Value Chain Analysis of Turmeric in Nizamabad District of Telangana

तेलंगाना के निजामाबाद जिले में हल्दी का मूल्य श्रृंखला विश्लेषण

Jetty Mrudula Patel

PROJECT REPORT

Master of Business Administration
(Agri Business)

उत्तमा वृत्तिस्तु कृषिकर्मेव

2022

Institute of Agri Business Management
Swami Keshwanand Rajasthan Agricultural University,
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PROJECT REPORT

Submitted to the

Swami Keshwanand Rajasthan Agricultural University,Bikaner

In partial fulfillment of the requirement for the degree ofMaster of Business Administration

(Agri Business)

By

Jetty Mrudula Patel

2022

INSTITUTE OF AGRI BUSINESS MANAGEMENT

SWAMI KESHWANAND RAJASTHAN AGRICULTURAL UNIVERSITY, BIKANER

CERTIFICATE – I

Date:

This is to certify that **Ms. Jetty Mrudula Patel** had successfully completed the Comprehensive Examination held on **25/04/2022** as required under the regulation for the degree of Master of Business Administration (Agri Business).

DIRECTOR, IABM

INSTITUTE OF AGRI BUSINESS MANAGEMENT

SWAMI KESHWANAND RAJASTHAN AGRICULTURAL UNIVERSITY, BIKANER

CERTIFICATE-II

Date:

This is to certify that this project report entitled **"Value Chain Analysis of Turmeric in Nizamabad District of Telangana"** submitted for the degree of Master of Business Administration (Agri Business) in the field of embodies bonafide project work carried out by **Ms. Jetty Mrudula Patel** under our guidance and supervision and that no part of this project report has been submitted for any other degree. The assistance and help received during the course of investigation have been fully acknowledged. The draft of this project report was also approved by the Advisory Committee on **/ / 2022**

(Amita Sharma)

Major Advisor

DIRECTOR, IABM

INSTITUTE OF AGRI BUSINESS MANAGEMENT

SWAMI KESHWANAND RAJASTHAN AGRICULTURAL UNIVERSITY, BIKANER

CERTIFICATE-III

(REPORT OF VIVA-VOCE ON PROJECT WORK)

This is to certify that project entitled **"Value Chain Analysis of Turmeric in Nizamabad District of Telangana"** submitted by **Ms. Jetty Mrudula Patel** to the Swami Keshwanand Rajasthan Agricultural University, Bikaner in partial fulfilment of requirement for degree of MBA degree in the subject of 'Agri Business' was examined by the constituted committee.

The candidate was examined orally on her project report by the committee with following recommendations:

(1) The performance of the candidates has been found satisfactory. We recommend the acceptance of the project for the award of the degree.

(2) The performance of the candidate has been found unsatisfactory. The candidate be asked to reappear in the oral examination.

(Amita Sharma) ( )
Major Advisor External Examiner

(Satyveer Singh Meena)
Member

(Manmeet Kaur)
Member

(Neena Saren)
Dean PGS Nominee

Recommended for approval

DIRECTOR, IABM

Approved

Dean, Post Graduate Studies

INSTITUTE OF AGRI BUSINESS MANAGEMENT

SWAMI KESHWANAND RAJASTHAN AGRICULTURAL UNIVERSITY, BIKANER

CERTIFICATE – IV

Dated: …….

This is to certify that **Ms. Jetty Mrudula Patel** of the Institute of Agri Business Management, Bikaner has made all the corrections/modifications in her project report entitled **"Value Chain Analysis of Turmeric in Nizamabad Districtof Telangana"**, which were suggested by the Advisory Committee in the oral examination held on…….The final copies of the project report duly bound and corrected were submitted on…… and are enclosed herewith for approval.

Advisory Committee:

(Amita Sharma)
Major Advisor

(Satyveer Singh Meena)
Member

(Manmeet Kaur)
Member

(Neena Saren)
Dean PGS Nominee

Recommended for approval

DIRECTOR, IABM

Approved

Dean,
Post Graduate Studies

INSTITUTE OF AGRI BUSINESS MANAGEMENT

SWAMI KESHWANAND RAJASTHAN AGRICULTURAL UNIVERSITY, BIKANER

CERTIFICATE-V

The under signed hereby assigns to Swami Keshwanand Rajasthan Agricultural University, Bikaner all right under copyright that may exist in and for the thesis entitled **"Value Chain Analysis of Turmeric in Nizamabad District of Telangana"** submitted by me to Swami Keshwanand RajasthanAgricultural University, Bikaner for the award of the **Master of Business Administration** in **Agri Business.**

(Jetty Mrudula Patel)

The following certificate will be submitted by the concerned HOD to the Dean, PGS

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Date :

This is to certify that the project entitled **"Value Chain Analysis of Turmeric in Nizamabad District of Telangana"** submitted by **Ms. Jetty Mrudula Patel** to the Swami Keshwanand Rajasthan Agricultural University, Bikaner in partial fulfillment of the requirements for the Degree of **MBA (Agri Business)** in the field of **Agri Business** was examined by the constituted committee.

The candidate was examined orally on her project report by the committee with following recommendations:

(1) The performance of the candidate has been found satisfactory. We recommend the Acceptance of the project for the award of the degree.

(2) The performance of the candidate has been found unsatisfactory. The candidate be Asked to reappear in the oral examination.

(Amita Sharma)	(Satyveer Singh Meena)	(Manmeet Kaur)
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Director, IABM

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Date:

Place:Bikaner *(Jetty Mrudula Patel)*

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Executive summary

The study was carried out to analyse the study on value chain analysis of turmeric in Nizamabad District of Telangana.

Telangana ranks first in the Turmeric area and it is the largest producer and export of turmeric in India. Telangana exported 1.37 lakh tonnes of turmeric in the year 2019-20 surpassing Karnataka and Maharashtra. In Telangana, turmeric occupies 42535 hectares of area with a production of 184285 tonnes of production with a productivity of 2.64 lakh tonnes. per acre.

For the present study, Nizamabad district had been selected, because currently it ranks first in production of Telangana. Based on the increase in area and production of turmeric in Nizamabad district, cluster development programs for seed and commercial cultivation had been started in the year 2020. So, Nizamabad had been selected purposively for the study the present study was carried by taking a sample size of 90 farmers, 7 wholesalers and 8 retailers through convenience sampling.

To study socio-economic profile of turmeric growing farmers in the area, primary data was collected through a structured schedule, which shows that major turmeric farmers are having 2.5 to 5 acres of landholdings and 75% percent of farmers depend only on agriculture.

That analysis revealed that majority of wholesalers purchase turmeric from farmers and retailers procure turmeric from wholesalers. 70% of farmers preferred the local variety called armoor variety to cultivate because of high curcumin content and high yield. For commercial cultivation there is a need to build another cold storage in Balkonda Mandal. And the degree of value addition of turmeric is 28% at processing stage it is the higher than in any other stage. In the study area major problem faced by farmers is non-availability of labour, the

major problem faced by wholesalers and retailers is non-availability of turmeric due to limited quantity and high cost respectively.

कार्यकारी सारांश

यह अध्ययन तेलंगाना के निजामाबाद जिले में हल्दी के मूल्य श्रृंखला विश्लेषण पर अध्ययन का विश्लेषण करने के लिए किया गया था।

हल्दी क्षेत्र में तेलंगाना पहले स्थान पर है और यह भारत में हल्दी का सबसे बड़ा उत्पादक और निर्यात है। तेलंगाना ने वर्ष 2019-20 में कर्नाटक और महाराष्ट्र को पीछे छोड़ते हुए 1.37 लाख टन हल्दी का निर्यात किया। तेलंगाना में, हल्दी 2.64 लाख टन की उत्पादकता के साथ 184285 टन उत्पादन के साथ 42535 हेक्टेयर क्षेत्र में व्याप्त है। प्रति एकड़।

वर्तमान अध्ययन के लिए निजामाबाद जिले का चयन किया गया था, क्योंकि वर्तमान में यह तेलंगाना के उत्पादन में पहले स्थान पर है। निजामाबाद जिले में हल्दी के क्षेत्रफल और उत्पादन में वृद्धि के आधार पर वर्ष 2020 में बीज और व्यावसायिक खेती के लिए क्लस्टर विकास कार्यक्रम शुरू किए गए थे। इसलिए, निजामाबाद को अध्ययन के लिए जानबूझकर चुना गया था, वर्तमान अध्ययन एक नमूना आकार लेकर किया गया था। सुविधा सैंपलिंग के माध्यम से 90 किसानों, 7 थोक विक्रेताओं और 8 खुदरा विक्रेताओं की।

