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Yield of Mango Marketed in Malda, West Bengal: The Socio-ecological and Techno-managerial Interpretation

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Abstract

Mango is the symbol of Indian culture nutritive value and elegance of taste and of course mainstay for livelihoods to far more millions. Presently mango entrepreneurs of Malda are suffering from market slag, faulty supply chains, and deteriorating brands, aging of most of the orchards leading to poor productivity and quality as well. Thus, marketing starts with the decision to plant unlike to the conventional way of thinking with the objective to isolate and elucidate the predictor and predicted variables as operating and characterising the yield (marketed) of mango in Malda. A study on this topic was carried out at Kotowali Gram Panchayat of the English Bazar block of Malda district in West Bengal taking 60 respondents randomly. Variables like age, size of mango orchard, homestead land**,** frequency of visit to the market etc variables are taken for collection of reliable data. The present study well identified some of the important factors (age, education, cropping intensity, communication exposures, and homestead land) to study the perception of individuals regarding arsenic contamination. Frequency of visit to the market is one of the important driving forces behind the marketing out of the total yield of mango. Frequency of visit to the market and problems related to mango cultivation has gone isochronously in characterising yield marketed.

Key words- *Mango, market, livelihood, productivity, yield*.

Introduction

Mango is the symbol of Indian culture and it is not just a fruit, it generates nutritive value with elegance of taste and delicacy for millions in India and beyond, of course mainstay for livelihoods to far more millions. Mango is the traditional crop vis-a-vis enterprise of district Malda, West Bengal which is both nationally, internationally recognised for unique but qualitative production of this fruit. Over centuries mango orchards in Malda have been representing and disposing of various economic and cultural outcomes along with economic and managerial terms.

The present day mango entrepreneurs of Malda are suffering from market slag, faulty supply chains, and deteriorating brands, aging of most of the orchards leading to poor productivity and quality as well.

Marketing is a major function after production. Acharya and Agrawal (1999) stated Production is the door to economic development but it is marketing that opens the lock. Thus, marketing plays an important role in agricultural production. Moreover marketing is the creation of time, place and possession utilities through which human wants are satisfied by the exchange of goods and services. Agricultural marketing is a process, which includes farmer's decision to produce a saleable farm commodity and various aspects of marketing structures both functional and economic consideration including products assembling, preparation of market distribution and use by final consumer. According to Pokhrel and Thapa (2005) thus, marketing starts with the decision to

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plant unlike to the conventional way of thinking. As per research findings by Shallu Gupta and Shakuntla Gupta (2013), the Indian horticulture sector is facing severe constraints such as low productivity, limited irrigation facilities and inadequate and improper infrastructure facilities like cold storages, markets, roads, transportation, processing etc.

Malda and contiguous districts of West Bengal constitutes one of the largest mango yielding regions of the country producing over 5 lakh tonnes or nearly about 5% of India's national yield. But, in many years a good part of the produce becoming ineligible to fetch a good market .So, healthy export is very much important for proper price realization of the yield (Sarkar, 2016).

Besides, Gopalakrishnan (2013) found that due to seasonality and perishability which badly affects the marketing of the produce, now mango growers are going for contract farming. And accidental falling of fruits, results in bruising and cracking of fruits and losses are estimated to a maximum of 15 % in mango. These also hamper marketability of the mangoes.

In a study has dealt with the various strategies for increasing the production of mango, Khanna and Gupta (1989) concluded that the new seed policy which will help in liberalizing the import of mangoes will go a long way in increasing the production of mango. The development of agriculture sector requires a balance improvement in the production and marketing. It is inefficient to improve the production side and neglect marketing side as the former's improvement is dependent on the latter's development stated by Rayamajhi *et al.* (2005).Marketing is also the most important multiplier of economic development.

The overall objective of this investigation was to study the mango cultivation in Malda district of West Bengal: The functions of productivity and entrepreneurship.

Following were the specific objectives of the investigation.

