

A Study of Forest Resources for Sustainable Rural Development in Darjeeling Hills of West Bengal.

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ABSTRACT

Sustainable rural development with natural forest resources contributes significantly to rural livelihoods. Issues relating to forest resources and rural livelihoods should not be ignored in policy decisions and other interventions. Therefore, different agencies should take steps to make efficient use of forest resources, which would be one effective way to improve the livelihoods of rural households. The result of the study also indicates that very little attention has been paid to the cultural, traditional and environmental value of forest resources in the Darjeeling hills. Even awareness programs on the use and conservation of forest resources by various governmental and non-governmental organizations are limited in the study area. Current forest management strategies suggest that forest resources are common resources, resulting in a lack of rural household active participation in forest conservation practices. It has been revealed that rural households use other sources of diversified livelihood strategies in addition to income from agriculture and forestry. Hence, to achieve sustainable development, it is necessary to involve certain core stakeholders namely 'community and small-holder forestry' into the forest resources management practices. It is important that active involvement of local community helps to achieve sustainable development goals. Unfortunately, consistently increasing number of population and anthropogenic pressure on forests, Poverty and illiteracy (lack of awareness) towards forest management and sustainable livelihood among large section of the local Darjeeling hilly inhabitants are major hurdles as observed during the course of study.

Keywords

Forest resources, Sustainable development, forestry, Forest dwellers, Rural livelihood, Rural development, Forest Department.

1. Introduction

The word "forest" is derived from the Latin word "*foris*" which means outside. Originally, the word "forest" included uncultivated or uninhabited land. At a later stage, forests have been defined as land for use for forestry purposes. Vegetation is maintained on these lands for several benefits, including environmental, climatic, protection and timber and non-timber products. From an ecological point of view, the forest is defined as "a plant community composed mainly of trees and closed canopy woody vegetation". In terms of law, forests are an area of land classified as forest within the meaning of the Forest Law. About 4 billion hectares, or about 31% of the world's land area, are covered with forests.

2. Forest Resources in India

Forests are an important renewable natural resource and contribute significantly to the economic development of rural populations in India. Forestry activities are very important in local and rural India because they provide fodder, fuel, fibre and so on. India is one of the 12 countries of the "great diversity" of the world, rich in natural resources and geographical diversification. With 10 bio geographic zones and 25 biotic provinces, all major ecosystems are represented here. The country has a coastline of 7,616 km and 14 types of climatic forests, the total forest cover in India is about 6.50 000 km². India is the homeland of 13 000 species of flowering plants, 20,000 mushroom species, 50,000 species of insects, 65,000 species of fauna, including 2,000 species of birds, 350 mammals and 420 reptiles, covering nearly 7% of the world's flora and 6.5% of the fauna of the world, of which 33% of the flora and 62% of the fauna are endemic. More than 30 national parks representing 1% of the landmass and 441 sanctuaries representing 3.5% of the country's total area are fortunate to have distinct and varied forest vegetation from the north-eastern tropical moist evergreen forests and the Western Ghats to the dry alpine forests of the Himalayas. Within this broad classification are semi-evergreen forests, deciduous forests, coastal and swamp forests, thorn forests, temperate mountains with alpine meadows and alpine meadows. These forests are rich in biodiversity, in the form of animals and plants. The estimated biodiversity is more than 45,000 plant species and 81,000 animal species, representing about 7% of the world's flora and 6.5% of the world's fauna, respectively.

Forest Resources in West Bengal

West Bengal state is covering an area of 88,752 sq. KM which is 2.7% of the geographical area of the country. The state can be divided into three major regions physio-graphically viz. The northern mountainous terrain, the south western peninsular tract exhibiting rolling topography and low lying alluvial Gangetic plains to the south. West Bengal has a diverse climate, varying from moist tropical in the southeast to dry tropical in the southwest and from subtropical to temperate in the mountains in the north.

3. Forest Resources in North Bengal

North Bengal has a large area of forest on its mountainous terrain and adjacent valleys. In the districts of Darjeeling and Jalpaiguri, 38.27% and 28.74% of the total geographical area of the respective districts are covered with forests. The forests of Darjeeling and Jalpaiguri districts, which include the Doars and Terai Forests, consist of tropical moist deciduous forests in the north. In mountainous areas, there are tropical moist hill forests in the north and temperate humid Himalayan forests and their various subtypes. These forests are covered with valuable trees such as sal, simul, panisay, paccasy, gamari, oodal, lali, kadam, etc. The precious wood available in the forests of northern Bengal is mainly used for the manufacture of furniture and plywood. Plywood is used in the manufacture of tea chests packing boxes.

