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Estimation of the attributes embedded with the economy of mango enterprise at Malda district of West Bangal, India

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ABSTRACT

In the era of globalisation, there is a need to concentrate upon the value added product from the available resources to go with the global market with the help of supply chain management system for the upliftment of the livelihood status of the ultimate stakeholders. The present study was conducted to estimate the socio-economic attributes of the mango growers embedded with the economy of the mango enterprise at the Malda district of West Bengal, India. This study was conducted using multistage sampling with purposively selected villages Dhantola, Kalyanpur, Arapur, Govindapur and Ganipur in the English Bazar block of Malda district. The dependent and the independent variables were operationalised and measured with the help of structured interview schedule. For analyzing and interpretation of the data statistical tools like co-efficient of correlation, regression and path analysis were used. The study revealed that the age, secondary occupation, education, size of orchard, age of orchard, family composition, experience of growers, percentage of variety grown, return from orchard, primary income and secondary income found to be associated with the total income, total expenditure and total savings of the family and the fourteen predictor variables had contributed to explain total family income 57 percent, total yearly expenditure 49 percent and yearly savings 83 percent variations embedded with the predicted variables.

Keywords: Attributes, economy, enterprise, path analysis and regression analysis

In the present global scenario, the trade liberalisation opens the vistas of exporting value added products for the development of the national economy in terms of developing the economy of the producers of the value added product. In such a resilient trading atmosphere the export of fruit crops like mango from India is very much lucrative in recent years. Subsidies in case of trading played a significant role in increasing employment and educational, economic and social status of mango growers by exporting the mangoes (Thorat *et al*., 1988). The recent development of overseas mango promotion programme had mainly focused on commercial varieties of mango like Chausa, Langra and Dasheri (Gandhi, 2006). The district of Malda in West Bengal is known as the 'Mucca' for mangoes. The predominant varieties like 'Fazli', 'Langra', 'Bombai', 'Himsagar', 'Gopalbhog', 'Laxmanbhog', 'Krishnabhog', 'Zardalu', 'Aswina', 'Amrapali', 'Mallika' etc. are commercially cultivated. About 250 varieties of mango are found to be grown in this district. The area under mango in Malda is 25 thousand hectare and the number of growers is above 82 thousand during 2011-12. The production is hovering around 250 thousand metric tonnes and the productivity is to the tune of 10 metric tones per hectare during the same year. Cultivation of mango in Malda district is still under the vagaries of monsoon. Sudden drought and shower may reduce the mango production, which in turn hampered the export of mango in the countries like UK, Middle East countries, China and Vietnam (Anon, 2006). Being a vital sector, stabilizing the economy of the district this mango crop deserves special attention and planning to increase its production potential and there by to better the economic prospects of those living on and earning from it. Mango is the principal source of income to many of the above 82 thousand of orchard owners as well as of a huge number of people who depends on the mango trading and value addition. In such a research climate, the present paper has aimed to identify the socio-economic attributes of the mango growers associated with the economy of the mango enterprise at the district of Malda in West Bengal.

MATERIALS AND METHODS

The present study was conducted at the Englishbazar block of Malda district (24°55′00″N, 88°08′09″E). The multi-stage random sampling procedure was followed to select the district, block, villages and respondents. The district, Malda and block, Englishbazar were purposively selected for the study. From the selected block five villages namely Dhantola, Kalyanpur, Arapur, Govindapur and Ganipur were selected randomly. An exhaustive list of the mango growers from these five selected villages was prepared with the help of block and panchayat officials. The total fifty numbers of respondents was selected randomly from the prepared exhaustive list of mango growers. For the present study the total annual income, annual expenditure and the annual savings from the mango enterprise were operationalised for conceptualising the total economy of the mango enterprise as dependent variables. The fourteen socio-economic attributes were also identified and operationalised for characterising the dependent one.

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Data were collected with the help of structured personal interview schedule, after conducting the pilot study. For analyzing and interpretation of the data statistical tools like co-efficient of correlation, regression and path analysis were used.

