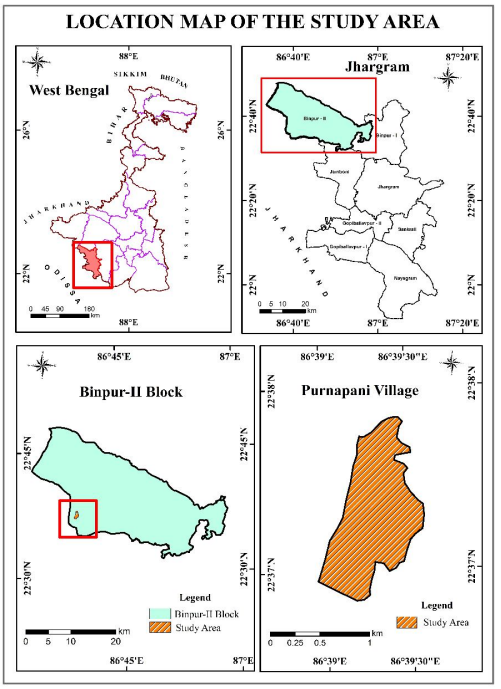


Fig:1 Map showing the location of the study area

Fig: 2 Satelite Image View of Purnapani Village

3. Materials and Methods

3.1 Sample Collection

The present study aims to assess the man-nature relationship through the detail inspection with the Sabar community in Purnapani village. It studies the traditional ecological knowledge (TEK) on the resource extraction, regeneration and conservation of the environment. To assess the man-nature relationship, their occupation, forest-based income, expenditure pattern, forest dependency for food items and housing, forest based herbal medicines for treatment have been considered. An intensive household survey has been carried out with the help of semi-structured questionnaire. The primary data has been collected from 23 households of Sabar community.

4. Result and Discussion

4.1 Demographic Background of the study area

The Purnapani village has population of 166,

out of which 48.80% are male while 51.20 % are female as per the census 2011. (Table-1) In Purnapani village population of children of 0-6 yrs is 20, which is 12.05 % of total population of the village. Sex ratio of this village is 1049 which is higher than the sex ratio of West Bengal (950). L**iteracy rate of Purnapani village is 58.43 %** which is comparatively lower than Binpur-II block (62.17 %), Jhargram district (70.92 %) and also compared to the West Bengal (76.26%).

4.2 Demographic Status of Sabar Community

Age-sex pyramid is constructed with 4 age groups i.e., below 18, 18-40, 40-60 and above 60 years. 25 % male and 32 % of female are in below 18 years age group. The child population of Sabar community is high due to control of diseases and high birth rate. Most of the people of Sabar community are in working age group. The percentage of population with age group of 18-40 years is high i.e. 48 % and 42 % for male and

Table-1: Population statistics of Purnapani village according to 2011 census

	Total	**%**
Total no. of household	51	
Total Population	166	
Male Population	81	48.80
Female population	85	51.20
Total Children	20	12.05
Male Child	13	7.83
Female Child	7	4.22
SC population	0	0
ST population	47	28.31
Sex ratio	1049	
Literacy Rate	58.43	
Literacy Rate (Binpur II Block)	62.17	
Literacy Rate (Jhargram District)	70.92	
Source: District Census Handbook (2011)		

female respectively. In age group of 40-60 years, the frequency of population is gradually decreasing. 23 % of male and 18 % of female are in this category. Dependent population (i.e., above 60 years) are about 5 % and 8% respectively for male and female. Frequency of male and female is remarkably less in old age group (>60 years) due to high death rate and low life expectancy. Marital status of the Sabar community shows that 42 % of male and 37 % female are unmarried whereas, 58 % of male and 47 % of female are married. 16% of female are widow because death rate is high due to their poor health condition.

