

Factors influencing NTEP management in the selected districts of Karnataka

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Received: 09.04.2012; Revised: 05.07.2012; Accepted: 05.09.2012

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■ **ABSTRACT** : The present study was conducted during the year 2005-06 in the villages of three districts of Karnataka, India with the objective to analyse the factors influencing the families dependent on Non-Timber Forest Products (NTFPs). The families involved in NTFP activities were purposively selected by using the multistage random sampling procedure. Totally 475 households were selected for the study. Frequency and percentages were used to tabulate the data and multivariate factor analysis technique was employed to analyse the data as per the objectives of the study. Around 12-15 different types of NTFPs were collected from the forests of the study areas. Maximum percentage of women collected the muttal leaves (*Butea monosperma*) for making leaf plates followed by collection of fuel wood, fodder grass and jamun fruits. The multiple linear regression analyses showed that the number of female respondents involved in NTFP activities in a family, agricultural income and number of NTFPs collected had positive influence and the respondent's age had negative influence on dependence on NTFP activities. The factorial analysis notified that out of the 15 variables, five *i.e.*, NTFP income, total number of days of NTFPs collection, average distance traveled per day for collection of NTFPs, total number of NTFPs collected and total number of agricultural labour days contributed for more than 84 per cent of total variation in NTFP management.

■ **KEY WORDS** : Non-timber forest products, Women, Factorial analysis, Management

■ **HOW TO CITE THIS PAPER** : Hasalkar, Suma, Varghese, M.A. and Ashatatha, K.V. (2012). Factors influencing NTEP management in the selected districts of Karnataka. *Asian J. Home Sci.*, 7 (2): 242-246.

The dependence on plants by the human population is as old as the existence of human race. In the beginning it was only for food and fuel, but with the advancement of civilization, the man started using the naturally grown forests for his needs. Any product, which is available from the forests and do not have the timber value can be said as the non-timber forest product (NTFP). The non-timber forest products include the products from both the plant and animal origin. It encompasses all biological materials other than timber, which are extracted from natural forests for human use. These include foods, medicines, ornamental plants, wildlife, fuel wood and raw materials, notably rattan, bamboo, smallwood and fibres (De Beer and Mc Dermott, 1989).

Involvement of women in management of non-timber forest products is very common and is proved through various studies conducted by Prasad (1993), Dandavatimath (1997), and Giri *et al.* (2001). Most of the times, it is the woman who gathers the forest products, processes them and either sells

them to support the family economically or uses them for family consumption. According to Falconer (1989), the available data indicate that women all over the world form majority of the labour force in forest based small scale enterprises, particularly those that are rural and household based. In the West African humid forest region, women dominate the collection, trade and processing of the majority of non-timber forest products.

The present study aims at identifying the factors influencing the management of NTFPs in the selected districts of Karnataka with the following objectives to study the types of NTFPs collected by women in the study area and to study the important factors influencing the dependence on NTFPs in the study area.

■ RESEARCH METHODS

The Kanara Forest Circle of Karnataka state was

purposely selected for the study as it has the highest forest cover, yields a variety of NTFPs and is a true representative of Western Ghats. The adjoining two districts namely, Dharwad and Haveri were selected purposely to study the contributions made by the forests of the neighboring districts. Among these three districts North Kanara has a maximum forest cover followed by Dharwad district and Haveri district.

The sample selection was done by using multistage random sampling procedure. The total sample size of the study was 475 households which constitutes around 15 per cent of the total population engaged in NTFP activities. A pre-tested interview schedule was used for collecting the data from each selected household by personal interview method.

Frequency and percentages were used to tabulate the data on types of NTFPs collected. Factor analysis was employed to identify the important factors influencing the NTFP activities. Factor analysis is a multivariate technique that attempts to account for the correlation pattern in a set of observed random variables in terms of minimal number of unobservable or latent variable called factors (or dimensions).

This technique seeks to resolve a large set of measured variables in terms of few categories (Kothari, 1998).

RESEARCH FINDINGS AND DISCUSSION

The findings obtained from the present study have been discussed under the following sub-heads:

Types and quantity of NTFPs collected by the female respondents:

Table 1 presents the various types of NTFPs collected and the quantity of each item of NTFP collected by the respondents in the selected districts. Maximum items of NTFPs (15) were collected in Haveri district followed by 14 items in Dharwad district and 12 items in north Kanara district.

