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A study on moringa production and marketing in the southern region of Tamil Nadu

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Abstract

Moringa oleifera is an important food that attracts attention as the "natural nutrition of the tropics". Almost all parts of the plant: roots, bark, gums, leaves, fruits (pods), flowers, seeds and seed oil are used in many South Asian traditional medicines. India is the largest producer of Moringa with an area of 43,600 hectares and an annual production of 2.6 million tonnes of fruits, producing approximately 63 tonnes per hectare. Tamil Nadu leads in area and production, followed by Andhra Pradesh and Karnataka. Tamil Nadu covers an area of 20,684 hectares. Among these areas, Dindigul has an area of 5538 hectares followed by Theni (2951 hectares). The specific objectives of this study include the production and marketing of Moringa. A list of Moringa farmers was selected, including 120 farmers from Dindigul and Theni districts. Farmers were interviewed through a previously developed and tested survey. Likewise, 30 traders were selected from the study area and interviews were conducted. Farmers reported an average annual return of Rs. 1,95,000 per acre/year, net return was Rs. 1,31,000 per acre per year for cultivation of perennial Moringa and Total gross income per acre/year was Rs 2 Lakh and the annual net income per acre was Rs 1.19 million from annual moringa cultivation. Of the two marketing channels identified, the producer's share in consumer rupee was highest in channel II (61%) and lowest in channel I (53%). Channel II has the best marketing efficiency followed by Channel I.

Keywords: Moringa, production, business, agriculture, price difference, trader

Introduction

Moringa (*Moringa oleifera* Lam.) belongs to the own family 'Moringaceae' is a fast developing multipurpose medicinal tree notably grown in tropics and subtropics of India and Africa. It is also widely distributed in Egypt, Philippines, Sri Lanka, Thailand, Malaysia, Burma, Pakistan, Singapore, West Indies, Cuba, Jamaica and Nigeria. In eastern and southern areas of India, Moringa is extensively used as vegetable and grown commercially for its safe to eat pods and leaves. It is an crucial food commodity which has had massive interest as the 'herbal vitamins of the Tropics'. Nearly all of the parts of this plant: root, bark, gum, leaf, fruit (pods), vegetation, seed and seed oil have been used for numerous ailments in the indigenous medication of South Asia. Its recognition is growing step by step due to its nutritional, medicinal value and for its sweetness in curry and slurry preparation along with crimson gram dhal.

India is the biggest producer of moringa, with an annual production of 2.6 million tonnes of fruits end result from an area 43,600 ha leading to the productivity of around 63 tonnes in keeping with ha. The various distinctive states, Tamil Nadu leads in area and production followed by Andhra Pradesh and Karnataka. Tamil Nadu engage an area of 20684 ha. Among the districts, Dindigul has an area of 5538 ha followed by Theni (2951 ha). 80 percent of the production of moringa leaves- fetching crores of foreign exchange for the country. The major importing countries of Moringa leaves are China, U.S.A., Germany, Canada, South Korea and European countries. Asia-pacific is largest producer of moringa in international market. India is the principle provider of moringa in global, accounting for around 80% of global call for. In India production of moringa is 2.2 million tonnes from an area of 43,600 ha. 2022.

This research examine attempts to analyze the production and marketing of moringa in Southern Districts of Tamil Nadu. The specific objectives of the study comprise:

- To evaluate the cost and returns involved in production of moringa in the study area
- To identify the existing marketing channel and analyze the marketing efficiency
- To study the major constraints faced by the producers and traders in the profitability of moringa production

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Review of Literatures

Kavithambika *et al.* (2020) ^[1] revealed that moringa changed into the most cultivated crop because it became drought tolerant and generated better profits. About 50 percentage of farmers operated in a technical efficiency range greater than 0.90 and, technical performance varied significantly among 0.67 and 1.00, with a mean technical efficiency of 0.89. Majority of the farmers favored promoting their produce to neighborhood traders and the cause for preferring that channel was it saved their time. Marketing Margin of processors were the highest.

Muhammed Iqshanullah *et al.* (2020) ^[2] found that greater than half of the sample respondents (68.34%) had been observed to adoption of encouraged technologies medium level accompanied by using high (22.5%) and occasional (9.16%) levels. The suggestions are the most important constraints in adoption should be considered. For the practices in which the moringa growers have been missing recognition and understanding, they need to be educated thru right educational efforts. via ensuring the timely deliver of inputs and energy, the level of adoption might be increased.

