FACTORS DETERMINING THE EXPLOITATION OF NON-TIMBER FOREST PRODUCTS (NTFPS) FOR LIVELIHOOD SECURITY IN GUREZ VALLEY OF KASHMIR

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Introduction

Forests are linked to socio-economic and cultural life of the forest fringe people in India (Shit and Pati, 2012). These forest dweller groups inhabit wide ecological and geo-climatic conditions in different concentrations throughout the country. Rural livelihood system varies considerably with different regions and ethnic groups, depending upon ecological, historical and cultural factors (Sarmah and Arunachalam, 2011). These forest fringe communities largely occupy the forest regions since the time immemorial, living in isolation from the mainstream life, maintaining harmony and a symbiotic relation with nature. The collection of NTFPs by the forest fringe people was primarily for meeting their subsistence needs. Over time, these NTFPs acquired commercial value resulting from huge trade transactions and income levels due to rising demands. Trade in NTFPs act as an incentive for forest conservation by providing a resource of income from resources that might otherwise appear to have little financial value (Sharma *et al.,* 2015)

The rural colonies in the Gurez valley of Kashmir mainly depend upon NTFPs for their livelihood and earn substantial income from these products. The NTFPs extracted are fuel, fodder, fruits, fertilizers, fiber, floss, medicines, oilseeds, ornaments, vegetables *etc.* These resource extraction are done for both commercial and subsistence purpose. The demand for these products is often seasonal in nature and depends on natural growth and regeneration, which makes their productivity unpredictable. Collection and selling of NTFPs is an important source of income and it contributes to livelihood security of the people dependent on this by enhancing their income and in turn increasing their purchasing power, which creates economic access to foods, so far very few studies have been done in the study area focusing poor situation of rural economy. This study tries to fulfill this gap by analyzing the contribution of NTFPs towards income and employment security. With this background the current research entitled "Non-Timber Forest Products (NTFPs) supporting livelihood security in Gurez valley of Kashmir".

Materials and Methods

Study Area, Sampling technique and Sample

The study was conducted in Gurez Valley of Bandipora district under Kashmir province in Jammu and Kashmir State. The valley is situated at 34º 23' to 34º41'N latitude and 74º37' to 74º 46'E longitude at an altitude of 2370 meters above MSL. The valley has an area of above 57842 hectares mostly mountainous with ranges of the Himalayas and situated along the almost east-west flowing Kishan Ganga River. Multi-stage random sampling technique (Ray and Mondol, 2004) was employed to select the blocks (3), villages (10) and households (103).The sample of 103 households was drawn from the sample villages having 5percent sampling intensity using simple random sampling technique for the field study. The respondents interviewed were either household heads or eldest members.

Data collection and Analysis

The primary data were collected by the personal interviews/ Quasi-participant observation of the respondents through a well-structured pre-tested interview schedules and personal observations. The interview schedule so prepared was employed to collect information diversity, distribution, utilization, collection, consumption, marketingand livelihood support of non-timber forest products in Gurez valley andtheir interrelationship with household socioeconomic andbiophysical characteristics. Suitable statistical tools like frequency, percentage, mean, standard deviation, range, correlation co-efficient, and multiple regression were used for analysis of the data as per standard procedure suggested by Snedecor and Cochran (1967).

Results

Factors influencing the NTFPs exploitation in the locality

Factors influencing the NTFPs exploitation averaged for the sample population (Table 1) indicated the preponderance of middle aged heads (41.40), low literate people (1.91) having large sized families (1.75), marginal sized landholding (1.48), owning 5-10 livestock (2.74), engaged mainly in agriculture (3.23), family labour of > 3 members and earning gross annual income of 89094.28. Proximity to the forests was 6.14 km where the surveyed households visited frequently (2.37) and about 0.10 ha of land was possessed under agroforestry/ homestead forestry plantation.