3. Assessment of Forest Resources of Darjeeling Hills

The northern most part of the Darjeeling district is a mountainous region situated on the Himalayan chains. Jalpaiguri and Coach Behar are characterized by their mixed hill and plain landscape. The southern districts, Uttar Dinajpur, Dakshin Dinajpur and Malda are completely riverine plains. Other plain areas comprise of southern parts of Coach Behar, Jalpaiguri and Darjeeling district. In the case of Darjeeling District, in the State of West Bengal, it is recognized that the region is agriculturally and economically backward according to the indicators prescribed by different institutions to determine the agricultural development of certain parts of the country. India. The forest is another important resource for economic development. The forest area is 1204 sq. Km. or 28% of the total area of the district. The forests are distributed in the sub-divisions of Darjeeling, Kurseong and Kalimpong (Kalimpong District now formed in 2017).

The Darjeeling Forests can be classified in lowland hill forests and hill forests. Sal trees are the most important type of tree grown in the plain or lowland hill forest. Mountain forests can be further divided into three groups' viz. Lower, middle and upper hill forests. The forests of the lower hills reach an altitude of 3,000 feet, the forests of the middle hills from 3,000 to 6,000 feet, and the forests of the upper hills from 6,000 to 9,000 feet.

Prior to 1863, very little attention was paid to conservation and afforestation programs. The district of Darjeeling had 11,000 hectares of reserve forest until 1879. But after independence, due to rapid urbanization, the upper part of the forest was exploited for commercial purposes. Much of the natural forests of the Senchal, Ghum-Simana and Takdah chains have been converted (urbanized). There are still some natural forest plots in Reshop, Bara Senchal, Lopchu, Rangbang and Durbin Gram Panchayats. On difficult terrain, there are still some plots of natural forest. The analysis of deforested areas indicates that landslides are most frequent in these areas. Therefore, areas with intense deforestation may be superimposed on the map of the landslide area in support of this assumption. The hills of the Darjeeling district are divided into two forest divisions, namely: - Darjeeling and Kurseong. The increasing pressure of the population over the past two decades has left a clear mark on the forest resources of the region. A marked decline in forest cover has been observed in the Takdah-Ghoom-Simana region, Darjeeling Sadar, Sukhna, Pankhabari areas of the Kurseong Division.

4. Sustainable Rural Development

Rural development is the union of two words "rural" and "development." Rural means "open land" and includes all people who live outside the town area and who live on the farm. Thus, agriculture is generally the main occupation in rural livelihoods. While, on the other hand, development refers to growth, evolution and the stage of progress. The economic contribution of agriculture to India's GDP (Gross Domestic Product) is steadily declining with the country's broad-based economic growth. Even so, agriculture is demographically the largest economic sector and plays vital role in the general socio-economic fabric of India. India is predominantly an agriculture based country. Agriculture is the predominant occupation of livelihoods and the rural India depends heavily on it. A large part of this rural

population (more than 200 million) still lives below the poverty line and is the focus of rural development programs. All governments after the country's independence in 1947 have committed to rural development agenda. So, we can say that rural development is a process of transformation of rural culture traditionally oriented towards acceptance and dependence on science and technology, or it can be stated as, rural development is an improvement in the standard of living of the masses of low-income population residing in rural areas and making the process of self-sustainability. Rural development can be defined in several ways, but for all practical purposes it means helping poor livelihoods living in villages in their economic development.

The connection of the three words 'sustainable', 'rural' and 'livelihoods' as a term denoting a particular approach was possibly first made in 1986 in a hotel in Geneva during the discussion around the Food 2000 report for the Brundtland Commission. Rural development is about a process that seeks social change and sustainable economic development for the rural community's ongoing progress. The ultimate goal is to improve their quality of living standard and preserve the environment. There are three basic needs in rural development for a sustainable future: 1. Improving millions of people's welfare that live in the country (nearly half of the world population), thus reducing the rural-urban gap, stamping out poverty and prevention towards city migration. 2. Protecting and preserving natural, landscape and cultural resources. 3. Ensuring universal access to food with a sustainable farming production. Sustainable Rural Development is improving the quality of life for the rural poor by developing capacities that promote community participation, health and education, food security, environmental protection and sustainable economic growth, thereby enabling community members to leave the cycle of poverty and achieve their full potential. This can be achieved by documenting lessons-learned in the field on practical solutions to challenges facing the rural poor. Sharing these lessons in a systematic framework so that underserved villagers receive the critical information on development activities they need to begin improving their difficult lives.

