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An Econometric Analysis of the Minor Forest Produce in Tribal Economy

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Abstract: **In the present paper, an attempt had been made to examine an econometric analysis of minor forest produce in a tribal economy with special reference to Telangana districts. The paper has been divided into three sections. Section-I deals with the importance of minor forest produce in the tribal economy. Section-II deals with the objectives and methodology of the paper. Findings and conclusions of the study had been presented in Section-III. The study is based on primary data as well as secondary data. Multiple regression analysis had been utilised to examine the relative importance of the variables while analyzing the total value of the MFP items.**

Keywords: **econometric analysis, MFP items, minor forest, tribal economy, Telangana districts.**

I. INTRODUCTION

The tribal economy being a subsistence economy, the main occupation is agriculture and it fails to provide full sustenance for the tribal households. The tribals largely depend upon the forest produce that collect, consume and market and it augments their incomes from the hand to mouth cultivation. In this context, collection of minor forest produce (MFP)[1] could assure the tribals a source of subsistence during the summer months. It is a well documented fact that the tribal households with less than 5 acres of land mainly depend on MFP collection. The contribution of the MFP in the income of the tribal households is 5.4 to 13 per cent in Orissa, 7.4 to 14 per cent in Bihar, 13.6 to 39 per cent in Madhya Pradesh and 10 to 55 per cent in Andhra Pradesh. Thus, it can be said that the income realized through the collection of MFP in these States ranges between 5.4 to 55 per cent. One of the studies shows that 35 per cent of the earnings of tribals in the Panchamahal district of Gujarat were from the collection of MFP[2]. Another study conducted in Bastar district (1981) indicates that an average household (having two adult members, at least one child and an old person) on an average earns Rs. 1,500/- a year (against a total annual income of Rs. 1,750/-) from the sale of MFP without any initial risk or input[3]. In this regard, it is very much pertinent to make mention about the estimates made by the National Committee on Rights Act, 2011 and the World Bank. An estimated 100 million people derive their source of livelihood directly from the collection and marketing of MFPs[4]. To World Bank estimates, the NTFP economy is fragile but supports close to 275 million people in rural India (quoted in 'Down To Earth' Report, November 1-15, 2010) - a significant part of which comprises the tribal population. MFPs provide essential nutrition to people living in forested areas, and are used for household purposes, thus forming an important part of their non-cash income[5]. For many tribal communities who practice agriculture, MFPs are also a source of cash income, especially during the slack season. Table-1 vividly depicts the economic dependence of tribal communities on MFP.

However, it can be surmised that the tribal economy has been subsisting on forest products since time immemorial. The collection of forest products by the tribals in the earlier days was primarily for meeting their domestic requirements. As time rolled on, these forest products acquired commercial value as a result of which trade developed and forest products have become a major source of cash income for the tribals. Tribals collect a number of forest products, which have both

value-in-use and value-in-exchange. They include food (edible products), fodder and grasses, bamboo, canes, medicinal products, spices, essential oils, insecticides, resins, gums, commercial leaves, natural dyes and tannins, starches, oils and fats, fibre and flosses and animal products like lac, silk, honey etc., Hence, the very welfare and development of the tribal economy depends on the flow of these products from the forests.

A large number of forest products are obtained from the forests. These are also commonly called minor forest produce (MFP) not because these of minor significance but since they are harvested in smaller quantities. Tribals are the most dominant group of communities who live near forest areas and depend on the forest for meeting their maximum needs.

Tribals depend upon forest for their existence in several ways. Their degree of dependence varies with several factors including socio-economic conditions, distribution, cultural and religious norms, literacy etc. The primitive tribes living inside dense forests are very poor and depend entirely on forests for most of their needs. The dwindling forest resources has also forced tribal people to look for alternative means of meeting their needs for consumption, income, employment, cultivation, pastoralism and their cultural and religious needs. As the collection of minor forest produce depends on many factors, and in view of this in mind the researchers had been undertaken an econometric analysis of minor forest produce in a tribal economy with special reference to Telangana districts – Khammam, Warangal and Adilabad in the erstwhile State of Andhra Pradesh in order to cull out the relative importance of the variables that have been considered for the analysis.

II. OBJECTIVES AND METHODOLOGY

The objectives of the study are as follows: to examine the collection of the forest produce of the tribals and its contribution to the economic activities of the tribal households. The study is an analytical one where both data from primary as well as secondary sources had been collected. The substantiation part of the analysis had been derived from various sources. Further, the collection of the data over the details of the tribal formation had also been taken up for categorization over the phenomenon of the forestry and its economic relation with the tribals. For the study, Girijan Co-operative Corporation, Warangal Division of the Warangal district, Palwancha Division of the Khammam District and the Utnoor Division of the Adilabad District had been chosen. Among the branches of GCC, Eturnagaram branch in Eturnagaram division, Bhadrachalam branch in Bhadrachalam division and the Jannaram branch in Utnoor division had been selected. The rationale behind in the selection of these branches is ascribed to the highest procurement of MFP than all other branches in the concerned divisional offices during the last five years. Of the three branches of the three divisions, only one mandal from each branch had been chosen. Of the three mandals, three shandy points had been considered and of which two villages from each mandal had been selected. Altogether, six villages had been taken up for the present study. In each village 60 sample tribal households have been chosen at random. Altogether, 360 sample tribal households have been selected for the study. The field study had been taken up during 2011-12 and the data relate to the 2010-11 reference year. Multiple regression analysis had been utilised to examine the relative importance of the variables assessing the total values of the MFP items in the study.

