Economic Significance Behind Of The Mango Cultivation Of The Malda District In West Bengal: Case Study In English Bazer Block, Malda District

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Abstract: Malda is called "Mango-city" due to on account of the "king fruit" mango which it's nutritive value, taste, attractive fragrance and health promoting qualities. Mechanization, diversification and commercialization of agriculture resulted in shifting of cropping pattern from traditional crops to new crops, which had contributed to the increased area and production under mango in the study region. Changing demand pattern also contributed significantly to shifting of more area under production of mango. A study was conducted in English Bazar Block in Malda district during the period March to June 2022 for Economics behind the cultivation of Mango in Malda district. A total 60 producers 10 traders, 5 Retailers and 2 key information interviewed of the research study area. The main objective of my research study, analysis the economic activities which explored the functional and economic factors behind for Mango production. Data regarding production, post -harvest handling and marketing were analysed by using SPSS and Micro-soft EXCEL

Keywords: *The king of all fruits, Mechanization, diversification, commercialization, cultivation and functional*

INTRODUCTION:

Mango (Mangifera indica) has an important significance both botanical as well as ecological values, but the other measurement of this unique orchard crop has been its capability up with the brunt of climate change and global warming. India is highest producing country accounting for about 50% of the world's mango production and other major mango producing countries such as China, Thailand, Mexico, Pakistan, Philippines, Indonesia, Brazil, Nigeria, and Egypt.

Mango cultivation is one the world's important tropical and subtropical fruits belonging to the family of Anacardiaceae available in both fresh and processed form (Gupta, 2017; Labutiya and Yadav, 2023). It is believed that originated I Asia around 4000 years ago, with the tropical and subtropical environments favouring its growth (Yadav and Paudel, 2022)

Mango is the most important cash crop of the Malda district as well as West Bengal. The protection of this precious fruit is essential that huge number of people is engaged for the mango season to take care for mango season, i.e. thieves, monkeys and other activities for mango season. According Malda merchant Association report that near about 2,91,000 people are employed in this job in the mango season.

The mango tree is a large branched perennial tree with height of 30-40 m and a crown radius spreading about 10 m. The flowers are produced in terminal panicles of 10-40 cm long and each flower has 5 petals of 5-10 mm long. After flowering, the fruit, which is a drupe, takes three to six months to ripe.