Rural livelihoods are sustainable when they can cope and withstand stress and shocks, and maintain or enhance their capabilities and assets without undermining the natural resource base. Forest resources play three potential roles in the livelihoods of rural households in developing countries such as ours: **(a)** they serve as a safety net to provide shelter in times of crisis due to lack of money or income, **(b)** they complement the current consumption that households do not fall into abysmal poverty and **(c)** guarantee a capital accumulation that allows them to get out of poverty. One feature share in common is that rural livelihood deals with people, their resources and what they do with these resources. Essentially it revolves around resources (land, crops, seed, labour, knowledge, cattle, money and social relationships) that cannot be disconnected from the issues and problems of access and changing political, economic and socio-cultural circumstances.

Forests of Darjeeling play vital role in the economy of rural livelihood. Darjeeling forests play both productive and protective functions as far as rural livelihood is concern. The local or rural economy associated with forests and its resources are called 'extractive economy'.

5. Statement of the Problem

According to 2011 Census, Darjeeling population reaches 16, 05900 which is consecutively increasing rapidly as per census data. The rapid population increase has caused expansion of land area of cultivated fields as well as forest land. Vast areas of forest and vested land been converted into cultivated fields. Simultaneously, the forests of nearby rural villages disappeared gradually. Due to expansion of land and degradation of forest resources causes rapid soil erosion and make huge impacts on rural livelihood as they are greatly interlinked with forest and its resources. Annual irregular rainfall pattern, landslide, water shortage and shrinking of forest resources makes huge direct impact towards rural development of the area. People of rural Darjeeling directly or indirectly depend on forest and its resources as far as income and daily livelihood chores are concern. Environmental and forest conditions plays a major role in conditioning the livelihood and economy of the rural Darjeeling. Hence, economic status of rural Darjeeling is very vulnerable. To draw a middle path solution in between of vulnerable rural status and degrading forest resources of Darjeeling, an urgent comprehensive plan is needed which can be fulfilled through a sustainable rural development approach. The need of a study is to draw an outline of all possible ways towards sustainable rural development which can help long-term solution towards degrading nature of forest resources and sustainable rural development. Amidst of rapid development, environmental exploitation and urbanisation; Sustainable rural developments draw a pathway towards conservation of forest resources as well as upliftment of socio-economic status of rural livelihood. In addition, Darjeeling shares 38.28% of recorded forest areas and multidimensional livelihoods patterns in the Darjeeling district provide extra scope to the study.

6. Objectives

The major aim of the study is to examine forest resources and prospects of sustainable rural development by the people of Darjeeling hills. Specifically, the study seeks the following sub-objectives:

- To examine the relationship between rural livelihood and forest resources of the Darjeeling hill.
- To assess the present forest resources of Darjeeling hills and its impacts and importance of sustainable rural development of Darjeeling hilly region.
- To examine the involvement and role of local communities and Forest Services Divisions in sustainable forest management in the Darjeeling hills.

7. Sample Design

The Darjeeling District in West Bengal consists of four sub-divisions along with nine blocks and four municipalities. This study was carried out specifically focusing on Darjeeling hill Sub-Divisions in three (3) blocks namely Darjeeling-Pulbazar, Rangli-Rangliot and

Jorebunglow-Sukhiapokhri block. These blocks were identified based on the hilly geographical location along with natural resources and rural livelihood. From each of the above-identified blocks, 5 (five) village Panchayats have been selected. Further, 10 households from each village panchayat and a total number of samples selected for the present study it was 150 as detailed below, by using Disproportionate Stratified Random Sampling method.

8. Sources of Data

The required data was collected from 150 rural households with the help of pre-tested interview schedules. The Schedule consisting of items of information such as access and availability to Forest Resources, Factors Affecting Degradation of Forest Resources, Impact of degradation of Forest Resources etc. The items of information collected through personal interview, focused group discussion and Participatory Rural Appraisal methods for understanding dependency on forest resources for their rural development.

9. Implications of the study

The present study has brought out a different dimension of forest resources and sustainable rural development particularly in the aspects of use by rural households and dependency rate on forest resources by the rural population. The outcome of the proposed study would help the policymakers to evolve a suitable policy for conserving and management of the forest resources in the study area. In the long it would also result in sustainable rural livelihoods of dependents and its implications for biodiversity of the Darjeeling hills.

10. Profile of Darjeeling District

Darjeeling district lies between 26°31'N and 27°13'N latitude and between 87°59'E to 88°53'E longitude, the total area is about 3,149Km² and 1/5th cover of the total geographical area of Darjeeling district is hilly (Shiwalik). On the north it is bounded by Sikkim, in the south by Bangladesh, in the west by Nepal and Bihar and on the east by Bhutan and Jalpaiguri district.