III. FINDINGS OF THE STUDY

The region-wise distribution of the sample households as per the different sources of income had been presented in Table-2. The mean values of each source of income had also been depicted in the Table. The total income of the sample households in the case of Adilabad is worked out to be Rs. 37, 20,417 and its mean value is of Rs. 31003.48. Of the total income of the sample households, 41.81 per cent of incomes from agriculture followed by the incomes from other than the MFP and agriculture, it accounts for 51.64 per cent of the total incomes. And the remaining only 6.55 per cent of the total incomes were from the collection of MFP. With slight differences, the same tendency holds good even in the case of Warangal and Khammam. In the case of Warangal, the percentage contribution of incomes from the MFP to the total incomes of the sample households is worked out to be 14.18 and in the case of Khammam, it is 10.38 per cent. While looking at the Table, it can be said that the percentage contribution of MFP incomes to the total incomes is higher in Warangal when compared with the districts of Khammam and Adilabad. In the case of Adilabad, the percentage contribution of income from agriculture is greater than the Khammam and Warangal with respective percentages of 51.64, 50.70 and 37.36. In the case of Warangal, the percentage contribution of income from other than MFP and agriculture is

higher when compared with the Adilabad and Khammam and their percentages are being 48.46, 41.81 and 39.20 respectively. By and large, the MFP is contributing to the extent of 10.38 per cent to the total incomes of the sample households. In the case of income from other than MFP and agriculture, its percentage is higher in Adilabad followed by Khammam and Warangal with 39.06 per cent, 30.72 per cent and 30.22 per cent respectively. In the case of income from the collection MFP items, 50.87 per cent in Warangal, 27.13 per cent in Khammam and 22 per cent in Adilabad are also contributing to the total income of the MFP of the study area as a whole. In the case of the income from agriculture of the study area, the percentage of contribution in Warangal is higher than the percentage contribution in Adilabad and Khammam with their respective percentages of 41.44, 33.43 and 25.13. Thus, from the above analysis, it can be inferred that the contribution of MFP to the total incomes ranging from 6.55 per cent to 14.18 per cent with which one can say that its contribution is very small when compared with the incomes earned from agriculture and the incomes from other than MFP and agriculture as well.

Table-3 shows about the relative contribution of each MFP item to the total value of MFP. In the case of Adilabad, the total value of MFP is worked out to be of Rs. 238031 and the mean value is of Rs. 1983.59. Of the total value, the value of beedi leaf is contributing to the extent of 47.98 per cent followed by morripandlu, mohwa flower, mohwa seed and gum with 26.68 per cent, 13.21 per cent, 11.20 per cent and 0.93 per cent respectively. The mean value of the gum is the lowest when compared with all other MFP items and the mean value of the gum is 18.33 and the mean value of the beedi leaf is the highest with 951.67. In the case of Warangal, the total value of MFP is worked out to be of Rs. 577685 and its mean value is 4814.04. Of the total value, the value of gum is contributing 41.98 per cent to the total followed by beedi leaf, mohwa flower, nuxvomica, mohwa seed, cleaning nuts, honey and morripandlu with 21.46 per cent, 9.06 per cent, 9.03 per cent, 7.70 per cent, 5.76 per cent, 3.35 per cent and 1.66 per cent respectively. In the case of Khammam, the total value of MFP is worked out to be of Rs. 304730 and its mean value is 2539.42. Of the total value, the value of beedi leaf is contributing to the extent of 62.22 per cent to the total followed by mohwa flower and mohwa seed with 19.04 per cent and 18.74 per cent respectively. These three districts put together, the total value of MFP is worked out to be Rs. 1120446 and its mean value is of Rs. 3112.35. of the total value of MFP, beedi leaf is contributing more to the total value i.e. 38.20 per cent followed by the gum with 21.83 per cent, mohwa flower with 12.66 per cent, mohwa seed with 11.43 per cent, morripandlu with 6.53 per cent, nuxvomica with 4.64 per cent, cleaning nuts with 2.98 per cent and honey with 1.73 per cent. Further, while looking at the Table as per the item-wise availability in accordance with the study area, there was no trace of the availability of gum in Khammam. 99.10 per cent of gum can be seen in Warangal district and the remaining per cent can be found in Adilabad. The total value of mohwa flower is of Rs. 141816 and its mean is of Rs. 394. Of the total value, Khammam is contributing 40.91 per cent followed by Warangal and Adilabad with 36.91 per cent and 22.18 per cent respectively. The total value of mohwa seed is worked out to be of Rs. 128170 and its mean value is 356. Of the total value, Khammam's contribution is 44.54 per cent, Warangal contribution is 34.66 and the Adilabad's contribution is 20.80 per cent. The availability of honey can only be found in Warangal and there was no trace of it in both the districts of Khammam and Adilabad. The similar tendency can also be found even in the case of cleaning nuts and nuxvomica. The total value of beedi leaf is of Rs. 427800. Of the total value, 44.32 per cent in Warangal, 44.32 per cent in Khammam and 26.70 per cent in Adilabad contributed. In the case of morripandlu, the study area of Khammam contributing with 86.87 per cent followed by Warangal. The total value of MFP in the entire study area is worked out to be of Rs. 1120446 and its mean value is 3112.35. Of the total value, the value of beedi leaf is contributing 38.20 per cent to the total followed by gum, mohwa flower, mohwa seed, morripandlu, nuxvomica, cleaning nuts and honey with 21.83 per cent, 12.66 per cent, 11.43 per cent, 6.53 per cent, 4.64 per cent, 2.98 per cent and 1.73 per cent respectively.