- To isolate and elucidate the predictor and predicted variables as operating and characterising the yield (marketed) of mango in Malda.
- To estimate the inter and intra level relationship between and amongst the predicted variables related to yield (marketed) of mango with a score of agro ecological and socio economic predictors.

Methodology

Research locale and sampling: Kotowali Gram Panchayat of the English Bazar block of Malda district in West Bengal was purposively selected for the study. The village namely Kotowali was selected by random sampling. The area had been selected for the study because of-

a) There is ample scope for collecting relevant data for the present study.
b) Acquaintance with the local people as well as the local language.
c) The concern area was easily accessible to the researcher in terms of place of residence.
d) The area was very easily accessible to the researcher in terms of transportation
e) The closure familiarities of the student researcher with the area, people, officials and local dialect.

Table 1 Sampling Technique and Sampling Design

Step	Items	Level	Approach
1	State	West Bengal	Purposive
2	District	Malda	Purposive
3	Sub-division	Malda Sadar	Purposive
4	Block	English bazar	Purposive
5	Gram -Panchayat	Kotowali	Purposive
6	Village	Kotowali	Purposive
7	Respondents	60	Random
Total number of respondents : 60			

Empirical measurement of the variables

Appropriate operationalization and measurement of the variables help the researcher to land upon the accurate conclusion. Therefore, the selected variables for this study had been operationalised and measured in following manner.

Variables in the present study have been categorized into two main categories.

A) Independent variables

Age (x1)*:* In the present study, the number of years rounded in the nearest whole number the respondent lived since birth at the time of interview, was taken as a measure of age of the respondent.

Education(x2)*:* Education may be operationalized as the amount of formal schooling attained/literacy acquired by the respondent at the time of interview.

Family Size (x3): The influence of family members on the decision-making process of farm operation is inevitable. It refers to the number of members present in the family of farmers.

Income from intercrops (per capita) (Rs) (x4): The Annual Income of a person is an important parameter to assess the economic status of the person in the society. It was operationally defined as the gross income from all the viable source of income in a single year. It is measured in terms of rounded of rupees. Total income of the family from intercrop (Chick pea, vegetables mustard, lentil etc.) farming is divided by the family size.

Income from mango crop (per capita) (Rs) (x5): It was operationally defined as the gross income from all the viable source of income in a single year. It is measured in terms of rounded of rupees. In the present study it has been calculated with the formula as follows.

(Total annual income from mango crop ÷ Family size)

Size of mango orchard (Acre) (x6): The amount of land owned by a person is an important parameter to access the economic status of the person in the society. In the present study, actual area under mango cultivation is in acre.

Homestead area (katta) (x7): Amount of land acquired by the home building and surrounding. In the present study, homestead area is in katta.

Distance Matrix (x8): In this study distance matrix calculated as distance from respondent's house to -

- Health centre
- Pacca road
- Market/ hat
- Knowledge centre
- Financial institution

All these distances are taken in km unit.

Fuel consumption (per month, per capita) (x9): Consumption of diesel, petrol, LPG and kerosene oil in a month (in Rs) / size of the family.

Electricity consumption (per capita) (x10): Consumption of electricity in house (in Rs) / size of the family.

Frequency of visit to the market (in a week) (x11): Market research or survey is any organized effort to gather information about target markets or customers. It is a very important component of business strategy. So, this variable is very important character for the study.

Group interaction (x12): **Interaction** is a kind of action that occurs as two or more objects have an effect upon one another. The idea of a two-way effect is essential in the concept of **interaction,** as opposed to a one-way causal effect. **Group interaction** refers to the dynamics of the team and the way individuals in the **group** interact with one another. In this study group interaction is calculated on the basis of 10 point scale.

STATEMENT	10- POINT SCALE
1. Frequency of interaction with panchayat leader	
2. Frequency of interaction with farmers group	
3. Frequency of interaction with development programmes	
4. Frequency of interaction with social service	

Problems related to mango cultivation (x13): To find the problems related to mango cultivation in the study area Kotowali village questions are raised for inquiry, consideration, or solution. The scores are given on the basis of 5 point scale.