Table-2: Demographic Status of Sabar Community

Variable	Categories	Male	Female	% of Male	% of Female
Age- Sex Composition	0-18 years	11	16	25	32
	18-40 years	21	21	48	42
	40-60 years	10	9	23	18
	>60 years	2	4	5	8
	Total	44	50	100	100
Marital Status	Un-Married	18	19	42	37
	Married	25	24	58	47
	Widow	0	8	0	16
	Total	43	51	100	100
Source: Field Survey, February 2023					

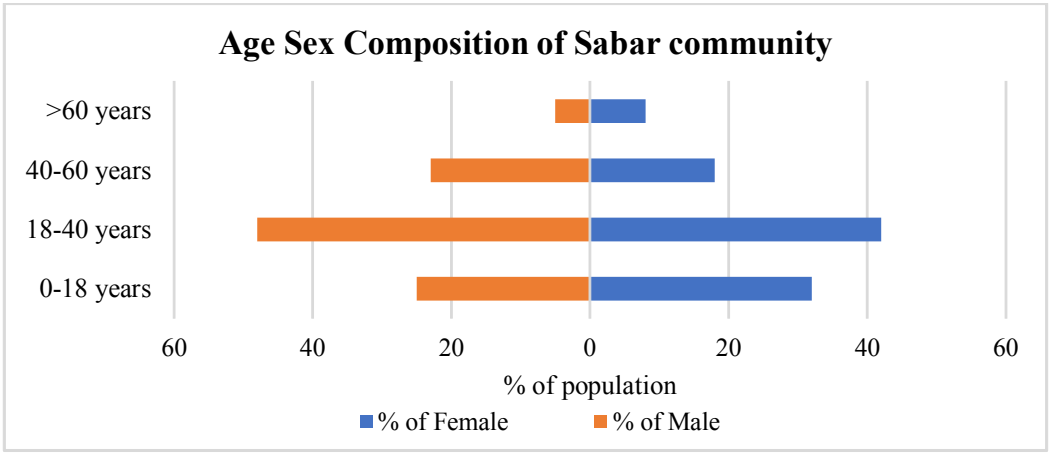


Fig:3 Age Sex composition of Sabar community

4.3 Educational Status

The development of any community depends on it's literacy rate. As per the Census 2011, the **literacy rate of Purnapani village is 58.43 %.** Purnapani village has lower literacy rate compared to Jhargram district (70.92 %) and also compared to the West Bengal (76.26%). Majority of the villagers of Purnapani village has no formal education (31.91%). About 4.26% children of Sabar community are going to ICDS centre. 29.79 % of Sabar people have primary level of education and 11.70 % people studied up to upper primary level. In higher secondary education, they are totally absent. Because thefulfillment of the basic needs are main preference than education.*(Table 3, Fig 4)*. Overall educational condition of the Sabar community is poor, because of their poor economic condition, child marriage, lack of awareness of parents etc.

Table-3: Educational Status of Sabar Community

Variable	Categories	No. of Respondent	%
Level of Education	No formal education	30	31.91
	ICDS	4	4.26
	Primary	28	29.79
	Upper Primary	21	22.34
	Secondary	11	11.70
	Higher Secondary	0	0
	Total	94	100