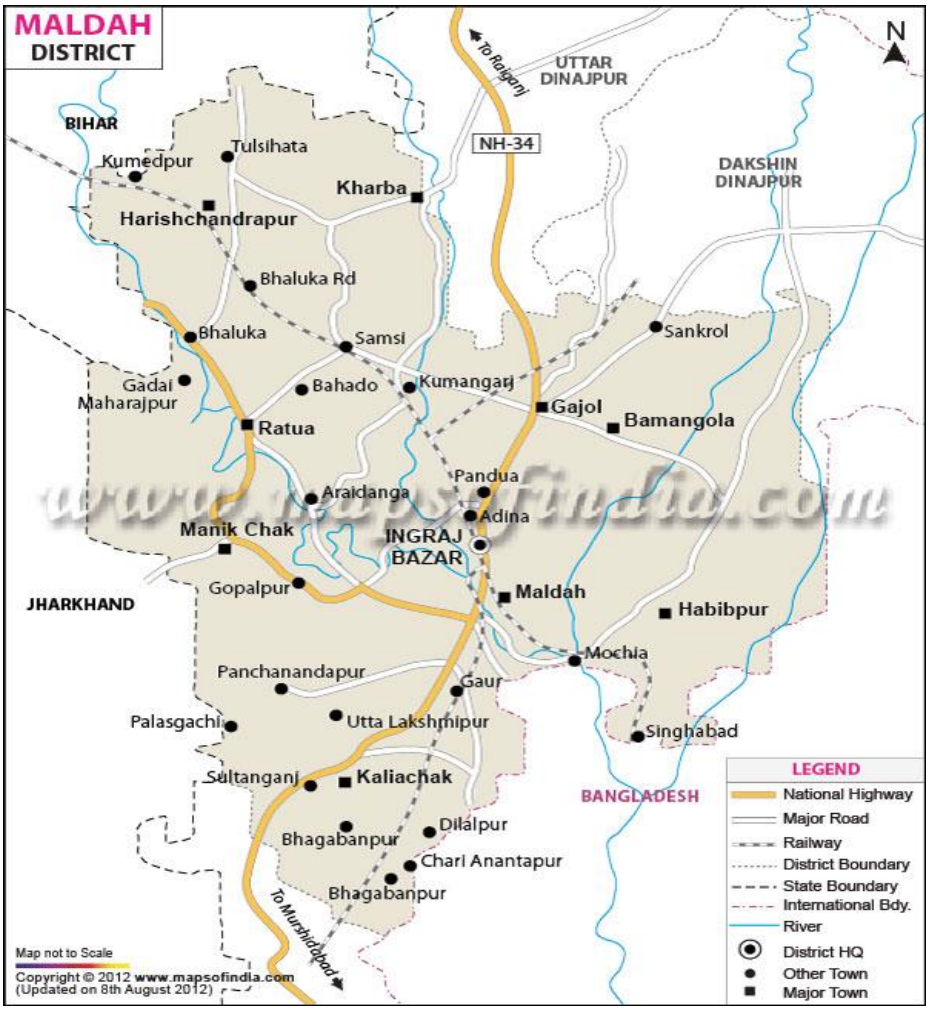
The ideal temperature ranged for mango cultivation is 24^0 C to 30^0 C during the growing season, along with high humidity. A rainfall ranging from 890 mm to 1015 mm in a year is considered to be ideal for growing mangoes. Dry weather before blossoming is conducive to profuse flowering. Mangoes, ripe or unripe, are widely used as a fresh fruit. It is also used to make juice, milk shake, pulp, jam, jelly, pickle and chatni. Ripe mango is often cut into thin layers, desiccated, folded and then cut and sold as mango chewy bars. Pieces of the fruit can be mashed and used in ice-cream. Dried unripe mango, mainly amchur is used as a spice in India.

There are 41 species of mango are known to exist all over the world, of these Mangifera indica which is endemic to India have about 1110 varieties and over 1000 to those varieties occur in India. Now in India, twenty varieties are now accepted as commercially well established (Source : NHB Statistics, 1998). West Bengal is unique in having more than 200 varieties (Mukherjee, 1984; Maiti, Sen and Bose, 1979). In Malda district, the famous varieties like Fazli, Langra, Himsagar, Laxmanbhog, Gopalbhog, Bambai, Kisenbhog, Zardalu, Ashwina etc. are commercially cultivated mangoes. Recently, Amrapali and Mallika varieties are cultivated in the district in massive way for their sweet flavour, aroma and taste but the Fazli and Langra variety is popular in the district.

MALDA DISTRICT:

Malda district is a unique district not only in West Bengal but also in the whole of India because of its location advantage. It shares 165.5 km international border with Bangaladesh. It shares boundaries with Bihar and Jharkhand in South west and also bounded by North Dinajpur and South Dinajpur in the north, east by Bangladesh and south by Murshidabad respectively. Due to positional advantage and proximity to Bangladesh it is very much important in international trade. It is called the gate way of North Bengal. It is situated in the midst of Kolkata and Siliguri and separated from the southern districts by the river Ganga. An area of 3733 sq km of land classified as Tal, Diara and

Barind stretches in north from 25^0 32'80" N and 24^0 40'20" N latitude and its easternmost extremity is 88^0 28'10" and westernmost is marked by 87^0 45'50" of longitude. Malda district consist of two Sub Division, fifteen Blocks and two Municipalities. As per census 2011, total population is appr. 39,97,929 with 52% of Hindu and 48 % of Muslim population. Majority of the population depends on agriculture and other allied industry. This district is also called as "Mango Valley" due to its trade volume nearly about ₹250 crores per year followed by Silk Trade.