11. Findings and Result

Analysis of economic characteristics and percentage distribution of sample respondents as shown below gives the major occupation-wise distribution of sample respondents. Occupation of respondents is directly related to use of forest resources and access. In general, those people who are dependent on Farming or livestock work are more likely to depend on forest resources in the hills as forest resources constitutes major income source and generated livelihoods in the form of fuelwood, medicinal plant, use of common grazing land for cattle and pets, getting access to fallow or barren land. Self-employed, business and Govt. employee class of people, in general, do not depend on forest resources for their day to day livelihoods as their economy largely does not depend on it. However, in rural villages still, people use forest resources as it supports the family economy or day to day activities.

Table 1. Distribution of Sample Respondents according to Occupation of Economic Characteristics

Sl. No.	Background characteristics Variables	1-Pulbazar-Bijanbari, 2-Rangli-Rangliot, 3-Jore bunglow-Sukhia Pokhri. (%)			Total (%)
		1	2	3	
1.	Farming & Livestock	15 (33.3)	16 (35.5)	14 (31.1)	45 (30.00)
2.	Teaching	08 (42.1)	07 (36.8)	04 (21.0)	19 (12.6)
3.	Wood Processing	02 (25)	02 (25)	4 (50)	08 (05.33)
4.	Carpentry	04 (50)	03 (37.5)	01 (12.5)	08 (5.33)
5.	Food Vending	02 (28.5)	03 (42.8)	02 (28.5)	07 (4.66)
6.	Govt. Employee	07 (43.7)	04 (25)	05 (3.33)	16 (10.66)
7.	Unemployed	06 (30)	03 (15)	11 (55)	20 (13.33)
8.	Student	02 (16.6)	06 (50)	04 (33.3)	12 (08.00)
9.	Others	04 (26.6)	06 (40)	05 (33.3)	15 (10.00)

In surveyed 30% of respondents depends on farming and livestock as majority. Comparatively in Rangli-Rangliot block majority of respondents noted farming and livestock as major occupation with 35.5%. It has also been noted that almost 13% of respondents were unemployed in three blocks of Darjeeling hills which might act as a major factor of degradation of forest resources and sustainable rural livelihood. Rest from the above table 1. it is clearly revealed that among the surveyed respondents with 12.6% teaching, followed by government employee with 10.66%, others category includes self-employed with 10%, students with 8%, wood processing and carpentry with 5.33% and food vendors with 4.66%.

Table 2. Distribution of Landholding Capacity of sample respondents.

S/No.	Background Characteristics Variables	1-Pulbazar-Bijanbari, 2-Rangli-Rangliot, 3-Jore bunglow-Sukhia Pokhri. (%)			Total (%)
		1	2	3	
1.	Own Land (land ownership)	33 (36.2)	24 (26.3)	34 (37.3)	91 (60.6)
2.	Forest Dwellers (Structure ownership)	10 (25.6)	17 (43.5)	12 (30.7)	39 (26.00)
3.	Other (landless, rented, tea garden area etc)	07 (35.0)	09 (45.0)	04 (20.0)	20 (13.33)

Table 2. shows the distribution of surveyed respondents as per land holdings. Availability of land is directly related to the economic status of the individuals. Land right often a vital element when rural households balance their capabilities and assets and determine their resulting strategies to cope with their daily production and food security. However, rights to land are not just a source of economic production but are also a basis of

social relationship and cultural values and a source of prestige and often power. Land size is a very important factor for the economic development of rural householders more particularly for farming dependent families. More land means far more agriculture activities which lead to economic empowerment. Although there are various factors due to which land resources are degrading and thereby affecting the agriculture production. In India, due to land fragmentation, the farmers are very diverse in nature. Based on land size there are three categories of farmers - Small, medium and large. The resulting social networks that are built up within a specific social and cultural group are a very important asset in ensuring the sustainability of livelihoods of rural households.

From the above table, it is revealed that respondents who have own land stands highest with 60.6% followed by forest dwellers with 26% and other category includes rented, tea garden area etc with 13.33%. It is also need to note that, comparatively Jorebunglow-SukhiaPokhri block consisted with highest 37.3% land owners and Rangli-Rangliot block consisted highest 43.5% forest dwellers.