Further, while looking at the Table, it can be said that more number of items are available in Warangal when compared with the other two districts of Adilabad and Khammam. In Khammam only three MFP items –mohwa flower, mohwa seed and beedi leaf are available. There is no trace of MFP items like honey, cleaning nuts, nuxvomica in the study area of Adilabad.

During the field work, it had also been observed that due to the deforestation in the study area is the prime cause for the low contribution of MFP to the total incomes of the sample households. Despite of its low contribution to the total incomes, the sample households in the study area were of the opinion that the collection of MFP provides an off- farm employment and the income during the lean season that is especially in the case of summer. Further, it had also been observed that though the income from MFP is a substantial, it provides the income when the agricultural activities are not there in general and the study area in particular.

The multiple regression analysis had been carried out to know about the influence of the values of the total gum, total mohwa flower, mohwa seed, honey, cleaning nuts, beedi leaf, amla, nuxvomica, morripandlu on the dependent variable of the total value of the MFP items for the overall sample size in the study area of the three districts of Adilabad, Warangal and Khammam.

For carrying out the analysis, step-wise method had been chosen. The summary statistics had been presented in Table-4**.** While looking at the results, the initial R-square is 0.709 when value of the total gum taken as a predictor. And in the latter case when we include another predictor value of the total beedi leaf, the R-square value has improved from 0.709 to 0.777. Here, the R-square change is 0.069. By adding one variable to another variable as a predictor, the R-square had improved starting from 0.709 to 0.940. Therefore, it can be said that all the predictors considered for the analysis influences the predictand. The higher R-square values suggest that the model fit is the best fit. Further, the R-square changes suggest that total value of morripandlu influences more when compared with the other predictors, whereas the inclusion of the value of the total honey as a predictor influences the predictand i.e. the total value of the MFP items very weakly. The statistics presented in the Table reveals the fact that the F-values were found to be statistically significant. In the case of first equation, one can account for 70.90 per cent of variation in the dependent variable; in the case of second equation, there is a 77.70 per cent of variation in the regressand; in the case of third equation, there is a 85 per cent of variation in the response variable; in the case of fourth equation, there is a 90.40 per cent of total variation in the predictand; in the case of fifth equation, there is a 92.70 per cent of total variation in the endogenous variable; in the case of sixth equation, there is a 93.90 per cent of variation in the dependent variable; and in the seventh equation, accounting for 94 per cent of total variation in the predictand had been observed as shown in Table-3.

Table-5 reveals the findings of analysis of variance. In the case of one, the F-value is 870.610, in the case of two, the F-value is 622.456; in the case of third, the F-value is 671.093; in the case of four, the F-value is 840.341; in the case of five, the F-value is 902.675; in the case of six, the F-value is 909.509; and in the case of seven, the F-value is 790.084. And all these F-values were found to be statistically significant. The second and third F-values are lower than the first F-value and in the case fourth, the F-value is slightly lesser than the first F-value. Except these F-values, in all other cases the F values are higher than the first F-value, indicating the fact the variables included in the variables by the method of step-wise can be of useful variables and they are better explained the variation through the regression equations and they are the better fits.

The numerical values of the unstandardised and standardised coefficients and their standard errors and the t-values were presented in Table-6. From the computed values of the 't' given in the Table, it can be said that all the t-values of the regression equations were found to be statistically significant. But in the case of sixth equation, the t-value of the constant is not found to be statistically significant. And even in the case of seventh equation also, the computed t-value of the constant is not found to be statistically significant. Thus, from the above analysis, it can surmised that all the unstandardised and standardised coefficients were found to be statistically significant indicating that the regression equations run by the step-wise method yields better fits in all the cases except in the case of the constants of the sixth and seventh equations.

Table-7 deals with the descriptive statistics-mean and standard deviation of the dependent variable and the explanatory variables included in the multiple regression model. The mean value of the MFP items is worked out be of Rs. 3076.90 and its standard deviation is 3016.880. In this case, one can say that there is no much spread among the sample households. The mean value of the total gum is worked out to be 679.72 and its standard deviation is worked out to be 2133.929. Therefore, it can said there is a wide spread dispersion among the sample households in the study area. The mean value of the total mohwa flower is 394.07 and its standard deviation is 385.289 and in this case there is no variation among the sample households. The mean value of the mohwa seed is 356.03 and its standard deviation is 360.487 and in this case, it can be said that there is no variation among the sample households. In the case of cleaning nuts, the mean value and its standard deviation are worked out to be 92.47 and 291.667 respectively. In this regard, one can say that there is a wide-spread dispersion among the sample households. In the case of beedi leaf, the mean value and its standard deviation are 1188.33 and 1045.572 respectively with which one can say that there is no variation among the sample households. The mean value of nuxvomica is 144.72 and its standard deviation is 454.228 and here there is a spread among the sample households in the study area. And finally in the case of morripandlu (local name of the fruit), the mean value is worked out to be 203.11 and its standard deviation is 857.884 and therefore, it can be said that there is dispersion among the sample households in the study area.