Sourcee: Google Maps

Mango Prooduction In Malda District.

SL NO.	Name of Block	Areas (Hectare)	Production (MT)
1	English Bazer	9156	46335
2	Manikchak	3793	27412
3	Ratua-II	2542	28986

Source: District horticulture Office (2021)

CLIMATE AND SOIL FACTORS IN MANGO CULTIVATION:

Mango is healthy adapted to tropical and subtropical climates. It flourishes well in almost all the region of the country from sea level to an altitude of 1500 metres. The main climate factors are which influence its growing and fruiting such temperature, rainfall, wind velocity and altitude. It cannot position severe frost, especially when the mango tree is young and highest temperature by itself is not so injurious to mango, but low humidity and high wind velocity the trees affected adversely. In India, the most of the mango trees flourish with good rain fall 75 to 375 cm per annum and dry season. Distribution of the rain fall is most important for growing its and dry weather before blossoming is favourable to profuse flowering is harmful to the crop as it affects with pollination. However, small rain fall is good for fruit growth but heavy rains cause damage to ripening fruits and strong winds and cyclones during fruiting season can play havoc as they cause excessive fruit drop on the ground.

Mango cultivates well on wide variety of soil such as lateritic, alluvial. Sandy loam and sandy. While it grows very well in high to medium fertility soils, its cultivation can be made fruitful even on low fertility soils by suitable proper management especially during early stages of growth of the trees. The loamy, alluvial, well drained, bubbling and deep soils rich in organic matter with a pH range of 5.5 to 7.5 are most appropriate for mango cultivation. Extremely sandy, shallow, rocky, waterlogged, heavy textured and alkaline or calcareous soils are not suitable for mango cultivation. Average rainfall is about 140.0 cm, the mean maximum and minimum temperature is 36°C and 16°C and relative humidity varies from maximum 85% to minimum 57%.

Agro-climatically, Malda district falls under lower Gangetic plain region (zone-III) and sub-zone old alluvium and new alluvium. Organic material is medium from 0.5 to 0.75, soil is acidic in nature with pH varying from 5 to 7. In Malda district, the suitable climate as well as nature of soil promote for mango cultivation.

LITERATURE REVIEW:

Ram Prakash Srivastava (1998), in his research paper, ha has discussed the mango cultivation practices from planting to till marketing of mango and also described the history origin and languages of mango. He has discussed the diseases the affected to the mango cultivation.

Krisagar, et al. (2003), in their research, they explained the marketing of mango production in south konkan region of Maharashtra state. In the survey field report that in Vashi market mangoes are healthy competition among traders in the domestic market and foreign market. He also described by the farmers that price received from wholesaler of Vashi market less than their expectation. They also highlighted that farmers faced problems of skilled labour at the time of harvesting of mangoes and have to pay heavy transport cost.

Patil, B.N. and Nirban, A.J. (2011), in their research article they have showed the actual scenario of export of mangoes from India to different countries. They analysed the details of low productivity of Maharashtra in spite of having highest area under mango cultivation.

Kavitha, (2013), in her research paper, she discussed the need for finance in mango cultivation as well as the growing importance of horticulture in India. She highlighted on special emphasis on implication of Good Agricultural Practices (GAP) in mango cultivation process cultivation process.

Rosalin, M.A. and Vinayagamoorthy, A. (2014), in their research article, they have explained exactly the process of mango marketing after maturity of the fruit. They mainly analysed the problems and perceptions of intermediaries in marketing of mangoes of the district of Salem, Tamil Nadu.

Rekha Priyadarshini, (2015) in her study research paper, she analysed, India's mango export scenario. She also suggested for adoption of better post-harvest techniques and certification techniques to increase the Indian mango exports to great extent.