Source: Field Survey, February 2023

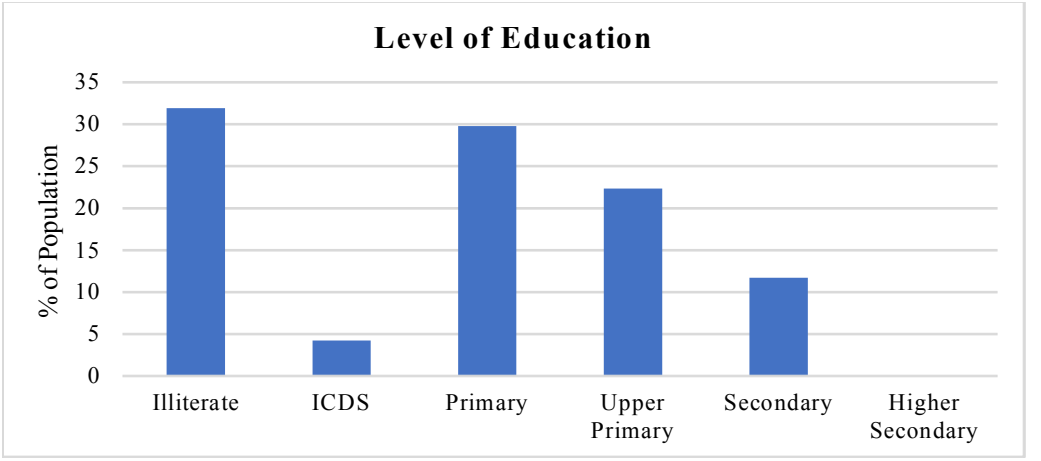


Fig:4 Educational level of Sabar community

4.4 Economic background

Table 4 shows different socio-economic variables. In terms of poverty levels, a significant proportion of the Sabar community (100%) falls under the Below Poverty Line (BPL) category. As the Sabar people are less educated and unskilled, their job opportunity is very less. So, most of the Sabar people depends on forest and forest product for their livelihood and also they are engaged in low-wage work i.e., agricultural labour (14.29 %) and construction labour (18.18 %). Forest product collection and marketization (19.48 %) are their dominant occupation. Sal plate making (15.83 %) and Babui Rope Making (11.69 %) are another important economic activities of the Sabar people. 6.49 % of population practiced agriculture on leased land as they do not have their own agricultural land. Few of them depend on hunting-gathering (5.19%), livestock rearing, liquor selling, and hand craft making (3.90 %).

Table-4: Economic background of Sabar Community

Variables	Categories	No. of Population	%
Poverty Level	BPL	23	100
	APL	0	0
Occupation (Person above 14 years) (N= 77)	Agriculture on leased land	5	6.49
	Hunting-gathering	4	5.19
	Livestock rearing	3	3.90
	Forest product collection and marketization	15	19.48
	Agricultural labour	11	14.29
	Daily or Construction labour	14	18.18
	Sal plate making	10	12.99
	Babui Rope Making	9	11.69
	Liquor Selling	3	3.90
	Handcraft making	3	3.90