The multiple regression for the overall sample had been carried out in order to capture the influence of the explanatory variables like kms of walk to collect MFP, tribe, land particulars, value of the agricultural produce, number of male members, number of female members, age of the respondent, education particulars, number of children in domesticity and waged work MFP, number of male earners in the household, number of female earners in the household, size of the family, income of the family members and availability of the forest on the dependent variable of the total value of the MFP items in the study area as a whole. Among the explanatory variables included in the model by running the regression through the step-wise method, only five explanatory variables like kms of walk to collect MFP, tribe, land particulars, value of agricultural produce and number of male earners in the household were found to be significant and the other variables were not found to be statistically significant.

The model summary statistics of the multiple regression analysis had been presented in Table-8. From the Table, it can be said that the R-square value has improved from 0.051 to 0.156. Therefore, it can be said that as the value of R^2 is increased, the model fit gives the better variation of the dependent variable. By putting the R-square values together, the explanatory variables are able to predict the 58 per cent of total variation in the dependent variable. The R-square change had also been observed from the Table. Even in the change statistics, the value of F-change is also found to be statistically significant. In the case of fourth equation, the F-change is statistically significant at 3 per cent level and in the case of fifth equation, the value of F-change is statistically significant at 2 per cent level. By and large, it can be surmised that the fitted model gives the better variation in the endogenous variable of the total value of the MFP items.

The findings of the analysis of variance (ANOVA) had been presented in Table-9. All the F-values computed through ANOVA are statistically significant. The computed F-value in the first equation is 19.125, the F-value in the case of second equation is worked out to be 22.847. Of all the five equations, the second equation is having the highest value indicating that the fitted regression line is a better fit. The F-value is relatively lower in the fifth equation though it is a good fit. From the above analysis, it can be inferred that irrespective of the higher or lower values of F, the estimates were found to be statistically significant.

The numerical values of the unstandardised and standardized coefficients had been shown in Table-10. In the case of second equation, despite the value of the co-efficient and the t-value are negative, they found to be statistically significant. While looking at the t-values, all of them were found to be statistically significant. In the case of third equation, the estimated values of both the variables that is tribe and the land particulars were found to be negative, even though they found to be statistically significant. By and large, from the Table, it can be inferred that though some of the coefficients are negative, all the coefficients were found to be statistically significant.

The overall inter-correlations of the study area between the variables considered for the analysis had been presented in Table-11. The data reveal the fact that there is a negative relationship between the total value of the MFP items and Tribe, educational particulars, number of female members, number of children in domesticity waged work MFP, income of the family members, and land particulars but they are having the weak correlations between the variables. The total value of MFP is positively related to the age of the respondent, number of female members, number of male earners in the household, number of female earners, size of the family, value of agricultural produce, availability of the forest and kms of walk to collect MFP, though they may be having the weak inter-correlations between the variables.

The variable tribe is negatively related to the variables like age of the respondent, education particulars, number of male members, number of female members, number of male earners in the household, number of female earners in the household, size of the family, value of agricultural produce, land particulars and availability of forest, despite negatively related, having the weak correlation between them. The variable tribe is positively related to number of children in domesticity waged work MFP and kms of walk to collect MFP, the correlation between them are moderate. The variable age of the respondent is negatively related to education particulars, number of male members, number of female members, size of the family, availability of the forest and kms of walk to collect MFP. Except in the case of education particulars in all other cases the correlations are weak. In the case of education, the correlation between them is moderate. The variable education particulars is negatively related to the variables like number of children in domesticity waged work MFP, number of male earners in the household, number of female earners in the household, income of the family members, value of the agricultural produce and kms of walk to collect MFP. But this variable is positively related to number of male

members, number of female members, size of the family, land particulars and availability of the forest. The correlation between them are very weak irrespective of the positive or negatively related to the variables like number of female members, number of children in domesticity waged work MFP and here the correlations are weak. This variable is positively related to the number of male earners in the household and its correlation is very moderate. This variable is positively related to the size of the family, its correlation is high. Again this variable is positively related to the variables like income of family members, value of agricultural produce, land particulars, availability of forest and kms of walk to collect MFP. In this regard, the correlations between them are weak.

The variable number of female members is negatively related to the variable that is number of children in domesticity waged work MFP and its correlation is very weak. This variable is positively related to the number of male earners in the household, number of female earners in the household, size of the family, income of the family members, value of the agricultural produce, land particulars, availability of the forest and kms of walk to collect MFP. In the case of the size of family, its correlation is high. And in the case of number of female earners in the household is moderate. The variable number of children in domesticity waged work MFP is negatively related to the variables like size of the family, land particulars, availability of the forest and kms of walk to collect MFP and these correlations are very weak. This variable is positively related to the variables like number of male earners in the household, number of female earners in the household, income of the family members and value of the agricultural produce and their correlations are very weak, except in the case of income of the family members. And here, the correlation co-efficient is 0.601. The variable number of male earners in the household is negatively related to the variables like number of female earners in the household and the availability of forest and they are having the weak correlation between them. This variable is positively related to the size of the family, income of the family members, value of the agricultural produce, land particulars and kms of walk to collect MFP. In the case of size of the family and income of the family members, the correlations are moderate. The variable number of female earners in the household is negatively related to the kms of walk to collect MFP and correlation is very weak. Further, this variable is positively related to the variables like size of the family members, income of the family members, value of the agricultural produce and land particulars. In the case of the size of the family and income of the family members the correlation is slightly moderate. In the case of value of the agricultural produce and land particulars, the correlation is very weak. The variable size of the family is positively related to the income of the family members, value of the agricultural produce, land particulars, availability of forest and kms of walk to collect MFP and their respective correlations are weak and very weak in the case of kms of walk to collect MFP. The variable actual income of the family members is positively related to the value of the agricultural produce, land particulars, availability of forest and kms of walk to collect MFP and their correlations are very weak. The variable value of the agricultural produce is positively related to the land particulars, availability of forest and kms of walk to collect MFP. In the case of land particulars, its correlation is high. In the case of the availability of forest and kms of walk to collect MFP are having the very weak correlations. The variable land particular is positively related to the variables like availability of the forest and kms of walk to collect MFP. The variable availability of the forest is positively related to the variable like kms of walk to collect MFP and its correlation is weak.