Sarkar et al., (2018) conducted a survey of study on the mango cultivation in Nadia district of West Bengal where they have used rank of the problems (related to the mango farming in the study area) on the basis of the responses from the sample growers to know the ground reality of mango farming.

Saha, R. and Bhowmik, G. (2020), described issues and challenges in cultivation of mangoes in Malda District (highest mango producing and exporting district in the state of West Bengal). The survey-based study evaluated the perception of different stakeholders associated with mango farming and its export. The study emphasized on necessity of increasing efficiency in marketing channel, expanding international market beyond Bangladesh, restricting the use of cheap harmful Carcinogenic chemicals like Calcium Carbide, etc.

OBJECTIVE OF THE STUDY:

The Main objectives of the present study research paper as follows below;

- To outline the general aspects of yield of Mango cultivation in Malda district.
- To highlight employment generation for mango cultivation.
- To study the cost of production, marketing and value addition at each
- To generate micro level policy implications based on the empirical studies.
- To analyse the marketing problems of mango cultivation of Malda District.
- To offer suitable suggestions for the improvement of production and marketing of Mangoes in Malda District.

Study Area: The present study research area is English Bazer in Malda district of West Bengal. In this Block, there are 9156 hectors land cover under mango cultivation and highest mango production in Malda district. A study survey conducted in English Bazar Block in Malda district during the period March to June 2022 and taken a random sampling, 60 mango producers, 10 Traders, 5 Retailers and 2 key information interviewed of the research study area.

METHODOLOGY AND DATA BASE:

This research study is based on secondary data and interviewed in the field survey from mango growers, Orchards, mango-processing industries, research centre, multi-purpose cold storages, Wooden box packing and Bamboo basket manufacturing areas of district were visiting in the mango season. The Secondary data was collected from published sources of State Government, District horticulture department, Malda Mango Merchant Association and records on Blocks wise area under mango cultivation.

Methodology:

- Estimate Cost of production

Establishment cost (A) =sapling cost+ Labour cost +Manure and fertilizer cost +Irrigation +Equipment cost +Miscellaneous cost

Maintenance Cost (B) = Manure and fertilizers cost +Irrigation + Labour cost + Plant protection cost.

Total fixed cost (TFC) included depreciation cost of equipment. In our research study, taken depreciation cost 10%.

TVC = Transportation cost + Labour Cost +Packing + Input cost

- Gross Margin

Gross Margin = Gross Return - Total cost of production

Gross Return = Total production × price of product

- Market Margin

Market margin = Retail price (p_r) – Farm gate price (p_f)

- Producer's share

Producer's share (P_s) = (P_f / P_r)×100%

- Profit Analysis

The net profit is the difference between gross income and total cost incurred. Thus,

Profit = Gross income – total cost.

- Benefit Cost

Benefit cost analysis is the benefit of the farm business relative to its cost to express monetary value. The benefit cost ratio is calculated by total revenue and total cost. Thus,

B/C ratio = gross income/ total cost.

Data Analysis:

The various graphs and charts were made by MS Excel tool and the qualitative analysis uses non quantifiable tools to understand or judges a process or system. In our research study, Economic activities for mango cultivation provide relevant and marketing research tools. The simple statistical tools like sum, mean, relative frequency, maximum and minimum and standard deviation is used for descriptive analysis of mango farm characteristics of the respondents like production, price, cost, margin, etc.

