Moringa Value Chain: Mapping the Linkage between Actors, Processes and Activities in the District of Tiruppur

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ABSTRACT

Understanding relationships and linkages in a commodity value chain is a crucial step in Value Chain Analysis. The objective of this study was to identify and map the stakeholders of Moringa Value Chain in Tiruppur district of Tamil Nadu. Structured interview schedules were used to collect primary data from the actors along the chain. The study identified conventional and peculiar actors such as Input suppliers, Producers, Market intermediaries such as the Wholesalers, Processors, Retailers; and finally the end Consumers. The results revealed that there were six major channels that operated in the study area and Moringa was traded mostly in unprocessed form. Moringa value chain was mapped in different dimensions to dope out the actors involved in the chain, the core processes that took place along the chain, activities undertaken by each actor, tracing the product flow from the farm to fork, knowledge on quality requirements of the produce and the geographical flow of the produce. The study recommended that structuring an efficient value chain will be a possible solution; something which can only be possible through the joint efforts of smallholders, associations, larger companies and public institutions. Also, intervention in the area of linking actors in the value chain to prospective markets will also benefit them.

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1. INTRODUCTION

Moringa oleifera, known popularly as *the Miracle tree*, is a tropical plant grown for its nutritious leafy greens, flower buds, and mineral-rich green fruit pods, having its origin from North West India. In India, both area and production of Moringa is highest in the states of Andhra Pradesh, followed by Karnataka and Tamil Nadu. In Tamil Nadu, Moringa is extensively cultivated in Tiruppur, Dindugal, Karur, Thoothukudi and Theni districts where the soil and climate are in favour of the crop. The growth of value added products in Moringa recently, necessitates that its value chain should be studied for further developments in the industry.

Value chain can be defined as the full range of activities and participants involved in moving agricultural products from input suppliers to farmers' fields, and ultimately, to the consumers [1]. Value chain approach presents a good picture of the process of creating value. Value chain analysis helps in understanding the connection among actors in the chain and the way trade takes place. The first step in value chain analysis is mapping the core processes and activities in the chain [2]. Value chain mapping is the process of developing a visual depiction of the basic structure of the value chain. Value chain map will illustrate the product flows from farm to fork and also present the way in which the industry functions. Value chain referred to the relationship established between actors involved directly and indirectly in a productive activity with the aim of adding value in each stage of the value chain [3]. It involves alliances among producers, processors, distributors, traders, regulatory and support institutions. This approach established a joint vision; to identify mutual needs, to work jointly in the achievement of goals, to share the associated risks and benefits and to invest time, energy, and resources in meeting these goals. Value chain is made-up of a series of actors from input suppliers, producers and processors, to exporters and buyers; engaged in the activities required to bring a product from its conception to its end use [4]. It is also viewed that in addition to the movement of a product from one stage to another, value chain analysis also includes identification of the actors, firms and their services and analysis of the institutional support [5].

The main objective of this study was to identify and map the stakeholders of Moringa value chain in the district of Tiruppur, Tamil Nadu. It is important to know the actors involved in the chain, core processes, activities that each actor undertake, product flow from farm to fork, actor's knowledge on quality requirements of the produce and geographical flow of the produce. This study identifies the existing linkage between the actors across the chain, and by doing so; it helps to identify areas that needs focus to strengthen the chain, to make it more efficient.

2. MATERIALS AND METHODS

2.1 Selection of Study Area

India is one of the largest producers of Moringa with an annual production of 1.10 to 1.30 million tonnes of pods from an area of 380 km². Tamil Nadu is a pioneer state having varied genotypes of Moringa from diversified geographical areas and introductions from Sri Lanka. In Tamil Nadu, Tiruppur district had a total area of 1191.73 hectares under Moringa cultivation and hence the district was chosen for the study. There were nine taluks under Tiruppur district, of which Dharapuram taluk ranked first in both area and production of Moringa. Mulanur block under Dharapuram taluk was purposively selected as it had the highest area (956.3 hectares) and production of Moringa. Four villages namely Kumarapalayam, Kilangundal, Mulanur and Mulyampoondi, under Mulanur block were selected for the study based on Moringa area and production statistics.