क्षेत्र में हल्दी उगाने वाले किसानों के सामाजिक-आर्थिक प्रोफाइल का अध्ययन करने के लिए, एक संरचित अनुसूची के माध्यम से प्राथमिक डेटा एकत्र किया गया था, जो दर्शाता है कि प्रमुख हल्दी किसानों के पास 2.5 से 5 एकड़ भूमि है और 75% किसान केवल कृषि पर निर्भर हैं।

उस विश्लेषण से पता चला कि अधिकांश थोक व्यापारी किसानों से हल्दी खरीदते हैं और खुदरा विक्रेता थोक विक्रेताओं से हल्दी खरीदते हैं। उच्च करक्यूमिन सामग्री और उच्च उपज के कारण 70% किसानों ने स्थानीय किस्म जिसे आर्मूर किस्म कहा जाता है, को खेती के लिए पसंद किया। व्यावसायिक खेती के लिए बालकोंडा मंडल में एक और कोल्ड स्टोरेज बनाने की जरूरत है। और प्रसंस्करण स्तर पर हल्दी के मूल्यवर्धन की डिग्री 28% है, यह किसी भी अन्य चरण की तुलना में अधिक है। अध्ययन क्षेत्र में

किसानों के सामने सबसे बड़ी समस्या श्रमिकों की अनुपलब्धता है, थोक विक्रेताओं और खुदरा विक्रेताओं के सामने सबसे बड़ी समस्या क्रमशः सीमित मात्रा और उच्च लागत के कारण हल्दी की अनुपलब्धता है।

1. Introduction

India is known as the land of spices. The history of Indian spices dates back to the early days of human cultivation. References to the use of spices are found in the Vedas (6000 B.C.), the trade of the Manu shastra (4000 B.C.), the Babylonian and Aryan civilizations (c. 3000 B.C.), and in the Old Testament (1000 B.C.) of the Most Holy (1000 B.C.) Bible.

According to the Bureau of Indian Standards (BIS), sixty-three spices are grown in our country. According to the international spice group, spices are any spicy or aromatic substances found in tropical or subtropical plants, which are often used as spices for other purposes because of their fragrance, preservation is the value of the drug.

Turmeric is an important spice plant grown in India and turmeric is also known as Indian saffron. Contains high content of curcumin grown in India. The scientific name is Curcuma Longa L., and the family name is Zingiberaceae. It is widely grown in India, Southeast Asia, and Indonesia. Thirty varieties of turmeric grown in India are CO-11983, BSR-11986, Krishna, Roma, Suroma, Ranga, Rashmi, Megha turmeric-1, Suguna, Sudarshana, Suranjana, Duggirala, kodur, Suvarna, Varna, ISR Prabha, ISR Pratibha and Rajendra Sonia.

India is a major producer, buyer and exporter of turmeric worldwide. It is used in various ways such as dye in the textile industry, cosmetics, cosmetic oil. It is also used for many therapeutic purposes to treat eye diseases, ulcers, leprosy, anthrax and allergies. It is an important spice used in Indian cuisine, which gives it a musky flavour and a deep yellow curry.

Global production is 11.5 tons lakh. India contributes about 80% of land production and 60% of all trade, 93% of Indian production is consumed in the country. India is also a leading player in the world market. Exports type of dried turmeric, fresh turmeric, turmeric powder, oil, curcuminoids etc., UAE is a major producer of turmeric. Some of the leading traders

are Japan, UK, Sri Lanka, Malaysia, Saudi Arabia and Bangladesh. (www.nbhcindia.com/docs/research-reports/SeasonalCommodity Insight)

The turmeric value chain analysis will be useful and the findings will contribute to strengthening the value chain as well as reducing production barriers and exploring opportunities to strengthen the turmeric value chain.

Value Chain Analysis is used to refer to a whole group of economic agents (real person such as a farmer, trader or buyer, as well as legal entities such as a business, authority or development organization) who directly contribute in determining the final product. The main objective of this study is to examine how the production of turmeric has increased over the past 5 years, to identify different chains of turmeric supply, to evaluate the use of turmeric products and to assess barriers facing farmers in production and marketing

There is a lot of research being done on commercial fruit and vegetable crops such as grapes to analyse the chain of value, but very little in spice plants; there has been extensive research into limited studies on the turmeric plant in this area. It was therefore felt that research on the value chain analysis of turmeric would be relevant and the findings would contribute to strengthening the value chain as well as reducing production barriers and exploring opportunities to strengthen the turmeric value chain.

The main purpose of this study is to know the demographic profile of farmers, wholesalers and retailers. Identify the which varieties are cultivated through the FGDs with farmers and discussion with wholesalers and retailer in Nizamabad, to study the feasibility of cluster approach for seed and commercial cultivation of turmeric and to identify the major constraints in the value chain and to suggest suitable strategies for enhancement of value chain of turmeric in Nizamabad

1.1 Production and Export of Turmeric

The total area under turmeric is 1.79 lakh hectares with an average production of 13.02 lakh. India exports only 6.2% of its export volume of 80,400 tons costing Rs.778.07 cr. Major imports of turmeric from India are Bangladesh (49,522 tonnes), UAE (12,182 tonnes), USA (9,712 tonnes) and Morocco (8,522 tonnes).

Table 1: Import, export and production of turmeric (2013-2021)

Year	Import of turmeric of India in tonnes	Export of turmeric from India in tonnes	Production of turmeric in India in tonnes
2013-14	7,284.02	78,360.18	1092630
2014-15	9,654.21	90,738.10	846250
2015-16	15,922.27	88,465.87	967060
2016-17	14,466.69	1,25,116.19	925270
2017-18	17,126.67	1,11,774.77	863460
2018-19	31.039.84	1,38,920.39	929967
2019-20	20,534.01	75,225.57	833079
2020-21	19234.53	171000.69	1100000

Source: https://www.tpci.in/indiabusinesstrade/blogs/

Table 1 depicts that the import of turmeric of India has decreased to 19234.53 tonnes in 2020-21 compared to the last year i.e., 20534.01 tonnes it is because of the production of turmeric has increased to 1100000 tonnes compared to the last year production of 833079 tonnes also the export to other countries from India has increased compared to

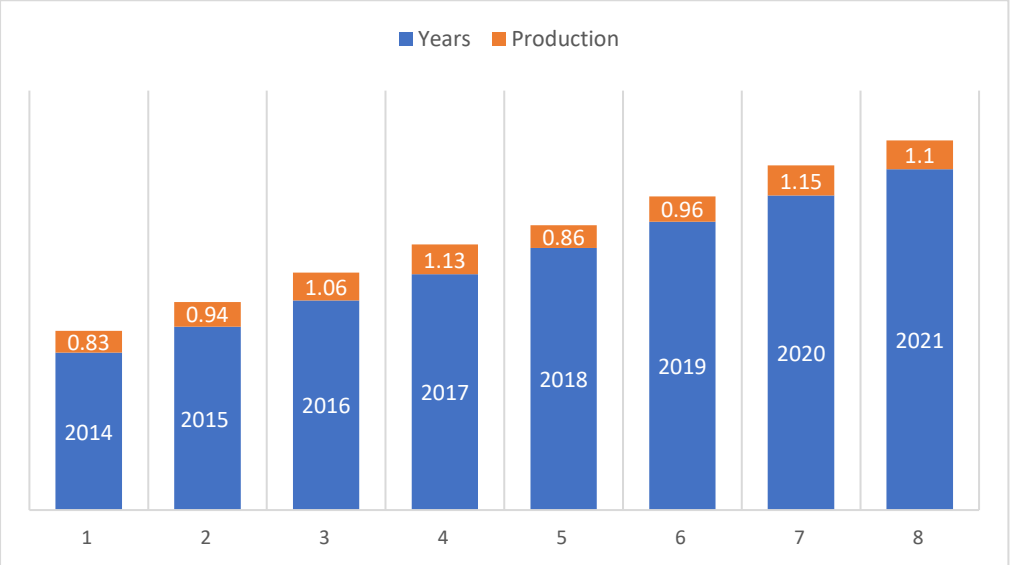
last year i.e., 75,225.75 tonnes to 171000.69 tonnes because of the production in 2020-21.

