Livelihood of local communities Forest Resources Dependency in Forest Fringe Villages of Pali District, Rajasthan, India

by **S. R. Baloch[a], Mr. N. K. Limba[b], Mr. N. Bala[c] & Mr. Afaq Ahmed Khan[d]**

Abstract

For centuries, forests have been a key component of rural livelihood. They are important both socially and economically in India. Fuel-wood and fodder are the basic forest products that are extracted daily or weekly basis in most of the rural areas in Rajasthan, India. Present study is an attempt to analyze important contributing factors of forest extraction by using some concomitant parameters. Remote Sensing and Geographical Information System was used for identification of forest fringe villages in Pali district of Rajasthan. The present paper deals with livelihood of local community of villagers in 432 out of 287 forest fringe villages, a sample comprising of 36 villages were randomly selected in Pali district. The result shows that fuel-wood availability, collection and consumption depend on the family size distance from forest area, transportation opportunity and economic condition of the household. Nearly 83% of fulfill their fuel-wood requirement completely from forest while rest procure it from various sources like own lands, community land, from market and van panchayat. Similarly the average monthly consumption figures were also high for fuel-wood that was 170.86 kg, 3.10 litters Kerosene, 0.86 kg for animal dung and 0.68 kg crop residues while the monthly consumption figure for LPG was found to be 1.11 kg amongst the LPG users. Total fodder consumption in the forest fringe area was 2.33 million tons on the basis of sample survey. The important available fuel wood species in forest fringe areas of Pali district, were the Prosopis juliflora (vilayati babul) Azadirachta indica (neem) A. nilotica cupriformis (babul) for their fuel wood requirement as it was found to be the source of fuel wood in 50 percent of villages. However, other species like Ziziphus mauritiana (ber) A. tortilis (umbrella thorn) A. nilotica (babul) Butea monosperma (dhak) were also found to be source of fuel wood and fodder species like Prosopis cineraria (khejri) Acacia senegal (gum senegal) Ziziphus mauritiana (ber) Z. nummularia Azadirachta indica (neem) are also commonly exploited for fodder in these areas. The study emphasizes the use of plant wealth to human need of the region.

Key words: Rural livelihood, Household response index, forest extraction, fringe Forest Fringe Villages, Pali.

[a]S. R. Baloch, Scientist ,Forest Ecology, Division Arid Forest Research Institute, Jodhpur.	**[b]Mr. N. K. Limba,** Senior Technical Officer, Arid Forest Research Institute, Jodhpur (Rajasthan).	**[c]Mr. N. Bala,** Scientist Arid Forest Research Institute, Jodhpur (Rajasthan).	**[d]Mr. Afaq Ahmed Khan** Consultant, Forest Research Institute, P.O. New Forest Dehradun.

1. Introduction

Forests provide a wide range of natural assets, including physical and biological products, cultural values and other services that are vital to the substance of mankind [United States Department of Agriculture (USDA), 2007, Natural Resources Canada (NRC), 2008]. Sunderlin et al. (2005) reported on the basis of household surveys and case study that are rural poor tend to be disproportionately dependent on forest resources in the sense that a higher proportion of their total income comes from forest resources (Reddy and Chakravarty, 1999). Similarly, Odihi (2003) opined that one cause of deforestation was the lack of alternative energy sources and high profit margins from the fuel-wood economy. Moreover, forests are promoted to improve the wellbeing of local communities (Elands *et al*., 2004), and extensive forest areas are occupied with large numbers of poor people that depend on the forest for their livelihoods in the tropics (Wunder, 2001). In India, forests are closely related to the basic needs and survival of the rural poor. They depended on forest for timber and non-timber forest products especially fuel-wood for cooking and house heating. Fodder collection and grazing are also traditionally practiced for livestock production. However, human dependency on forest resources has had adverse impact on flora and fauna, and excessive pressure on these resources has led to climate change, desertification and forest degradation.

Growing levels of concern have been leading to the studies of forest resource dependence among the rural households (Mamo et al., 2007); socio-economic factors and their related activities (Namaalwa *et al*., 2007), fuel wood consumption and forest degradation (Heltberg *et al.,* 2000); micro econometric analysis of forest biomass extraction by households (Dayal, 2006) and models of policy changes (Grainger and Malayang, 2006) in various part of the world. Although certain researches and individual studies (Fox, 1984, Adhikari *et al.*, 2004, Adhikari *et al*., 2007, Sapkota and Oden, 2008, Panta *et al*., 2009, Baloch *et al.* 2015) have been carried out in Indian, yet the number of studies to address these issues in North India region is very few. It is widely known that degree of forest dependency is also determined by the various households' characteristics. Therefore, we considered some households' characteristics such as education, poverty, income and landholdings size related with forest resources extraction pattern in Pali district. Thus, this paper attempted to analyze the socioeconomic attributes of households' and their dependency on forest in terms of using fuel-wood, timber, fodder and grazing based on primary information gathered from local communities during the household survey. This information could be useful to planner in decision making process by understanding the households' livelihood, forest dependency, and their critical consequences in deforestation and forest degradation process of Rajasthan India.