An in depth view into Table 1 reveals that in Dharwad district maximum percentage of women (70.28%) collected Muttala leaves at the rate of around 9.19 kg per day followed by karonda fruit (18.27%), ker (17.71%) jamoon fruits (16.57%) and Pongamia seeds (16%). The average quantity of Pongamia

Sr. No.	Name of the NTFP	Dharwad (n=175)		North Kanara (n=200)		Haveri (n=100)		Total (n= 475)	
		Women (%)	Avr. quantity (kg)	Women (%)	Avr. quantity (kg)	Women (%)	Avr. quantity (kg)	Women (%)	Avr. quantity (kg)
1.	Muttal leaves (<i>Butea monosperma</i>)	123 (70.28)	9.19	88 (44.00)	9.89	6(6.00)	7.33	217 (45.68)	10.37
2.	Pongamia seeds (<i>Pongamia pinnata</i>)	28 (16.00)	8.36	12 (6.00)	3.92	-	-	40 (8.42)	7.03
3.	Edible gum (<i>Acacia nilotica</i>)	21 (12.00)	0.65	-	-	-	-	21 (4.42)	0.65
4.	Tumri leaves (<i>Diospyros melanoxylon</i>)	24 (13.71)	11.25	22 (11.00)	10.45	2(2.00)	17.50	48 (10.10)	11.13
5.	Karonda fruit (<i>Carissa carondus</i> L.)	32 (18.27)	5.27	24 (12.00)	4.56	15 (15.00)	13.13	71 (14.94)	6.09
6.	Ker (<i>Semicarpus anacardium</i>)	31 (17.71)	5.05	-	-	7(7.00)	13.14	38 (8.00)	7.23
7.	Fuel wood	15 (8.57)	20.63	72 (36.00)	24.86	60 (60.00)	19.64	147 (30.94)	22.36
8.	Amla <i>Emblca officinalis</i>	8(2.85)	6.40	11 (5.50)	9.55	1(1.00)	8.25	20 (4.21)	8.56
9.	Medi grass (broom) (<i>Andropogon scoparius</i>)	4 (2.28)	27.50	-	-	14(14.00)	19.23	18 (3.78)	21.18
10.	Jamoon fruit (<i>Syzygium cumini</i> L.)	29 (16.57)	4.82	47 (23.50)	5.38	22 (20.00)	13.78	98 (20.63)	7.49
11.	Bamboo (<i>Dendrocalamus strickus</i> , <i>Bambusa aurandinaceae</i>)	4 (2.28)	15.00	-	-	6(6.00)	7.67	10(2.11)	10.60
12.	Antwal (<i>Sapindus laurifolius</i>)	12 (6.85)	4.00	-	-	-	-	12(2.53)	4.00
13.	Alalekai <i>Terminalia chebula</i>	-	-	13 (6.50)	13.08	-	-	13(2.73)	13.08
14.	Churni	-	-	10 (5.00)	5.10	-	-	10(2.11)	5.10
15.	Murkhi	-	-	3(1.50)	5.33	-	-	3(0.63)	5.33
16.	Shikakai (<i>Acacia concinna</i>)	15(8.57)	-	3 9(19.50)	7.00	-	-	54(11.36)	7.00
17.	Fodder grass (<i>Pennisetum purpeurm</i>)	60(34.28)	-	50(25.00)	-	17 (17.00)	18.44	127 (26.73)	18.44
18.	E-fruit (<i>Pithecellobium dusce</i>)	-	-	-	-	2(2.00)	9.00	2(0.42)	9.00
19.	Ber (<i>Zizyphus mauritona lamk</i>)	-	-	-	-	6(6.00)	91.50	6(1.26)	91.50
20.	Parangi fruit (<i>Carica papaya</i> L.)	-	-	-	-	5(5.00)	10.40	5(1.05)	10.40
21.	All leaves	-	-	-	-	4(4.00)	27.50	-	27.50
22.	Kalale (<i>Phydlostachys acoreosculata</i> , <i>Thysanlalaina merxima</i>)	-	-	-	-	15 (15.00)	16.07	15(3.15)	16.07

Figures in the parenthesis indicate percentage

seeds collected per day was about 8.36 kg followed by karonda fruit (5.27 kg) and ker fruits (5 kg). The other items of NTFP's collected by women were edible gum (12.00% @ of 0.65 kg/day), tumri leaves (13.71% @ 11.25 kg/day), fuel wood (8.57% @ 20.63 kg/day), amla (2.85% @ 6.40 kg/day), medigrass (2.28% @ 27.50 kg/day), bamboo (2.28% @ 15 kg/day) and antwal (6.85% @ 4.00 kg/day) in Dharwad district.