Source: Field Survey, February 2023

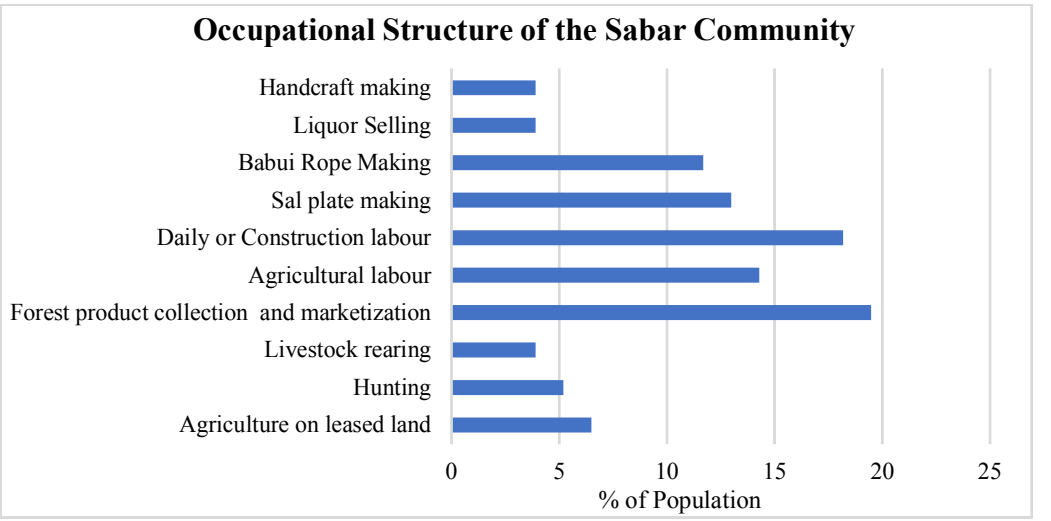


Fig: 5 Occupational structure of the Sabar community

Fig: 6 Babui rope making

Fig: 7 Fuel wood cutting for marketization

Fig: 8 Mahua flower collection and Sun drying of mahua flower

4.5 Income

Monthly family income reveals that 52.17 % of Sabar families earn less than Rs. 4000, 34.78 % of families have monthly income Rs. 4000-8000 and very few families (13.04 %) earn more than Rs. 8000 per month. Marketization of different non-timber forest product, sal plate, babui rope and fuel wood selling are their major source of household income.

4.6 Source of Income

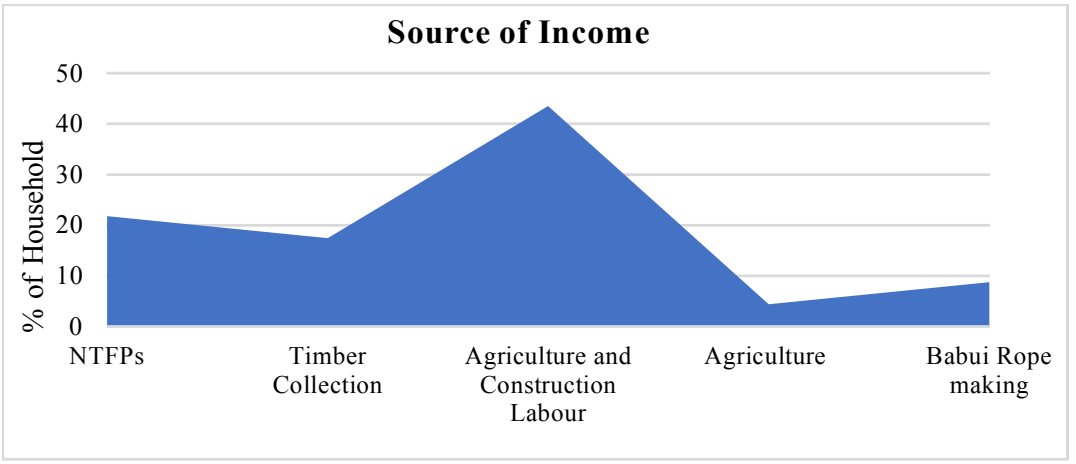
In this area Sabar families are engaged with varieties of income sources, like agriculture and construction labour, NTFPs collector, timber collector, agriculture, babui rope maker and other occupation. Table 6 shows the dominant source of household income. Agriculture and construction labour (43.48 %) is most prominent source of earning as the Sabar family do not possess cultivable land. 21.74 % families are NTFPs collector, 17.39 % families earn from timber collection, 8.70 % household make babui rope and very few family engaged in agriculture practices.

Table- 5: Monthly Income of Sabar Community

Variables	Categories	No. of Household	%
Monthly Income In Rs.	<4000 Rs.	12	52.17
	4000-8000 Rs.	8	34.78
	>8000 Rs.	3	13.04
Source: Field Survey, February 2023			

Table- 6: Source of income

Source	No. of Household	%
NTFPs	5	21.74
Timber Collection	4	17.39
Agriculture and Construction Labour	10	43.48
Agriculture	1	4.35
Babui Rope making	2	8.70
Source: Field Survey, February 2023		



Source: Field Survey, February 2023

Fig: 9 Income source of the Sabar households

4.7 Land holding

In the study area, most of the households do not possess their own land and engaged as agricultural labours in other's land. The study shows that number of landless villagers are more in Purnapani village. 60.87 % families do not have their own land for cultivation. 30% households of Purnapani village possess very small landholding (less than 1 bigha) and only 8.7 % of household possess land between 1 and 2 bigha (Table 7 and Fig 10).