Table 3. Distribution of access to Dependency on Forest Resources

Sl. No.	Background characteristics Variables	1-Bijanbari Pulbazar, 2-Rangli Rangliot, 3-Jorebunglow SukhiaPokhri (%)			Total (%)
		1	2	3	
1.	Directly	10 (40.0)	10 (40.0)	05 (20.0)	25 (16.66)
2.	Indirectly	28 (33.7)	24 (28.9)	31 (37.3)	83 (55.33)
3.	Both (direct and indirect)	09 (26.4)	14 (41.1)	11 (32.3)	34 (22.6)
4.	None	03 (37.5)	02 (25.0)	03 (37.5)	08 (05.33)
Table 3.1 Distribution of respondents according to dependency on forest and its resources (in year)					
1.	1 – 10 years	06 (30.0)	08 (40.0)	06 (30.0)	20 (13.33)
2.	11 – 20 years	16 (41.0)	08 (20.5)	15 (38.4)	39 (26.00)
3.	More than 20 years	28 (30.7)	34 (37.3)	29 (31.8)	91 (60.66)

From the above table 3., it is found that 55.33% of sample respondents stated that they have indirect access to forest resources and 16.66% of sample respondents reported that they have direct access to forest resources. Also 22.6% of the respondents stated as both direct and indirect access of the forest resources followed by 5.33% did not have such dependency on forest resources. The access to forest resources is based on mutual understanding on the ground that minor forest products collectors from the forest will not take any endangered species as per Government rules and regulation. It appears that they will have limited collection on a daily basis and during seasons.

In this regard, the above table 3.1, shows that 60.66% of the sample respondents having regular access of dependency on forest resources for more than twenty (20) years.

Also, 26% of sample respondents having direct and indirect dependency from 11 – 20 years and 13.33% respondents have their dependency from 1 – 10 years on forest resources.

Table 4. Distribution of respondents according to the types of access to major forest resources

Sl. No.	Background characteristics Variables	1-Bijanbari Pulbazar, 2-Rangli Rangliot, 3-Jore bunglow Sukhia Pokhri (%)			Total (%)
		1	2	3	
1.	Timber	07 (41.1)	04 (23.5)	06 (35.2)	17 (11.33)
2.	NTFPs	34 (37.3)	23 (25.2)	34 (37.3)	91 (60.66)
3.	Both	09 (21.4)	23 (54.7)	10 (23.8)	42 (28.00)
Table 4.1 Distribution of respondents' purpose to use forest resources/products					
1.	Only for household use	42 (35.5)	35 (29.6)	41 (34.7)	118 (78.6)
2.	Income generation	03 (17.6)	11 (64.7)	03 (17.6)	17 (11.33)
3.	Construction use	05 (33.3)	04 (26.6)	06 (40.0)	15 (10.00)

In the study area, highest 60.66% sample households are having major access on Non-Timber Forest Products (NTFPs) and 28% sample households have both types (Timber and NTFPs) of forest resources. Whereas, only 11.33% of sample households have their direct access of dependency on timber as major forest resources. Bijanbari-Pulbazar block and Jorebunglow-SukhiaPokhri block shares equal 37.3% each of sample respondents depends on NTFPs and Bijanbari-Pulbazar block sample respondents have 41.1% access on timber as major forest resource. Further, it is interesting to note that majority of the households (54.7%) in Rangli-Rangliot block depending on both (timber and NTFPs) access of forest resources.

Table 5. Observation on Forest Resources by the respondents during past one decade duration

Sl. No.	Respondents' observation on forest resources for the past 5 to 10 years.				
	Background characteristics Variable	1-Pulbazar-Bijanbari, 2-Rangli-Rangliot, 3-Jore bunglow-Sukhia Pokhri			Total (%)
		1	2	3	
1.	Increasing in quantity	12 (70.5)	01 (05.8)	04 (23.5)	17 (11.33)
2.	Reducing in quantity	23 (23.4)	37 (37.7)	38 (38.7)	98 (65.33)
3.	Remain Same	08 (50.0)	03 (18.7)	05 (31.25)	16 (10.66)
4.	Cannot Assess	07 (36.8)	09 (47.3)	03 (15.7)	19 (12.66)

From the above table 5., it is noted that, 65.33% of sample respondents observed that, forest resources are reducing in quantity in the past 5 to 10 years. 12.66% of sample respondents cannot access any such observation on forest resources whereas, 11.33% of sample respondents believe that forest resources are increasing in quantity during past one decade. Also, 10.66% of the respondents believe that there are no such changes occurred in the forest resources.

Interestingly, respondents from the Jorebunglow-SukhiaPokhri block observed highest 38.7% of reducing quantity on forest resources under the block whereas 37.7% of respondents from Rangli-Rangliot block observed reducing quantity of forest resources.