2. Material and Methods

Study area: The present study has been conducted in the 36 forest fringe villages (out of 287 villages) which fall under nine tehsils of Pali district in state of Rajasthan.

Pali district lies between 24°20* to 25°17* North latitude and 72°16* to 73°10* East latitude on the world map. Geographical area of the district is 12,387 sq. km. It is bounded by eight districts, Nagaur District to the north, Ajmer District to the northeast, Rajsam and District to the east, Udaipur District to the southeast, Sirohi District to the southwest, Jalore District and Barmer District to the west, and Jodhpur District to the northwest. District has tropical, arid climate. It receives 486 mm rainfall annually. Temperature ranges from 9.8°C in winter to 41.3°C in summer. Total population of the district is 20.37 lakhs, of which the rural population is 77.42 % and urban population is 22.58%. The males and females are 50.33 and 49.67 %, respectively. The sex ratio in the district is 987 females per 1,000 males. (Census of India, 2011). The average literacy rate in Pali district has seen upward trend and is 62.39 % as per 2011 census. About The 76.81% of the male and 48.01 %, female are literacy. There are nine tehsils in the district, consisting of 936 villages, of which 287 were identified as forest fringe villages. The fringe forest cover is 494.79 km2. Of the total forest cover (662 km2), the area under open forest (446 km2) is higher than that of moderately dense forest (216 km2) Forest Survey of India (FSI, 2011). A similar pattern of distribution of forest cover is observed in fringe forest, where extent of the open forest (375.10 km2) is higher than moderately dense forest (119.69 km2)

Forests provide natural resources to mankind for various livelihood purposes since time immemorial. Various goods and services available in forests are important for day to day needs of the rural population especially those who live in the forest fringe areas. The dependency of forest fringe villagers for their subsistence lies mostly on forests especially in the forest rich districts. Pali district covers an area of 12,387 Km2, out of which 5.34 per cent is covered by forests Indian State Forest Report (ISFR, 2011). The extractions of important forest produce from the forests are fuel wood, fodder, medicinal plants and other wood parts.

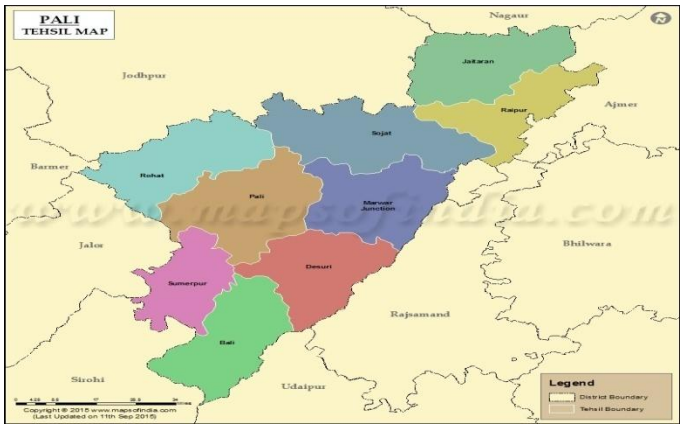

Fig- 2.1 Showing Study area, Pali district of Rajasthan India (source mapsofindia.com).

3. Methodology

Identification of forest fringe villages the number and location of forest fringe villages were identified by applying Global Image satellite GIS techniques. Earth Resource Development Assessment System (ERDAS) Imagine and ArcGIs software were used in the study. Forest The shape file of the Pali district boundary was overlaid on the corresponding digital forest cover layer to extract forest cover layer of the district. The raster layer was converted to vector format. All vector lirnits for forest cover densities were dissolved to generate shape files of forest cover only. The 1 km buffer was generated on the forest boundary and the digital village boundary layer was intersected with 1km buffer area of forest layer. The intersected villages were recorded as forest fringe villages.

Selection of Villages for Socio-Economic Survey

The data/information was collected by visiting the selected houses in each selected villages in all the 275 districts of India. These data were collected at the village level as well as at household level through the detail questionnaire. The questionnaires are prepared for village level information and for household level information in both English and Hindi language. Stratified random sampling design was employed for selection of villages for carrying out socio-economic survey. The first stage sampling units were the villages within each district was stratified based on the population of the villages available in the population census 2001. All the villages of the Pali district were arranged in descending order of population. This list of villages was classified into 8 groups randomly selected from each such group with the help of random number table.