Results and Discuss:

Table 1: Initial and Current Mango Plantation status in study area

Farm Characteristics Mean	MEAN
Initial area of mango plantation per HH (ha)	0.4±0.17
Current area of mango plantation per HH (ha)	0.41±0.27
Initial number of plants per HH	40.02±31.61
Current number of plants per HH	71.85±59.09
Number of productive trees	75.35±62.7
Number of unproductive trees	1.69

Source: Primary Field Survey 2022

Table: 2 Production status of the mangoes (year)

YEAR	MEAN(N=60) (KG)MT	MINIMUM(KG)	MAXIMUM(KG)
2019	10801.23±9779.323	300	41000
2O20	15613.25±13141.7	500	52400
2021	1445.42± 12318.533	450	42500

Source: Field Survey 2022

In Table 1 shows that HH (Household) is .4ha which increased to 0.041 ha. It shows an increment of around 55% in the study area. Again, similarly the average number of trees per HH ha increased from 40.02 to 71.85, the number of trees among respondents varied from 25 to 350 and the average number of productive and unproductive trees was 75.35 and 1.69 respectively.

Table:3 Establishment cos of the Mango Orchard (Per Hector)

description	Number		Unite	Rate (INR)	Value (INR)
1.Unskilled Labour Cost	1000		Man-days	250	250,000
2.Semi-unskilled labour cost	65		Man-days	300	19,500
3.Skilled labour cost	5		Man-days	350	1750
4.Materials cost					12000
5.Unplanned cost					7500
Total Cost (1+2+3+4+5)					290,000

Source: Primary Field Survey 2022

Table:4 Maintenance cost of mango orchard

Particulars	COST INR/Ha)				
	2nd year	3rd-5th year	6th-10th year	11th-20th year	21th-30th year
Manure fertilizer cost	8300	9350	6500	4500	4000
Irrigation cost	6500	8000	4500	4900	3500
Labour cost	65800	66000	98900	99100	75400
Plant protection cost	5450	5500	4500	4300	4300
Total cost	86050	88,850	114,400	112,800	87,200

Source: Primary Field Survey 2022

Table 5. Cost incurred during postharvest management and marketing

Particulars		Cost (INR/kg) mean=10
Transportation cost	Local market	10
	Distance market	15
Labour cost		12
Packaging cost		7.50
Other raw materials		07

Source: Primary Field survey 2022

Table 6: Return on Mango orchard in different aged orchards

particulars	1st year	2nd-5th year	6th-10th year	11th-20th year	21th-30th year
Yield (kg/ha)	00	500	16500	25500	20560
Cost (INR/ha)	3,50,000	175000	225000	230,000	176,000
Returns (INR/ha)	00	8000	675000	920,000	750,000

Source: Primary Field survey 2022

Table7: Profitable analysis of mango Producers

Particulars	Cost (INR/ha)
Total cost of production (CoP)	290,750
Total variable cost (TVC)	2,37,250
Marketing cost	53,500
Gross Return GR)	5,94,000
Gross Margin (GM=GR-CoP)	303250
Net profit (GR- TVC)	356,750
Payback period	11.06 year
BC Ration	2.04

Source: Primary Field survey 2022

Table: 8Marketing margin and Producer's share

Particulars	local market (INR/kg)	Distance market (INR/kg)
Retail price	Rs. 35-Rs. 40	Rs.60 to Rs. 75
Fragment price	Rs. 30	Rs.35
Market margin	Rs.20	Rs.55 to Rs.60
Producer's share	65%	35%

Source: Field survey 2022

Table: 9 Value addition in different level at mango value chain

particulars	Buying price (INR/kg)	Packing cost (INR/kg)	Total cost (INR/kg)	Selling cost (INR/kg)	Value addition (INR/kg)
producers	--	Rs.16	Rs.16	Rs.Rs 18	--
Contract farmers	Rs.18	Rs3.50	Rs.21.50	Rs.26.50	Rs.5
Wholesalers	Rs.26.50	Rs.3	Rs.29.50	Rs.33.50	Rs.4
Retailers	Rs.33.50	Rs.1.50	Rs.35.00	Rs.40.00	Rs.5

Source: Field survey 2022

Table 10: Major production problem

Particulars	severe (4)	moderate (3)	slight (2)	No problem (1)	Index	Rank
Influx of Disease, Insect and Pest	51	6	3	0	3.8	I
Lack of Irrigation facilities	15	18	16	11	2.62	III