Table 6. Distribution of respondents' observation on deforestation/loss of forest resources for the past one decade

Sl. No.	Background characteristics Variables	1-Bijanbari Pulbazar, 2-Rangli Rangliot, 3-Jorebunglow SukhiaPokhri (%)			Total (%)
		1	2	3	
1.	Excessive use of forest resources	06 (28.5)	08 (38.0)	07 (33.3)	21 (14.00)
2.	Human Settlement/population	25 (35.2)	19 (26.7)	27 (38.0)	71 (47.33)
3.	Illegal logging	07 (22.5)	16 (51.6)	08 (25.8)	31 (20.66)
4.	Natural calamities	00 (00.0)	01 (100)	00 (00.0)	01 (0.66)
5.	Charcoal production	04 (57.1)	02 (28.5)	01 (14.2)	07 (4.66)
6.	Dumping of wastes	05 (83.3)	00 (00.0)	01 (16.6)	06 (4.00)
7.	Cannot assess	03 (23.0)	04 (30.7)	06 (46.1)	13 (8.66)

Reduction in common resources is mainly due to encroachments by rural households and the developmental programmes of the government. During the study area, majorly six factors been addressed viz. Excessive use of forest products/resources, human settlement/population, illegal logging, natural calamities, charcoal production, dumping of wastes. An option been provided to the respondents for the state of 'cannot access' any such major factors as mentioned above.

In the above stated table 6 highest 47.33% respondents believe that, human settlement/population is the major factor for degradation of forest and its resources in the Darjeeling hill divisions. 20.66% of sample respondents believe illegal logging is second major factor of degradation of forest and its resources followed by 14% noted that, excessive use of forest resources/products, 4.66% charcoal production and 4% of dumping of wastes. 8.66% of sample respondents did not figure out the actual factor(s) of forest and its resources degradation in the hills. It has been noted that 38% respondents of Jorebunglow-SukhiaPokhri block stated human settlement/population as major factor of forest degradation within the block. 38% respondents of Rangli-Rangliot block believe that, excessive use of forest resources might be a major factor towards forest degradation. Whereas, 51.6% respondents of Rangli-Rangliot block noted illegal logging is the major factor towards rapid degradation of forest resources. Among three sub-divisions, 57.1% of respondents from

Pulbazar-Bijanbari block noted charcoal production is major factor for forest degradation of the area.

Table 7. Distribution of sample respondents towards awareness/knowledge towards sustainable use of forest resources

Sl. No.	Blocks Variables	Responses (%)			Total (%)
		Very much aware/fully aware	Neutral (neither much aware/less aware)	Less aware/very less aware	
1.	Pulbazar-Bijanbari	05 (10.0)	19 (38.0)	26 (52.0)	50 (33.33)
2.	Rangli-Rangliot	06 (12.0)	26 (52.0)	18 (36.0)	50 (33.33)
3.	Jorebunglow -SukhiaPokhri	02 (4.0)	34 (68.0)	14 (28.0)	50(33.33)
	Total	13 (8.66)	79 (52.66)	58 (38.66)	150 (99.99)

Sustainable use of forest resources leads to sustainable rural development. In the table 7 stated that, 52.66% of sample respondents were neutral about awareness and knowledge towards sustainable use of forest resources. It provides vivid picture about people understands and awareness towards sustainable use of forest resources is not much clear whereas, 38.66% of respondents are less aware/very less aware with sustainable management of forest resources. 8.66% of respondents reported as they are very much aware with the concept of sustainable use of forest resources.

Table 8. Distribution of sample respondents' satisfaction towards FDs (Forest Departments) and their initiatives towards sustainable use of forest resources

Sl. No.	Blocks Variables	Responses (%)			Total (%)
		Very much happy/happily satisfied	Neutral (neither happy/unhappy)	Very unhappy/unhappy	
1.	Pulbazar-Bijanbari	04 (8.0)	13 (26.0)	33 (66.0)	50 (33.33)
2.	Rangli-Rangliot	07 (14.0)	19 (38.0)	24 (48.0)	50 (33.33)
3.	Jorebunglow – SukhiaPokhri	02 (4.0)	29 (58.0)	19 (38.0)	50 (33.33)
	Total	13 (8.66)	61 (40.66)	76 (50.66)	150 (99.99)

The table 8 shows that how much sample respondents are satisfied with FD and their initiatives to practice sustainable use of forest resources. 50.66 of sample respondents reported as they are not happy/very unhappy with FD initiatives. 40.66% of the respondents found neutral (neither happy nor unhappy) and 8.66% of respondents reported that, they are happy and satisfied with FD initiatives towards sustainable use of forest resources.