Selection of households

The households were categorized in three groups based on their economic status i.e. ‘Affluent’, ‘Less-affluent’ and ‘Others’. Thereafter 12 households from each village were selected proportionally and randomly from each stratum.

4. Data collection and analysis

The data/information was collected at village and household level through the detail questionnaire in order to gain a detailed overall understanding of forest fringe villages. The questionnaire at the village level contains the information about the village profile, its land distribution, infrastructure facilities, etc., whereas the household questionnaire was divided into two parts. The first part included the socio' economic status of the household and the second part contains information about forest related information. These questionnaires were prepared keeping in mind the objective of the study. The village level survey was carried out before the household survey. The Government officials, public leaders, elderly people, Gram Pradhan, Panchayat member. Ration control dealer, Anganwadi member and Aasha etc. were interviewed to fill in this questionnaire. Door to door survey of selected houses was conducted to gather information at household level.

5. Results and Discussion

Information on the Sampled Villages Physical and social based infrastructures strongly influence the day to-day life and indicate the living standard at large. It was found that the primary schools and secondary school were found in 72.22% and 25% of the sample forest fringe villages. Whereas the college was 5.56 % in the sample villages, 47.22% had Panchayat House and Primary Health Centre (PHC) was 30.56%, but the bank, hospital, regular market. seed centre and were found in less than 16% of the sample villages. However, post office existed in 52.78% villages. The road connectivity status of the sampled villages revealed that 77.78% villages were connected by paccka road and the rest of 13.69 and 8.53% had semi paccka and kaccha road respectively. 62.07% the sampled villages are electrified, Hand pump tape and Wells are the main source of drinking water in the sample villages. Tape water having (83.33%) followed by the Hand pumps and Well 80.56% and 50%. Other options adding towards drinking water requirements in the Fringe villages are natural spring/source, canal and river.

The interaction between the village and town influences the socioeconomic conditions of the village. In case of forest fringe villages of Pali district, 11.11% villages lie at a distance of 5km or less from the town and 11.11 o/o villages lie at a distance of 6 km to 10km from the town. Certain villages (16.67%) were as far as > 30 km away from any of the towns.

General Characteristics of Respondent Household

Understanding of the socio-economic conditions of local people was crucial to estimate the forest dependency, for the study. The general household characteristics of the respondents are presented in Table 5.1.

.

Table 5.1 showing General characteristics of respondent households (n=432)

Parameter	***Number of respondent***	***Percentage of respondent***
Type of Houses		
Kaccha	246	57
Semi Kaccha	48	11
Paccka	138	32
Total	**432**	**100**
Average Household Size **5**		
Age group		
0-10	445	20.83
11-20	522	24.44
21-30	409	19.15
31-40	310	14.51
41-50	259	12.13
51-60	112	5.24
61-70	78	3.65
Above 70	1	0.05
Total	**2,136**	**100**

Educational status(n=2136)		
Illiterate	595	27.86
Primary	550	25.75
Middle	385	18.02
High school	216	10.11
Higher secondary	71	3.32
Graduate	43	2.01
Post graduate	8	0.37
Professional degree	2	0.09
Not applicable**	266	12.47
Total	**2136**	**100**
Household Accessories(n=432 for each)		
Television	86	19.91
Refrigerator	26	6.02
Mobile/ Phone	174	40.28
LPG	34	7.87
Car/Jeep	9	2.08
Scooter/Bike	42	9.72
Others	7	1.62
Annual income status (Rs)(n=432)		
<30,000	150	34.72
30,000-60,000	169	39.12
60,000-90,000	38	8.80
90,000-120,000	38	8.80
120,000-150,000	10	2.31
150,000-180,000	7	1.62
>180,000	20	4.63
Total	**432**	**100**
Agricultural Equipment (n=432 for each)		
Plough –Ox	225	52.08
Tractor	26	6.02
Solar energy	0	0.00
Fodder machine	0	0.00
Harvesting machine	0	0.00
Pump set	6	1.39
Thrasher machine	6	1.39
Sowing machine	0	0.00
Others	1	0.23
Livestock Population(n=1707)		
Goats	805	47.16
Sheep	390	22.85

Cow	286	16.75
Buffaloes	179	10.49
Bulls	28	1.64
Others	19	1.11
Total	**1707**	**100**
House Distances to the Nearest Forest(n=432)		
<100	358	82.88
100-500	15	3.47
500-1000	0	0.00
1000-1500	15	3.47
1500-2000	8	1.85
2000-2500	0	0.00
2500-3000	36	8.33
Total	**432**	**100**
Ownership of dwelling(n=432)		
Own house	430	99.54
Rental house	2	0.46
Total	**432**	**100**