1.2 Turmeric in India

India is the largest manufacturer and exporter of curcumin, contributing more than 80% of the global production. Turmeric ranks 3rd in total export of spices from India. Major growing states are:

- Telangana
- Maharashtra
- Tamil Nādu
- Gujarat
- Orissa

Fig 1: Production of turmeric in India (2014-2021)



Source:https://www.statista.com/statistics/798681/india-turmeric-production-volume/

Figure 1 depicts that the production of turmeric in India from the year 2014 to 2021. In 2020 the production has increased to 1.15 lakh tonnes from the past years but in the year 2021 the production of turmeric has decreased to 1.1 lakh tonnes compared to the last year.

1.3 District wise area, production and productivity of turmeric crop in Telangana state

Table 2: Area, Production and Productivity of turmeric in Telangana from (2019-2020)

District	Area (ha)	Production (MT)	Productivity (%)
Adilabad	59	60	61
Jagtial	138	289.8	2.1
Jangoan	34078	68153.9	1.9
Jogulamba Gadwal	1766	3532	2
Karimnagar	191	401.1	2.1
Khammam	633	1329.3	2.1
Mahabubabad	77	154	2
Mahabubnagar	10234	21491.4	2.1
Medak	140	294	2.1
Medchal	3	6.3	2.1
Nagarkurnool	135	270	2
Nizamabad	26,162	49707.8	1.9
Peddapalli	40624	101560	2.5
Rajanna Sircilla	1491	2534.7	1.7
Rangareddy	84	168	2
Sangareddy	25	45	1.8
Siddipet	1388	2637.2	1.9
Suryapet	2	3.8	1.9
Vikarabad	8	14.4	1.8
Wanaparthy	4200	7560	1.8
Warangal	1091	1963.8	1.8
Bhuvanagiri	16739	31804.1	1.9
Total	139698	294919.093	2.1111

Source: https://horticulture.tg.nic.in/

Table 2 depicts that the major turmeric cultivation areas are 1st ranks goes to Peddapalli district with 101560 MT, Jangoan which ranks 2nd position in turmeric cultivation with the 68153.9 production, and the 3rd position goes to Nizamabad district has increased to 26,162 in hectares from past years, the production of turmeric in the district is 49,707.8 MT and the productivity of turmeric is 1.9%.

1.4 Objectives of the study

The following are the objectives of the research:

a. To study the demographic profile of farmers
b. To study the turmeric crop variety preferred by farmers related to stakeholders in value chain
c. To study the feasibility of cluster approach for seed and commercial cultivation of turmeric
d. To identify the major constraints in the value chain and to suggest suitable strategies for enhancement of value chain of turmeric in Nizamabad

2. Review of Literature

Angles (2001) studied the production and business direction in the sale of turmeric from India. In terms of exports Indian turmeric was high in the U.K. Countries like Japan, Iran, UAE and USA were not regular exporters of turmeric from India.

Simons *et al.* (2003) used value chain analysis to analyse the value of a value chain in the supply chain and to study the role of participants in a value chain and production process. It helps the business to survive in a competitive environment.

Schmitz (2006) examined the potential of a global value chain approach in defining the growth of production and distribution capabilities. He suggests that opportunities for local business development are organized by value chain relationships. This is clearly demonstrated in the case of the clothing and footwear industry, where development is very rapid in product development and process but is highly restricted in performance improvement, in terms of distribution of benefits, the value chain approach also provides a clear hypothesis and tangible evidence remains weak.

Risgard (2009) conducted an analysis that included the concept of a labor agency in value chain analysis and showed how retailer-driven chains provide more space for unions to use their agency than conventional flower cutting chains. Trade unions have been able to contribute to the establishment of social order, and to apply standards to further the representation of workers in production facilities. However, the union's ability to challenge the dominant structure in a series of cut flowers seems to be extremely limited.

Presutti and Mawhinney (2009) developed a numerical model showing features that the porter model did not. Those components include leadership, business culture and the principles of supply chain

management. The supply chain, an important part of the value chain but not the same, encompasses all the main functions of the porter model. Combining those functions in the supply chain component of a modern model provides an opportunity to integrate other factors that are critical to the success of a value chain.

Reji (2013) examined the value chains of small-scale organic turmeric processing companies in India's Kandhamal district. The background of these firms, their business activities, various chain members, and their roles in the value chain are all covered in the important sections of the study. The research finds that increased demand for organic turmeric products from both domestic and international markets provides opportunities for these businesses to expand and thrive.

Sahoo and sarangi (2018) performed in Kandhamal district, with a focus on three blocks: Daringbadi, Raikia, and K. Nuagaon. Four villages were chosen at random from each block. A total of 120 Turmeric growers were chosen. Descriptive analysis, SWOT analysis, and other analytical technique. Price spread analysis, the Marketing Efficiency Index, partial budgeting, and Garrett's rating were all used in this study. The research information flow asymmetry was plainly visible throughout the chain. It has been noted that in the research area, there were three marketing channels.

Chatzinasiou *et al.* (2019) studied the chemical differences in turmeric finished goods accessible in the UK, as well as to determine the quality of turmeric products received from key phases of the supply chain, with a focus on quality disparities in the UK. The phytochemical and metabolomics investigation of 72 turmeric samples, including crude powders, intermediate products from various manufacturing stages, and commercial products obtained from health food stores and the Internet, was conducted using 1H-NMR spectroscopy metabolomics coupled with Principle Component Analysis (PCA) and HPTLC methods. There was a considerable difference in the chemical composition of turmeric finished

goods, particularly those containing turmeric extracts. Several items were discovered to simply contain curcumin or curcuminoids, with no other active components or C. longa signal chemicals. The chemical makeup of goods obtained at various phases of the Pukka value chaivn was similar, with intermediate products (S57-59) containing the most active components. As a result, the manufacturing processes used to create turmeric food supplements are crucial in ensuring high-quality end goods.

Chhetri *et al.* (2020) studied the agriculture was the primary source of income for 81.67 percent of the population. Fresh, dried, and powder turmeric BC ratios were determined to be 1.30, 1.09, and 1.36 (machinery), respectively, and 1.16 (Dhiki Jhato). Similarly, the cost of producing fresh dry and powder turmeric was found to be NRs. 18.46, NRs. 119.20, and NRs. 162.92 (machinery), correspondingly, and NRs. 189.87 (Dhiki Jhato). Fresh, dry, and powder turmeric had market margins of NRs. 6.03, NRs. 25.07, and NRs. 179.70, respectively. Providers, producers, collectors, processors, distributors, retailers, and consumers were all key value chain actors in the research area. Turmeric producers faced considerable challenges due to a lack of technical support and an enhanced seed rhizome.

Singh *et al.* (2021) examined the performance of the Lakadong turmeric value chain in Meghalaya's north-eastern state. It evaluates the activities, added value, and pricing obtained at each stage of the product's journey, from farmer to customer. Although the powdered form of Lakadong turmeric was more expensive, growers and processors still sold their produce as dry flakes due to a shortage of processing equipment such as dryers and grinders. Many opportunities have been identified, and taking advantage of them would help Meghalaya process turmeric and create jobs. Channels 1 and 4 were the most important and favoured for semi-processed turmeric among the four value chains. Consumer prices have a low producer share.

3. Research Methodology

The research methodology is the specific plan, procedures, or technique used to identify, select, process, and analyse information about a topic. The methodology allows the researcher to create insight into the topic that one was about to work on.

3.1 Research Design

The survey was conducted in type following way:

The study was descriptive in nature. The objective is to gather the preliminary information from the famers, wholesalers and retailers about the demographic profile, variety preferences of seed, cluster approach for seed and commercial cultivation and to define problems and to reach conclusion

3.2 Research Instrument

Structured questionnaire for farmers, wholesalers and retailers was prepared with open and closed ended questions. The questionnaire and schedule were entered in Microsoft excel so that responses could be collected in a systematic manner. Quantitative analysis of data was done using Microsoft excel and represented with the help of pie-charts and bar-graphs. Garett rankings are used to identify the major constraints faced by farmers.

3.3 Collection of data

Data required for accomplishment of the objectives of project will be collected from primary and secondary sources.

3.3.1 Primary data

The primary data obtained through FGDs was related to famers, wholesalers and retailers about the demographic profile, variety preferences of seed, cluster approach for seed and commercial

cultivation and major constraints faced by farmers, retailers and wholesalers.

3.3.2 Secondary data

The secondary data contained in various reports of the departments and the other sources like the government publications, portals, websites, journals and magazines provided the turmeric production details in the districts, trends in sown area.

3.4 Sampling

Sampling was done for statistical analysis of the research by studying farmers, wholesalers and retailers in Nizamabad District.