Similarly maximum percentage of women (44.00%) collected muttala leaves only in North Kanara district also and the average quantity collected per day was 9.89 kg. The other items of NTFP's collected by majority of women in North Kanara were fuel wood (36% @ 24.86 kg/day), fodder grass (25% @ 12.14 kg/day) and jamoon fruits (23.50% @ 5.38 kg/day). Shikakai was another important item of NTFP collected by 19.50 per cent women on an average of 7.00 kg per day during its season. Eleven to twelve per cent women collected tumri leaves @ 10.45 kg per day and karonda fruit at the rate of 4.5 kgs per day. Less than 10 per cent women collected Pongamia seeds (6.00%), amla (5.50%), alalekai (6.5%), churni (5.0%) and murkhi (1.00%).

Where as, in Haveri district fuel wood was collected by as high as 60.00 per cent of women and the average quantity collected per day was around 20 kgs. This was followed by 22 per cent women collecting jamoon fruit at the rate of 13.78 kg per day, fodder grass (17% @ 18.44 kg per day), kalale (15% @ 16.07 kg per day) and karonda fruit (15% @ 13.13 kg per day). Medigrass (broom grass) was also collected by around 14 per cent women at the rate of 13.78 kg per day during rainy season. Less than ten per cent women collected tumri leaves (2.00% @ 17.50 kg per days), ker (7.00% @ 13.14 kg per day), bamboo (6.00% @ 7.67 kg per day), ber fruit (6% @ 9.15 kg per day), parangi fruit (5% @ 10.40 kg per day) and all leaves (4% @ 27.50 kg per day).

A glance of Table 1 reveals that from all the three districts totally 22 different kinds of NTFP's were collected. Six items, namely muttal leaves, tumri leaves, karenda fruit, fuel wood, jamoon fruit and fodder grass were collected in all three districts. A maximum of 45.68 per cent women collected muttal

leaves followed by 30.94 per cent women collecting fuel wood, collection of fodder grass (26.73 %) and collection of jamoon fruit (20.63). The average quantity collected per day was 10.37 kg, muttala leaves, 22.36 kg of fuel wood, 18.44 kg of fodder grass and 7.49 kg of jamoon fruits. Shikakai (11.36% @ 7 kg/day), karonda fruit (14.94% @ 6.09 kg/day) and tumri leaves (10.10% @ 11.13 kg/day) were collected by more than 10 per cent women. Totally less than ten per cent women collected other NTFPs like Pongamia seeds (8.42 % @ 7.03 kg/day), ker fruit (8.00 % @ 7.23 kg/day), Amla (4.21% @ 8.56 kg/day), broom grass (3.78% @ 21.18 kg/day), bamboo (2.11% @ 10.60kg/day), antwal (2.53% @ 4 kg/day), alalekai (2.73% @ 13.08 kg/day), churni fruit (2.11% @ 5.10 kg/day), murkhi fruit (0.63% @ 5.33 kg/day), elachi fruit (0.42% @ 9 kg/day), ber fruit (1.26% @ 9.15 kg/day), parangi fruit (1.05% @ 10.4 kg/day), kalale (3.15% @ 16.07 kg/day) and all leaves (3.00% @ 27.5 kg/day).

Depending upon the flora and fauna, vegetation, agro-climatic conditions and the soil profiles, the different items of NTFP's were collected by the people living in and around the forests. A number of researchers like Tewari (1995), Olsen (1996), Dandavatimath *et al.* (1997), Girish (1998), Suryaprakash (1999), Ganapathy *et al.* (2000), Krishamoorthy and Mani (2002), have listed a variety of NTFP's collected in their selected forest areas.

Factors influencing NTFP management in the selected districts of Karnataka:

To identify the factors and the magnitude of their influence on the collection of NTFPs by the selected families, the analytical tools such as multiple linear regression and factor analysis were employed. The details of the results are presented in the following sections.

