VALUE CHAIN ANALYSIS OF ARAKU VALLEY COFFEE

BY

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B.Sc. (CA&BM)

**PROJECT REPORT SUBMITTED TO THE
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AWARD OF THE DEGREE OF**

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(AGRIBUSINESS MANAGEMENT)

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2022

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This is to certify that **Mr. PALLI SAI KUMAR** has satisfactorily prosecuted the course of research and that the project entitled "**VALUE CHAIN ANALYSIS OF ARAKU VALLEY COFFEE"** submitted is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that neither the project report nor its part thereof has not been previously submitted by him for a degree of any university.

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No part of the project report has been submitted by the student for any other degree or diploma. The published part and all assistance and help received during the course of investigation have been duly acknowledged by the author of the project report.

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LIST OF SYMBOLS AND ABBREVIATIONS

et al.	:	and other
e.g.,	:	Example
Fig.	:	Figure
%	:	Per cent
<	:	Less than
>	:	Greater than
S.No.	:	Serial Number
i.e.	:	That is
No.	:	Number
NGO	:	Non-Government organization
GCC	:	Girijan cooperative corporation
ITDA	:	Integrated Tribal Development Agency
FPO	:	Farmer Producer Organization
FPC	:	Farmer Producer Company
HoReCa	:	Hotels, Restaurants, and cafes
FMCG	:	Fast Moving Consumer Goods
WWW	:	World Wide Web

ABSTRACT

Author of the project	:	**PALLI SAI KUMAR**
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Coffee is the second most traded commodity after oil on international trade exchanges both in terms of volume and value representing a significant source of income to several developing countries in Africa, Asia and Latin America. India ranks seventh position (International Coffee Organization) with a total production of 2,99,280 tons of during the year 2019-20 India accounts for about 3. 02 per cent of world's coffee production. The present investigation was aimed for analyzing the value chain of araku valley coffee in Vishakhapatnam district of Andhra Pradesh. Visakhapatnam district was purposively selected for the study as the area under coffee cultivation is highest among Visakhapatnam and East Godavari the districts of Andhra Pradesh and the top two mandals were chosen which has maximum area under coffee plantation crop and two villages from each mandal were selected. The selected villages were Siragam and Vanthamuru villages from Araku valley mandal, Minumuluru and Gurramgaruvu villages from paderu mandal. The study is based on both primary and secondary data.

The primary data needed for the study have been collected from 67 stakeholders selected using probability proportional cum snow ball sampling technique from selected district duly categorized into 60 farmers, 4 local traders, two local roasters, one exporter. The secondary data pertaining to area, production and productivity of coffee crop for India and Andhra Pradesh was obtained from the coffee board of india. The data was analysed to attain the stated objectives by using CAGR, Value chain mapping technique, Price spread analysis, Markov chain analysis and Garette ranking technique.

The trend analysis study shows an increasing trend in area, production and productivity of coffee for a period from 2010-11 to 2020-21 in Andhra Pradesh. The CAGR of area under coffee was higher compared to production and productivity under coffee crop in the study. The reason for higher growth rate in coffee area was mainly due to the promotion by coffee board of India.

Six different coffee value chains were identified in the study area. Farmers, local traders, GCC, NGOs/facilitators, FPOs, local roasters, aggregators and exporters were the actors in the coffee value chains. Farmers were involved in cultivation and pulping of raw coffee cherries. local traders, GCC, NGOs/facilitators, FPOs and local roasters involved in aggregation of coffee cherries and parchment coffee. Curing and roasting was the major value addition activities in the coffee value chains. Among the existing value chains, price spread was less in the value chain 1 (31.73%).

The major constraints perceived by farmers during the production were Lack of Credit and high prevalence of pests & diseases etc. And the major constraints perceived by farmers during processing were non-availability of hand -pulpers and other machinery and cost of machinery is high. The major constraints faced by farmers for marketing of the produce were Lack of good transport facilities and Lack of marketing facilities. The major constraints faced by local traders in their business were lack of adequate storage facilities and high transport cost. The local roasters are facing the problem of high-end machinery cost for processing and high electrical consumption in terms of prices and units. The exporter is facing the problem of government policies of both importing and exporting countries. Freight charges are costlier and the 50 percent of the value goes to it. Inadequate export promotional measures are another highly critical issue as the low credit access, heavy documentation work for exports.