*upto 13 years of age** Children below 5 years age

Table 5.2 showing Occupation wise data

Occupation status(n=2136)		
Agriculture	258	12.08
Agricultural labour	66	3.09
Unskilled labour	122	5.71
Skilled labour	61	2.86
Business &cattle rearing	22	1.03
Govt. services	31	1.45
Private services	86	4.03
Unemployed	932	43.63
Not Applicable*	558	26.12
Total	**2136**	**100**

The study revealed that, 32%% of respondents owned paccka houses 57% lived in kachha house and semi pacca house were 11% %. The study revealed that about 25.64 % population is directly engaged in economic activities and 43.63% is unemployed including house wives. Majority of the peoples survive on agriculture and allied activities. About 5.71% peoples were completely dependent upon unskilled labour while 3.09 % were engaged as agricultural & labor and 4.56% agricultural as well as in other income generating works. About 6.52% were occupied in Government and private jobs. The scenario is encouraging in terms of age structure of the population in sample households. The development of forest fringe villages seems to be satisfactory from 6.31% percent family owned refrigerator. Further 42.72% families were found

to own mobile phones and 8.25% family had LPG connection. The two wheelers (Scooter/bike) were owned 10.44 % families and 2.08% had four wheelers (car/jeep). The annual income of 34.72% households in forest fringe villages of Pali district was less than Rs. 30,000 and 39.12% earned between Rs.30,000- 60,000. The proportion of households, whose annual income was more than Rs. 180,000/-, was 4.63%. About 52.08% households are still having conventional ploughs, 6.02 % households having tractors in sampled households whoever thrashers, pump sets, sowing machine and harvesting machines were found less in the sampled households. Paddy is the main crops in this area- The Cow buffalo and goat are the most preferred cattle in the fringe area which 16.75%, 10.49% and 47.16% respectively. Since the traditional ploughs are being used, the number of oxen is 4.20%. The exploitation of forest bv local communities depends directly on the distance between their house and the forest. It was found that 82.88 % households were almost touching the forest boundary as they were only 100m away from the forest. Another 3.47% was located at a distance of less than 500m from the forest about 8.33%% houses were at a distance of 2.5 km or more from the forest.

Fuel-use Pattern and Dependency upon Fuel-wood

Forest fringe community- of Pali district used different type of fuel like fuel-wood, kerosene, cow dung, electricity, crop residue and LPG for cooking, heating and lighting. The fuel-wood is the main source of energy for cooking whereas kerosene is mostly used for cooking and lighting, Electricity is the main source of lighting. The monthly consumption of fuel wood was 170.86 kg per capita and the daily consumption by each household was 5.90 kg in the forest fringe area. It was estimated that the total fuel wood consumption in forest fringe villages of Pali distinct was 234676.29 tons per annum.

Table 5.3 showing Annual energy consumption in forest fringe village of Pali district

S. No.	Source of energy	Cooking	Heating	Lighting	Total
1	Fuel-wood(Ton)	234,676.29	0.00	9.41	234,685.70
2	Crop residue (Ton)	940.80	0.00	0.00	940.80
2	Dung cake (Ton)	1,160.32	0.00	18.82	1,179.14
3	Kerosene (1000- litter)	9.41	0.00	4,243.01	4,252.42
4	LPG (Ton)	1,457.93	0.00	63.35	1,521.27
5	Bio-Gas (Ton)	0.00	0.00	141.12	141.12
6	Electricity (1000- unit)	44.53	0.00	53,045.44	53,089.97
7	Coal (Ton)	94.08	0.00	297.92	392.00
8	Others (Ton/unit)	0.00	0.00	0.00	0.00

Fuel-wood is the major energy source and the consumption of other sources of energy is less due to the cost involved fuel -wood provides 96.53% of total fuel requirement in the fringe areas, which clearly reflects very high dependency on fuel wood.