Kaleeswari, *et al.* (2019) ^[3] mentioned that growth rate of area and production showed positive growth rate of 6.24 percent and 5.45 percent respectively. The yield showed negative growth rate of -0.73 percent. The structure of cost of cultivation of annual moringa was Rs.86509.09/ha and net income became Rs.2, 23,491/ha. The variables of labour, FYM and fertilizers were significant at five percent level and plant protection chemical substances showed high significant at one percent level. Channel – III turned into top marketing channel which showed high marketing efficiency and producer share of 83.54 percent and hence this channel ought to be practised by way of the farmers of the region.

Akintunde, *et al.* (2019) ^[4] reported that age turned into significant at 10%, formal education was significant at 1%, marital popularity was significant at 5% and gender was significant at 10%. The HHI found out that there was excessive opposition and occasional attention across all of the markets; in Karim-lamido LGA, most effective the oil enterprise had HHI of 1804, implying an exceptionally focused market with low opposition. In Yorro LGA, all the markets had low concentration and excessive opposition as found out by way of the HHI fresh leaves (13.98), dry leaves (13.21), seeds (29.74) and oil (43.07). Zing LGA had HHI of fresh leaves (91.99), dry leaves (3856.78), seed (180.13) and oil (221.56). All of the industries, as obtrusive from the end result, had low marketplace awareness, besides for the dry leaf industry, with HHI value of 3856.78. Processors' marketing efficiency value become 292.2%, which indicated a quite efficient marketplace, even as the markets had marketing efficiency value of 96.59%.

Sekar *et al.* (2018) ^[5] found out that presence of better returns, sustainable earnings technology, availability of land and water resources for cultivation, minimum pest problems, good market demand for value added Moringa products in the national and international markets were found to be the principal factors influencing the area under Moringa. Resource Use efficiency evaluation revealed that four principal variables *viz.*, number of limb cuttings used for planting, amount of FYM, amount of fertilizer applied (kg) and the range of human labour used (man days) per ha per annum were found to influence the yield of Moringa and the results indicated that all these four variables significantly contributed towards the yield of Moringa.

Venkatesan *et al.* (2018) ^[6] suggested that clean Moringa (Drumstick), there had been three marketing channels through which the fresh Moringa pods have been issued to the consumers. In respect of value added products of Moringa, there had been three channels concerned in distribution of the produce to the ultimate consumers. Among the three channels, two are domestically operating pathways and the one is devoted for export of Moringa produce. Among the three channels of Fresh Moringa pods, the Channel – I was determined to be efficient with respect to addition of higher proportion to the producers.

Methodology

The perfect research layout is important to achieve the findings and results and to get significant conclusions. The choice of the study area, sampling method and choice of analytical tools had been taken into consideration for designing the present day. In this chapter, a concise description of the studies layout, selection of respondents, method of collection of data and numerous tools of analysis employed are presented and discussed.

Southern region of Tamil Nadu was selected for the present study as it has the maximum contribution towards the cultivation of moringa in Tamil Nadu. In southern place of Tamil Nadu, Dindigul (5538 ha) and Theni (2951 ha) districts occupied more than 70 percent of moringa production areas (2021-2022). In Dindigul district, Ottanchatram and Thoppampatti blocks occupied the major area of cultivation and every block 30 sample respondents were selected through the usage of random sampling approach. In Theni District, Andipatti and Chinnamanur blocks occupied the major area and every block 30 sample respondents have been selected.

In onsultation with agricultural officers, lists of villages were randomly selected for the purpose of collection of information from the farmers. Lists of moringa developing farmers were selected randomly making a total of one hundred and twenty farmers. similarly, 30 traders, had been selected and interviewed from the study area.

Analytical techniques

The following tools had been used to measure the cost and returns, marketing efficiency and price spread to meet the objectives of the study.

Simple Percentage Analysis

Percentage analysis consists of reducing a sequence of associated amounts to a chain of percentages of a given base. This form of evaluation seems at uncooked streams of facts within the form of a percentage. This evaluation enables assessment that is beneficial in comparing the relative size of the items or the relative change in items.