RESULTS AND DISCUSSION

Table-1 reflects the descriptive distribution of the variables considered for the study on the basis of the mango grower's profile of the study area. The table revealed that 'Age' distributed with a mean 46.14 and S.D. of 11.34. The coefficient of variation was 3.47% within the range of 75-31. It is to infer that the distribution of 'Age' is highly consistent in nature, which ranked twelfth. The table also revealed that the variable 'Primary Occupation' distributed with a mean value of 1.06 and S.D. of 0.24. The co-efficient of variation is this study was 3.20 % within the range of 2-1. Primary occupation' is highly consistent in nature, which ranked thirteenth. The table interpreted that the variable 'Secondary Occupation' distributed with a mean value of 0.46 and S.D. of 0.57. The coefficient of variation this study was 17.79 % within the range of 2-0. 'Secondary Occupation' is medium consistency in nature which ranked second. The table interpreted that the variable 'Education' distributed with mean value 1.56. S.D. 0.95. The coefficient of variation was 8.62 % within the range of 3-0. 'Education' is highly consistency in nature, and ranked sixth. The table depicted that the variable 'Size of Orchard' distributed with a mean of 2.39, S.D. 1.75. The co-efficient of variation was 10.37 % within the range of 7.98–0.15 which indicates that distribution is highly in consistency. Here the variable 'Size of orchard' ranked fifth. The table also revealed that the variable 'Age of Orchard' distributed with a mean of 68.10, S.D. 26.12. The coefficient of variation was 5.42 % within the range of 100-3.00 which indicates that the distribution is highly consistency in nature, which ranked tenth. The table also presented that the variable 'Family Composition' distributed with a mean of 4.48, S.D. 1.26. The coefficient of variation was 3.99 % within the range of 9-2. 'Family Composition' is very highly consistency in nature and ranked eleventh.

Table 1: Descriptive distribution of the variables with reference to respondent's profile

Variables	Range		Mean	S.D.	Coefficient of variance (%)	Rank
Age (X_1)	75	31	46.14	11.34	3.47	**XII**
Primary occupation (X_2)	2	1	1.06	0.24	3.20	**XIII**
Secondary occupation (X_3)	2	0	0.46	0.57	17.79	**II**
Education (X_4)	3	0	1.56	0.95	8.62	**VI**
Size of orchard (X_5)	7.98	0.15	2.39	1.75	10.37	**V**
Age of orchard (X_6)	100	3.00	68.10	26.12	5.42	**X**
Family composition (X_7)	9	2	4.48	1.26	3.99	**XI**
Experience of growers (X_8)	50	0	21.70	10.39	6.77	**IX**
Percentage of variety grown (X_9)	90	30	58.60	11.95	2.88	**XIV**
Use of information channel (X_{10})	76.19	47.61	62.00	8.13	1.85	**XV**
Cost of production (X_{11})	125000	1000	23120	20471	13	**IV**
Return from orchard (X_{12})	175000	2500	66770	36044	8	**VII**
Primary income(X_{13})	20,0000	15,000	64920	34208	7	**VIII**
Secondary income (X_{14})	10,0000	0	12700	21533	24	**I**
Total income (Y_1)	30,000	15,000	77620	46477	8	**VII**
Yearly expenditure (Y_2)	144,000	14,400	43668	21719	7	**VIII**
Yearly savings (Y_3)	177,600	0	33952	37621	16	**III**

The table also presented that the variable 'Experience of Growers' distributed with a mean of 21.70. S.D. 10.39. The coefficient of variation was 6.77 % within the range of 50-0 'Experience of Growers' is highly consistency in nature which ranked ninth. The table revealed that 'Percentage of variety grown' distributed with a mean of 58.60. S.D. 11.95. The coefficient of variation was 2.88 % within the range of 90-30 which indicates that the distribution is very highly consistency in nature and ranked fourteenth. The table also depicted that the variable 'Use of information channel' distributed with a mean value of 62.00, S.D. 8.13. The coefficient of variation in this distribution was 1.85 % within the range of 17.19-47.61. 'Use of information channel' is very highly consistency in nature and ranked fifteenth. The table revealed that the variable 'Cost of Production' distributed with a mean of 23120, S.D. of 20471. The coefficient of variation in this distribution was 13% within the range of 12500-1000. 'Cost of Production' is slightly moderate in consistency which ranked fourth. The table revealed that the variable 'Return from Orchard' distributed with a mean of 66770, S.D. of 36044. The coefficient of variation in

this study was 8% within the range of 175000-2500 which indicates that the distribution is highly consistent in nature. Here, 'Return from Orchard' ranked seventh. The table present that the variable 'Primary income' distributed with a mean of 64920, S.D. 34208. The coefficient of variation in this study was 7% within the range of 20,000 – 15,000 which indicates that the distribution is highly consistent in nature and ranked eighth.

