Contributing of Forest Product to the livelihood of the Hajong Community in the Changlang District of Arunachal Pradesh

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Abstract- Forest provided an ample scope for the survival of all living being, especially forest play a vital role for the rural people in terms of providing food, shelter, fuel and others means of livelihoods. The paper tries to examine the contribution of forest resources to the livelihoods of Hajong community in the Changlang district of Arunachal Pradesh and 60 households selected randomly from the three villages (Haripur, Madhupur and Srirampur) of Diyun Circle of Changlang district (Arunachal Pradesh). Forest resources is measure based on monetary yardstick (based on current value of market price). In the study area after the analysis of data, it was found that the income generation from the forest resources is second highest after the income generation from the shifting cultivation. It was observed that income generation from the forest product is an important component for the livelihoods of Hajong community with direct generation of forest income is Rs 68545 per household in a year (Rs= Rupees national currency of India US$1= Rs 81.84) and the rest of the income come from the shifting cultivation. It was also observed that the size of family and number of family members influence the access of forage the forest resources. It means large number of family sized with more people collectively collect the forest product. The study is suitable for the policy maker of rural community development as well as the policy maker for environmental development.

Introduction

The Arunachal Pradesh is a state of indigenous tribes and in the whole state (Arunachal Pradesh) tribal people directly touch with the forest hub and forest resources and also considered that the tribal people have a great interest and intense significance from the forest perspective (by Tarh 2014).

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Arunachal Pradesh is a forest rich state in Eastern Himalayan region of the country. According to India State Forest report (2019) the state (Arunachal Pradesh) has about 20% species of country's fauna, about 4,500 species of flowering plants, 400 species of Pteridophytes, 23 species of conifers, 35 species of bamboos,20 species of canes, 52 species of Rhododendron and more than 500 species of orchids. As per the Champion and Seth Classification of Forest type (1968), Arunachal Pradesh belongs to 11 forest type Groups (forest classification) which are further dived into 23 different types of forest.

 In the same way Changlang district of Arunachal Pradesh has a wide range of individual variation ranging from 200 meter to 4500 meter from sea level sprawling over lush evergreen forest overhauling beautiful hill and rivulets over the Patkai Mountain range in the Myanmar border of northeast corner of India. The relevance of the present study is that many study revealed that tribal people have direct right over the forest resources (Nimachow et.al, 2010).

Despite of tribal people's right the Hajongs community has also direct relation with forest resource specially those Hajongs people who were residing at Changlang district of Arunachal Pradesh because Hajongs community considered as most deprived community in the state (Rahaman, 2020). Hajongs originally inhabitants of Chittagong hill tract of Bangladesh. They were migrated from Chittagong Hill tract in the year 1964 due to construction of Kaptai dam over Karnaphuli River which submerge specially the area of Hajongs inhabitant. Thereby they were migrated from Bangladesh through Lushai hill and now they inhabit at Changlang district of Arunachal Pradesh (Prasad, 2006). Since three generation had been passed still they are facing identity crisis, livelihood problems and Arunachal government and local indigenous people called them as a refugees (Rahaman 2020). It means they don't have the basic right to fulfill their basic need from different government deprived up gradation scheme thereby there is a direct relationship between forest resources and exploring forest resources by Hajong community.   So Hajong community also attach with forest resource as like indigenous community of Changlang district of Arunachal Pradesh and Hajong community culture and lifestyle totally related with forest based resources as per the **source India State of Forest Report 2019,** Arunachal Pradesh is a forest rich State in Eastern Himalayan region of the country and forest are the mainstay of the economy and the livelihoods of the local people have been closely linked and heavily dependent on forest resource since the time immemorial.