3.4.1 Sampling unit

To study the objectives, farmers, wholesalers and retailers were selected in the particular area as sample unit and required data was collected in order to fulfil the study.

3.4.2 Sampling Method

Judgemental sampling method was adopted for selecting the state and district. Mandals was chosen by using Judgemental sampling as the chosen Mandals are having major turmeric production in the district. Total 90 farmers were taken as the sample unit through convenience sampling in order to collect the primary data under study. 7 Wholesalers and 8 retailers were also selected by using convenience sampling. Cluster sampling will be followed to study the feasibility of commercial cultivation and seed cultivation.

Table 3: Selection of Sampling Unit and Sample Size

Sampling Unit	Sampling Size	Selection Criteria
District	1(Nizamabad)	Judgmental sampling, as the district is the highest turmeric producer in the state
Mandal	3	Judgmental sampling based on the high production
Farmers	90	Convenience and Cluster sampling
Retailers and wholesalers	15	Convenience sampling

Source: Researcher's own computation from primary source

Table 4: Details of stake holders in Nizamabad district of Telangana

S. No.	Taluka	No. of farmers	No. of wholesalers	No. of retailers
1.	Armoor	30	2	3
2.	Velpoor	30	3	3
3.	Balkonda	30	2	2
	Total	90	7	8

Source: Researcher's own computation from primary source

3.5 Analytical Framework

Data analysis was performed using different analytical tools, taking into account the research objectives. The same is explained in more detail below.

a. Descriptive statistics
b. Mapping process
c. Garretts technique

3.5.1 Descriptive statistics

These are used to describe the basic features of data collected from various sources. They provide simple summaries about the sample and the following steps such as ratings, percentages etc. used in the study.

3.5.2 Mapping process

The mapping process is an important tool that helps to understand every part of the input and output. It helps to document the process to maintain control and reduce variability due to time changes. The basic process of mapping is to create an accurate, complete picture of the whole value system. A common tool for flow chart, performance schema, decision point, delay, movement and controls or testing. By splitting the process into steps, the flow chart makes the process analysis easier.

3.5.3 Garrett's ranking method

In this study, the garret level method was used to analyse the barriers for farmers, retailers and wholesalers involved in the turmeric value chain.

Researching the challenges of farmers, wholesalers and retailers' phase is a very important aspect of research from a policy perspective. Respondents were asked to rate (by difficulty plan) the barriers and these levels were converted to points by referring to the Garrets table. The eligibility order provided to respondents was changed to levels using a formula

$$\text{Percentage position} = \frac{100\ (Rij - 0.50)}{Nj}$$

There,

Rij = Rank given for i^{th} item by j^{th} per person,

Nj = Number of items measured per person

Specific Tools

Objective 1: To study the demographic profile of farmers

The objective is aimed to find out the age, educational qualification, land size, farming experience and income of farmers

Objective 2: To study the turmeric crop variety preferred by farmers related to stakeholders in value chain

Through the FGDs with farmers and discussion with traders, identify the which varieties are cultivated from the point of adaptability and adoption by farmers in Nizamabad

Objective 3: To study the feasibility of cluster approach for seed and commercial cultivation of turmeric

a) Through the FGDs and personal interviews with the farmers, the seed clusters will be identified which are contiguous in nature and similar in soil types and agro climatic conditions

b) For commercial production, a cluster will be identified which enables the production, value addition and availability of raw materials like seed suppliers and farm machinery services also other services like warehouses and cold storages

Objective 4: To identify the major constraints in the value chain and to suggest suitable strategies for enhancement of value chain of turmeric in Nizamabad

The objective aimed to find out the problems faced by the farmers in production and marketing of turmeric in Nizamabad.

3.6 Area of Study

In Telangana the turmeric plant is cultivated on an area of 42,535 hectares with a production of 184285 MT during 2018-19**.** Nizamabad region is a leading producer of turmeric and turmeric production. Nizamabad is located at 18 ° 41′N 78 ° 6′E. The city is bounded in the North by Nirmal, in the East by Jagtial and Karimnagar, in the south by Kamareddy, and in the West by Nanded in the Maharashtra region. The city is governed by 3 territories, Nizamabad North, Nizamabad South Nizamabad Urban constituency and Nizamabad Rural constituency. Nizamabad Municipal Corporation owns an area of 42.9 square kilometres (16.6 sq. Mi) under Nizamabad Urban which covers mainly areas under Nizamabad North and South. The current study was conducted in the Nizamabad region of Telangana. The Nizamabad region includes nine talukas from these 3 taluks are selected to study they are armoor, velpur and Balkonda. Research details are presented here. (https://en.wikipedia.org/wiki/Nizamabad,_Telangana)

Figure 2: Area of Study

Source:https://nizamabad.telangana.gov.in/about-district/map-of district.

4. Findings and Analysis

This study provides the information about the turmeric crop, area, productivity and production. Also, it provides the information about farmers, wholesalers and retailers. The objectives are as follows

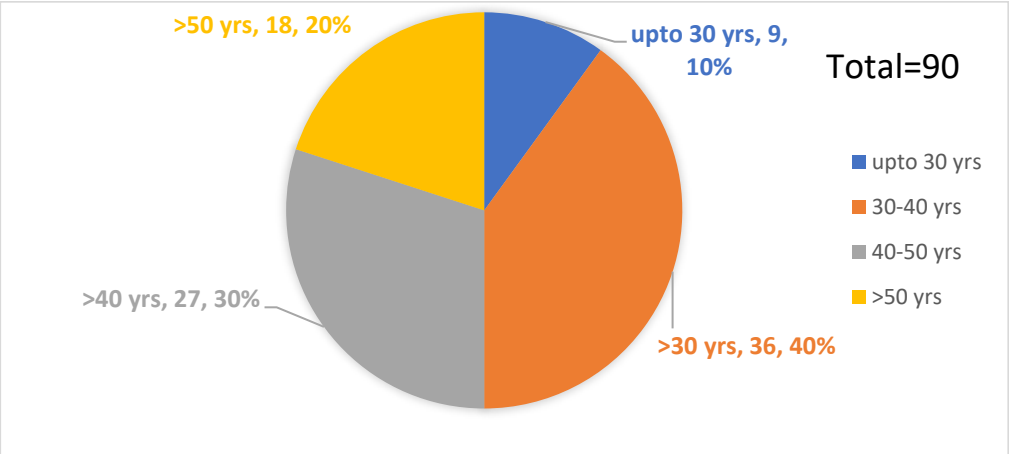
a. Demographic profile of the respondents
b. Area, production and productivity of turmeric
c. Study the turmeric crop variety preferred by farmers related to stakeholders in value chain
d. To study the feasibility of cluster approach for seed and commercial cultivation of turmeric
e. Mapping of value chain
f. Identifying the constraints in the value chain

4.1 Demographic Profile of the Farmer Respondents

The demographic profile is based on the age group, education, land, experience in farming and income status of the farmers.

4.1.1 Farmers socio-economic characteristics

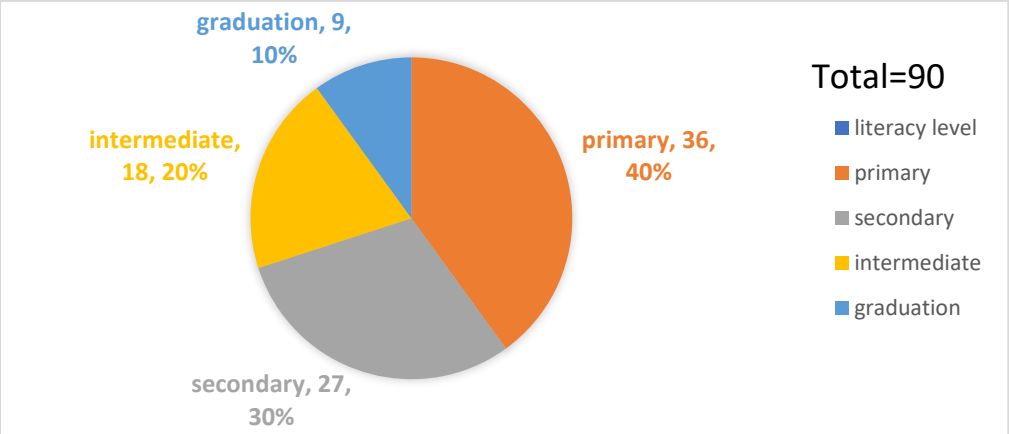
Fig 3: Age group of respondents



Source: Researcher's own computation from primary data

From the above pie chart, 10% of farmers belong to less than 30 years age group, 40% of farmers belong to 30-40 age group of farmers, 30% of farmers belong to 40-50 age group of farmers and 20% of farmers belong to more than 50 years of age group