From the results and analysis of the study suggestions were made for improving the structure, governance and livelihood opportunities in coffee value chains. Introduction of cost-effective machinery in processing, skill development in processing of raw coffee cherries. Promotion of coffee-based farmer association, proper market regulation were the policies suggested to improve coffee value chain governance.

Chapter –I

Introduction

Chapter - I

INTRODUCTION

Botanically, coffee belongs to the genus *Coffee* in the Rubiaceae family. There are more than 70 commercially cultivated species in the genus Coffee, most of which are native to Africa, including Indian coffee like *Coffea arabica* and *Coffea canephora*. Another species, *Coffea liberica*, is cultivated on a small scale. Indian coffee is grown as a silvi-horticultural crop under the canopy for optimal yield. Growing oranges, peppers and cardamom between coffee plantations is a source of additional income. Coffee plantations are vital to the survival of the vibrant ecosystem of the ecologically sensitive Eastern Ghats and Western Ghats, which has been recognized as one of the world's biodiversity hotspots.

The shade growing conditions are common in coffee plantations offer good diversification with a wide variety of intercropping. India's shade coffee forests are internationally recognized as one of the most diverse forests on the planet. These biodiversity rich parks are a symbol of wilderness harboring a wide variety of herbs, shrubs and multiple crops. Indian coffee is known to be the world's best shade-grown mild coffees. India is the only country that grows entire coffee under shade. Typically, mild and not too acidic coffees possess an exotic full-boiled taste and a fine aroma. India cultivates all of its coffee under a well-defined two-tier mixed shade canopy, comprising evergreen leguminous trees.

In the modern urban life, coffee as a beverage is a great socializer. It is also used as an important therapeutic agent to stimulate heart and respiratory systems and as a diuretic, a variety of useful nutrients are found in coffee, including riboflavin (vitamin B-2), niacin (vitamin B-3), magnesium, potassium, and various phenolic or antioxidant compounds.

Coffee is the second most traded commodity after oil on international trade exchanges both in terms of volume and value representing a significant

source of income to several developing countries in Africa, Asia and Latin America. Four regions were listed as major coffee growing countries: South America, Asia, Africa and Central America. Brazil, Vietnam, Colombia, Indonesia, Honduras, Ethiopia, India, Uganda, Peru and Mexico are listed as the top 10 coffee growing countries in these regions (International Coffee Organization). In 2019-20, the overall global production of coffee was 99.03 lakh MT (International Coffee Organization, Historical data). Among the coffee growing countries, Brazil stands first both in area and production. It's share to the total world production was 35.26 per cent which was followed by Vietnam, Colombia and Indonesia. The share of the above major coffee growing countries was about 69 per cent and remaining 31 per cent was contributed by the other coffee growing countries. According to the International Coffee Organization, 100 million people are working in the coffee industry, 20-25 million of whom are small growers.

Coffee was introduced to the Indian subcontinent in the 1640s. By introduction of new economic policy during 1991-92 helped greater globalization by easing restriction on exports and imports in Indian International trade policy. At present, India ranks seventh position *(International Coffee Organization*) with a total production of 2,99,280 tonnes of during the year 2019-20 India accounts for about 3.02 per cent of world's coffee production and more than (95 per cent) of it is shade grown under a multi layered canopy of forest trees and multiple crops. The cultivation of coffee in India is limited to traditional coffee growing areas such as Karnataka, Tamil Nadu and Kerala; non-traditional regions consisting of states like Andhra Pradesh and Odisha. The North Eastern Region consisting of the states of Assam, Tripura, Mizoram, Meghalaya, Nagaland, Manipur and Arunachal Pradesh. The country's exports during 2020-21 was 1,64,108 GBE (Green Bean Equivalent - Quantity In MT). Export earnings 2020-21 was Rs. 2,78,905 lakhs and contributes 2.5 per cent to the nation's primary sector export earnings. On an average daily number of persons employed in coffee plantations is about 6,64,505 during 2018-19.

There are 3,79,697 coffee holdings in India, of which 99 percent are less than 10 hectares in size and they come under the category of small holdings. (Coffee board of India, 2019-20).