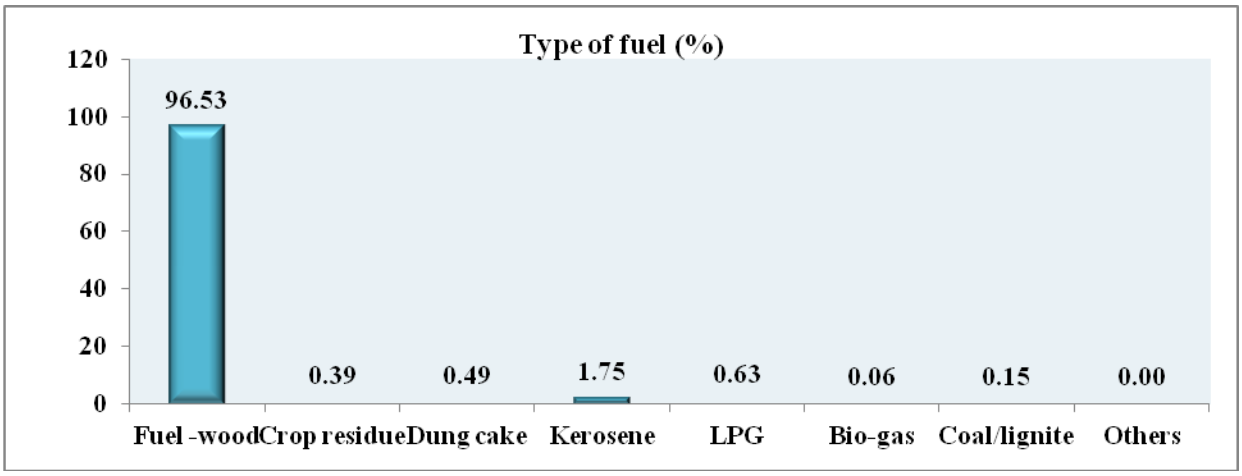

Figure 5.1 showing Energy sources and their consumption

Economic, class wise annual energy Consumption

Utilization of different sources of energy and their consumption by different affluence classes is condensed in Table 5.4. The annual consumption of fuel- wood was 234,676.29 ton, out of which 'Other' category consumed minimum (54,226.90 ton) and less affluent consumed maximum (113,538.29 ton).

Table 5.4 showing Energy sources and their consumption

S. No.	Source of energy	Purpose	Affluent	Less Affluent	Other	Total Quantity
			---------- Quantity ----------			
1	Fuel-wood (ton)	Cooking	66,911.10	113,538.29	54,226.90	234,676.29
		Heating	0.00	0.00	0.00	0.00
		Lighting	2.68	4.55	2.17	9.41
2	Crop residue (ton)	Cooking	268.24	455.17	217.39	940.80
		Heating	0.00	0.00	0.00	0.00
		Lighting	0.00	0.00	0.00	0.00
3	Dung Cake (ton)	Cooking	330.83	561.37	268.12	1,160.32
		Heating	0.00	0.00	0.00	0.00
		Lighting	5.36	9.10	4.35	18.82
4	Kerosene (1000-litter)	Cooking	2.68	4.55	2.17	9.41
		Heating	0.00	0.00	0.00	0.00
		Lighting	1,209.77	2,052.80	980.44	4,243.01
5	LPG (ton)	Cooking	415.69	705.36	336.88	1,457.93
		Heating	0.00	0.00	0.00	0.00
		Lighting	18.06	30.65	14.64	63.35
6	Bio-Gas (ton)	Cooking	0.00	0.00	0.00	0.00
		Heating	0.00	0.00	0.00	0.00
		Lighting	40.24	68.28	32.61	141.12
	Electricity	Cooking	12.70	21.54	10.29	44.53

7	(1000-unit)	Heating	0.00	0.00	0.00	0.00
		Lighting	15,124.36	25,663.81	12,257.27	53,045.44
8	Coal/Lignite/Charcoal (ton)	Cooking	26.82	45.52	21.74	94.08
		Heating	0.00	0.00	0.00	0.00
		Lighting	84.94	144.14	68.84	297.92
9	Others (ton /unit)	Cooking	0.00	0.00	0.00	0.00
		Heating	0.00	0.00	0.00	0.00
		Lighting	0.00	0.00	0.00	0.00

Source of fuel wood

The communities living in the forest fringe depend heavily on the forest for their fuel wood needs as 82.68% (1,94,043.66 tons) of the total fuel wood is extracted from forest, while 10.59% is obtained from own land. However, 4.26% of total fuel wood is purchased from the market and a small amount is obtained from other sources by the forest fringe villagers.