The table also presented that the variable 'Secondary income' distributed with a mean of 12700, S.D. 21533. The coefficient of variation in this study was 24% within the range of 10,000-0 which indicates that the distribution is medium consistency in nature which ranked first. The table revealed that the variable 'Total Income' distributed with a mean of 77620, S.D. 46477. The coefficient of variation in this study was 8% within the range of 30000-15000. 'Total Income' is highly consistency in nature. Here 'Total Income' ranked seventh. The table depicted that the variable 'Expenditure' distributed with a mean of 43668, S.D. of 21719. The coefficient of variation in this study was 7% within the range of 144,000 –14400 which indicates that the distribution is highly consistency in nature, which ranked eighth. The table also revealed that the variable 'Savings' distributed with a mean of 33952, S.D. 37621. The coefficient of variation in this study was 16% within the range of 177600-0. 'Savings' is medium consistency in nature which ranked third.

Table2, presents the coefficient of correlation between the fourteen independent variables and the total family income (Y_1). Out of 14 independent variables age (X_1), secondary occupation (X_3), education (X_4), size of orchard (X_5), experience of growers (X_8), percentage of variety grown (X_9), return from orchard (X_{12}), primary income (X_{13}) and secondary income (X_{14}) are found to be highly associated with the total family income (Y_1).

Here, age of the mango growers is negatively correlated with the total family income because the young and energetic individual contributes more to the total family income.

The variable secondary occupation is positively and significantly associated with the total family income due to the increased earnings from various sources of secondary avocations.

Education always plays a pivotal role for enhancement of family income. It increases the exposure and avenues for earning which contributes positively to the family income. In the present context, orchard is considered to be more viable proposition so far as cultivation of crop is concerned. Here, experience of growers and total family income is negatively correlated. Experience of growers can minimize the cost of production by utilizing the uncanny management practices, harvest the price of the produce to its maximum limits and that in turn helps in savings. Selection of variety is an important aspect in mango cultivation. The selection should be in favour of the varieties which have demand in domestic as well as international market. Naturally, it brings more money in comparison to the traditional variety.

Table 2: Correlation coefficients between the total family income (Y_1) and independent variables

Variables	Correlation coefficient (r)
	Y_1
Age (X_1)	-0.355*
Primary occupation (X_2)	-0.011
Secondary occupation (X_3)	0.342*
Education (X_4)	0.298*
Size of orchard (X_5)	0.297*
Age of orchard (X_6)	-0.109
Family composition (X_7)	0.061
Experience of growers (X_8)	-0.236
Percentage of variety grown (X_9)	0.242
Use of information channel (X_{10})	0.071
Cost of production (X_{11})	0.178
Return from orchard (X_{12})	0.450**
Primary income (X_{13})	0.902**
Secondary income (X_{14})	0.726**

*Note: *** Significant at 5% and 1% level, respectively*

In the era of globalization, value added horticultural fruit crops has the potentiality to fetch more money than any other farm produce as it has the greater scope of value addition, total quality management and export. Mango is also a horticultural crop which is grown in orchard. Consequently, the return from the orchard increases the income of the mango grower's family. The primary source of income of the mango growers is the mango enterprise. So, the total contribution from the mango enterprise reflects the total family income. Similarly, the secondary source of income is also positively contributed towards the development of total family income of the mango growers as the people are also involved in several secondary vocations in the study area.