Coffee was introduced by the British in Pamuleru valley in non-traditional areas of eastern ghats of Andhra Pradesh in 1898, later spreading to Araku valley in the early 19th century. In 2019-2020, the total number of coffee growers in non-traditional areas such as Andhra Pradesh and Odisha were around 1,96,966. Out of them 1,92,864 tribal farmers were exclusively located in the Andhra Pradesh especially Visakhapatnam, is very proud of its "Araku coffee". While coffee grown in araku is sold at premium prices. About 99 per cent farmers from the non-traditional area was engaged in cultivation of Arabica coffee. The coffee from the Araku Valley is pure arabica with a rare aromatic odour. In 2019, for its special aroma and organic approach to coffee production by the tribals, the Department for the Promotion of Industry and Internal Trade, under the Ministry of Commerce and Industry, awarded the Geographical Indication tag to Araku valley coffee. Approximately 90 Per Cent of the total production of Araku coffee is exported to countries such as Sweden, Switzerland, Italy, and the United Arab Emirates.

Value chain refers to the set of actors (Private, Public, and including service providers) and the sequence of value-adding activities involved in bringing a product from production to the final consumer, in agriculture they can be thought of as a "farm to fork" set of processes and flows. (Miller and Da silva,2007).

Value chain analysis – assessment of the actors and factors influencing the performance of an industry, and relationships among participants to identify the driving constraints to increased efficiency, productivity and competitiveness of an industry and how these constraints can be overcome (Fries, 2007).

1.1 NEED FOR THE STUDY:

In last few recent years, value chain analysis of different crops received serious attention by the researchers, because a considerable amount of consumer's rupee goes to different value chain actors. The relation between the actors in the value chain place a major role in overall development of any industry. Commercial crops like coffee have been selected for the study because it is second most traded commodity in our country. In fact, there are no enough works done on value added products of coffee. An attempt is made to take up value chain analysis of araku coffee grown in non-traditional area of Visakhapatnam district to track the flow of produce from farmers through various channels undergoing value addition and ultimately reaching to the final consumer. A better analysis of value chain will help to understand how to improve the farmer's performances in every value adding step. It also provides in-depth understanding how to increase farmer's share in consumer rupee. It also provides in depth understanding how to increase the share of benefits out of consumer rupee spent by enhancing the consumer satisfaction to maximum in fluffing their need through various offerings. It is important to discover who the actors are, and what their relationships are, to gain a better understanding of where small coffee farmers are in the global value chain, and knowing their issues is essential. Thus, the present study was taken up with the following objectives.

1.2 OBJECTIVES:

1. To map the existing coffee value chains in Araku valley.
2. To analyze the Araku valley value chain of coffee.
3. To examine the constraints in different stages of Araku valley coffee value chain.

1.3 LIMITATIONS:

The study is based on primary data collected from a sample of farmers, local traders, Processors and Exporters. As majority of the farmers are not maintaining any farm records. Most often the data is obtained on recall basis based on their memory and experience over years. The other stakeholders involved in the study, even though they had records of transaction and price in many cases, some stakeholders were reluctant to disclose actual figures on purchase price, sales price, monthly sale, income and profit etc. After collection of data, the data was scrutinized well to avoid any specification biases. The collected data which was taken for analysis pertained to one agricultural season and area specific i.e., Visakhapatnam district only. Despite this number of constraints, adequate care was taken to ensure the trueness of data by cross checking it with available information. There are many other factors to be taken into consideration when these results are generalized.

1.4 PLAN OF THE RESEARCH WORK:

The research work is presented in five chapters. The first chapter deals with the introduction along with objectives. Review of literature available on trend analysis in area, production and productivity, value chain mapping, and analyzing the value chain of Araku valley coffee under different value chains and constraints faced by different value chain actors were cited in the second chapter. The third chapter deals with theoretical frame work of the study which includes the period of study, collection of data and method of analysis adopted for study. The fourth chapter encompasses a critical analysis of results and discussion. The fifth chapter presents the summary and conclusions of the study along with suggestions.

Chapter – II

Review of Literature

Chapter-II

REVIEW OF LITERATURE

To attain comprehension on a study, it is necessary to review the various concepts, research methodologies and analytical tools used by the researchers in earlier studies conducted by them. The findings of earlier studies would help in setting appropriate hypotheses and objectives and enable to evaluate the validity of the findings. This attempt would also help the researcher to have better understanding of the perspectives of the research problem and also facilitate the researcher to modify and improve the analytical framework in the right direction to suit the problem situation.

Hence, an attempt is made in this chapter to critically review the literature of the past research work relevant to the present study. The research work carried out by various research workers related to the problem under study has been reviewed under the following heads.