Table 1, Changlang District Forest cover in Arunachal Pradesh (in Sq. Km) (2019 Assessment)

District	Geographical Area (GA)	Very Dense Forest	Mod. Dense Forest	Open Forest	Total	% of GA	Change Wrt 2017	Scrub
Changlang	4,662	1,789.84	1,351.70	845.22	3,986.76	85.52	-5.24	4.30
Arunachal Pradesh	83,743	21,095.43	30,556.50	15,035.85	66,687.78	79.63	-276.22	229.46

Source: India State of Forest Report 2019

According to Miah et.al (2012), studied on the contribution of forest resources to the Chakma community in the Chittagong hill tract of Bangladesh. They observed that Chakma community of the Chittagong hill tracts directly depend on forest resource by selling, consuming forest resource and help to fulfill the basic need of the people. In the globe millions of people directly dependences on the forest resource or environment ecosystem to meet the food security of livelihoods (Balvanera & Guariguata 2009). In the Arunachal Pradesh most of the tribes were practice forestry resource tribes like Nyshi, Bangru and Puroik etc were mostly depends on forestry for their livelihood pattern and as an income source (Ramya, 2014). In the same way Hajong are also belongs to ancient tribal forest community among the ethnic minorities of the North-eastern region of Bangladesh and even they planted different kind of species in their nearby homestead forest which are considered as a very much important source of food (Rana et.al, 2009). So study on contributing forest resource to Hajong Community under Changlang district of Arunachal Pradesh, has a great significance in this context. Because these community were staying nearby place of forest.

Methodology and Data source of the study

The study was conducted on the Hajong community of Changlang District of Arunachal Pradesh.

Sampling

The study is conducted through a well prepared interview scheduled and intentionally considered one community among the others communities residing in the district. The survey confined that the Hajong community is totally dependent on the forest resource in the district.

The forest resources contribute a huge resource for the livelihoods to the community directly or indirectly. The community main source of income is collecting forest product from nearby or far by forest where they require products is available and it selling in the domestic market and a portion of people among them were engaged in shifting cultivation. So the collecting forest product were available in the nearby domestic market which is easily accessible. But it has also observed that during the survey time due to over consumption of forest product with increasing at increasing rate of population, the percentage of virgin forest area has been degraded.

Data has been collected from the Diyun circle under the Bordumsa subdivision of Changlang District because Diyun circle has the highest number of Hajongs populated area among all the other subdivision of the Changlang district as per 2011 Census. The three villages were selected randomly based on highest number of population. The selected villages were Haripur, Madhupur and Srirampur. Twenty five Hajongs household were selected from each of the mention villages. Thus 75 is the total sample for the study, with attached this, market survey data had collected from the three different local markets such as Diyun Bazar, Innao Bazar and Piyoung Bazar. The three market and the three villages were selected based on the nearby distance from the villages to the local market. In this study, local market tender person (considering annually tender market, or contract for one year collection of revenue person also involved) also physically helped with this smooth running of survey.

Data collection at different level

The data has been collected based on the three main significance indicators such as socio - demographic and examine with the based on forest resource and livelihood pattern of the study area. In the socio-demographic characteristics all the necessary characteristics were studied such as consumption pattern, monthly household expenditure etc. attached with the considering community. Vegetation and market structure attached with Hajong community also studied. The socio-economic and demographic information were collected from door to door survey from the selected villages along with the crossed check by local qualified leaders, educated person, community head and nearby others community qualified person. The forest product data such as fuel wood, timber etc. had been collected under the names of head where the community person engaged in work. Simply they were engaged under the control group of someone (leaders) and they used the name of that head person for collecting forest product.

The market data were collected by measuring the domestic market product to current market value of that particular product in the nearby properly established market by asking the current value of the product from the wholesaler, retailer and tender person of the established market etc. The data had been collected in the month of November (2022) to February (2023) by visiting several time in the study area.

Data processing method and analysis

After the collection of data directly put on Microsoft Office Excel 2013 and then SPSS version 20.0 to analyze the collected data. The market based survey of the study is directly help to know the contribution of forest resources to the Hajong Community and also the value of the forest product confirmed in the study area for the Hajong community. Through this way the monetary value of the forest product to the total household income was calculated. Direct income earn from the selling forest product and indirect income through the consumption of forest product also calculated to know the total income constitute from the forest product based on the market survey. The income earn from forest product either direct or indirect way added to the earning gain from shifting cultivation in order to calculated the total gross income of the household. Here income from the forest product directly added to with the income of shifting cultivation because more than 80% population in the study area were directly involved into the shifting cultivation because they were totally landless earlier they were migrated people from the Chittagong hill Tracts of Bangladesh to NEFA (North-East Frontier Agency) presently Known as Arunachal Pradesh .Indian currency were denoted in Rupees (Rs); on average during the study period, US$1=80.