4.8 Living Standard

The living standard of Sabar community is assessed by the ratio of the amount spent for food purpose to total monthly income of the household. The estimated ratio ranges from 0 to 1. Value closer to '0' indicates better condition and close to '1' indicates poorer condition of a family. 47 % of the families belong to the poorest of the poor category, spend more than 80 percent of their total income for food purpose.

Table- 7: Availability of land and landholding size classification

Availability of Land (Bigha)	No of Households	%
No Land	14	60.87
< 1 Bigha	7	30.43
1-2 Bigha	2	8.70
Total	23	100.00
Source: Field Survey, February 2023		

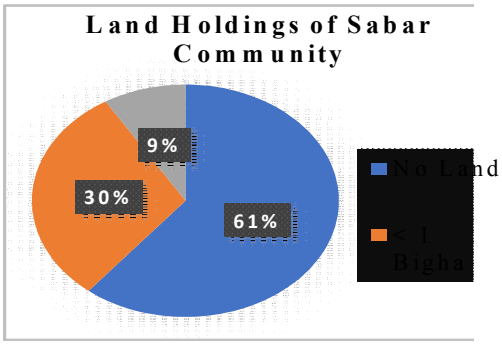


Fig:10Land holdings of Sabar community

Table-8: Ratio between food expenditure and income

Ratio between Expenditure for Food and Total Income	Living Standard	No. of Household	%
<0.2	Better Condition	0	0.00
0.2-0.4	Relatively in Better Condition	0	0.00
0.4-0.6	Moderate	4	17.39
0.6-0.8	Relatively Poor	8	34.78
>0.8	Poorest of the Poor	11	47.83

Source: Based on authors calculation

4.9 Housing condition

Housing is not only a physical shelter but also a place where family can grow physically, mentally and socially. According to the material used and structure, the houses are categorized into three types i.e., pucca (concreate), semi-pucca (mixed with pucca and kutcha), and kutcha. In Sabar community of Purnapani village, 65.22 percent houses are kutcha made of mud, grass, bamboo and 26.09 % of houses are semi-pucca and only 8.70 % of houses are pucca type made through PM Awas Yajna. Roofs are made by asbestos (69 percent), few other materials such as tin, straw, mud tiles are also used. Wall are mainly made by mud (about 56.52 percent) and followed by cement (30.43 percent) and brick (about 13.04 percent). Whereas, 91.35% of house'sfloor are made by mud only 8.70 % of houses have concrete floor(*table-9*). 65.22 % households enjoy toilet facilities in their premises but open defecation mostly practiced by this community. As the study area is a forest fringe village, most of the families use fuel wood as their cooking fuel. 34.78 % of families depend on fuel wood with dry leaves collected from the forest. Only 8.70 % of families use kerosene with fuel wood for cooking purpose.

4.10 Dependency of household on NTFPs

The dependency on NTFPs in the study area was determined by the local people's perception. Five types of NTFPs i.e. fuelwood, medicinal plants, sal leaves, mahua flower, kendu leaf were mostly harvested. They depend on sal wood for construction material, dry sal wood and leaves for fuel, wild fruits and mushroom as their food. Mahua flower as traditional liquor and food.

Table-9:Housing condition of Sabar Community

Variables	Sample Size (N= 23)	No. of Household	%
House type	Kutcha	15	65.22
	Semi-Pucca	6	26.09
	Pucca	2	8.70
Roof Material	Tin	3	13.04
	Straw	3	13.04
	Mud Tiles	1	4.35
	Asbestos	16	69.57
	Cement	0	0.00
Wall Materials	Brick	3	13.04
	Mud	13	56.52
	Cement	7	30.43
Floor Materials	Mud	21	91.30
	Cement	2	8.70
Toilet facility	Yes	15	65.22
	No	8	34.78
Energy for Cooking	Fuel Wood	13	56.52
	Fuel wood with Dry leaves	8	34.78
	Fuel wood with Kerosine	2	8.70
Source of Lighting	Electricity	18	78.26
	Kerosine	5	21.74
Source: Field Survey, February 2023			