2.1 Studies on trends of area, production, productivity and exports.

2.2 Studies related to value chain mapping

2.3 Studies related to value chain analysis

2.4 Studies related to constraints faced by different actors in the value chain.

2.1 STUDY ON TRENDS OF AREA, PRODUCTION, PRODUCTIVITY AND EXPORTS.

Cleland. (2010) in his study on the impacts of coffee production on local producers found that even though the presence and growth of coffee may seem like a recent phenomenon to many Westerners, coffee producing countries realize the long history of this cash crop. With the spread of industry, promotion of free markets and price crashes, coffee farmers have had to suffer the impacts and adapt to changes. As seen in just a few case studies, coffee production can

heavily influence the lives of farmers and their families. In the face an unstable coffee market, producers have been forced to uproot their coffee trees, attempt to work on larger competitor's farms or find other means to survive. Whole countries, like Rwanda, have become dependent on the economy of coffee and without structure; profit can end up in the hands of the powerful rather than the hands of the farmers themselves. As with Brazil, governments often encourage farmers to put into place sustainable practices in order to yield more coffee from their crops.

Syariefet *et al.* (2012) in their study entitled, smallholder coffee processing design using wet technology based on clean production, highlights that wet processing for red coffee berry is intended to improve smallholder coffee quality. In order to minimize and prevent waste water generated from processing, it should be designed coffee processing based on water minimization as part of clean production.

Darvishi and Indira. (2013) in their study entitled, an analysis of changing pattern in area, production and productivity of coffee and tea in India, highlights that theplantation crops are high value commercial crops with greater economic importance andplay a vital role in Indian economy. It is the source of livelihood for millions of small and marginal farmers and provides employment for millions of plantation workers. The export earnings from plantation crops like coffee and tea played a significant role in financing Indian development. Plantation sector also plays an important role in the socio-economic development of the Indian regions. Being export oriented crops; changes in the trade policies affect the production of these crops much more than any other crops. Trade liberalization policies adopted in India with the introduction of New Economic Policies have greater impact on the area, production and productivity of thesecrops.

Gathura. (2013) in his study entitled, factors affecting small-scale coffee production in Githunguri district, Kenya, tries to determine whether marketing factors, finances, government policies and physical and human resources

affect coffee production in Githunguri district. The research established that marketing factors, finances, government policies and physical and human resources greatly affected coffee production. The study recommended that the government should encourage coffee production by formulating favorable marketing factors and other policies and provide finances to small scale coffee producers. Producers on the other hand should strive to provide conducive working environment to their workers so as to sustain them in their farms. This will help to improve coffee yields and quality.

Amaravathi and Raja. (2014) in their research paper on Indian coffee production and export destinations mentioned that coffee production is dependent on the climatic conditions and rain fall. Coffee production in India largely occurs on small, family- owned farms. A long-term increase in the number of extreme and unseasonal rainfall events will lead to lowered crop yields, threatening the livelihood of Indian coffee worker and will affect their employment. The export of coffee has shown a shrink dueto lack of rainfall which has a direct effect on production and export.

Panhuysen and Pierrot. (2014) in their report about coffee barometer 2014, have mentioned that world coffee consumption is growing steadily at around 2.5 Per Cent per year, and the demand for coffee is on the rise. Growth is fastest in the emerging markets, suchas those in Eastern Europe and Asia, and in the coffee producing countries themselves. The demand is expected to reach 165 million of 60 kg bags in 2020 and calls for around 15 percent increase in green bean production over the next 5 years. Thereby a shift in demand preference towards Robusta coffee has to be factored in. Global production averages 12 bags per hectare. If the production shortfall is to be met by expanding the land under coffee cultivation, it will necessitate opening up at least one million hectares of mostly forest covered land. With the increased pressure on land resources, a more sustainable solution is to produce more coffee per unit of land, water and agrochemicals. To increase and maintain quality and quantity in the long-term, it is of paramount importance to focus on

ensuring that women and the next generation of farmers remain in, and benefit from coffee production.

Jacob and Job (2015) studied the trends of area, production, productivity and exports of Indian pepper over a period from 1985-86 to 2013-14 by dividing the period into three sub-periods. He reported that area and production have shown a declining trend in period 3 when compared to period 1 and period 2. Whereas the export unit value had shown a comparative increase in period 3 due to increased due to the declining trend in production of pepper. While productivity had shown a positive trend in period 3 among all the periods.