Result and Discussion

Socio-economic characteristics of the Hajong community

Most of the Hajong people in the study were illiterate or semi-literate/ or up to primary level. There were number of causes behind the illiterate or semi-literate like they were already belongs to deprive category, existence of financial problems, distance from residence to school, preferring more child labour etc. In the considering three villages of study area the average family size was five in numbers member and from the average size the total number/percentage of male and female categories in (Table 2). The community were staying in a place where Arunachal Government was provided government land at the time of migration and each of the

households occupy land resources approximately 6,146m^2. But the community were shifted different place to places for shifting cultivation at the time of farming (Response taken from community as well as seniors/ responsible citizens of Indigenous tribes of the district, Such as local Gaon Bura, Panchayat members and local leaders etc.)

Forest Distance from the Residence and people look around forest resource

The number of average person collecting forest product (household/day) of village Haripur is 3 (three) and the mean distance to forest from the residence is 2.0 km. In the same way for the village Madhupur and the average number of people gathering forest product (household/day) is 2.5 and the distance from residence to forest is 1.92 km. In Srirampur village the average number of people collecting forest product (household/ day) is 2 (two) and the distance to forest from the residence is 1.39 km. The study observed that there is a variation of average people foraging in the forest/ household/ day is not only due to the large distance from the residence to forest but also due to the impact factors of family size and Numbers of family members. Family size and number of young people in a household highly influence the household engaged in gathering the forest product.

Yearly basis of Household Income in the study area

After the analysis of household income in the study area. It was found that the average household income is Rs 68,545 (rupees) in a year/ in the study area of which 37% was generated from shifting cultivation, 29%   from marketing of forest resource and rest 34% from the consumption of forest resource (Table 5).

In the study area it has been found that average income of per household from the selling forest product is 10,629 in a year. The greatest income generate from forest product is selling timber or it converted into final furniture product (Rs 5,838/average/in a year) and least income generate from the forest resources is from selling forest fruit which is mostly require for the preparation of medicine an average income generate from least is 10 rupees (Table 6).

The village Srirampur has gained highest from the forest product due to better accessible and closer distance to forest so it was found that they earn highest income directly from the forest resource. Srirampur village monetary contribution is Rs 28,167 in a year of a household which is considered as highest. Out of the total monetary income of a household Rs 10,516 in a year directly earn from the forest product and rest of household income Rs 17,651 in a year form

the indirect income earn from the forest resource consumption. The lowest dependency village is Madhupur in the study area and the monetary contribution of the forest was only Rs 18,952 in a year (fig. 1). In the Madhupur villager's people were less dependent on forest resource because most of the people of Madhupur village were engaged in shifting cultivation in compare to the village of Haripur and Srirampur and thus villages Madhupur has the lowest forest based income and villages Haripur and Srirampur accounted as the highest forest based income.

Table 2 Household size of the Hajong Community in Haripur, Madhupur and Srirampur

Family Members	VILLAGE		
	Haripur	Madhupur	Srirampur
Male	2.76 (0.18)	2.89 (0.12)	2.81 (0.17)
Female	2.15 (0.16)	2.45 (0.18)	2.13 (0.15)
Total	4.91 (0.20)	5.34 (0.21)	4.94 (0.19)

Figure denote based on standard error of mean

Table 3 Area of land cultivating under shifting cultivation (forest land) by Hajong Community under Diyun circle.

Villages	Land under shifting cultivation m^2
Haripur	6,825.32 (5614.02)
Madhupur	4,957.46 (3023.75)
Srirampur	8, 195.62 (912.18)
Mean	6,842.37 (349.28)

Figure denote based on standard error of mean

"Homestead land not taken into consideration in the table-3 because Hajong community do not have the direct right over land (means own land), they are staying in a particular congested area under the permission of Arunachal Pradesh Government.

Table 4, number of persons from Hajong household forage in a day (forest/per/day) and distance to forest from the residence.