From Table-3, it can be concluded that total family income (Y_1) is characerized by the variables return from orchard (X_{12}), secondary occupation (X_3), size of orchard (X_5) variables with their positive contribution towards enhancing total family income (Y_1) and the variables, cost of production (X_{11}), experience of growers (X_8) with their negetive impacts towards reducing the magnitude of total family income (Y_1). The fourteen predictor variables had all together explained 57 per cent of the variation embedded with the predicted one, total family income (Y_1).

Table-4 presents the correlation coefficient between yearly expenditure (Y_2) and the fourteen independent variables. The result indicates that only four variables size of orchard (X_5), age of orchard (X_6), family composition (X_7), return from orchard (X_{12}) and primary income (X_{13}) are significantly correlated with yearly expenditure. Maintenance and cultivation of fruits necessarily involved a recurring expenditure. Expenditure on orchard management incurred in the form of ploughing, fertilizer application, irrigation, plant protection chemical, harvesting, labour charges and security charges for conducting all the operations. Obviously more investment is required for maintenance of the orchard which is older. Mostly the orchards are more than 70 years old. As a result the yearly expenditure of a family for the maintenance of the orchard is high.

Table-3: Result of multiple regression analysis between total family income (Y_1) and causal variables

Dependent variable (Y)	Regression equation	R^2	Adj. R^2	SE (est.)
Total income (Y_1)	$Y_1 = 26602.53 + 1.05\ X_{12}^{**} + 38812.32\ X_3^{**} - 1.30\ X_{11}^{**} + 7085.68\ X_5^{*} - 1107.19\ X_8^{*}$	0.57	0.52	32211.63

*Note: *,** Significant at 5% and 1% level, respectively*

Table 4: Correlation coefficients between yearly expenditure (Y_2) and independent variables

Variables	Correlation coefficient (r) Y_2
Age (X_1)	-0.175
Primary occupation (X_2)	-0.057
Secondary occupation (X_3)	-0.067
Education (X_4)	0.089
Size of orchard (X_5)	0.290*
Age of orchard (X_6)	0.246
Family composition (X_7)	0.279 *
Experience of growers (X_8)	0.071
Percentage of variety grown (X_9)	0.158
Use of information channel (X_{10})	-0.007
Cost of production (X_{11})	0.006
Return from orchard (X_{12})	0.449 **
Primary income (X_{13})	0.662**
Secondary income (X_{14})	0.248

Size of the family is closely related with the expenditure as the number of family member increases, the family expenditure also increases. Yearly expenditure is largely influenced by the income from the orchard. Selling of mango and its by-product actually is being reflected in return from orchard. Primary income which is mostly coming from mango orchard has been the main contributing source of income and regulates the yearly expenditure.

From table-5, it can also be concluded that yearly expenditure (Y_2) is characterized by primary income (X_{13}) and age of orchard (X_6) variables with their positive contribution towards enhancing yearly expenditure of the mango growers. The fourteen predictor variables had all together explained 49 per cent of the variation embedded with the predicted one, yearly expenditure (Y_2).

Table 5: Result of multiple regression analysis between yearly expenditure (Y_2) and causal variables

Dependent variable (Y)	Regression equation	R^2	Adj. R^2	SE (est.)
Yearly Expenditure (Y_2)	$Y_2 = 4315.96 + 0.42\ X_{13}^{**} + 182.35\ X_6^{*}$	0.49	0.47	15889.01

Table-6 presents the correlation coefficient between yearly savings (Y_3) and the fourteen independent variables. The result depicts the fact that the variables like age (X_1), secondary occupation (X_3), education (X_4), age of orchard (X_6), experience of growers (X_8), percentage of variety grown (X_9), return from orchard (X_{12}), primary income (X_{13}) and secondary income (X_{14}) have a significant association with the variable yearly savings (Y_3). The variable age and yearly savings is found to be negatively correlated. It suggests that lower the age higher the savings. It is probably due to the fact that as an individual grows his liability, responsibility develops to the family and the larger world, as compared to the younger age and the expenditure increases and the savings decreases accordingly. Primary occupation meets the requirement of the family expenditure to a considerable extent and the secondary occupation paves the way in support of savings. Education has a strong bearing on savings. It is quite reasonable that savings definitely requires some planning which can be properly understood by a person who have some educational background. The relationship between age of orchard and yearly savings are found to be negatively correlated. It suggests that as the age of the orchard increases the productivity decreases accordingly.