Scarce of labour	2	13	15	30	1.78	V
Low technical knowledge	22	15	18	5	2.9	II
Limited fertilizers and other inputs	3	24	27	6	2.4	IV

Source: Primary Field survey 2022

Table 11: Producer's level marketing problem

Particulars	severe	moderate	slight	No problem	Index	Rank
Interference of middlemen	6	26	19	7	2.57	IV
Lack of processing technology	47	10	3	0	3.73	I
Low farm gate price	6	22	32	0	2.57	III
Lack of market information	33	22	5	0	3.47	II
Lack of post-harvest technology (equipment's)	6	25	23	7	2.47	V

Source: Field survey 2022Table 12: Trader's level of marketing problem

Particulars	severe	moderate	slight	No problem	Index	Rank
Lack of processing facilities	6	4	0	0	3.6	I
Insufficient cold storage facilities	4	3	3	0	3.1	III
Transportation problem	0	0	3	7	1.3	IV
Market inadequacy	4	4	2	0	3.2	II

Source: Primary Field survey 2022

Table 13: SWOT analysis at Producers' level of problems

Strength	Weakness
Production	Production
Suitable agro-climate condition for Mango	Alternative bearing causes production and financial problem.
Mango produced in English Bazer in Malda regarded	Traditional practices of mango cultivation
Superior in quality, taste an flavour	Growth period of 5-6 years restrain farmers to adopt mango production
Long-term crop, it can provide Revenue for long period	Lack of processing industry in the production areas.
Production of mango in Malda can seve industrial level of demand	
Marketing	Marketing
Easily accessible market	Weak market information system.
High scope for the value-added products	No proper organization co-operative among mango farmers

Production	Production
Greater scope for increasing production and productivity	Low shelf-life of mango
Severable public and non—Governmental institutions working for the capacity building of mango production	Infestation diseases (Anthracnose, powdery mildew, scab) and pest (Mango hopper, mealy bug)
Marketing	**Marketing**
Easy to sell	Price fluctuation due to alternative bearing
Export potential	Interference of middle men
Transport access to major markets	Export limitation
Opportunity	Threats

Source: Field survey 2022

Economic data analysis:

The economic analysis of the major level of factors is such as Cost of production, gross margin, benefit cost ratio, and profitable index are estimated in each level.

- **Cost of production:**

Mango trees plantation from seeds will take roughly 8 years to produce fruit but mango trees planted from saplings will take up to 5 years to grow fruit for economic yield. The total cost sustained up to 5th year constitutes establishment cost. The establishment and maintenance costs incurred during growth period are distributed over natural lifespan of the mango trees. The establishment cost of mango orchard plantation in one hectare land is estimated as Rs. 350,000. And maintenance cost of the 10th year is Rs. 114,400, in later year, indicates that the cost will be deceased gradually. Table 4

shows that the establishment and maintenance costs of mango plantation respectively, transport mangoes to proximal market (English Bazer) to distance market the cost Rs. 9500.

- **Return Cost from Mango tree plantation:**

Generally, the first five year are called gestation period, commercial return is obtained from 6th year. The average yields from one hector land initial year estimate is around 500kg Mago generating Rs. 8000in revenue, but the production yield increased from 11th to 20th year with average 25500 kg and revenue earnings Rs. 920,00 Profitable of the mango producers:

The table 7 shows the profitable of mango producing per hector. The total cost of production is Rs.290,750/ha and the gross return Rs.594,000 and gross margin Rs. 303,250. Then deducting total variable cost Rs.237,250, the net profit is Rs.356,750. The benefit cost ratio is 2.04 that it is indicated the mango farming is a profitable business.

Marketing margin: The retail price of local market is Rs35/kg to Rs.40/kg and distance market Rs.60 To Rs.75/kg. The average farm gets price Rs. 45/kg. However, producer share's is in local market in 35% and distant market 65% (in Table 8).