By and large, it can be said that the activity of the collection of MFP provides gainful employment and income to the tribal households in general and the sample households in particular. The collection of MFP items depends on not only the forestry but also on an availability of the MFP items. The researchers had also been observed that the quantity of MFP has gone down to such a large extent owing to the deforestation that had been taking place due to various reasons like illegal cutting of the trees, felling of the trees and lack of scientific extraction of the MFP etc. The contribution of MFP to the total incomes in the study area vary from 6.55 per cent to 14.18 per cent, which evinces the declining the availability of MFP as in the case of 10 years back. Therefore, there is an imminent need to organise the training programmes to extract the MFP items scientifically. Further, it can be also be said that it is the responsibility of the State not only to introduce but also take necessary measures for the improvement and development of the forestry which is the subsidiary source of livelihood for the tribals especially those who live in the lap of forestry. Further, it can also be stated that there is an urgent need to arrest the natural death of trees and to mitigate it people should come forward to protect the forestry and vegetation in general and the study area in particular. Further, it can also be stated that the State should come forward to take up the afforestation programmes at massive scale for the rejuvenation of the forest-eco system.

NOTES AND REFERENCES

[1] The following items of our M.F.P. commodities whether found in or brought from a forest or not, have been declared as forest produce under section 2(g) (1) of A.P. Forest Act. 1967.

1. Bark
2. Lac
3. Mohwa Flower
4. Mohwa seed
5. Myrobalans
6. Tunki leaves
7. Rousa grass
8. Rouwolfia sepentina
9. Adda leaves

[2] Report of the Committee on Forests and Tribes in India, 1982.

[3] (Ibid, p.20).

[4] Report of the National Committee on Forest Rights Act, 2011.

[5] Tribal Co-Operative Marketing Development Federation of India Limited (TRIFED), Ministry of Tribal Affairs, Government of India.

APPENDICES

LIST OF TABLES:

Table-1: Economic Importance of MFPs

Seasons	MFPs collected	Economy
January- March	Lac (resin), mahuwa, flower and tamarind	Over 75 per cent of tribal households in Orissa, Madhya Pradesh and Andhra Pradesh collect mahuwa flower and earn Rs.5000 a year. 3 million people are involved in lac production
April-June	Tendu leaves, sal seeds and chironji	30 million forest dwellers depend on seeds, leaves and resins from sal trees; tendu leaf collection provides about 90 days of employment to 7.5 million people, a further 3 million people are employed in bidi processing
July-September	Chironji, mango, mahuwa fruits, silk cocoons and bamboo	10 million people depend on bamboo for livelihood; 1,26,000 households are involved in tussar silk cultivation only
October-November	Lac, kullu gum, resins used in incense sticks	3 lakh person days of employment from collection of gums.

Source: Tribal Co-Operative Marketing Development Federation of India Limited (TRIFED), Ministry of Tribal Affairs, Government of India.

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Table-2: Region-wise Distribution of the Sample Households as per the Different Sources of Income

Study area	No. of Households Surveyed	Income From Agriculture	Income from MFP	Income from other than MFP& Agriculture	Total Income
Adilabad	120	19,21,000 [16008.33] (51.64) {39.06}	2,43,817 [2031.81] (6.55) {22.00}	15,55,600 [12963.33] (41.81) {33.43}	37,20,417 [31003.48] (100.00) {34.84}
Warangal	120	1486000 [12383.33] (37.36) {30.22}	564031 [4700.26] (14.18) {50.87}	1928200 [16068.33] (48.46) {41.44}	3978231 [33151.93] (100.00) {37.25}
Khammam	120	1511000 [12591.67] (50.70) {30.72}	300830 [2506.92] (10.10) {27.13}	1169000 [9741.67] (39.20) {25.13}	2980830 [24840.25] (100.00) {27.91}
Grand Total	360	4918000 [13661] (46.06) {100}	1108678 [3079.66] (10.38) {100}	4652800 [12924] (43.56) {100}	10679478 [29665.22] (100) {100}

i) Figures in [] indicates mean values.

ii) Figures in () indicates row-wise percentages and figures in {} indicates column-wise percentages.