Table 6: Correlation coefficients between yearly savings (Y_3) and independent variables

Variables	Correlation coefficient (r) Y_3
Age (X_1)	-0.338*
Primary occupation (X_2)	0.047
Secondary occupation (X_3)	0.461**
Education (X_4)	0.317*
Size of orchard (X_5)	0.200
Age of orchard (X_6)	-0.276
Family composition (X_7)	-0.085
Experience of growers (X_8)	-0.332 *
Percentage of variety grown (X_9)	0.208
Use of information channel (X_{10})	0.091
Cost of production (X_{11})	0.182
Return from orchard (X_{12})	0.297**
Primary income (X_{13})	0.731**
Secondary income (X_{14})	0.754**

*Note: *,** Significant at 5% and 1% level, respectively*

After the initial establishment of the orchard as the age grows productivity increases to a large extent but in the study area the average age of the orchard is 70 years as a result the productivity is decreasing with the increasing age of orchard. Here experience of growers and yearly savings is negatively correlated. Experience of growers can minimize the cost of production by utilizing the uncanny management practices, harvest the price of the produce to its maximum limits and that in turn helps in savings. As the age grows the mental capacity of an individual decreases and the efficiency of utilising their experiences also decreases which creates a negative impact to yearly savings.

Selection of variety is an important aspect in mango cultivation, especially the varieties which have demand in domestic as well as international market. Naturally, it brings more money in comparison to the traditional variety which has bearing to the yearly savings positively and significantly. As the primary source of income of the family is from mango enterprise, naturally the return from orchard is the strong determinant of the earning and savings. The price of mango is so remunerative that the growers despite meeting his family expenditure earn profit from mango enterprise. Income from various secondary sources is also playing a significant role in savings. The primary income meets the need of the family and secondary sources earning helps in developing the savings.

From Table-7, it can be concluded that yearly savings (Y_3) is explained by primary income (X_{13}), secondary income (X_{14}) variables with their positive contribution towards enhancing yearly savings (Y_3) and age of orchard (X_6) variable with its negative impact towards reducing the magnitude of yearly savings (Y_3). The fourteen predictor variables had all together explained 83 per cent of the variation embedded with the predicted one, yearly savings (Y_3). In the ever changing global scenario mango is the most important export oriented fruit crop to be concentrated upon. So, in the present context the need of the hour is to fetch the foreign money by exporting the mango as table fruit and value added mango products after total quality management. In this direction the present study had explained the socio economic attributes of the mango growers embedded with the economy of the mango enterprise in this area because a large number of population maintains their livelihoods with the help of the mango enterprise. The income, expenditure and savings of the respondents from the mango enterprise of the study area have the positive and significant relationship with the age, secondary occupation, education, area under orchard, percentage of mango varieties, age of orchard growers, return from orchard, primary income, secondary income, family composition, experience of the growers. The fourteen predictor variables altogether had contributed to explain 57, 49 and 83 percent variations in the predicted variables income, expenditure and savings of the mango growers respectively.

Table 7: Result of multiple regression analysis of yearly savings (Y_3) with causal variables

Dependent variable (Y)	Regression equation	R^2	Adj. R^2	SE (est.)
Yearly Savings (Y_3)	$Y_3 = -2725.55 + 0.90\ X_{14}^{**} + 0.61\ X_{13}^{**} - 209.42\ X_6^{*}$	0.83	0.82	15929.49

On the basis of the present study, the line departments of the Government and Non Government Organisations can take initiative to make the enterprise more profitable by enhancing productivity by considering the revelation of the study on the socio economic attributes of the mango growers for the income, expenditure and savings from the enterprise for facing the global challenges.

REFERENCES

Gandhi, G.P. 2006. Exports prospects of mango and Mango based products from India. *Pl. Hort. Tech.*, **6**:38-44.

Thorat, V.A., Patil, H.N., Borude, S.G. 1988. Socio-economic impact of subsidy for mango plantation in Konkan region of Maharastra. *J. Rur. Dev.*, **7**: 453-60.