B) Dependent variables

Yield marketed (kg) (Y): The amount of produce taken to the market for sale.

Findings and Discussion

Relationships between 13 independent variables and yield marketed of mango in Malda: The purpose of this section is to explore the relationships between 13 independent variables and yield marketed of mango in Malda. The relationship between 13 independent variables and yield marketed of mango in Malda is presented in Table 3.

The only variable which is significant with Y that is yield marketed (at10 per cent) is x11 (frequency of visit to the market)

So there is a possibility for the respondents having less volume of yield marketed, their frequency to market interaction is high, but this relation is not that conclusive. Because, the farmers face problems like they have to bring the produce physically to the market, market levies or charges depending upon the weight of the produce etc. farmers go multiple times in the market to sell their whole produce and it consumes time a lot (Agriculture marketing and role of weekly gramin haats, 62nd report, 2018-19, Standing committee on agriculture, Ministry of Agriculture and Farmers Welfare). Bung (2013) in his research also found that majority farmers market their lesser volume of produce in the local market or to wholesalers, either directly or through middlemen frequently.

Table 3 Coefficient of correlation (r) between yields marketed (Y) and 13 independent variables (x1-x13)

Co- efficient of correlation(r); Yield marketed (Y) vs. Exogenous variables	
Exogenous variables	**"r" value (Spearman's Correlation coefficient)**
Age(x1)	-0.128
Education(x2)	0.12
Family size(x3)	-0.061
Income from intercrops(per capita)(x4)	-0.06
Income from mango crop(per capita)(Rs)(x5)	-0.093
Size of mango orchard(Acre)(x6)	-0.068
Homestead area(katta)(x7)	0.002
Distance matrix(x8)	-0.012
Fuel consumption(per month per capita)(x9)	0.072
Electricity consumption (per capita)(x10)	0.071
Frequency of visit to the market(in a week)(x11)	-0.233
Group interaction(x12)	0.104
Problems related to mango cultivation(x13)	-0.129

** Correlation is significant at the 0.01 level (2 tailed) *Correlation is significant at the 0.05 level (2 tailed)

Functional relationship between 13 causal variables and yield marketed of mango in Malda: The purpose of this section is to explore the functional or causal relationships between 13 causal variables and yield marketed of mango in Malda. The functional relationship between 13 causal variables and yield marketed of mango in Malda is presented in Table 4.

Stepwise regression is a variation of multiple regressions which provides a means of choosing independent variables that yield the best prediction possible with the fewest independent variables i.e. the screening of the variables having highest efficacy in Table 5.

Table 4 presents the Multiple Regression analysis where in 13 variables have been regressed against the consequent variable yield marketed (Y)

Through the stepwise regression analysis it has been found that one causal variable frequency of visit to the market (x11) has been retained at the last step to make significant contribution to yield marketed (Y) so; this variable has got substantive strategic and operational impact on mango cultivation and production function.

It has been found that the collectively 13 variables have explained 20.1 per cent of variance embedded with the consequent variable Y. The variable Frequency of visit to the market (x11) has been retained at the last step explains 7 per cent.

Only frequency of visit to the market (x11) has been retained at the last stage of Step-wise Regression Analysis which has got solitary contribution of **(7.0/20.1 *100 = 34.8)** per cent to the total R^2 value i.e., to infer that market visit deserve to earn a special attention while we intend to make a serious intervention in the mango cultivation. So, these variables can be considered the most important strategic and functional variables that would characterise as well as explain the production function in the most efficient way. Moreover it is discernable that mango cultivation is an important horticultural enterprise must be market linked and responsive.