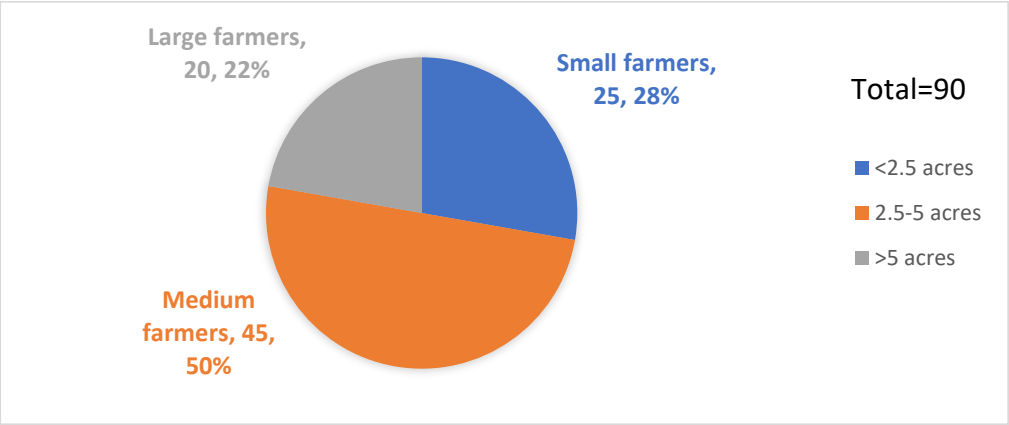
Fig 4: Literacy rate of respondents



Source: Researcher's own computation from primary data

From the above pie chart, the literacy rate of the farmers shows that, 40% of the farmers belongs to primary level of education, 30% of farmers belongs to secondary level of education, 20% of farmers belongs to intermediate education and 10% of farmers belongs to graduation.

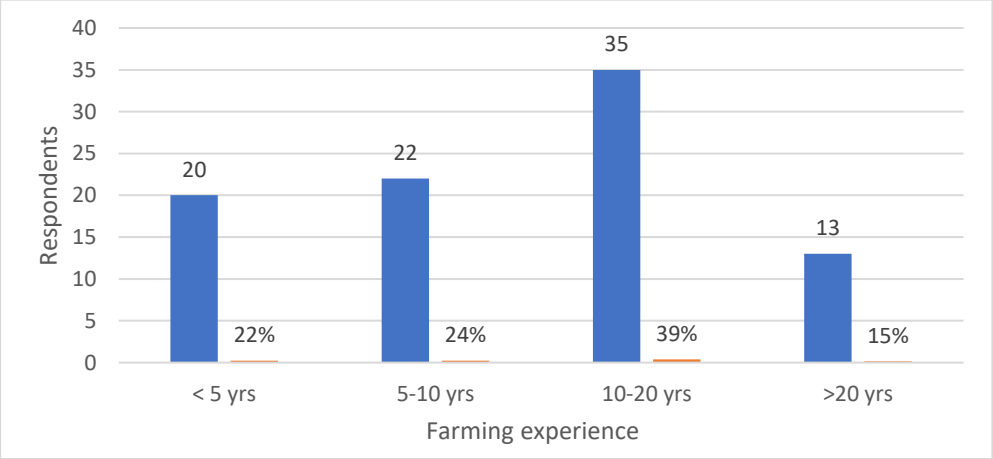
Fig 5: Land holding size of farmers



Source: Researcher's own computation from primary data

From the above pie chart, it shows that 28% of farmers holding less than 2.5 acres of land, 50% of farmers holding 2.5-5 acres of land and 22% of farmers holding more than 5 acres of land.

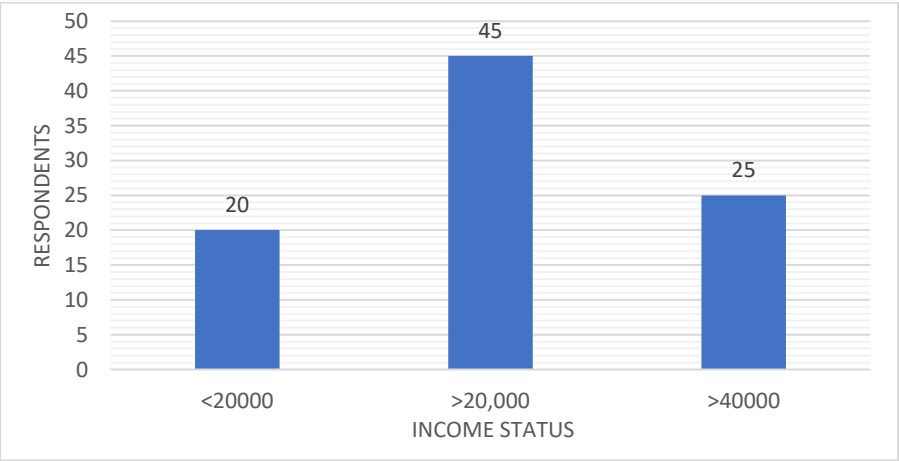
Fig 6: Farming experience of farmers



Source: Researcher's own computation from primary data

From the above diagram, the experience in farming shows that the farmers of 22% are having less than 5 years, 24% of farmers are having 5-10 years of experience, 39% of farmers are having 10-20 years of experience in farming and 15% of farmers are having more than 20 years of experience in farming.

Fig 7: Income status of farmer



Source: Researcher's own computation from primary data

The income status of farmers shows that, 22% of farmers are earning less than 20,000 of income, 50% of farmers are earning 20,000-40,000 of income and 28% of farmers are earning more than 40,000 of income.

4.2.2 Socio-economic profile of the wholesalers

Table 5: Demographic profile of wholesalers

S. No	Group	No. of persons	Percentage
1.	Age group		
	a) Upto 30 years	2	28.5
	b) 30-40 years	3	43
	c) 40-50 years	2	28.5
2.	Literacy level		
	a) Upto SSC	2	28.5
	b) Intermediate	3	43
	c) Graduation	2	28.5
3.	Turmeric quantity handled per week		
	a) <5 tonnes	1	14
	b) 5-10 tonnes	3	43
	c) >10 tonnes	3	43
4.	Purchase of turmeric		
	a) Farmers	4	57
	b) APMC	2	28.5
	c) Middlemen	1	14.5

Source: Researcher's own computation from primary data

From the above table, 28.5% of farmers belong to upto 30 years age group, 43% of farmers belong to 30-40 age group, 28.5% of farmers belong to 40-50 age group.

From the above table, the literacy rate of the farmers shows that, 28.5% of the farmers belongs to SSC level of education, 43% of farmers belongs to intermediate education and 28.5% of farmers belongs to graduation.

From the above table, 14% of farmers handles less than 5 tonnes of turmeric quantity per week, 43% of farmers handles 5-10 tonnes of turmeric quantity per week, 43% of farmers handle, more than 10 tonnes of turmeric per week.

From the above table, 57% of persons purchase the turmeric from farmers, 28.5% of persons purchase the turmeric from APMC, and 14.5% of persons purchase the turmeric quantity from middlemen.

4.3.3 Socio-economic profile of retailers

Table 6: Demographic profile of retailers

S. No	Group	No. of persons	Percentage (%)
1.	Age group		
	a) Upto 30 years	2	25
	b) 30-40 years	3	37.5
	c) 40-50 years	3	37.5
2.	Literacy level		
	a) Upto SSC	3	37.5
	b) Intermediate	4	50
	c) Graduation	1	12.5
3.	Turmeric crop procurement (quantity)		
	a) Farmers	2	25
	b) Traders	2	25
	c) Wholesalers	4	50
4.	Turmeric quantity handled per month		
	a) <1 qtl	3	37.5
	b) 1-2 qtl	3	37.5
	c) >2 qtl	2	25

Source: Researcher's own computation from primary data

From the above table, 25% of farmers belong to upto 30 years age group, 37.5% of farmers belong to 30-40 age group, 37.5% of farmers belong to 40-50 age group.

From the above table, the literacy rate of the farmers shows that, 37.5% of the farmers belongs to SSC level of education, 50% of farmers

belongs to intermediate education and 12.5% of farmers belongs to graduation.

From the above table, it shows that turmeric crop procurement done by 25% of farmers, 25% of traders and 50% of wholesalers.