Multiple linear regression analysis:

The multiple linear regression analysis was employed in order to identify the influence of independent variables and their magnitude of influence on the management of NTFPs by

Sr. No.	Districts	Constant	No. of female respondents (x ₁)	Respondent's age (x ₂)	Total cultivable land (x ₃)	Family size (x ₄)	Agri. work days (x ₅)	Agri. income (x ₆)	Total no. of NTFPs collected (x ₇)	R ²
1.	Dharwad	-2356.731	1597.821 (3.153)**	-0.166 (-0.011)NS	-25.197 (-0.278)	-53.959 (-0.640)	-0.567 (-0.237)	7.098E-02 (3.809)**	38.731 (7.494)**	0.747
2.	Haveri	-3048.664	-567.315 (-1.112)	16.360 (0.504)	1.050 (0.061)	305.939 (2.063)*	37.818 (4.989)**	-7.787E-02 (-0.593)	-3.727 (-0.586)	0.763
3.	North Kanara	-5629.008	2322.707 (3.164)*	-20.315 (-0.893)*	63.022 (0.255)	130.273 (1.458)	-1.808 (-0.577)	0.140 (2.795)**	52.046 (4.931)**	0.904
4.	All districts (Pooled)	-2817.436	1722.075 (-3.884)**	-0.502 (-0.038)NS	1.667 (0.148)	-31.569 (-0.506)	-0.595 (0.729)	8.089E-02 (4.334)**	36.276 (9.059)**	0.656

Figures in the parentheses indicate the calculated t-values.

* and ** indicate significance of values at P=0.05 and 0.01, respectively

the selected families. The results are presented in Table 2.

The estimated values of regression co-efficients for the variables *viz.*, number of female respondents involved in NTFP activities, respondent's age, total cultivable land, family size, agricultural work days per year, agricultural income and total number of NTFPs collected were 1597.821, -0.166, -25.197, -53.959, -0.567, 7.098E-02, and 38.731 in the respective order in Dharwad district. The corresponding co-efficients for Haveri district were -567.315, 16.360, 1.050, 305.939, 37.818, -7.787E-02, and -3.727 and for the North Kanara district the values were 2322.707, -20.315, 63.022, 130.273, -1.808, 0.140, and 52.046 as presented in Table 2. When all districts data were pooled and the regression analysis was done, the respective regression co-efficients for the selected factors obtained were 1722.075, -0.502, 1.667, -31.569, -0.595, 8.089E-02, and 36.276. The goodness of fit as revealed by R² for Dharwad, Haveri, North Kanara districts and all districts (pooled) was 0.747, 0.763, 0.904 and 0.656, respectively.

When the calculated t-values were compared with the table t-values, it was found that in Dharwad district number of female respondents involved in NTFP activities, agricultural income, and total number of NTFPs collected were highly significant (at 1 % level of probability). Whereas in Haveri district only two variables *viz.*, family size and agricultural work days per year were statistically significant (at 5 % and 1 % level of probability, respectively). In North Kanara district, maximum number of variables have shown statistical significance, *i.e.*, number of female respondents involved in NTFP activities and age of the respondent were significant (at 5 % level of probability) and agricultural income and total number of NTFPs collected were significant (at 1 % level of

probability). For the pooled group of all districts the statistical significance was observed for number of female respondents involved in NTFP activities, agricultural income and total number of NTFPs collected (at 1 % level of probability).

From Table 2, it was observed that 90 per cent of the variation in management of NTFPs was explained by independent variables. Agricultural income and the total NTFPs collected had positive influence on NTFP management. Whereas the respondent's age had negative influence on the NTFP management. Younger the age of the respondents better was the management of NTFPs. In Dharwad district there was a significant positive relationship between the NTFP income and the number of female respondents

Factor analysis:

The factor analysis was administered to identify the factors influencing the management of NTFP activities by the selected families in all three districts of Karnataka state. Table 3 presents the results of factor analysis for all three selected districts. The factor loadings for all 15 variables have been depicted in the table. Table 3 and Fig. 1 describe the factors influencing collection of NTFPs in the three selected districts of Karnataka through factor analysis and factor loadings.