2.2 Selection of Sample

Since the study probes into the Value chain of Moringa, it was vital to study each and every actor along the chain. Total sample size for the study was 110, of which 40 were Moringa farmers, 35 market intermediaries (10 Local traders / Commission agents, 10 Wholesalers, 5 Processors and 10 Retailers) and 35 consumers. Non-probability sampling was the technique used to select the sample respondents. From the selected four villages, 10 farmers from each village were selected for the study. The intermediaries involved in value chain of Moringa namely local traders (or) commission agents, wholesalers, processors and retailers were also contacted for the study. Sample intermediaries were drawn from the value chain, tracing from

the origin (i.e.) the farmers. Consumers are a key figure in the value chain as their needs, values, opinions and decisions affect the whole chain. Hence, consumers were randomly selected and contacted for the study.

2.3 Data Collection

Primary data were collected from the sample respondents using detailed structured questionnaires. Secondary data related to the study area such as total population, land utilization pattern, cropping pattern, agro climatic condition, rainfall and irrigation sources were collected from the records available in the Department of Economics and Statistics at Tiruppur, from the Government Departments of Agriculture and Horticulture at Tiruppur district and also from official websites of the district.

2.4 Value Chain Mapping

Mapping value chain eases a clear understanding of the series of activities with main actors and relationships involved. Models, figures and diagrams were used to understand the value chain. Different dimensions like the core processes, main actors involved, specific activities undertaken by each actor, product flow, knowledge and also the geographical flow of the product were mapped to provide an overview of the Moringa value chain.

Value chain analysis is an examination of value chain activities in order to undertake them more efficiently, effectively and economically [6]. It is used as a tool to establish a joint vision and identify needs of the existing supply and market barriers, in order to develop intervention strategies [3]. Value chain analysis disaggregates the international structure of production, trade and consumption of commodities, and allows for identification of actors and geographical division [7]. Mapping the actors involved in the sweet potato value chain helped in identifying marketing channels that existed in the study area. It was found that majority of the producers set prices after hearing from their fellow farmers and most of the sampled producers sold their produce directly to the market. The results showed a possibility of producing other value added products, as only two products were currently being processed. It was also pointed out that this sector in general faced a number of structural and technological problems, which needed immediate attention to revamp agricultural sector development [2].

Similarly, a study carried out to appraise tomato value chain revealed that though tomatoes were produced in large quantities, a lot of it was lost due to lack of processing and inadequate storage facilities [8]. Another study revealed that the value of Moringa oleifera increased as it moved from the point of harvest to the final consumer and the value added by activities along the chain varied [9]. Thus, mapping the value chain will give a better understanding of connections between actors and processes; demonstrate interdependency between actors and processes; and create awareness of stakeholders to look beyond their own involvement in the value chain [10].

3. RESULTS AND DISCUSSION

This section presents the results of the study, in various forms including percentages, statements, tables and figures. The results are based on the objectives of the study.

3.1 General Characteristics of Sampled Respondents

Age influenced decision making. The respondents were classified into four categories and the results revealed that majority (62.50 per cent) of the sample farmers were above 50 years of age, 51.43 per cent of the sample market intermediaries were middle aged (31- 40 years) and 34.29 per cent of the sample respondents were below 30 years of age.

Education facilitated better understanding of technologies, aided in adoption of new farming practices and also influenced decision making. The results revealed that, 50 per cent of the sample farmers had higher secondary level of education, followed by 22.50 per cent with primary education and 15 per cent were illiterates and only 5 per cent were graduates. In case of intermediaries, 31.43 per cent had secondary education, 28.57 per cent had a diploma and 17.14 per cent had primary education. The study area had only a lower proportion of the sample intermediaries who were illiterates and graduates. About 31.43 per cent of the sample consumers had secondary education, followed by 20 per cent who had a diploma and 17.14 per cent were graduates.

3.2 Channels

There were six major channels that operated in the study area. Moringa farmers purchased

seeds from input suppliers. After the harvest, the produce was sold by the farmers to the local traders, wholesalers, processors or retailers. Local traders and wholesalers did not involve much in value addition. They graded the pods based on color, length and variety; and packed fresh produce with palm leaves in order to maintain the moisture content of pods. Processors added value to the produce through processing. There were two value added products being processed i.e. Moringa leaf powder (capsules, tablets and tea) and Moringa seed oil.