Table-3: Relative Contribution of Each MFP Item to the Total Value of MFP

Study area	V1	V2	V3	V4	V5	V6	V7	V8	V9
Adilabad	2200 [18.33] (0.93) {0.90}	31461 [262.18] (13.21) {22.18}	26650 [222.08] (11.20) {20.80}	- - -	- - -	114200 [951.67] (47.98) {26.70}	- - -	63520 [529.33] (26.68) {86.87}	238031 [1983.59] (100) {21.25}
Warangal	242500 [2020.83] (41.98) {99.10}	52365 [436.38] (9.06) {36.91}	44430 [370.25] (7.70) {34.66}	19400 [161.67] (3.35) {100}	33290 [277.42] (5.76) {100}	124000 [1033.33] (21.46) {28.98}	52100 [434.17] (9.03) {100}	9600 [80.00] (1.66) {13.13}	577685 [4814.04] (100) {51.55}
Khammam	- - -	58040 [483.67] (19.04) {40.91}	57090 [475.75] (18.74) {44.54}	- - -	- - -	189600 [1580] (62.22) {44.32}	- - -	- - -	304730 [2539.42] (100) {27.20}
Grand Total	244700 [680] (21.83) {100}	141866 [394] (12.66) {100}	128170 [356] (11.43) {100}	19400 [54] (1.73) {100}	33290 [92] (2.98) {100}	427800 [1188] (38.20) {100}	52100 [145] (4.64) {100}	73120 [203] (6.53) {100}	1120446 [3112.35] (100) {100}

Note: i) Figures in [] indicates mean values.

ii) Figures in () indicates row-wise percentages and figures in {} indicates column-wise percentages.

iii) V1=Value of Gum; V2=Value of Mohwa flower; V3= Value of Mohwa seed; V4= Value of Honey; V5= Value of Cleaning nuts; V6= Value of Beedi leaf; V7= Value of Nuxvomica;V8= Value of Morripandlu.

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Table-4: Statistics of Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.842[a]	.709	.708	1630.79129	.709	870.610	1	358	.000
2	.882[b]	.777	.776	1428.19014	.069	109.775	1	357	.000
3	.922[c]	.850	.848	1174.34913	.073	172.014	1	356	.000
4	.951[d]	.904	.903	937.66162	.055	203.409	1	355	.000
5	.963[e]	.927	.926	819.32818	.023	110.948	1	354	.000
6	.969[f]	.939	.938	749.92051	.012	69.560	1	353	.000
7	.970[g]	.940	.939	745.28281	.001	5.407	1	352	.021

a. Predictors: (constant), value of the total gum

b.Predictors: (constant), value of the total gum, value of the total beedi leaf

c.Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu

d.Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomica

e. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomica, value of the total mohwa flower

f. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomica, value of the total mohwa flower, value of the total mohwa seed

g. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomica, value of the total mohwa flower, value of the total mohwa seed, value of the total honey

Table-5: Findings of ANOVA[h]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.315E9	1	2.315E9	870.610	.000[a]
	Residual	9.521E8	358	2659480.238		
	Total	3.267E9	359			
2	Regression	2.539E9	2	1.270E9	622.456	.000[b]
	Residual	7.282E8	357	2039727.072		
	Total	3.267E9	359			
3	Regression	2.777E9	3	9.255E8	671.093	.000[c]
	Residual	4.910E8	356	1379095.868		
	Total	3.267E9	359			
4	Regression	2.955E9	4	7.388E8	840.341	.000[d]
	Residual	3.121E8	355	879209.314		
	Total	3.267E9	359			
5	Regression	3.030E9	5	6.060E8	902.675	.000[e]
	Residual	2.376E8	354	671298.670		
	Total	3.267E9	359			
6	Regression	3.069E9	6	5.115E8	909.509	.000[f]
	Residual	1.985E8	353	562380.774		
	Total	3.267E9	359			
7	Regression	3.072E9	7	4.388E8	790.084	.000[g]
	Residual	1.955E8	352	555446.470		
	Total	3.267E9	359			

A. Predictors: (constant), value of the total gum

B. Predictors: (constant), value of the total gum, value of the total beedi leaf

C. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu

D. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomia

E. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomica, value of the total mohwa flower

F. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu, total value of the nuxvomica, value of the total mohwa flower, value of the total mohwa seed

G. Predictors: (constant), value of the total gum, value of the total beedi leaf, total value of morripandlu total value of the nuxvomica, value of the total mohwa flower, value of the total mohwa seed, value of the total honey

H. Dependent variable: total value of the MFP items.

Table-6: Numerical Values of the Standardised and Unstandardised Co-efficients

Model		Unstandardised Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2267.947	90.217		25.139	.000
	Value of the total gum	1.190	.040	.842	29.506	.000
2	(Constant)	1352.377	117.808		11.480	.000
	Value of the total gum	1.214	.035	.859	34.293	.000
	Value of the total beedi leaf	.757	.072	.262	10.477	.000
3	(Constant)	860.486	103.876		8.284	.000
	Value of the total gum	1.251	.029	.885	42.779	.000
	Value of the total beedi leaf	.981	.062	.340	15.867	.000
	Total value of morripandlu	.989	.075	.281	13.115	.000
4	(Constant)	808.458	83.020		9.738	.000
	Value of the total gum	.916	.033	.648	27.646	.000
	Value of the total beedi leaf	.944	.049	.327	19.114	.000
	Total value of morripandlu	1.002	.060	.285	16.650	.000
	Total value of the nuxvomica	2.212	.155	.333	14.262	.000
5	(Constant)	279.385	88.235		3.166	.002
	Value of the total gum	.971	.029	.687	33.008	.000
	Value of the total beedi leaf	.994	.043	.344	22.885	.000
	Total value of morripandlu	1.034	.053	.294	19.623	.000
	Total value of the nuxvomica	1.647	.146	.248	11.303	.000
	Value of the total mohwa flower	1.289	.122	.165	10.533	.000
6	(Constant)	79.273	84.249		.941	.347
	Value of the total gum	.948	.027	.671	35.050	.000
	Value of the total beedi leaf	.964	.040	.334	24.148	.000
	Total value of morripandlu	.976	.049	.277	20.026	.000
	Total value of the nuxvomica	1.656	.133	.249	12.413	.000
	Value of the total mohwa	1.088	.115	.139	9.493	.000
	Value of the total mohwa seed	.958	.115	.114	8.340	.000
7	(Constant)	84.143	83.754		1.005	.316
	Value of the total gum	.943	.027	.667	34.967	.000