Garrett Ranking Technique

It was used to rank the sample respondents' preferences on various factors. According to this model, sample respondents were asked to rank each factor and their ranking were converted into scores using the following formula:

Percent position = $100(R_{ij}-0.5)/N_j$

- R_{ij} = Rank given for the i th variable by j th respondents
- N_j = Number of variable ranked by j th respondents

With the help of Garrett's table, the percent position estimated is converted into scores. Then for each factor, the scores of each individual are added and then the total value of scores

and mean values of the score is calculated. The priority with the highest value is considered the most important.

Price spread analysis

In general, a price spread refers to the difference between the price paid by consumers and the price received by the farmers for an equivalent unit of the product.

Price spread analysis estimates the share of consumer rupees held by different market functionaries and this would facilitate the understanding of the relative efficiencies, otherwise existing in alternative channels of marketing. The Concurrent margin method was used to analyze the price spread because concurrent margin is one, which takes into account the prevailing prices at successive stages of marketing at a given point of time.

This analysis involves calculating different marketing costs and profit margin for each level and their expression as a percentage to the consumer's rupee. Various costs incurred in the marketing process were considered for each of the identified channels and price spread was worked out. The profit margin for each market functionaries in the market channel was computed by subtracting the price paid and the marketing cost incurred by the intermediary from the price received by the intermediary on the sale of the product. Thus marketing costs and marketing margins were distinguished and the price spread was worked out.

Producers' share in consumers' rupee

$$Ps = Pp/Pc \times 100$$

Where

Ps – Producer's share in consumer's rupee

Pp – Price received by the producer

Pc – Price paid by consumer

Acharya Approach

Marketing efficiency has been calculated using Acharya's modified marketing efficiency (Acharya & Agarwal, 2011). An increase in the ratio indicates better marketing efficiency and vice-versa.

$$MME = FP / (MC + MM)$$

Where

MME - Marketing efficiency

FP - Net price received by the farmer

MC - Total marketing cost

MM - Net marketing margin of intermediaries

Results and Discussion

Cost Structure of Moringa Cultivation

Moringa plants can be grown as annual and perennial crops. The establishment cost is an important consideration in perennial Moringa cultivation. The costs and returns per acre of perennial Moringa were analyzed and discussed in Table 1.

Table 1: Cost and Returns of Perennial Moringa Cultivation

Initial Establishment Cost (in Rs.)		
Particulars	Amount (RS. /acre)	Percentage to Total
Field Preparation	6,800	20.12
Seedling cost (80 seedlings / acre (Rs.50 / seedling)	4,000	11.83
Manure & Fertilizer Application	6000	17.75
Weeding (10 weeding / acre (3 labours/ weeding) (Rs. 300/women labour)	9000	26.63
Plant Protection chemicals	8000	23.67
Total	Rs 33,800	100.00
Maintenance Cost per Year (in Rs.)		
Pruning two times	2,400	3.76
Ploughing & Wedding Cost	10,000	15.65
Manures & Fertilizer Cost	6,500	10.17
Pesticide & Fungicides Cost	7,000	10.95
Channel formation & Irrigation Charges	9000	14.08
Harvesting charges	29,000	45.38
Total Cost	63,900	100.00
Returns (in Rs.)		
Average Yield – 13 tonnes /acre/Year	13	
Average Selling price – Rs.15,000 / ton	15000	
Gross Income per annum /ac	1,95,000	
Net income per annum/ac	1,31,000	

It was reported from the above table that the average initial establishment cost was worked out to Rs. 33,800 per acre of perennial moringa cultivation, out of which Rs. 9,000 (26.63 percent) was incurred as weeding operation cost followed by plant protection chemicals Rs. 8,000 (23.67 percent) field preparation cost Rs. 6,800 (20.12 percent) application of manures and fertilizers includes Rs. 5,500 (17.75 percent), and seedling cost (11.83 percent).

The maintenance cost per acre cultivation of perennial moringa was Rs.63,900, out of which harvesting charges

occupied the major share of Rs. 32,000 (50 percent) followed by Ploughing & Wedding Cost (15.65 percent), Channel formation & Irrigation Charges (12.52 percent), pesticides & fungicides cost (9.39 percent), manures and fertilizer expenses (8.61 percent) and pruning charges (3.76 percent).

The average annual gross return worked out to Rs.1, 95,000 was received per acre/annum and the net return of Rs. 1, 31,000 per acre/annum. Moringa's costs and returns per acre per year are analyzed and discussed in Table 2.