Villages	Number of persons foraging in a day	Distance of the forest from the residence (Km)

Haripur	3.0 (0.27)	2.0 (0.06)
Madhupur	2.5 (0.25)	1.92 (0.08)
Srirampur	2.0 (0.14)	1.39 (0.09)

Figure denote based on standard error of mean

Table 5, Households income of three villages from selling and consuming forest product, and practicing shifting cultivation

Villages	Income (in Rs per year, per household)			
	Selling forest Resource	Consuming forest Resource	Shifting cultivation practicing	Total
Haripur	12,654.65	27,675	32,325.05	72,654.07
	12.65	28.65	58.7	100
Madhupur	14,132.03	19,521.08	31,119.92	64,773.50
	14.12	23.89	61.59	100
Srirampur	17,321.01	18,916.03	32,883.57	69,120.61
	17.21	22.90	59.89	100
Mean	15,612.23	23,814.15	29,118.94	68,545.32
Mean %	15.41	25.58	59.01	100%

Fig-1, Total Monetary contribution from the forest by Hajongs community in the villages Haripur, Madhupur, Srirampur of Changlang district of Arunachal Pradesh (in percentages %).
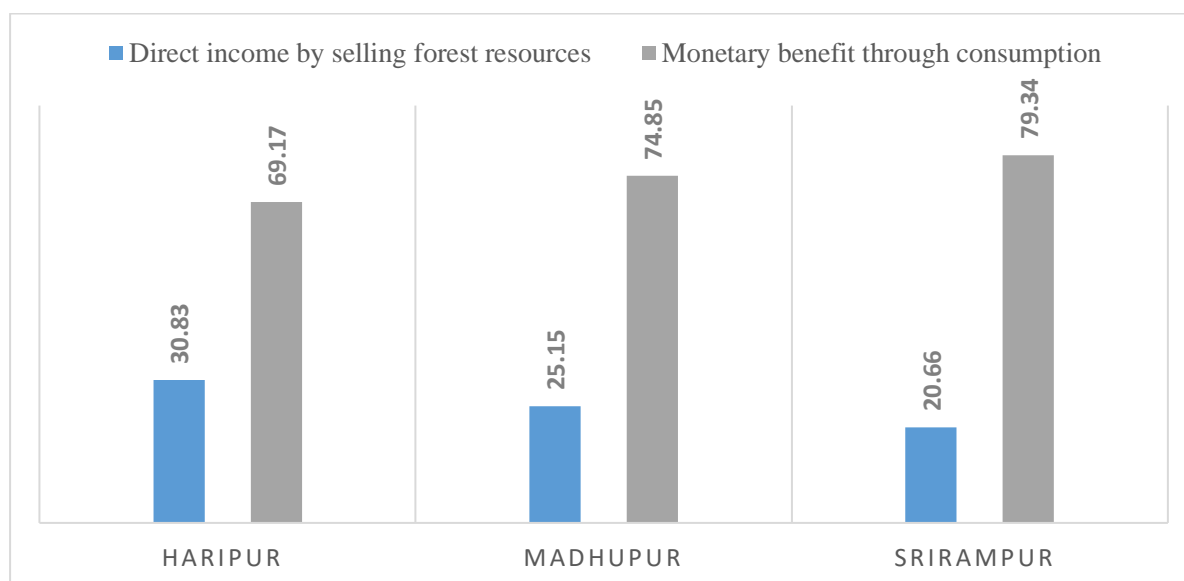
Table-6 Forest Resources used by Hajongs community for fuel wood as well as Timber (in percentages)

Species	Per Households (in %)	
	Fuel wood	Timber
Alianthus Grandis	24	43.88
Duabangagrandiflora	54.45	20.13
Canarium	12.67	45.98
Strictum	21.73	1.63
Acrocarpus Fraxinifolius Terminalia	28.90	32.75
T. arjuna	0.00	1.98
T. chebula	32.90	29.00
Castanopsis indica	00	21.00
Mesua ferrea	41.89	36.89
Chukrasia tabularis	41.36	51.21
Tectona grandis	0.00	86.00

Multiple responses taken into consideration

The percentage of Tectona grandis (86%) was used by majority of Hajong community households for fuel wood. It was also found that the tree species such as Alianthus Grandis Canarium, Acrocarpus Fraxinifolius Terminalia, T. chebula, Mesua ferrea, Mesua ferrea, Chukrasia tabularis are used moderately ranking (from 20 to 51) for fuel wood, while very

small percentage of tree spices were used for fuel wood such tree spices were Strictum, and T. arjuna and there used percentages were 1.63% and 1.98% respectively.