Table 4 Multiple Regression analysis yield marketed (Y) vs. 13 causal variables (x1-x13)

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8344.943	2600.581		3.209	0.002
Age(x1)	-19.820	24.472	-0.135	-0.810	0.422
Education(x2)	29.724	60.992	0.081	0.487	0.628
Family size(x3)	-134.545	149.280	-0.200	-0.901	0.372
Income from intercrop(x4)	-0.044	0.053	-0.149	-0.828	0.412
Income from mango crop(x5)	-0.006	0.006	-0.306	-0.972	0.336
Size of orchard(x6)	222.653	213.512	0.333	1.043	0.302
Homestead area(x7)	65.435	84.051	0.117	0.779	0.440
Distance matrix(x8)	50.564	101.130	0.080	0.500	0.619
Fuel consumption(x9)	3.301	2.657	0.227	1.242	0.220
Electricity consumption(x10)	2.034	7.674	0.046	0.265	0.792
Frequency of visit to the market(x11)	-333.607	162.480	-0.293	-2.053	0.046
Group interaction(x12)	68.058	111.868	0.090	0.608	0.546
Problems related to mango cultivation(x13)	-123.848	122.520	-0.141	-1.011	0.317

Dependent Variable: **Yield marketed (Y2)**

R Square	Adjusted R Sq.	SE(est)
0.201	-0.024	1318.529

Table 5 Regression Analysis (Step wise): Screening of variables having significant efficacy for character yield marketed (Y)

Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8041.111	865.412		9.292	0.000
Frequency of visit to the market(x11)	-300.556	144.035	-0.264	-2.087	0.041

Dependent Variable: **Yield marketed (Y2)**

R Square	Adjusted R Sq.	SE(est)
0.070	0.054	1267.184

Interactional relationship between 13 independent variables and yield marketed of mango in Malda: The purpose of this section is select a collection of discriminating variables that measures characteristics on which the groups are expected to differ. This is presented in Table 6.

Canonical discriminant function (step wise) has been carried out to elicit the variables having critical and clandestine impact on yield marketed (Y) by dint of discriminatory properties of respective

variables. It stands discernible that the variables Frequency of visit to the market(x11) and Problems related to mango cultivation (x13) have gone isochronously in characterising yield marketed (Y). Because in some primary wholesale markets of India infrastructure and facilities are very poor and farmers face huge problem in marketing their produce(Agriculture marketing and role of weekly gramin haats,62nd report,2018-19,Standing committee on agriculture, Ministry of agriculture and farmers welfare). From a study by Bang, it has found that mango cultivation of India are facing lot of challenges leading to negative growth rate such as non availability of sapling of required mango varieties which are ideal for processing. Besides poor infrastructure, almost no cooperative effort amongst farming community and also lack of co-ordination of all activities starting from the farm gate to the point of final consumers because of ill functioning of the government departments or ill structure and functions of the institutions, very small land holdings, huge post-harvest loss because of dearth of infrastructure, middle men problems, poor profitability of the cultivation activity, etc.

Table 6 presents the Canonical Discriminant Function Coefficients for yield marketed (Y2)

Canonical Discriminant Function Coefficients for yield marketed (Y2)(Unstandardized coefficients)

Variable	Function			
	1			
Frequency of visit to the market(x11)	0.795			
Problems related to mango cultivation(x13)	0.451			
(Constant)	-6.104			
Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.835	10.277	2	0.006
Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0.198	100	100	0.406
Correctly classified 65%				

The yield marketed (Y) has been scaled up when the frequency of market visit has activated and problem perception have been simultaneously activated as well as orchestrated. This discrimination holds well in 65 per cent cases.

Conclusion

Malda, West Bengal has the potentiality to produce a good yield of mango. But there are some problems regarding marketing and management related issues. And the entire

study has elucidated the entrepreneurial behaviour and functions of mango orchards in terms of set of exogenous and consequent variables. To usher a quality driven mango enterprise management along with its peripheral characters like yield and its marketability, we need to take a comprehensive action plan along with the critical factors of management have been traced in the present research. Albeit after having a better harvest of mango, the market viability and profitability of the produce stand as an issue even today. So, linking and making market accessible as well as interactive can go a long way in making mango enterprise a voice of success and a dialogue of sustainable livelihood for thousands of mango growers and stakeholders.

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