- **Value addition at different level**:

The estimating value addition in different level of mango value chain, the average price of mango ar different level is shown in Table 9. The average cost of production per kg is Rs16, packing cost transform cost is Rs 3.50 making total cost Rs.21.50 for contract farmer that is the sold at Rs.26.50 to wholesalers. The wholesalers purchase in unpacked and Rs.3/kg incurring during transports and distribution. At last, producer to retailers who deals in small quantity.

- **The problems of the mango cultivation**:

The problems and constraint in production and marketing of the mango production. In order to rank the harshness of problems, respondents are given and marketing problems each and asked to rate its severity in 4-point scale as severe, moderate, slight and no problem (in Table 10)

- **Major production problem:**

In the survey field, there is a problem as infestation of disease, insects and pest, post-harvest loss and low technology of the major problems with index rank of 3.8, 2.9 and 2.62 respectively (in table 10).

- **Major marketing problem:**

In survey field, different constraints related with mango marketing in study area are recognized in sharing with farmers and traders are detailed in table No.10.

- **Producer's level of problems:**

The marketing problems faced by producers are shown in table 11. It is found that lack of processing technology, insufficient market information and low farm gate price are major marketing problems with ranking I, II, and III respectively with index value 3.73, 3.47 and 2.57. It is followed by other marketing problems like middlemen (IV) and interference of lack middlemen IV) and lack of post-harvest technology (V).

- **Trader's level of problems:**

The marketing problems faced by traders are ranked in table 12. The major marketing problem at trader's level are insufficient processing facilities (I), marketing inefficiency (II), insufficient (III) and transportation problem IV) with index value 3.6, 3.2, 3.1 and 1.3 respectively. Mango has high potential value for processing and value addition, since, storage period of mangoes is less. There, lack of processing facilities has highly affected its marking system at both producer's and trader's level leading to 25 -35% post -harvest loss.

SWOT ANALYSIS:

This data analysis is done regarding production and marketing. The major strength lied in suitable agro-climatic condition, superior taste and easily accessible market. Similarly, alternatively bearing, weak market organization is weakness in mango subsector. The scope lied in post-harvest, handling, export etc. It is based on key informant interview upgrading strategies are presented at production, post-harvest and market level (Table 13).

RECENTLY REPORT OF MANGO CULTIVATION IN MALDA DISTICT.

Recently report, in Malda district, around 31 thousand 700 hectares of land is mango cultivated with mangoes. Thousands of people in the district are directly and indirectly dependent on mangoes. In 2021 -2022-year, 4.5 lakh metric tons of mangoes were produced. Ujjal Saha, president of Malda Mango Merchants Association, said: "The farmers are greatly benefitted as the mango trees get water at the beginning of winter. Weak plants are rejuvenated in the rains and will recover from the weakness. The pale gardens have now turned green so there is a huge possibility of increased mango production."

CONCLUSION AND SUGGESTION:

Mango production is an important horticulture activity in English Bazer Block in Malda district. The mango cultivation has huge employment generate and potentiality in export and value addition due to its quality, taste and flavour. The research study exposes that the production functions is highly efficient despite limited input supply and use of traditional practices and with use of quality input, new technologies and proper agronomic practices the production can be increased greatly. Malda district has the great potential to grow a good yield of mango production.

But there are some problems with regarding market and financial management related issues. In the above research study, it has explained the entrepreneurial behaviour and functions of the Mango cultivation i.e. in terms set of exogenous and consequent variables. It a quality driven mango enterprise management along with its marginal types like yield and marketability. So, we need to take a comprehensive action plan along with the critical factors of management have been drawn in the present research study. It has a better harvest processing of mango, the market viability and profitability to produce stand as an important issue. So, it has a linking and market accessible as well as interactive can go long way in producing mango enterprise and its sustainable livelihood for thousands of mango cultivators and shareholders.

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