Channel 1: Input suppliers - Farmers - Local traders - Wholesalers - Processors - Retailers - Consumers.
Channel 2: Input suppliers - Farmers - Local traders - Other states
Channel 3: Input suppliers - Farmers - Wholesalers - Retailers - Consumers
Channel 4: Input suppliers - Farmers - Wholesalers - Other states
Channel 5: Input suppliers - Farmers - Processors - Retailers - Consumers
Channel 6: Input suppliers - Farmers - Retailers - Consumers

3.3 Value Chain Mapping

3.3.1 Core processes

The core processes that the produce went through before it reached the final consumption stage was distinguished and mapped in Fig. 1. Input provision was the major process without which the chain was incomplete, followed by production where the inputs (seeds) were converted into produce (Moringa pods) along with other parallel sets of inputs (irrigation, fertilizers, and plant protection chemicals). After maturity, the produce was harvested and it was either collected by the local traders or wholesalers. Processing was the next major phase in the chain, where the produce was being value added and converted into other forms (Leaf powder and Seed oil) for consumption. About 60 per cent of the produce was exported as it was less frequently consumed and the remaining was for domestic consumption.

3.3.2 Actors

Input suppliers were those who supplied seeds or cuttings to the farmers for further production, farmers were involved in cultivation and production of Moringa pods and leaves. Local traders or commission agents procured produce from the farmers; wholesalers dealt with bulk produce and distributed it further to the other intermediaries in the chain. Processors were involved in the conversion of raw farm produce to other forms such as leaf powder, seed oil and other value added products. Retailers purchased the produce in minimal quantities and stored them to purvey domestic needs. Consumers were the end users for whom the value was created across the chain.

Table 1. Age and education of the sampled respondents

Particulars	Number of farmers (n=40)	Number of intermediaries (n=35)	Number of consumers (n=35)
Age			
Below 30	2 (5.00)	2 (5.71)	12 (34.29)
31 - 40	2 (5.00)	18 (51.43)	11 (31.43)
41 - 50	11 (27.50)	9 (25.71)	09 (25.71)
Above 50	25 (62.50)	6 (17.14)	03 (8.57)
Education			
Illiterate	6 (15.00)	4 (11.43)	4 (11.43)
Primary	9 (22.50)	6 (17.14)	7 (20.00)
Higher secondary	20 (50.00)	11 (31.43)	11 (31.43)
Graduate	5 (12.50)	14 (40.00)	13 (37.14)

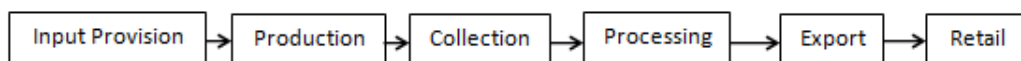*Figures in parentheses indicate percentage to total*

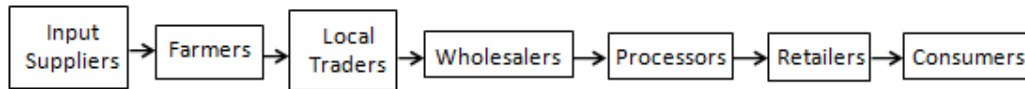**Fig. 1. Mapping core processes along Moringa value chain**

Fig. 2. Mapping the main actors involved in Moringa value chain

3.3.3 Specific activities undertaken by the actors in the chain

The core processes mapped (as in Fig. 1) were further broken down into specific activities that were undertaken by the different actors, identified along the Moringa value chain. Input provision was taken up by the private seed suppliers and agricultural universities; production was taken up by the Moringa farmers; collection by the local traders and wholesalers, which involved procuring the produce from different Moringa growing regions in the district, grading them, storing and marketing it further along the chain. Processors were involved in conversion of raw produce into value added products.
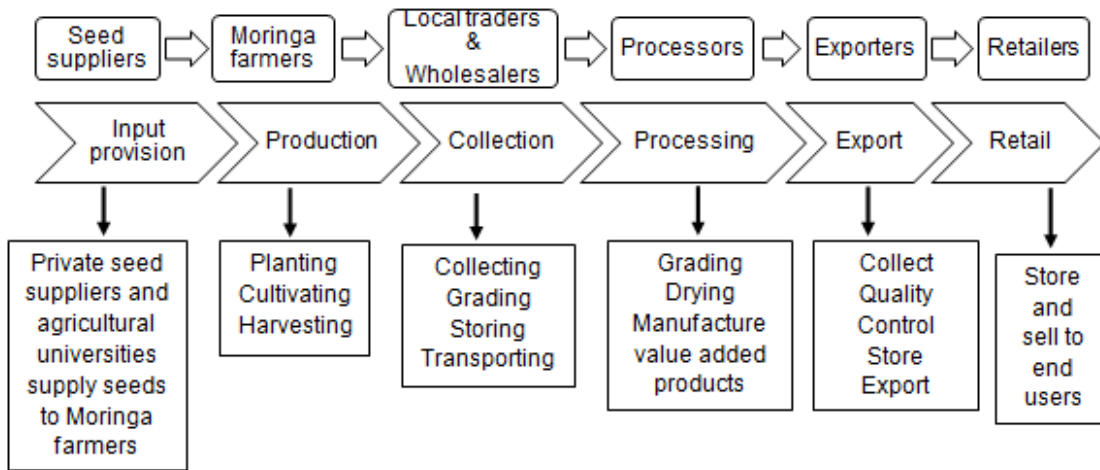