4.11 Scenario of NTFPs collection

Forests have generally played a very crucial role in domestic livelihood of these Sabar people. They mostly rely on forest and non-timber forest resources to fulfil their day-to-day subsistence life. They have symbiotic relation with the forest as the forest provides sal wood for construction material, dry Sal wood and leaves for fuel, Mahua flower as traditional liquor and food. Mushroom, Ban kundri, Bel, Dumur, Kham alu and Kendu fruit as their food. Flower and leaves of Sal and Mahua are used for different socio-cultural activities. They mostly depend on herbal medicine such as basak, kalmegh, satmuli, neem etc. collected from the adjoining forest. Different non-timber forest products are collected by these people throughout the year as per availability. Table 10 shows the seasonal collection NTFPs in the study area.

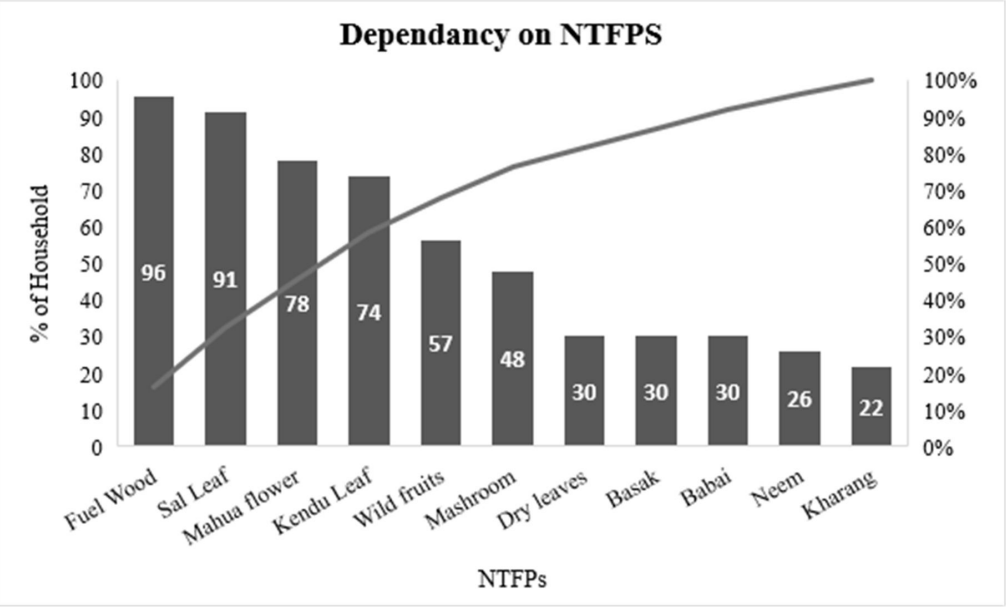


Fig:11 Household dependent on different NTFPs

4.12 Forest-Based Medication System

Folk medicine includes ideas on health care and healing practices based on folk education, philosophical beliefs and culture (Saha & Sengupta, 2021). This treasure of knowledge is transmitted orally through generation without any written document and it is still reserved by several indigenous groups of India. Several studies reflect indigenous knowledge of forest conservation and regeneration by the tribal people in India (Putri *et al*., 2022; Rao & Ramana, 2007). The medicine man of the Sabar community transfers an outstanding knowledge about wild plants. They have developed the healthcare traditions and practices through constant experimentation and yearlong understanding. The traditional knowledge of using medicinal plants by these 'forest people' has made their life easier through decades. Table 11 shows the use of medicinal plants by the Sabar community in the study area for healing purposes in different diseases.