From the above table, 37.5% of farmers handle the less than 1 quintal of turmeric quantity per month, 37.5% of farmers handle the 1-2 quintal of turmeric quantity per month, 25% of farmers handle the more than 2 quintal of turmeric per month.

4.2 To study the turmeric crop variety preferred by farmers related to stakeholders in value chain

During group discussions as well as personal discussions with farmers, wholesalers and retailers given different views on the types of turmeric used by farmers from adoption and adaptability. A few years ago, farmers used a duggirala variety called the Armoor variety because it was cultivated in the Armoor area of the Nizamabad region.

Table 7: Farmers variety preference

Villages	Armoor variety		Pratibha variety		ACC-79		Total
	No. of farmers	(%)	No. of farmers	(%)	No. of farmers	(%)	No. of farmers
Armoor	23	77	6	19	1	3	30
Velpur	20	67	7	23	3	10	30
Balkonda	20	67	8	27	2	6	30

Source: Researcher's own computation from primary data

Table 8: Analysis of chi square test in between demographic profile of farmers and variety preferred by farmers

Variable	Chi square value
Education	0.89
Age	0.84
Landholding	0.49
Experience of farmer	0.56
Income	0.24

Source: Researcher's own computation from primary data

Table 8 depicts that chi square tabular value at 6 degrees of freedom and 5 percent level of significance is 12.592. Therefore, we can conclude that all demographics and variety preference are not found. They are insignificant for each other.

The Telangana region has recommended many varieties of turmeric plants but none of them have shown satisfactory results compared to the armoor variety in the area. The farmers said the varieties called Prathibha tried by the government but did not show good results compared to armoor in terms of dry yields. Also, the department of agriculture has introduced varieties such as PTS-10 and Salem. Although the Salem varieties show a fairly yellow colour, high wet yield, drying of the rhizome after boiling, and then the rhizome is thin, loses its lustre and has wrinkled fingers, so the final harvested product was inferior in quality compared to the armoor variety in appearance and dry weight.

Pratibha Variety did not show a positive effect on internal color. Rhizomes with a darker inner color than an orange color that was inferior to curcumin content are sold at a lower price this has been seen by farmers. Therefore, growers are willing to sow high levels of curcumin

content. Farmers have shown a lack of interest in cultivating PTS-10 as it has not shown a good yield compared to local varieties. Areas where groundwater depletes in the last few phases of the plant life cycle, so short-term species may be suitable. PTS-10 is a type that tolerates leaf rot and rhizome rot as a duggirala. Varieties called ACC-48 and 79 as brought to the Guntur region for Andhra Pradesh farmers. These varieties have been tried by a few growers but ACC-79 has shown good results regarding leaf blotch and resistance to rhizome rot and quality of high curcumin content.

4.2.1 Processors, retailers and popular grocery stores

Processors, retailers and wholesalers often choose size, brightness, moisture and finger weight no matter what type.

Traders are willing to buy turmeric with a high curcumin content based on the demand of the retail market, as long as the limits of quality and quantity are maintained at the end of the grower. Traders have chosen that at least 10 MT of high-quality turmeric after harvest should be brought to market without a mixture of other varieties. In order to be more comprehensive that traders will provide a premium value for that product.

4.3 Cluster Approach for Seed and Commercial Turmeric Cultivation

4.3.1 Cluster approach for commercial cultivation

The production package is identified based on the services provided to farmers for their needs and business. It also allows for value addition, production and supply of goods at a competitive price to consumers through the economy of the standard. The production group also reduces the cost of transport to the end markets as the volume of the product is high enough for mass transport and creates a conducive trading ecosystem.

Production enables seed suppliers to disseminate seed, the service of agricultural machinery to farmers. Basic processing facilities such as boilers, dryers and polishers and other equipment such as drip irrigation are essential for production collections.

Cold storages and cold spaces are established systematically as a supportive service that promotes high utilization, a basic condition for the profitability of storage units. Based on the production capacity of turmeric in the study areas a collection analysis will be performed. Conditions such as compliance with regulations, market infrastructure services, cold storage facilities and processing facilities are also implemented during the identification of the collection.

4.3.2 Cluster: Nizamabad

The area of turmeric in the Nizamabad region is about 26162 Ha. With a production of 49707.8 MT, it provides 25% of the total turmeric production. In this collection there is a need to provide seed center equipment, machinery equipment, basic processing in Nizamabad collection. There are 20 available cold storage units in this collection, both in and around the Nizamabad AMC market.

About 50 other polishing units belonged to other traders in Nizamabad. Although there is a lack of storage space for farmers less than 10-15% to cool stock, so there is plenty of space to build another cold storage area to cater the needs of turmeric growers near the Balkonda Mandal.

The Department of Agricultural Marketing has set up a laboratory near the AMC market area to provide samples and testing services. But this lab does not do curcumin testing because it takes 4 to 5 hours to test the sample.

Table 9: States of turmeric infrastructure facilities available in district

S.no	District	Number of cold storage units	Number of polishing units	Number of powdering units	Number of turmeric markets
1	Nizamabad	20	599	11	1

Source: Researcher's own computation from primary data

Table 10: Identified turmeric production mandals in Nizamabad cluster

S.no	Name of the production cluster	Mandals in the cluster	Area under identified seed cluster (Ha)	Seed cluster area in the production cluster (%)	Total production (MT) of the cluster	Seed cluster production in the production cluster (%)
1	Nizamabad	Armoor Velpoor Balkonda	9005	57	40607.8	55

Source: Researcher's own computation from primary data

4.3.3 Cluster approach for seed production

Telangana recommended seed replacement for promising varieties which is very poor in place of seed this is due to the lack of pure seed and the unavailability of duggirala (high varieties). Generally, farmers use 9-10 q per hectare of seed and most farmers use their seed. Sometimes they buy seeds from other farmers, using their seed which reduces the 15-16% of total cost, so many farmers use their seed to

provide a large portion of increasing total production costs. Farmers are hesitant to buy new seeds from other sources that increase production value. Also, turmeric is a natural supplement. To control or reduce this issue, the Department of Agriculture has tried to make single-shoot seed popular which will reduce the demand for seed from 10 qtl to 2 qtl. If farmers are concerned about the cost of seeds, they can save 8 qtl of seed costs, at least adding 1.5 qtl of dried turmeric to a full crop. However, farmers are reaping the economic benefits of using smaller seeds and using new technologies such as the 1 or 2 germination method. The collection method should be strategically followed to introduce new varieties to larger production areas.

Integration in the seed production sector may create an environment conducive for seed growers and farmers. Even in the Department of Agriculture, it can be easier to disseminate information as seed farms will come together naturally which is a necessity for this approach.

During discussions with farmers and departmental officials, a group-based approach to seed production was discussed and a few points were raised to facilitate activities such as the introduction of new varieties under MIDH.