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	Value of the total beedi leaf	.955	.040	.331	23.963	.000
	Total value of morripandlu	.974	.048	.277	20.108	.000
	Total value of the nuxvomica	1.529	.143	.230	10.663	.000
	Value of the total mohwa flower	1.122	.115	.143	9.772	.000
	Value of the total mohwa seed	.941	.114	.112	8.230	.000
	Value of the total honey	.376	.162	.037	2.325	.021

a. Dependent Variable: Total Value Of The MFP Items

Table-7: Means and Standard Deviations of the Variables used in Multiple Regression Analysis

Variables	Mean	Std. Deviation
Total value of the MFP items	3076.90	3016.880
Value of the total gum	679.72	2133.929
Value of the total mohwa flower	394.07	385.289
Value of the total mohwa seed	356.03	360.487
Value of the total honey	53.89	296.941
Value of the total cleaning nut's	92.47	291.667
Value of the total beedi leaf	1188.33	1045.572
Total value of the nuxvomica	144.72	454.228
Total value of morripandlu	203.11	857.884

Table-8: Model Summary Statistics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.225[a]	.051	.048	2943.49062	.051	19.125	1	358	.000
2	.337[b]	.113	.109	2848.51186	.063	25.272	1	357	.000
3	.365[c]	.134	.126	2820.06160	.020	8.240	1	356	.004
4	.380[d]	.145	.135	2805.71476	.011	4.650	1	355	.032
5	.395[e]	.156	.144	2790.44597	.012	4.896	1	354	.028

a. Predictors: (Constant), kms of walk to collect

b. Predictors: (constant), kms of walk to collect, tribe

c. Predictors: (constant), kms of walk to collect, tribe, land particulars

d. Predictors: (constant), kms of walk to collect, tribe, land particulars, value of agricultural produce

e. Predictors: (constant), kms of walk to collect, tribe, land particulars, value of agricultural produce, number of male earners in household

Table-9: Findings of ANOVA[f]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.657E8	1	1.657E8	19.125	.000[a]
	Residual	3.102E9	358	8664137.041		
	Total	3.267E9	359			
2	Regression	3.708E8	2	1.854E8	22.847	.000[b]
	Residual	2.897E9	357	8114019.839		
	Total	3.267E9	359			
3	Regression	4.363E8	3	1.454E8	18.287	.000[c]

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	Residual	2.831E9	356	7952747.436		
	Total	3.267E9	359			
4	Regression	4.729E8	4	1.182E8	15.018	.000[d]
	Residual	2.795E9	355	7872035.294		
	Total	3.267E9	359			
5	Regression	5.110E8	5	1.022E8	13.125	.000[e]
	Residual	2.756E9	354	7786588.717		
	Total	3.267E9	359			

A. Predictors: (constant), kms of walk to collect
B. Predictors: (constant), kms of walk to collect, tribe
C. Predictors: (constant), kms of walk to collect, tribe, land particulars
D. Predictors: (constant), kms of walk to collect, tribe, land particulars, value of agricultural produce
E. Predictors: (constant), kms of walk to collect, tribe, land particulars, value of agricultural produce, no of male earners in household
F. Dependent variable: total value of the MFP items

Table-10: Numerical Values of the Standardised and Unstandardised Coefficients[a]

Model		Unstandardised Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1615.941	368.330		4.387	.000
	kms of walk to collect	965.026	220.667	.225	4.373	.000
2	(Constant)	2395.910	388.748		6.163	.000
	kms of walk to collect	1234.393	220.167	.288	5.607	.000
	Tribe	-669.161	133.111	-.258	-5.027	.000
3	(Constant)	2992.677	437.428		6.842	.000
	kms of walk to collect	1273.363	218.390	.297	5.831	.000
	Tribe	-729.772	133.462	-.282	-5.468	.000
	Land particulars	-444.470	154.843	-.143	-2.870	.004
4	(Constant)	3053.969	436.130		7.002	.000
	kms of walk to collect	1259.090	217.380	.294	5.792	.000
	Tribe	-749.837	133.109	-.289	-5.633	.000
	Land particulars	-725.656	201.832	-.234	-3.595	.000
	Value of agricultural produce	.027	.012	.139	2.156	.032
5	(Constant)	2899.066	439.370		6.598	.000
	kms of walk to collect	1246.321	216.274	.291	5.763	.000
	Tribe	-737.439	132.503	-.285	-5.565	.000
	Land particulars	-778.762	202.163	-.251	-3.852	.000
	Value of agricultural produce	.029	.012	.150	2.326	.021
	No of male earners in household	556.689	251.599	.109	2.213	.028

a. Dependent Variable: Total Value Of The MFP Items

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Table-11: Inter-Correlations between the Variables (N=360)