5. Conclusion

This community depends mostly on forest and local environment to fulfil their basic needs. Sabar households live below the poverty line and are more dependent on non-timber forest products (NTFPs) as they have no agricultural land and they are not equipped with modern technology, training and education. 65 % of households have

Table-10: NTFPs collection calendar by Sabar Community of Purnapani Village

SL No.	Plant from which NTFPs are collected	*Scientific name*	Used Parts	Collection Period											
				J	F	M	A	M	J	J	A	S	O	N	D
1	Sal	*Shorea robusta*	Leaf	■			■	■	■	■	■	■	■	■	■
			Seed					■	■						
2	Mahua (*Mahul*)	*Madhuca indica*	Flower			■	■								
			Fruit					■	■						
3	Kend	*Diospyros melanoxylon*	Leaf				■	■	■						
			Fruit			■	■								
4	Mushroom	*Agaricus bisporus*	Plant						■	■	■	■	■		
5	Ban-kundri	*Coccinia grandis*	Fruit						■	■	■	■			
6	Ban-Khajur	*Phoenix acaulis*	Fruit					■	■	■					
7	Aam	*Mangifera indica*	Fruit				■	■							
8	Bel	*Aegle marmelos*	Fruit		■	■	■								
9	Dumur	*Ficus hispida*	Fruit					■	■						
10	Kham-alu	*Dioscorea alata*	Root							■	■	■			
11	Basak	*Justicia adhatoda*	Leaf												
12	Kalmegh	*Andrographis paniculata*	Leaf									■	■	■	■
13	Satamuli	*Asparagus racemosus*	Root	■	■	■	■	■	■	■	■	■	■	■	■
14	Neem	*Azadirachta indica*	Leaf		■	■									
16	Babui	*Saccharum spontaneum*	Grass	■	■										■
17	Firewood		Leaves/ Branches	■	■	■	■	■	■	■	■	■	■	■	■

Data source: Based on interaction with the villagers of Purnapani during questionnaire survey, 2023

■ Collection period of NTFPs

kuccha house. Mud, grass, wood, thatch and associated building materials are collected from nearby forests. Most of the population of Sabar community use medicinal plants and herbs collected from forest for their healing practices. Hunting of fish from a nearby lake and gathering fruits, Mahua flower, and honey collection from the forest etc. are integral part of their livelihood. They alter natural environment in a limited scale as their demand and daily consumption is too small. They maintain their surrounding forest areas through traditional knowledge-based forest management system where diversified plant species are grown which support the community in yearlong livelihood. This sustainable as well as symbiotic approach is more effective in forest conservation and biodiversity protection.

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Table-11: Herbal medicines used by the Sabar community

Name of Disease	Plant Name	Scientific Name	Parts Use
Anaemia	Kulkha	*Centella asiatica*	Leaf
	Thankuni	*Hydrocotyl asiatica*	Leaf
Asthma	Kalmegh	*Andrographis paniculata*	Root
	Dhutra	*Datura fastuosa*	Leaf
Bronchitis	Basak	*Adhatoda vasica nee*	Leaf
Cold and cough	Tulsi	*Ocimum sanctum*	Leaf
	Aam	*Mangifera India*	Leaf
	Kusum	*Schleichera oleosa*	Seed
Defective Vision	Satmuli	*Asparagus racemosus*	Leaf and Root
Digestive problem	Bell	*Aegle marmelos*	Fruits
	Kalmegh	*Andrographis paniculata*	Leaf
	Thankuni	*Hydrocotyl asiatica*	Leaf
Diarrhoea	Aam	*Mangifera indica*	Bark
	Horitoki	*Terminalia chebula*	Root
	Grita-kumari	*Aloe Vera Tourn*	Leaf
Headache	Pathar kuchi	*Bryophyllum pinnatum*	Leaf
	Grita-kumari	*Aloe Vera Tourn*	Steam
Joint pain	Chihurlata	*Bauhinia vahlii*	Bark
	Kochu	*Colocasia esculenta*	Leaf, Steam
	Hatisur	*Heliotropium indicum*	Leaf
Skin disorders	Neem	*Asadirachala indica*	Leaf and fruit
	Halud	*Curcuma longa*	Rhizome

Data source: Based on interaction with the villagers of Purnapani during questionnaire survey, 2023

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