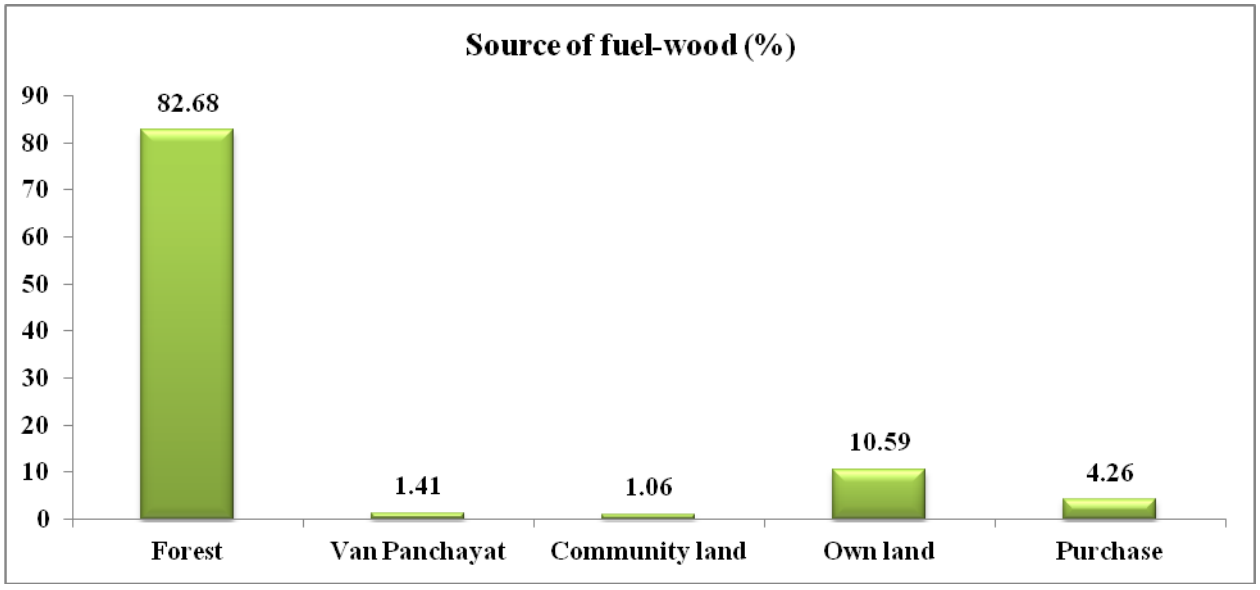

Figure 5.2 showing Source of fuel- wood in forest fringe villages of Pali district

Fodder Consumption

Rural communities in the forest fringe areas meet their fodder requirement from different sources like forest, agricultural field, community land, market etc. Forests are the major source of fodder for glazing second major source for stall feeding. The cattle of about 72.49% households graze in the forest area and 76.71% families extract fodder from forest for stall feeding. This dependency upon forest for fodder creates pressure additive to other causes of forest degradation. The total fodder consumption in the forest fringe areas of Pali was estimated as 1.649 million tons on the basis of sample survey. Out of these1.101 million tons is grazed and 0.548million tons is stall fed.

Table 5.5 showing source of fodder for grazing

S. No.	Source	Grazed Fodder (million tons/year)	Stall-fed fodder (million tons/year)	Total fodder (million tons/year)
1	Forest	1.101	0.548	1.649
2	Van Panchayat	0.008	0.003	0.010
3	Community land	0.020	-	0.020
4	Road side	0.016	-	0.016
5	Private pasture	0.374	-	0.374
6	Market	-	0.074	0.074
7	Own land	-	0.089	0.089
Total		**1.519**	**0.714**	**2.233**

Source of Fodder for grazing

1.101 million tons of grazed fodder which makes 72.49 % of total fodder, is obtained from forests fodder, grazed. A small amount of fodder is also obtained from other sources like community land, from road side areas and private pastures.

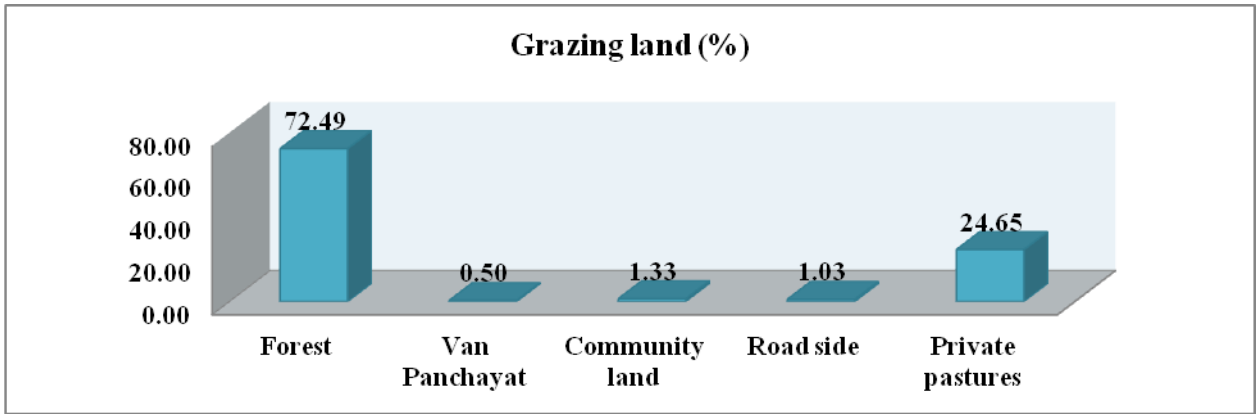

Figure 5.3 showing Source of grazing in forest fringe villages of Pali district

Source of Fodder for stall feeding major sources of fodder for stall feeding in forest fringe villages of Pali district were forest land and own land. Forest product extraction from forest During the survey at household level, it was found that forest fringe communities extract different types of forest product in the form of timber for agricultural equipments, timber for household item, medicinal plants, honey 76.71 % of the total stall-fed fodder is extracted from forests and about 12.51% is brought from won lands.