12. Summary and Findings:

- The present study has revealed that sample households have collected forest resources for personal use and also for sale. Further, it has been noted that 11.33% of sample households have earned income from forest resources.
- The present study also noted that, 65.33% of respondents reported that forest and its resources are reducing in quantity during the past 5 to 10 years duration.
- A vast majority of the sample households stated that they have followed conservation strategies to ensure the sustainability of rural livelihoods. But, major concern reported by the rural households is due to lack of knowledge and awareness of sustainable use of forest and its resources, proper balanced conservation of forest resources are not maintained so far.
- The reasons for not taking up conservation activities in certain cases were mainly due to lack of awareness on conservation strategies and sustainable development practices. Hence, it has been analyzed that sustainable rural livelihood is not maintain in an adequate form.
- The study indicated that the sample households had the knowledge of decline of forest resources in the study areas. Due to unawareness, the management practice is very rare resulting in overexploitation of these resources. It has been observed that, the reduction in forest and its resources is mainly due to human settlement (increasing population), encroachments by rural households, unemployment and developmental programmes.
- It was evident from the study that the sources of common water resources have declined and the narrowing of forest cover areas and declining rate of forest resources were also reported by the respondents. Due to the decline of forest resources, out-migration of local populace and alternative livelihood options were reported. On the basis of these arguments, the linkage between forest resource degradation and impact on socio-economic status of rural livelihood has been established.
- Further, the study has shown that the local community had little control over forest resources governance and people were lacking in knowledge of management and conservation of forest resources. It has been reported that regular communication and peoples' involvement are very less in the rural hill sub-divisions by the forest department. Active involvement and participation of local residents are very less. These reasons have also contributed to the decline of forest resources in the study areas.

- The level of educational attainment as noted in the sample blocks presents huge potentials for mobilizing community participation for effective management of forest resources. Successful sustainable development model can be achieved if active participation of locals been made.
- Of the three blocks covered for the study, Rangli-Rangliot Block had highest human settlement. And also there are great chances that in future their might be huge crisis of forest and its resources as a result of rapid urbanization. Therefore, it is very clear from this study that the decline of forest area has serious consequences for the rural socio-economic threads.
- It was interesting to note that majority of the households were having regular access to the forest resources for their domestic use. However, due to unawareness, the management practice is very rare resulting in overexploitation of these resources.
- It is noted that the majority of the households had the knowledge of management and conservation of forest resources. The types of management and conservation of forest resources included avoided cutting trees, consciously avoidance of polluting the water bodies, conserving of reckless deforestation practices and other traditional beliefs that were treated as common resources for all.
- This study also has revealed that the sample households were aware of the phenomenon of forest decline in general and in the study areas in particular.
- The sample households those who reside as forest dwellers and they have only structure ownership, they have obtained permission from Forest Department for the collection of forest products felt that the resources should be brought under the control of the community for better management and conservation which might result sustainable rural development.
- This study also reported the negative effects such as climate change, pollution, artificial and advanced lifestyle on account of decline forest resources. Further, it has shown that the local community had little control over forest resources governance and people. This results a decline of local ownership and responsibility of rural livelihoods towards forest and forest resources.
- The householders in the study areas have also worried of as to whether the upcoming generation will realize the importance of forest resources or not. It was suggested by the locals that providing more employment opportunities and creating provisions under the government schemes at local level would help the upcoming generation to cope-up with the possible decline of forest resources in the future.
- It was also learned from this study that persons with less level of educational attainment appeared to more dependency on forest resources when compared with other categories of sample respondents covered by the present study. It is also equally true the farmers are

more engaged with forest resources as such an action is an integral part of farming itself either on the own land or least in lands.

- Out of the total respondents, that majority of the respondents had positive responses on illegal logging in which Rangli-Rangliot block is highest with 51.6% and Pulbazar-Bijanbari is lowest with 22.5%.
- It has been observed that, cutting of tree for various household purposes was a general practice among the forest dwellers and dependent communities but after implementation of various forest acts many such activities have been banned in order to stop unauthorized cutting and smuggling and also in order to protect the forest resources.
- Among the surveyed blocks with 12% respondents of Rangli-Rangliot and 10% of Pulbazar-Bijanbari were highly aware of the topic and respondents from Jorebunglow-SukhiaPokhri with 4% have low awareness towards sustainable use of forest resources.
- Lack of conservation activities is could be directly associated with unawareness about the importance of forest resources which further could be associated with another factor such as either people are fewer dependents or have no control (active participation) over forest resources. Dependency on forests for housing material is a very primary activity for the dependent communities and also it is an age-old practice.
- 5.33% of respondents have reported that they are completely not dependent on forest resources as they have other sources or they are less dependent which may be due to having developed infrastructures.
- Non-Timber Forest Products are those items which do not pose major and direct threat to forest and when its collection is done in a proper and scheduled manner it may last longer for the use of dependent communities.
- The surveyed data reveals that 60.33% of respondents are engaged directly or indirectly on Non-Timber Forest Products for their livelihoods.
- It was observed from the analysis that, lack of conservation activity, population increase, and management of Non-timber forest products education plays a major role in the degradation of forest and its resources in the study area.