Table 2: Annual Moringa Cost and Returns

Particulars	Amount (RS. /acre)	Percentage to Total
Initial Establishment Cost (in Rs.)		
Preparatory Tillage Operation	4600	5.68
Sowing Operation	1200	1.48
Channel formation	2250	2.78
Seed cost (Rs.3*1000)	3000	3.71
Manure & Fertilizer Application	6000	7.41
Total	Rs.17,050	21.06
Intercultural Operation		
Weeding (3 times)	3600	4.45
Channel formation, Tippling and clearing charges	9000	11.12
Manure & Fertilizer Application (3 times)	24,650	30.45
Plant Protection chemicals	6,500	8.03
Irrigation charges	8,640	10.67
Harvesting charges	6,500	8.03
Transport charges	5,000	6.18
Total	Rs. 80,940	100.00
Returns (in Rs.)		
Average Yield – 13 tonnes /acre/Year	20	
Average Selling price – Rs.10,000 / ton	10,000	
Gross Income per annum /ac	2,00,000	
Net income per annum/ac	1,19,060	

As can be seen from Table 3, the total cost was calculated as Rs. 80,900 per acre of perennial Moringa cultivation of which Rs. 24,650 (30.45 percent) was incurred as manures and fertilizer application cost followed by channel formation and other charges Rs. 9,000 (11.12 percent), both plant protection chemical and harvesting charges of the same amount of Rs. 6,500 (8.03 percent), transportation charges of Rs. 5000 (6.18 percent) and preparatory tillage operation cost of Rs. 4,600

(5.68 percent)

The average annual gross return worked out to Rs.2, 00,000 was received per acre/annum and the net return of Rs. 1, 19,060 per acre/annum.

Problems perceived by the sample farmers

The major challenges faced by the sample farmers are described in Table 3.

Table 3: Problems perceived by the sample farmers in marketing of moringa

S. No.	Problems	Number of sample respondents (N =120)	Percentage to Total
1.	Price fluctuation	113	94.17
2.	Non availability of labour	98	81.67
3.	High wage rate	90	75.00
4.	Low price, cartel	97	80.83
5.	Lack of market information	80	66.67

Among the sample respondents, 94 percent of the sample respondents said that price fluctuation was the main obstacle in marketing moringa in the southern region of Tamil Nadu, followed by late payments (82 percent), trader dominance (81 percent). And low price (75 percent).

Market Intermediaries and their Functions

Functionaries involved in the moringa marketing channels include farmers, village traders, wholesalers, retailers and

consumers.

Marketing Channel

The intermediaries in the marketing channels play typical role for the transactions of produce right from harvesting stage to end use. Role played by one intermediary sometimes overlap the role of others also, to say, the role of village merchant is to mediate the seller and buyer. The different marketing channel in the trading of moringa pods in the study area was given in the Table. 4

Table 4: Different marketing channel in the trading of Moringa Pods

Channel No.	Marketing Channels
1.	Producer → Village Merchant → Wholesaler → Retailer → Consumer
2.	Producer → Village Merchant → Retailer → Consumer

The moringa pods reaches to the consumer through several channels. Overall two marketing channels have been identified and depicted in the above table. Village merchants are played a vital role in procuring the moringa pods from the farmers field itself and distributed to the other channel members.

Marketing Costs, Margins and Price Spread Channel I

Various costs and margins associated with Moringa marketing channel I have been tabulated. The table showed that the producer's net share of consumer rupees was 53 percent. The village merchant while selling the moringa to the wholesaler

incurred 11 percent on cost of marketing and the profit of village merchant was Rs.3 /kg which was 7.89 percent of consumer rupee. The wholesaler incurred a marketing cost of Rs.2.50 / kg (6.58 percent) and marketing margin of Rs. 2.50 / Kg which was 13.16 percent of consumer rupee. The retailer

incurred a marketing cost of Rs.2.50 / kg (6.58 percent) and the marketing margin of Rs. 3.50 / Kg which was 9.21 percent of consumer rupee. The marketing efficiency of channel I was 1.11.