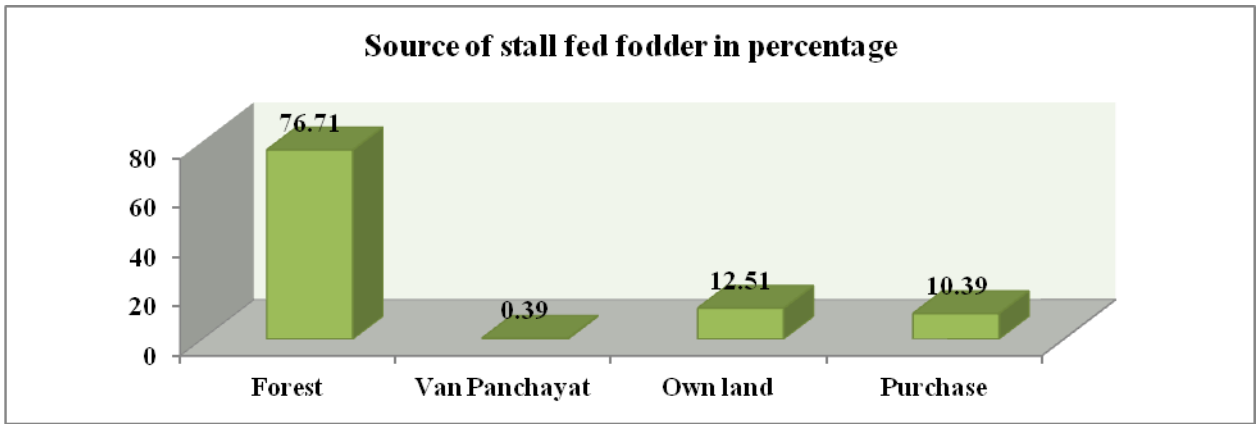

Figure 5.4 showing Source of stall-fed fodder in forest fringe villages of Pali district

Forest product extraction from forest during the survey at household level, it was found that forest fringe communities extract different types of forest product in the form of timber for agricultural equipments, timber for household item, medicinal plants, honey 74 per cent of the total stall-fed fodder is extracted from forests and about 26 per cent is brought from own lands etc. The estimated timber extraction from forests for the household needs was 4,653.04 tons per annum. The extracted forest products were used basically for self consumption by the forest fringe community.

Table 5.6 showing Annual extraction of forest products of district

S. No.	Extraction and utilization of Product	Fuel-wood	Fodder	Timber	NTFPs
		Quantity in tons per annum			
1	Extraction	194,043.66	1,648,819.66	4,653.04	Nil
2	Self consumption	194,043.66	1,648,819.66	4,653.04	Nil
3	Selling	Nil	Nil	Nil	Nil

6. Discussions

In addition, the dependency of fuel wood on forests is 82.68% and an agricultural residue is 10.59%. The results show that the annual per household consumption of fuel wood in the village of Pali distinct was 2.04 tons per annum. It may mainly depend on many reasons. First may be due to the development of the living standard of the study area and the households are now trying to abandon the use of traditional cooking stoves by using fuel wood. The second may be improvement of the mildest of the rural people and increase awareness raising of the value and important of forest on climate change and are now utilizing agricultural residues such as wheat, maize-stalk and other agricultural residues for cooking. The third may be in some villages, most households are using Liquefied Petroleum Gas (LPG) to save fuel wood. The dependency of fodder on forest is 72.49% from forest and estimated as 1.649 million tons on the basis of sample survey. Out of these1.101 million tons is grazed in forest and 0.548million tons is stall feeding. The timber extraction from forests for the household needs 4,653.04 tons per annum. The extracted forest products were used basically for self consumption by the forest fringe community.