Table 1. Descriptive statistics of factors influencing the NTFPs exploitation in the locality (N=103)

Factors (Code)	Mean	Std. Dev.	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
Age (X_1)	41.40	14.20	38.63	44.18	20	81
Education (X_2)	1.91	1.85	1.54	2.27	0	6
Size of family (X_3)	1.74	0.43	1.66	1.83	1	2
Size of land holding (X_4)	1.48	0.73	1.34	1.62	0	3
Herd size (X_5)	5.00	3.86	4.25	5.76	0	18
Main occupation (X_6)	3.23	1.28	2.98	3.48	1	6
Family labor (X_7)	3.38	1.00	3.19	3.58	2	6
Gross annual income (X_8)	89094.28	70467.79	75322.08	102866.47	30000	420000
Proximity to forest(X_9)	6.14	4.84	5.19	7.08	0.5	18
Frequency of forest visits (X_{10})	2.37	0.88	2.20	2.55	0	3
Forest resources possession (X_{11})	0.10	0.11	0.09	0.14	0	0.51

Correlation Analysis

The results in the Table 2. illustrated that out of eleven factors influencing the NTFPs exploitation, nine attributes *viz.,* education (0.503), size of family (0.401), size of land holding (0.412), herd size (0.627), main occupation (0.526), family labour (0.679), gross annual income (0.556), proximity to forest (0.702) and frequency of forest visit (0.639) were positively and significantly correlated with the NTFPs based livelihood. The forest resource possession (-0.415) had exhibited negative and significant correlation with the NTFPs based livelihood whereas the relationship between age (0.180) and the NTFPs based livelihood was non-significant.

Table 2. Correlation and multiple regression analysis of household variables with the NTFPs based livelihood (N=103)

Household variables (Code)	Co-efficient of correlation (r)	Regression co-efficient (b)	Standard error of 'b'	't' value
Age (X_1)	0.180	-4.019	11.68	-0.344
Education (X_2)	0.503*	204.86	112.47	1.821
Size of family (X_3)	0.401*	433.37	472.53	0.917
Size of land holding (X_4)	0.412*	-158.09	289.88	-0.545
Herd size (X_5)	0.627*	154.07	63.58	2.423*
Main occupation (X_6)	0.526*	830.29	158.80	5.288*
Family labor(X_7)	0.679*	398.91	234.23	1.703
Gross annual income (X_8)	0.556*	0.03	0.01	8.525*
Proximity to forest (X_9)	0.702*	155.74	51.83	3.005*
Frequency of forest visit (X_{10})	0.639*	2161.59	264.28	8.179*
Forest resource possession (X_{11})	-0.415*	-7394.15	1730.24	-4.273*

a = 7401.43 F = 95.06* R^2 = 0.920 Multiple R = 0.959 Adjusted R^2 = 0.910

** = Significant at 5% level of probability*

Multiple Regression Analysis

The regression results indicated that among the eleven explanatory variables six variables *viz.,* herd size (2.423), main occupation (5.288), gross annual income (8.525), proximity to forests (3.005), frequency of forest visits (8.179) and forest resource possession (-4.273) were statistically significant in influencing the NTFPs-based livelihood (Table 4.8). The coefficient of determination (R^2) of 0.920 implies that all the factors jointly explained 92.00% of variation on the NTFPs-based livelihood. The magnitude of F value (95.06) indicated that the R^2 is statistically significant ($p < 0.05$) and all the six factors contributed significantly in the variation of the household NTFPs-based livelihoods.The explicit form of multiple regression equation fitted for NTFPs-based livelihood is presented as:

$Y = 7401.43 - 4.019X_1 + 204.86X_2 + 433.37X_3 - 158.09X_4 + 154.07X_5 + 830.29X_6 + 398.91X_7 + 0.03X_8 + 155.74X_9 + 2161.59X_{10} - 7394.15X_{11}$

Where, Y = NTFPs based livelihood (₹annum^{-1})