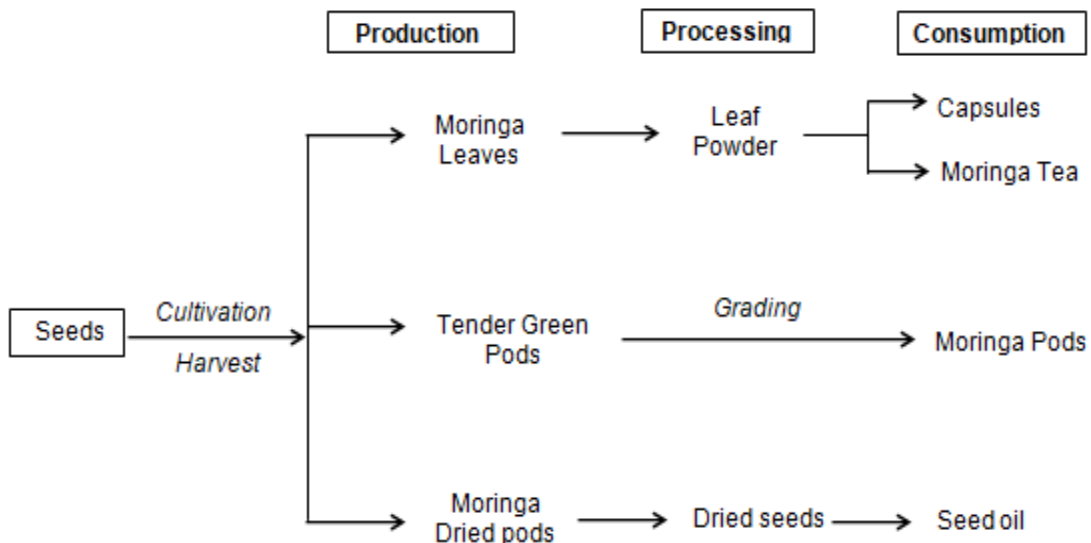**Fig. 3. Mapping specific activities undertaken by the actors in the chain**

Fig. 4. Mapping product flows in the Moringa value chain

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3.3.4 Product flow

Mapping the product flow (Fig. 4) involved identifying the products at each stage of the process as they were being transformed from inputs (Moringa Seeds) to raw produce (Moringa pods and leaves), to intermediate products (leaf powder and dried seeds) and to final products for consumption (Moringa tea, Capsules, seed oil).

3.3.5 Knowledge of actors along the chain

A crucial issue mentioned by the actors throughout the value chain was inconsistent quality of Moringa. Each actor had a different view on the quality requirements. Local traders did not procure pods that had a pinkish tinge and preferred only medium sized and small sized pods, as the longer pods were to broken, in order to pack them in jute sacks. Once the pods were broken, it lost its weight before it reached the wholesaler, which yielded loss to the local traders. Processors preferred only light green colored pods and leaves for processing. Also, freshness of the produce was important to them, to meet the quality requirements during export. Retailers looked into the color, length, girth and the freshness of the pods to meet consumers' preference.