Table 5: Price spread for Perennial Moringa pods

Functionary / Items of cost	Channel I		Channel II	
	Rs./Kg	Percent	Rs./Kg	Percent
Net price received by the producer	20.00	52.63	20.00	55.56
Village Merchant				
Price paid by the Village Merchant	20.00	52.63	20.00	55.56
Marketing cost of Village Merchant	4.00	10.53	4.00	11.11
Village Merchant margin	3.00	7.89	4.00	11.11
Price received by the Village Merchant	27.00	71.05	28.00	77.78
Wholesaler				
Price paid by the wholesaler	27.00	71.05	-	-
Marketing cost of wholesaler	2.50	6.58	-	-
Wholesaler margin	2.50	6.58	-	-
Price received by the wholesaler	32.00	84.21	-	-
Retailer				
Price paid by the retailer	32.00	84.21	28.00	77.78
Marketing cost of retailers	2.50	6.58	3.50	9.72
Retailer's net margin	3.50	9.21	4.50	12.50
Retailer's sale price /Consumer price	38.00	100.00	36.00	100.00
Producer's share in consumer's rupee	20.00	52.63	22.00	61.11
Price spread	18.00	47.37	16.00	38.89
Marketing Efficiency	1.11		1.57	

Channel II

It was depicted from the table 7 that the price spread along with marketing costs and margins for moringa sold through channel II. The producer net share of the consumer's rupee was 61.11 percent, which was slightly more than its share in channel I. This clearly indicated the positive effect of shortening the length of the marketing channel on the producer share. The village merchant while selling the moringa to the retailer incurred 11.11 percent on marketing cost and the margin of village merchant was Rs.4.00/kg which was also 11.11 percent of consumer rupee and the margin was

slightly higher than channel I.

The retailer incurred a marketing cost of Rs 3.50/kg (9.72 percent) and the highest marketing margin of Rs. 4.50/kg which was 12.50 percent of the consumer rupee and slightly higher than channel I. The marketing efficiency of channel II was 1.57.

Marketing Efficiency

The marketing efficiency was estimated using the following modified Acharya marketing efficiency (MME) method which was presented in Table 6.

Table 6: Marketing Efficiency of Moringa in Southern Region of Tamil Nadu

S. No.	Particulars	Channel I	Channel II
1.	Consumer's purchase price (in Rs.)	38	36
2.	Net price received by the producers (in Rs.)	20	20
3.	Total marketing costs (in Rs.)	9	7.50
4.	Total margin of intermediaries (in Rs.)	9	8.50
5.	Producers share in consumers rupee in percentage	52.63	61.11
	Marketing efficiency	1.11	1.57

From Table 6, it could be observed that the marketing efficiency in channel II was 1.57, which was higher than that of channel I. It showed that the smaller the number of intermediaries involved in the trade of the business, the higher the marketing efficiency. There was only one intermediary in channel II. The advantage of a short marketing channel is also the consumer who pays lower

prices for the products.

Problems Faced by the Traders for Marketing of Moringa

The traders play a major role in the marketing of moringa and the costs of transportation, packing, loading and unloading are borne by the traders. The problems faced by the traders for marketing of moringa were depicted in Table 7.

Table 7: Problems perceived by the traders in marketing of Moringa

S. No.	Problems	No. of traders	Percentage to total
1.	Price fluctuation	28	93.33
2.	Lack of cold storage facilities	20	66.67
3.	High transportation cost	18	60.00
4.	Lack of quality products	10	33.33
5.	Wastages	8	26.67
6.	Financial constraints	7	23.33
7.	Non availability of labours	6	20.00

From the above table, it could be observed that 93 percent of the traders in the sample stated that price fluctuations was the main constraint, followed by lack of cold storage facilities (67 percent), high transportation costs (60 percent), lack of quality products (33 percent), waste (27 percent), financial constraints (23 percent) and unavailability of labor (20 percent).

Conclusion

The sampled farmers reported an average annual gross return of Rs. 1,95,000 per acre/year was received and a net return of Rs. 1,31,000 per acre/year was received for cultivation of perennial moringa and Rs. 2 lakhs was taken as gross income per acre / year and Rs. 1.19 lakhs was taken as net income per acre/year for annual moringa cultivation. 94 percent of the farmers in the sample said that price fluctuations was the main problem in the study area.

Two marketing channels were identified for the marketing of moringa pods in the study area. The present study showed that the share of producer to consumer rupee was highest in channel II (61 percent) and lowest in channel I (53 percent) between the two channels identified. The marketing efficiency was highest in channel II followed by channel I. The main problems faced by marketers in marketing moringa were price fluctuations followed by lack of cold storage facilities and high cost of transportation.

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