$X_1 - X_{11}$ = Factors influencing NTFPs exploitation

Rock mineral *Shilajeet*

Bistorta amplexicaulis roots for herbal tea

Dried leaves of *Megacarpea polyandra* cooked as vegetable

Basket weaving

Crushing of *Juglans nigra*

Fruit of *Rubus irritans*

Sambucus wightiana fruits for dying woolen clothes

Discussion

Factors influencing the NTFPs exploitation

Correlation Analysis

The co-efficient of correlation (r) was worked out to ascertain the relationship between the NTFPs based livelihood and the socioeconomic and biophysical characteristics of the people. Out of eleven factors nine attributes *viz.,* education, size of family, size of land holding, herd size, main occupation, family labour, gross annual income, proximity to forest and frequency of forest visit were positively and significantly correlated with the NTFPs based livelihood. The positively significant correlation between education and NTFPs based livelihood is well uttered by the facts that the education results in bringing desirable changes in human behavior and helps the individual to move in right direction (Sapkota and Odén, 2008), the knowledge is built up through education, which makes the person aware of new innovations (Opaluwa *et al.*, 2011), and the change in attitude is partly a function of education (Inoni, 2009). The positive and significant relationship of size of family with the NTFPs based livelihood could be attributed to the fact that the indigenous people being an important member of their nuclear family might have taken up independent decision regarding any matter concerning to the livelihood generation for their family (Islam *et al.*, 2016) and the larger sized families were having more livelihood diversification and opportunities resulting in higher livelihood dependency on NTFPs (Shrestha and Bawa, 2014). The economic attributes *viz.*, size of land holding, herd size, main occupation and gross annual income of the indigenous people exhibited direct bearing on the household economy (Mujawamariya and Karimov, 2014), facilitating the possession of livelihood assets that's why the higher the magnitudes of these characteristics the higher will be NTFPs based livelihood. The amount of labour invested in NTFPs collection, consumption and sale is directly related to the size of the family labour availability (Tejaswi, 2008). High labour investments necessarily translate into a higher collection, consumption and sale of NTFPs accruing higher income.

Proximity to forests and frequency of forest visits have direct influence on livelihood dependency on NTFPs among the local people (Islam *et al.*, 2015), thus, the higher the custody of these variables the higher will be collection, consumption and sale of NTFPs. That's why these variables had exhibited positive and significant correlation. The forest resource possession had exhibited negative and significant correlation with the NTFPs based livelihood whereas the relationship between age and the NTFPs based livelihood was non-significant. The forest resource possession of the indigenous people exhibited direct bearing on the NTFPs based livelihood (Sheikh Shah, 2015) as the higher the forest resource assets the higher is the availability of fuel wood, fodder, medicines, vegetables, fruits and other NTFPs at household level. The persons thus, who have higher forest resource possession will have lower livelihood dependency on NTFPs.

Multiple Regression Analysis

The analysis of 't' values of regression co-efficient indicated that out of the eleven explanatory variables six variables *viz.,* herd size, main occupation, gross annual income, proximity to forests, frequency of forest visits and forest resource possession were statistically significant in influencing the NTFPs-based livelihood. The coefficient of determination (R^2) of 0.920 implies that all the factors jointly explained 92.00% of variation on the NTFPs-based livelihood. The magnitude of F value (95.06) indicated that the R^2 is statistically significant ($p < 0.05$) and all the six factors contributed significantly in the variation of the household NTFPs-based livelihoods. The regression analysis indicated that herd size, main occupation, gross annual income, proximity to forests, frequency of forest visits and forest resource possession were the potential predictors in explaining the variation in the NTFPs based livelihood.

Conclusion

The livelihood security from NTFPs depends on multitude of household socioeconomic and biophysical factors like education, size of family, size of land holding, herd size, main occupation, family labour, gross annual income, proximity to forest, frequency of forest visit and forest resource possession.

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