3.3.6 Geographical flow of the product

The produce was collected from major Moringa growing villages such as Kumarapalayam, Kilangundal, Mulanur and Mulyampoondi to nearby markets located at Vadugapatti, Mulanur and Pudhupai and transported to Oddanchathiram vegetable market located in Dindugul district, from where the produce was transported to other districts and states.
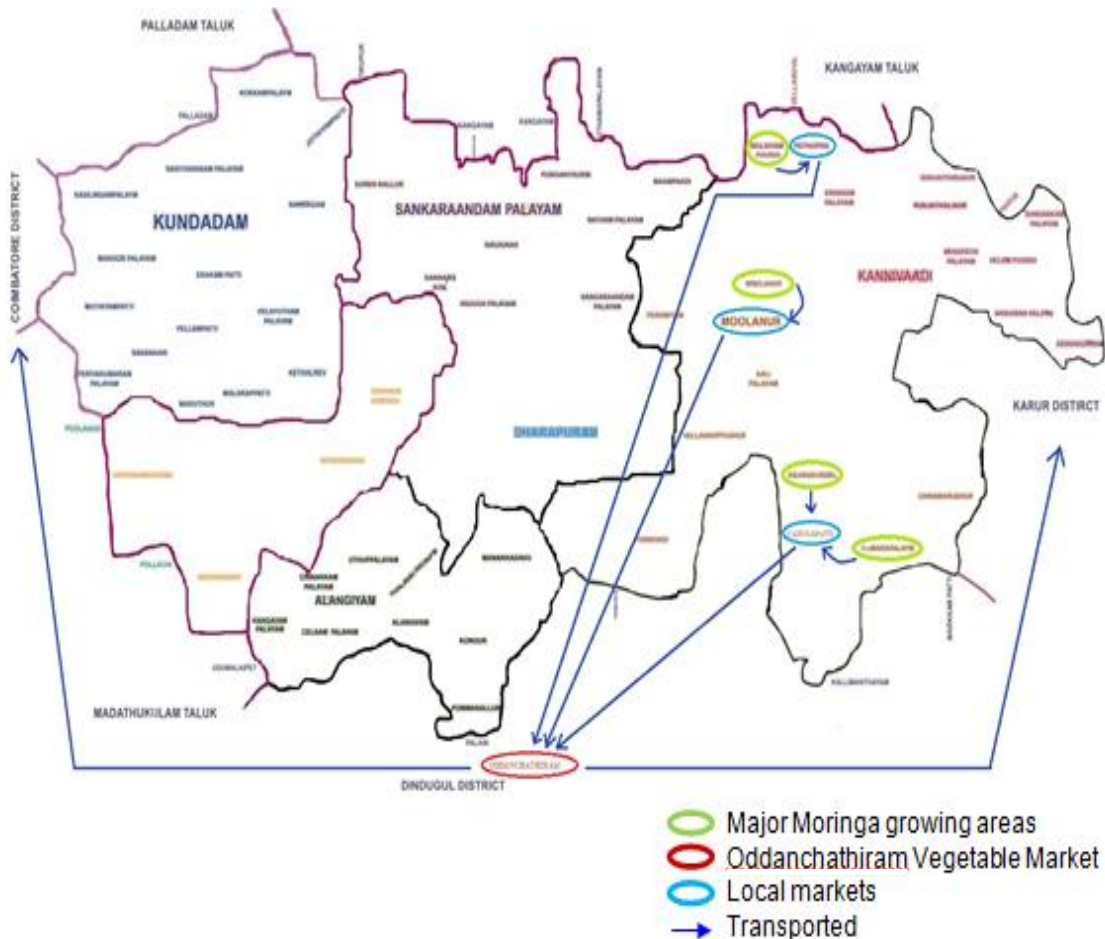

Fig. 5. Mapping the geographical flow of the product

Table 2. Mapping knowledge on the quality requirements

Actors	Knowledge on the quality requirements
Farmers	• Color: *Dark and Light green* • Length: *Long, Medium and small* • Girth
Local traders & Wholesalers	• Color: *Dark and Light green* • Length: *Medium and Small* • Girth
Processors	• Color: *Light green* • Length: *Long, Medium and Small* • Freshness
Retailers	• Color: *Light and Dark green* • Length: *Medium and Small* • Girth • Freshness
Consumers	• Color: *Light green* • Length: *Long, Medium and Small* • Girth • Freshness • Weight

4. CONCLUSION

Mapping Moringa value chain helped in identifying the key actors and in visualizing the diverse roles and connections between participating actors in the chain, trace product and information flows; and in identifying entry points to improve the value chain. The challenge now will be in structuring an efficient value chain; something which will only be possible through joint efforts including smallholders, associations, larger companies and public institutions. This indeed can be done by demonstrating success stories in other countries, where smallholders have proven to be highly instrumental in successfully operating Moringa value chains, catering to the international market. Most of the farmers preferred selling their produce to local traders as it saved their time. But it was found to be the longest channel and farmers did not gain much by selling their produce in that channel. Instead they can sell their produce directly to the retailer, which was found to be more efficient.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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