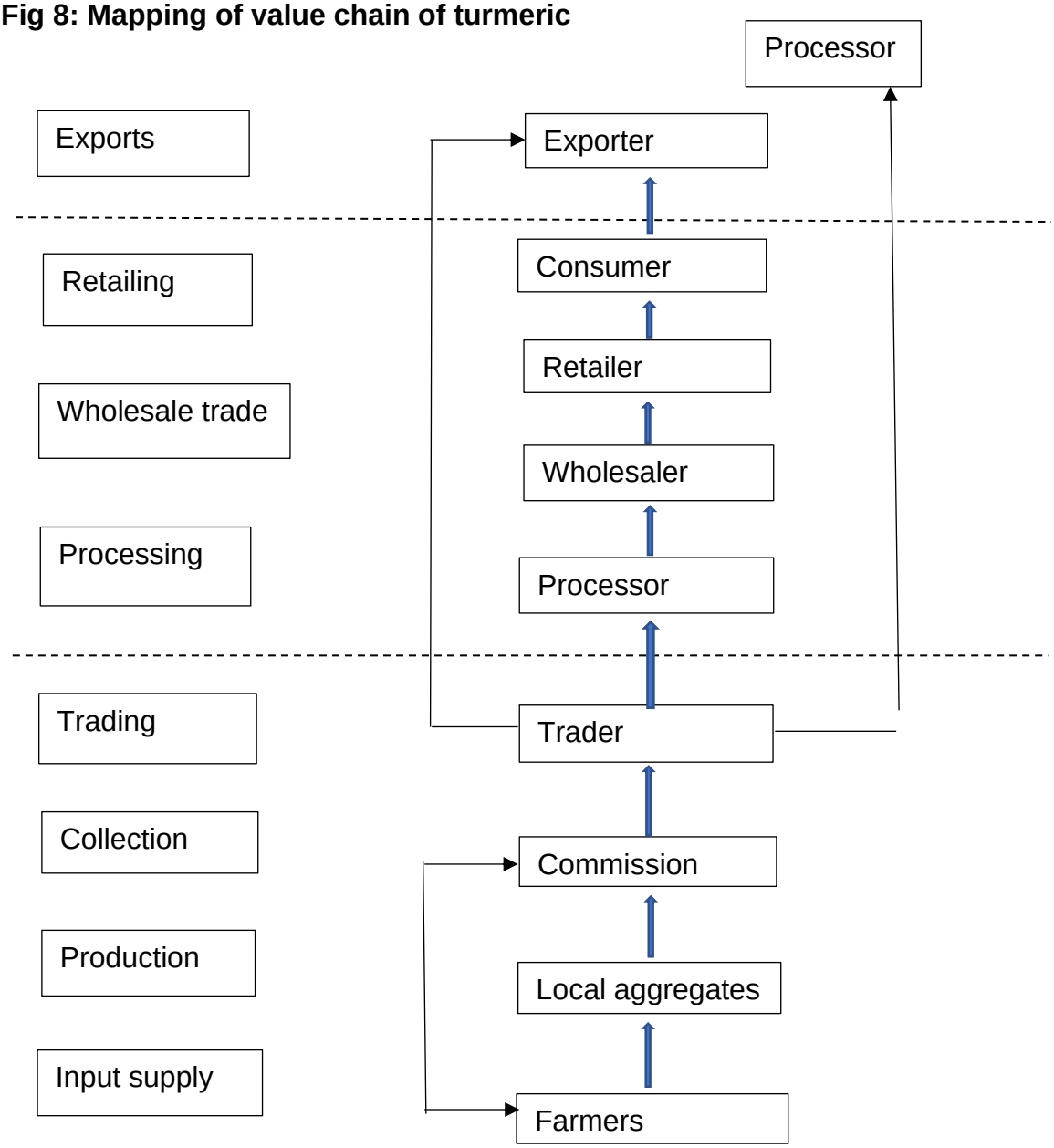
Varieties proven by the turmeric research station using field tests in the state turmeric belt under different soils and climates that will only be presented. This is the first step in implementing this program. The following year, initially a small number of seed should be given to interested farmers in the compound area under assistance. In order to increase diversity, exposure visits should be arranged for farmers in the neighbouring villages in the group. Based on factual data, seed prices should determine a committee comprising officials from the Department of Horticulture, Horticulture Scientists and a few farmers representing all collections. For the next 4-5 years the same should be done for new farmers and it is ensured that all the seeds produced in the collection should flow only to the seed series. Based on interactions with farmers

and Horticulture officials the following seed groups have been identified naturally and similarly in soil types and agricultural climates. In addition, they contribute 40-50% to the total area and production of the identified production group.

4.5 Value Chain Mapping of Turmeric

The value chain map is a graphical representation of different actors operating in the turmeric value chain and flow of the produce in the chain.

Fig 8: Mapping of value chain of turmeric



Source: Researcher's own computation from primary data

4.5.1 Stakeholders in the value chain

A. Input suppliers

Input suppliers include large channel companies, government distributors, small retailers and small stores that sell small seeds, fertilizers and pesticides to local farmers.

B. Farmers

Three types of production system can be identified, namely, subsistence production, small commercial production and large commercial production. Subsistence production is done for home use and is produced in small quantities. Products from the first class of farmers usually do not enter to the market or enter at a very limited price. Small and large commercial farmers sell most of their products to various market coordinators. Manufacturers often deal with merchants and wholesalers. In many cases farmers rely on local-level retailers and commission agents for pricing information but over the past 2-3 years, the situation has changed slightly due to easier access to communication technology and larger farmers often have access to market information to some degree. Farmers do clean and grading jobs at the farm level. They also cool the turmeric by boiling it in hot water for one hour to remove the pericarp. This gives more light to turmeric and improves the quality and cool turmeric to download the best value on the market. After polishing and farmers sort the product and pack it in a gunny bag to avoid moisture and insect invasion.

C. Village Level Traders

Small local retailers and large producers are often involved in turmeric advertising. They often visit the best-selling markets and maintain good relationships with major manufacturers and retailers. Usually, they deal with a small amount at a time because of their merger income. They know the details of prices and usually do not risk losing out because only after knowing the market price they are buying locally.

D. Commission agents

These employees play an important role in marketing channels. The bulk of the turmeric marketed volume goes to commission agents working in the high-end markets and APMC. Grading and packaging work is usually done by traders who buy stock from farmers. Commission agents have excellent trading relationships with retailers and wholesalers.

E. Processors

Selected items are taken to the processing industry by processors and subject to the processing of various value-added turmeric products. Processors buy turmeric from traders or APMCs or sometimes directly from farmers. For all value processors they receive the highest benefits due to the high rate of value addition

F. Promotional agencies

This is an important area in increasing the productivity and profitability of farm services. However, sufficient resources are not available. The Department of Agriculture is said to be the main supplier of this information, but the distribution process is very limited. Big farmers get this information by using "embedded resources" from implant equipment suppliers. " However, the level of that knowledge is very low and farmers far and wide receiver or no access to this information.

G. Agricultural services

Knowledge of disease integration and pest control, sustainable soil management / integrated nutrient management are some of the key factors in effective production management. Farmers' access to such information is not good. Regional-level agencies within the Directorate of Horticulture (DOH) are the main providers of this information, but because of limited resources, the distribution process is poor. Most farmers get information about embedded services that make up pesticide / fertilizer dealers. However, the standard of service is low.

4.5.2 Degree of value addition

Percentage increase in product value is the value-added value of that product. In this study, the rate of additive in both raw turmeric products and processed turmeric was calculated. The rate of increase is calculated by considering the price difference of the product. The margin is acquired after deducting the cost in the price difference. The acquired margin is therefore divided by the purchase price to the value of the value addition.

Table 11: Degree of value addition of turmeric (Rs/Kg)

S. No	Particulars	Farmers	Trader	Processor	Wholesaler	Retailer	Consumer
1.	Selling price	55	64	129	155	190	
2.	Purchase price		55	64	129	155	190
3.	Price difference		8	65	26	35	
4.	Cost		3	46	15	5	
5.	Margin		5	18	10	30	
6.	Degree of value addition (%)		9	28	8	19	

Source: Researcher's own computation from primary data

The degree of value addition for turmeric is presented in the above Table. The degree of value addition at trader stage is 9 Rs/kg, followed by 28 Rs/kg at processor stage followed by 8 Rs/kg at wholesaler level and 19 Rs/kg per cent at retailer stage.

The degree of value addition of turmeric at processor stage is much higher than in any other stage.

4.6 Constraints in Value Chain of Turmeric

The identification of constraints is not distinct form, but rather part of value chain analysis. Using structured questionnaire and focus group discussions, value chain constraints can be identified during interviews. Here is the list of constraints.

4.6.1 Major constraints of farmers

The constraints as analysed by the data collected from the sample farmers is been presented in the table. According to the ranking given by the sample farmers keeping in mind the severity of those problems listed below

Table 12: Constraints faced by the farmers

S. No	Constraints	Average score	Rank
1.	Availability of planting materials and fertilizers	39.84	5
2	Non availability of credit for farming operations	45.73	4
3	Fluctuation of prices by the marketing intermediaries	50.22	3
4	Availability of labour	66.75	1
5	Pests and diseases	58.77	2
6	Availability of transportation facilities	38.66	6

Source: Researcher's own computation from primary data

Table 12 depicts that availability of labour is considered as the major constraint by the farmers due to limited number of labours and high wage cost. The second major constraint ranked by the farmers are pests and diseases due to the congenial environment for their attack. Fluctuation of prices by the marketing intermediaries is ranked by the farmers as third constraint. Farmers are facing the problem of credit availability too in the study area as a result non-availability of labour of credit for farming

operations is ranked fourth. Availability of planting materials and fertilizers is ranked by the farmers as fifth constraint. And the availability of transportation facilities is ranked as the sixth problem by the farmers.