Variables	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V1	1.000 (-)	-.188 (.000)	.026 (.313)	-.041 (.221)	.081 (.062)	-.009 (.431)	-.081 (.063)	.105 (.023)	.046 (.193)	.055 (.150)	-.062 (.120)	.014 (.399)	-.095 (.036)	.050 (.174)	.225 (.000)
V2	-.188 (.000)	1.000 (-)	-.082 (.060)	-.141 (.004)	-.113 (.016)	-.149 (.002)	.402 (.000)	-.057 (.140)	-.062 (.119)	-.108 (.020)	.404 (.000)	-.035 (.255)	-.148 (.003)	-.111 (.018)	.243 (.000)
V3	.026 (.313)	-.082 (.060)	1.000 (-)	-.382 (.000)	-.016 (.378)	-.021 (.345)	.125 (.009)	.311 (.000)	.000 (496)	-.028 (.301)	.149 (.002)	.137 (.005)	.241 (.000)	-.112 (.017)	-.048 (.183)
V4	-.041 (.221)	-.141 (.004)	-.382 (.000)	1.000 (-)	.056 (.143)	.001 (.492)	-.072 (.086)	-.176 (.000)	-.005 (.465)	.020 (.353)	-.156 (.001)	-.030 (.284)	.028 (.297)	.032 (.271)	-.029 (.292)
V5	.081 (.062)	-.113 (.016)	-.016 (.378)	.056 (.143)	1.000 (-)	-.089 (.046)	-.055 (.148)	.364 (.000)	.066 (.107)	.656 (.000)	.176 (.000)	.121 (.011)	.131 (.006)	.058 (.136)	.020 (.353)
V6	-.009 (.431)	-.149 (.002)	-.021 (.345)	.001 (.492)	-.089 (.046)	1.000 (-)	-.018 (.365)	.016 (.382)	.352 (.000)	.604 (.000)	.069 (.096)	.052 (.164)	.119 (.012)	.100 (.029)	.025 (.316)
V7	-.081 (.063)	.402 (.000)	.125 (.009)	-.072 (.086)	-.055 (.148)	-.018 (.365)	1.000 (-)	.238 (.000)	.107 (.022)	-.012 (.408)	.601 (.000)	.005 (.463)	-.066 (.106)	-.093 (.039)	-.046 (.193)
V8	.105 (.023)	-.057 (.140)	.311 (.000)	-.176 (.000)	.364 (.000)	.016 (.382)	.238 (.000)	1.000 (-)	-.022 (.341)	.310 (.000)	.420 (.000)	.008 (.442)	.102 (.027)	-.020 (.355)	.015 (.386)
V9	.046 (.193)	-.062 (.119)	.000 (.496)	-.005 (.465)	.066 (.107)	.352 (.000)	.107 (.022)	-.022 (.341)	1.000 (-)	.249 (.000)	.293 (.000)	.030 (.282)	.063 (.115)	.144 (.003)	-.027 (.305)
V10	.055 (.150)	-.108 (.020)	-.028 (.301)	.020 (.353)	.656 (.000)	.604 (.000)	-.012 (.408)	.310 (.000)	.249 (.000)	1.000 (-)	.209 (.000)	.109 (.019)	.137 (.005)	.103 (.025)	.052 (.164)
V11	-.062 (.120)	.404 (.000)	.149 (.002)	-.156 (.001)	.176 (.000)	.069 (.096)	.601 (.000)	.420 (.000)	.293 (.000)	.209 (.000)	1.000 (-)	.037 (.241)	.008 (.443)	.042 (.213)	.122 (.010)
V12	.014 (.399)	-.035 (.255)	.137 (.005)	-.030 (.284)	.121 (.011)	.052 (.164)	.005 (.463)	.008 (.442)	.030 (.282)	.109 (.019)	.037 (.241)	1.000 (-)	.645 (.000)	.025 (.316)	.053 (.158)
V13	-.095 (.036)	-.148 (.003)	.241 (.000)	.028 (.297)	.131 (.006)	.119 (.012)	-.066 (.106)	.102 (.027)	.063 (.115)	.137 (.005)	.008 (.443)	.645 (.000)	1.000 (-)	.018 (.367)	.024 (.327)
V14	.050 (.174)	-.111 (.018)	-.112 (.017)	.032 (.271)	.058 (.136)	.100 (.029)	-.093 (.039)	-.020 (.355)	.144 (.003)	.103 (.025)	.042 (.213)	.025 (.316)	.018 (.367)	1.000 (-)	.108 (.020)
V15	.225 (.000)	.243 (.000)	-.048 (.183)	-.029 (.292)	.020 (.353)	.025 (.316)	-.046 (.193)	.015 (.386)	-.027 (.305)	.052 (.164)	.122 (.010)	.053 (.158)	.024 (.327)	.108 (.020)	1.000 (-)

Note: i) V1= Total Value of the MFP Items; V2= Tribe; V3= Age of the Respondent; V4= Education Particulars; V5= No. of Male Members; V6= No. of Female Members;

V7= No. of Children in domesticity, waged work MFP; V8= No. of Male Earners in the household; V9= No. of female earners in the household; V10= Size of the family;

V11= Income of the family members; V12= Value of agricultural produce; V13= Land particulars; V14= Availability of forest; V15= kms of walk to collect MFP

ii) Figures in parentheses indicate the significance level of the correlation co-efficients.