In factor 1, the variables like NTFP income, total number of days of NTFP collection, average distance traveled per day and total number of NTFPs collected per year has higher loadings compared to the other variables as presented in Table 3. In factor 2, the variables that had higher factor loading were agriculture labour days and total quantity of NTFPs collected per day. In factor 3, it was only NTFP activity days per year which had higher factor loading. Respondent's age was the

Table 3 : Factors influencing collection of NTFPs in the three selected districts of Karnataka – factor analysis

Sr. No.	Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1.	Family size	0.604	0.193	6.470E-02	0.495	-0.288	-0.114
2.	Total agriculture land	-0.541	-0.555	0.357	0.307	0.166	90492E-02
3.	NTFP activity days	0.589	-0.223	-0.640	0.144	-3.372E-03	0.259
4.	NTFP Income	0.861	-0.178	-1.514E-02	0.109	0.292	1.047E-02
5.	Total no. of NTFPs collected	0.701	-0.592	0.113	-3.405E-02	-0.151	-3.334E-02
6.	Total time spent per day	0.664	-0.235	0.415	-0.432	-0.164	-2.033E-02
7.	Total no. of days of NTFP collection per year	0.830	-0.175	-0.318	7.085E-02	-0.138	0.209
8.	Average distance traveled per day	0.738	-0.229	0.315	-0.378	-0.222	-0.222
9.	Agriculture days	0.429	0.661	0.287	-0.212	0.175	-7.716E-02
10.	Agriculture income	0.443	0.514	6.616E-02	0.126	0.463	-0.144
11.	Agriculture labour days	0.347	0.844	3.123E-02	3.201E-02	-0.128	-5.950E-02
12.	Agriculture labour income	0.483	0.670	-9.485E-02	0.189	-0.297	-9.590E-02
13.	Total quantity of NTFPs collected	0.440	-0.762	7.128E-02	9.392E-02	7.113E-02	-3.643E-02
14.	Respondents age	7.962E-02	0.328	0.522	0.361	-2.794E-02	0.675
15.	No. of female respondents involved in NTFP collection	0.390	-0.318	0.240	0.568	7.552E-02	-0.400
Proportion of total variance (%)		34.662	22.331	8.539	8.133	5.669	5.061
Proportion of cumulative variance (%)		34.662	56.993	65.532	73.664	79.333	84.394

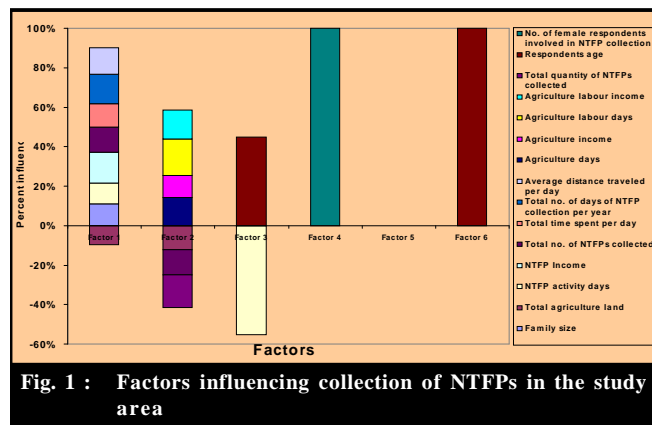


Fig. 1 : Factors influencing collection of NTFPs in the study area

variable which showed higher factor loading in factor 5.

Totally five factors all together contributed more than 84 per cent of total variation. On the whole, the variables which contributed for variation were NTFP income, total number of days of NTFP collection per year, average distance traveled per day, total number of NTFPs collected, agriculture labour days and total quantity of NTFPs collected as presented in Fig. 1.

Conclusion:

The non-timber forest products are the important sources of income, employment and food security for the rural households. More than timber, it is the non timber forest products which cater to the needs of people living near the forests. Forests make a significantly direct and indirect contribution to the improvement of human life in and around the forests. Totally 22 different kinds of NTFP's were collected from the study area and five NTFPs were commonly collected in all the three districts, namely Muttala leaves, tumri leaves, karonda fruits, fuel wood and jamoon fruits. Five factors all together contributed more than 84 per cent of total variation. On the whole, the variables which contributed for variation are NTFP income, total number of days of NTFP collection per year, average distance traveled per day, total number of NTFPs collected, agriculture labour days and total quantity of NTFPs collected.

Acknowledgement :

This study is part of the research conducted by Dr.Suma Hasalkar (first author of the article) for the award of PhD degree programme by the SNDT Women's University, Mumbai under the guidance of Dr. M.A.Varghese, Retd. Vice Chancellor, SNDT Women's University, Mumbai

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