13. Suggestions

- The State and Local government and forest department require concentration for the protection of forest resources at the village level. The authorities require enacting additional policies to prevent the encroachments of forest and its forest resources at the village level.
- The Government authorities may use women SHGs to manage and protect the forest resources at the village level, which may enhance women empowerment and income generation for rural hill livelihoods.

- The policy makers may intensify the management and protection of forest resources through the Mahatma Gandhi National Rural Employment Guarantee Act.
- The coordination of community groups may help the authority to enhance the quality of the forest resources at the village level. The dominant user groups may be instructed to manage and protect the same at the village level.
- The quality and quantity of available forest resources at village level may be surveyed to protect the forest and its resources for the future generation. Regular supervision of Forest Departments and local government officers may help to avoid the encroachments and protection of resources.
- The focus should be given to strengthening the village level Institutions, the decentralized governance will ensure addressing the issues faced by rural poor. Involving forest and its resources dependent communities in local level governance for management and conservation their own resources. Many empirical studies also have suggested that community-based management could be an effective way to conserve forest and its resources in the study area.
- Villages where forest resources are available, in those areas specific resources centered policies and program should be made to ensure proper conservation, protection, and management of common resources for environmental sustainability and poverty alleviation.
- Ministry of Rural Development and Panchayati Raj should consider and make rural development strategies by considering the rural poor who are dependent on common property resources. It will ensure sustainable rural livelihoods. Therefore, Panchayati Raj system in the hills is most important for rural sustainable development.
- The role of NGOs at the local level is very important and essential, as they can play a key role in providing awareness of scientific knowledge about sustainable management, conservation and use of common property resources.
- At the village level, Government authorities with local bodies may conduct an awareness program about the importance of forest resource management.
- Traditional knowledge for conservation and management of hilly forest and its resources should be documented and implemented in a more scientific way. This will ensure local level conservation and also enhance the local skill.
- Without peoples' participation, the conservation of forest resources is not possible hence the involvement of local dependent communities, more specifically women and young generation is essential.

- Skill-based training for collection, processing, packaging and marketing of should be provided for NTFPs or Minor Forest Product based entrepreneurship for local dwellers, as MFP have good market value i.e of US\$2.7 billion per year.
- Compensatory afforestation is not enough to compensate for the loss of complex biodiversity, because loss forest means a collapse of the entire ecosystem of forest and environment. Hence dense forest shouldn't be diverted for any development projects.
- Human settlement and illegal encroachment should be checked and people participation should be encouraged at local level.
- The local, decentralized economy should be promoted to ensure conservation of forest resources. Banking and credit facilities should be improved and should be more rural poor centric, to enhance the financial capacity of rural poor. Villagers more specifically women should be encouraged to increase the habit of savings and access to banking service.

14. Conclusion

Forest resources are important natural resources which enhance and stabilize the income, employment, and sustenance of a poor rural village community. It is an established fact that the entire development process of the rural economy is in some way linked to the availability of the common and natural resources that surround it. In addition to an incomparable and non-enumerable contribution to ecology, climate and the environment, the forest and its resources can generate a source of income - jobs for the rural poor and positive benefits for agriculture, cottage industries and livestock.

The findings of this study have important implications: improving the quality of forest resources will have a lasting impact on poverty reduction and sustainable rural development. If resource dependence decreases with income - conventional wisdom - efforts to improve the village's natural resource base would immediately help the poorest of the poor. Improvements to the natural resources would, on the other hand, have a lasting impact on poverty if both the poor and the rich are dependent on these resources. Even as household incomes improve, households will continue to draw on forest resources to earn a living. Furthermore, governments have put in place various programs, but despite their poverty reduction strategies, this remains a major challenge. The present study shows that the forest and its resources provide livelihoods to dependent rural communities. Therefore, the conservation and proper management of the forest and its resources could be the top priority of planning at the micro level.

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