Fruit and Vegetables used by Hajong Community

Plant species such as Artocapus Lam, Ardisia Sims, Averrhoa Carambola, Antidesma bunius, Bischofia Blume, Bauhinia Variegate, Calamus tenuis, Castanopis, Citrus grandis and Citrus medica used as a fruit. Plant species such as Amaryllidaceae, Zingiberaceae, Brassicaceae, Solanaceae, Luraceae, Apiaceae, Poaceae, Zingiberaceae, Asteraceae and Fabaceae used as a vegetables by the Hajong community. The percentages is highest in Calamus tenuis (79.51%) and Artocapus Lam (78.53%) of plant species used for fruits by Hajong community and in case of vegetables the percentages is highest Poaceae (76.69%) and Zingiberaceae (74.90%) used plant species as a vegetables by the Hajong community in the study area.

Table 7 Plant uses fruit and vegetable by the Hajong community in the Changlang district of Arunachal Pradesh (the area residing by Hajongs community are, Haripur, Madhupur and Srirampur)

Species used as fruits	Households (%)	Species used as vegetables	Household (%)
Artocapus Lam	78.53	Amaryllidaceae	2.17
Ardisia Sims	16.91	Zingiberaceae	74.90
Averrhoa Carambola	2.45	Brassicaceae	58.73
Antidesma bunius	21.90	Solanaceae	66.81
Bischofia Blume	25.72	Luraceae	5.90
Bauhinia Variegate	13.70	Apiaceae	87.18
Calamus tenuis	79.51	Poaceae	76.69
Castanopis	6.45	Zingiberaceae	44.78
Citrus grandis	57.39	Asteraceae	48.62
Citrus medica	22.12	Fabaceae	23.12

According to Bapu & Nimsasow, (2017), The Himalayan region of Arunachal Pradesh is rich in high value of medicinal and aromatic plants as well as an endangered species. Arunachal Pradesh is also known for the ethnic tribes and preparation of many ethnic medicine and the

uses of various tree species for the treatment of different diseases with a practical applied aspect of knowledge acquire through close natural observation (Doley, et.al, 2014)

Table 8 Medicinal plants use by the Hajong community in the study area (Haripur, Madhupur and Srirampur).

Species used as a medicine	Household (%)	Species with other usage	Household (%)
Acorus calamus	21.78	Diplazium	9.67
Andrographis paniculate	45.12	Elatostema sessile	14.58
Aquilatia agallocha	2.12	Houttuynia	41.90
Dioscores floribunda	36.90	Piper pedicellatum	13.87
Oroxylym indicyum	1.82	Solanum	4.65
Piper longum	34.90	Nigrum	73.01
Rauvolfia serpentinea	32.00	Plantago Major	51.78
Rauvolfia serpentines	37.18	P. minor	67.33

In the study area it was found that (table 8), Acorus calamus, Andrographis paniculate, Dioscores floribunda, Piper longum, Rauvolfia serpentine, Rauvolfia serpentines given the high priority in case species used as a medicine. Conversely Nigrum, Plantago   Major, P. minor, Houttuynia, Elatostema sessile, Piper pedicellatum, Diplazium were used for other purpose.

Conclusion

The present study confirmed that the Hajong community in the Changlang district of Arunachal Pradesh is considerably dependent on forest resources for the sake of livelihoods support and for food security. The findings also support that the community also generate income from forest resource by selling or consuming different categories of forest resources. Households of the study area were meet their daily requirement from both forest derived income and agricultural production. The income generation from the forest resources dominant the second position after the income generation from the shifting cultivation. It was also observed that exploring income from forest resources was influences by easily forest access and the number of family member, size of family and the number of forager also influence the access to forest resources. The number of forest resources collected by the Hajong community for different purpose such as they collect forest fruit, Timber for fuel wood as well as for other used, wild

vegetables, medicine etc. if the share of income generation compare with from generation of income from fuel wood and medicinal plant than the share of income generation was highest from the selling from fuel wood as compare to selling of medicinal plants. It was also observed that the main income directly generate from the selling of forest resources meet the current consumption need of the households of the community. The findings of the present study proved that the thematically hypothesis of the study. So there is a positive relationship between contribution of forest resources to the livelihoods of Hajong community and considering it was interesting and very useful.

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