7. Conclusions and Recommendations

In conclusions, efficient use of natural resources is one of the areas of Green Growth. It will augment our capacity to manage natural resources on sustainable basis with less negative environmental impacts, increase resources efficiency and reduce waste effectively. The fringe villages of Pali district have been frustrating its best to manage forest resources on a sustainable basis for enhanced humanity. Fringe villagers believe the sustainable landscape for green growth to eliminate poverty as well as maintaining the health functioning of the Earth. Energy needs for living of all livelihoods to generate a minimum level of income. And also income-generation should be the primary goal of rural energy development in fringe villages' social, economic and environmental affair. In order to support the fuelwood and fodder in fringe areas and to conserve natural forest sustainably, the following should be done. (a) Village-owned fuel-wood plantations and community forest plantation should be established. (b) Natural forests should be conserved annually and regionally. (c) Distribution of improving cooking stoves and LPG should be promoted. (d) Multipurpose use of tree plantation should be established around the farm lands. (e) There should be appropriate land use policy to transfer the inherited land to future generations.

8. References

1) *Adhikari, B., Di Falco, S. & Lovett, J. C. (2004). Household Characteristics and Forest Dependency: Evidence from Common Property Forest Management in Nepal, Ecological Economics; 48: p.p.245-257.*
2) *Adhikari, B., Williams, F. & Lovett, J. C. (2007). Local Benefits from Community Forests in the Middle Hills of Nepal, Forest Policy and Economics; 9: p.p.464-478.*
3) *Baloch, S.R., Afaq Khan, Bala, N. and N. Bohra, N.K.(2015). Socioeconomic status and Forest Resources Dependency of Forest fringe Villages of Pali District, Rajasthan, India. Int. J. of Usuf Mngt; 16 (1): p.p.92-105.*
4) *Census (2001) and Census (2011) of India, Rajasthan & Pali district.*
5) *Dayal, V. (2006) A micro econometric analysis of household extraction of forest biomass goods in Ranthambhore National Park, India, Journal of Forest Economics; 12: p.p.145-163.*
6) *Elands, B. H., O'Leary, T. N., Boerwinkel, H. W. & Wiersum, K. F. (2004). Forests as a Mirror of Rural Conditions; Local Views on the Role of Forests Across Europe, Forest Policy and Economics; 6: p.p.469-482.*
7) *Forest Survey of India. (2011). State of Forest Report. Forest Survey of India (Ministry of Environment & Forests). Dehradun, India p.p.12-132.*
8) *Fox, J. M. (1984) Firewood Consumption in a Nepali Village, Environmental Management; 8: p.p.243-250.*
9) *Grainger, A. & Malayang, III, B. S. (2006). A Model of Policy Changes to Secure Sustainable Forest Management and Control of Deforestation in the Philippines, Forest Policy and Economics; 8: p.p.67-80.*
10) *Heltberg, R., Arndt, T. C. & Sekhar, N. U. (2000). Fuelwood consumption and forest degradation: a household model for domestic energy substitution in rural India. Land Economics; 76: p.p.213-232.*
11) *Mamo, G., Sjaastad, E. & Vedeld, P. (2007). Economic Dependence on Forest Resources: A Case from Dendi District, Ethiopia, Forest Policy and Economics; 9: p.p. 916-927.*
12) *Namaalwa, J., Sankhayan, P. L. and Hofstad, O. (2007). A Dynamic Bio-economic Model for Analyzing Deforestation and Degradation: An Application to Woodlands in Uganda, Forest Policy and Economics; 9: 479-495.*
13) *Natural Resources Canada (2008). Ecosystem Services: The Total Value of the Forest. http://canadaforests.nrcan.gc.ca/articletopic.*
14) *Odihi, J. (2003). Deforestation in Afforestation Priority Zone in Sudano-Sahelian Nigeria, Applied Geography; 23: p.p. 227-259.*
15) *Panta, M., Kim, K. & Lee, C. (2009). People's livelihood and their perception towards forest degradation in central Nepal: The households' perspective. GIS joint Conference of KSISS, KOGSIS, GISAK, KINTEX, NSDI Korea.*
16) *Reddy, S. R. & Chakravarty, S. P. (1999). Forest Dependence and Income Distribution in a Subsistence Economy: Evidence from India, World Development; 27: p.p. 1141-1149*
17) *Sapkota, I. P. & Oden, P. C. (2008). Household Characteristics and Forest Dependency on Community Forests in Terai of Nepal, International Journal of Social Forestry; 1: p.p.123-144.*
18) *Sunderlin, W. D., Angelsen, A., Belcher, B., Burgers, P., Nasi, R., Santoso, L. & Wunder, S. (2005). Livelihoods, Forests, and Conservation in Developing Countries: An Overview, World Development; 33: p.p 1383-1402.*
19) *United States Department of Agriculture (2007). The US Department of Agriculture. http:/ /www.fs.fed.us/ecosystemservices.*
20) *Wunder, S. (2001). Poverty Alleviation and Tropical Forest- What Scope for Synergies? World Development; 29: p.p.1817-1833.*