4.6.2 Major constraints of wholesalers

Table 13: Constraints faced by the wholesalers

S. No	Constraints	Average score	Rank
1	Non availability of turmeric	72.57	1
2	Transportation facilities	28.28	6
3	Price fluctuation in the market for procurement	62.57	2
4	Market fees and charges	47.00	4
5	Handling charges / labour availability	39.85	5
6	Storage facility and poor quality	49.71	3

Source: Researcher's own computation from primary data

Table 13 depicts that availability of turmeric is considered as the major constraint by the wholesalers due to limited quantity and high cost. The second major constraint ranked by the wholesalers is price fluctuation in the market for procurement. Storage facility and poor quality is ranked by the wholesalers as third constraint. wholesalers are facing the problem of market fees and charges too in the study area as a result is ranked fourth. Handling charges/ labour availability is ranked by the wholesalers as fifth constraint. And the availability of transportation facilities is ranked as the sixth problem by the wholesalers.

4.6.3 Major restraints of retailers

Table 14: Constraints faced by the retailers

S. No	Constraints	Average score	Rank
1	Non availability of turmeric	75.25	1
2	Demand for branded	31.12	6
3	Price fluctuation in the wholesale of procurement	53.25	3
4	Competition from fellow retailers	57.12	2
5	Handling charges/ labour availability	49.25	4
6	Storage facility available	34.00	5

Source: Researcher's own computation from primary data

Table 14 depicts that non-availability of turmeric is considered as the major constraint by the retailers due to limited quantity and high cost. The second major constraint ranked by the Retailers is competition from fellow retailers. Price fluctuation in the wholesale of procurement is ranked by the retailers as third constraint. Retailers are facing the problem of Handling charges/ labour availability too in the study area as a result is ranked fourth. Storage facility available is ranked by the retailers as fifth constraint. And demand for branded facilities is ranked as the sixth problem by retailers.

5. Conclusion and Recommendations

From the current study's analysis and interpretations, the following conclusions can be drawn:

5.1 Conclusion

- Turmeric is an important cash crop that is widely invested in the expected profit that comes from supporting emotion. It is considered a good luck crop that despite high production costs has encouraged farmers to cultivate in the smallest available area. However, in recent times prices have not been encouraging and are much lower than in 2018-19. In 2019-20 turmeric was cultivated on an area of 42535 hectares with a production of 184285 tons in Telangana province.
- The socio-economic factors of the respondents indicated that the majority of farmers, i.e., 40% were members of the 30–40-year age group. 40% of respondents have a basic education. 50% of respondents own 2.5-5 hectares of land. 39% of respondents have 10-12 years of experience in agriculture. And 50% of respondents earn 20,000- 40,000 per annum.
- 43% of retailers carry more than 10 tons of turmeric quantity per week and 28.5% of retailers purchase turmeric product from APMC.
- 50% of sellers buy turmeric from retailers and 75% of farmers carry 1-2 qtl of turmeric quantity per month
- The government has recommended many varieties of turmeric but none of them have shown satisfactory results compared to the armoor variety in the area. Farmers say the varieties called Prathibha, PTS-10 and Salem have been tried by the government but have not produced good results compared to armoor with a dry yield. Therefore, many growers have grown a variety called armoor a local variety with a high curcumin content and good yield.
- Traders are willing to buy turmeric with high curcumin content based on market demand, as long as quality and quantity limits are met.

Traders have chosen that at least 10 MT of high-quality turmeric after harvest should be brought to market without a mixture of other varieties.

- There are 20 cold storage areas on the market near Nizamabad AMC. In previous years, these units were close to the market, staying in them for almost a year. Not only because of turmeric but also because of the other last units like bajra and red jowar seeds. About 50 other polishing facilities were owned by other Nizamabad traders. Although there is a shortage of storage space for farmers at less than 10-15% to cool stock, so there is plenty of space to build another cold storage area to meet the needs of turmeric growers near Balkonda Mandal.
- The government has recommended the replacement of seed for the armoor variety due to the lack of seed and the unavailability of seeds. Typically, farmers use 9-10 qtl per hectare of seed and most farmers use their seed. Sometimes they buy seed from other farmers, using their seed which reduces 15-16% of the total cost, so many farmers use their seeds to provide a large portion of the increase in production costs.
- The challenges farmers face is the availability of workers due to the limited number of workers and the high cost of wages, pests and diseases due to the favourable nature of their attacks, price fluctuations by commercial consultants and the problem of access to credit in the study area. As a result, the unavailability of agricultural labor loans is considered as a major problem.
- The challenges retailers face is the unavailability of turmeric due to its limited price and high cost, price volatility in the retail and storage market and the low rate calculated by retailers are major concerns for retailers.
- Challenges that traders face are the unavailability of turmeric due to limited price and high cost, competition from other traders, price

fluctuations in the sale of goods are major issues considered by traders.

5.2 Recommendations

- There are many intermediaries involved in the turmeric supply chain and therefore, it is suggested that advanced communication equipment to be built to allow farmers to sell directly to processors.
- Seed rotation with improved varieties is a priority and should be taken with a 4–5-year application using the collection method.
- Varieties with high curcumin content without compromising on the dry harvest of turmeric are necessary and need to be presented with extensive field testing.
- Production of high content of curcumin should be given a premium and should be developed cost-effective to encourage the cultivation of such varieties.
- Interactions between processors and growers cultivating turmeric varieties with high curcumin content should be improved.
- The introduction of cold storage units in identified clusters, to some extent, reduces stress sales.
- The biggest problem with turmeric growers in the study area is that they do not have storage facilities for turmeric. This makes many farmers turn away from growing turmeric. Therefore, the government is developing ways, so that all farmers have cold storage facilities for processing.
- Steps need to be taken to resolve issues in the turmeric value chain and to strengthen the value chain with potential measures.

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Appendix- I

Schedule for farmers

1) Name of the farmer
2) Age of the farmer
   a) Upto 30 yrs
   b) >30 yrs
   c) >40 yrs
   d) >50 yrs
3) Education qualification of farmer
   a) Primary
   b) Secondary
   c) Intermediate
   d) Graduation and above
4) Land holding size of farmers
   a) Small farmers
   b) Medium farmers
   c) Large farmers
5) Farming experience of farmers
   a) < 5 yrs
   b) > 5 yrs
   c) > 10 yrs
   d) > 20 yrs
6) What is the income status of the farmer
   a) <20,000
   b) >20,000
   c) > 40,000
7) What type of varieties preferred by farmers?
   a) Armoor variety
   b) Pratibha variety
   c) ACC-79 variety

8) Constraints faced by farmers in the production and marketing of turmeric

Availability of planting materials and fertilizers	❶❷❸❹❺❻
Non availability of credit for farmers	❶❷❸❹❺❻
Unavailibility of labour	❶❷❸❹❺❻
Pest and disease problem	❶❷❸❹❺❻
Price fluctuations in the market	❶❷❸❹❺❻
Lack of proper transportation	❶❷❸❹❺❻

Appendix-II

Schedule for Wholesalers

1) Name of the wholesaler

2) Age of the wholesaler
   a) Upto 30 yrs
   b) >30 yrs
   c) >40 yrs
   d) >50 yrs

3) Education qualification of wholesaler
   a) Primary
   b) Secondary
   c) Intermediate
   d) Graduation and above

4) How much turmeric quantity they handled per week
   a) <5 tonnes
   b) 5-10 tonnes
   c) >10 tonnes

5) From where you purchase the turmeric
   a) APMC
   b) Farmers
   c) Middlemen

6) Constraints faced by wholesalers in the marketing of turmeric

   a) Non availaibility of Turmeric ❶❷❸❹❺❻
   b) Market fees and charges ❶❷❸❹❺❻
   c) Storage facility and Poor quality ❶❷❸❹❺❻

d) Handling charges / labour unavailibility ❶❷❸❹❺❻

e)Price fluctuations in the market for ❶❷❸❹❺❻

procurement

f)Lack of proper transportation facilities ❶❷❸❹❺❻

Appendix- III

Schedule for Retailers

1) Name of the retailer

2) Age of the Retailer
   a) Upto 30 yrs
   b) >30 yrs
   c) >40 yrs
   d) >50 yrs

3) Education qualification of Retailer
   a) Primary
   b) Secondary
   c) Intermediate
   d) Graduation and above

4) How much turmeric quantity handled per month
   a) <1 qtl
   b) 1-2 qtl
   c) >2 qtl

5) From where you procure the turmeric crop
   a) Farmers
   b) Wholesalers
   c) Traders

6) What are the constraints faced by retailers

a) Non availibility of turmeric ❶❷❸❹❺❻

b) Demad for branded ❶❷❸❹❺❻

c) Unavailibility of labour/ Handling charges ❶❷❸❹❺❻

d) Lack of proper storage facility ❶❷❸❹❺❻

e) Competition from fellow retailers ❶❷❸❹❺❻

f) Price fluctuation in the wholesale of procurement ❶❷❸❹❺❻