Ramamoorthy and Jeyalakshmi (2016) studied the growth rates in area, production and productivity of coffee in India over a period from 1970-71 to 2013- 14 by dividing into pre-Liberalization and post-Liberalization periods. They reported that area, production and productivity have shown a positive growth rate in both preLiberalization and post-Liberalization periods except the productivity in postliberalization. They stated that fluctuations in prices was the main reason for the changes in production. They concluded that there was scope for increasing the coffee production and exports in India by increasing the quality.

Das and Zirmire (2018) in their study on tea industry in India, they studied the present status of Indian tea industry and the growth rates of production, export and import of Indian tea over the period of 12 years from 2003 to 2015. They reported that the compound growth rates of production, exports and imports of Indian tea were 2.86 per cent, 1.22 per cent and 0.78 per cent respectively indicating an increase in production and exports were increasing over the period than imports. They also stated that, even though there was an increase in the exports, but the share of exports in production has decreased from 43 per cent (2006) to 34 per cent (2015).

Babu et al. (2019) studied the trends in area, production and productivity of type-wise Indian coffee. They reported that Robusta coffee had shown more growth in production than the Arabica coffee, whose area and productivity were

declining. Overall growth rates of area and production of coffee have shown positive trend while productivity had shown a declining trend. They also observed the percentages of area and production of arabica and Robusta coffee in overall coffee and he reported that the productivity of Robusta coffee was higher than the Arabica.

2.2. STUDIES RELATED TO VALUE CHAIN MAPPING

Fitter and kaplinksy (2001) in Copenhagen showed that, by focusing on the capacity of value chain analysis to map input-output relations, and by identifying power asymmetries along the chain, it is possible to analyze the factors explaining inter-country distributional outcomes. This article applies value-chain analysis to an agricultural 'commodity', which is in the process of significant change in final product markets (coffee). It is concluded that there is a simultaneous process of power concentration in importing countries and power deconcentration in producing countries. It is hypothesized that similar trends can be observed in other agricultural- based value chains.

Angula (2010) in his study about determinants of sustainable coffee marketing channel choice and supply response among organic and utz certified smallholder farmers, evidence from Uganda, found that coffee growers may be attracted by price premiums offered by the sustainable coffee marketing channel, although its overall impact appears to be limited. This may reflect a cost-benefit assessment on the part of the farmers in deciding whether the premium offered is worth investing in quality. This has important implications in that the distribution of the price premium within the supply chain is important if farmers' participation is to be ensured. Access to credit was found to be a constraint for the amount of coffee offered for sale to the sustainable coffee marketing channel. Access to credit enables farmers to make necessary investments in the quality of their coffee and meet quality requirements of this channel.

Chepng'eno e*t al.* (2010) revealed that the tea buying with in the small holder subsector had been the exclusive role of Kenya Tea Development

Agency (KTDA) before 2000 when the sector was liberalized leading to the emergence of two marketing systems. The study was conducted in Nandi North District with the objective of establishing whether there is a difference in the farm gate prices associated with the existing marketing channels of KTDA and non KTDA. They suggested that profitability of the smallholder tea enterprise can be improved by advising farmers to sell their greenleaf through channels that realize better earnings. The study recommends that ways of improving profitability of the smallholder tea enterprise should be established.

Anteneh and Ruben. (2011) in their study entitled, factors affecting coffee farmers market outlet choice, the case of Sidama zone, Ethiopia highlights that access to market in the form of different channels for coffee farmers is crucial for exploiting the potential of coffee production to contribute to increased cash income of rural households.

Toni *et al.* (2012) supply chain in coffee industry can be divided into two categories: vertical integration and fragmented networks. Global companies such as Nestle and Maxwell House utilize vertical integration supply chain in order to achieve greater level of profit margin and to be able to monitor the quality of the product. Fragmented supply chain, on the other hand, involves dealing with specialized network actors such as growers, roasters and local traders in a direct manner with the aim of establishing strategic relationships.

Higuchi *et al.* (2012) in their research paper on the impact of socio-economic characteristics on coffee farmers' marketing channel choice, evidence from Villa Rica, Peru, mentioned that the intermediaries focus solely on higher prices while marketing organizations offer benefits to their members. A survey of 60 producers was carried out in June 2011 in Villa Rica. They are used a binary logistic model in order to show how these characteristics affect farmers' choice of which marketing channel to use to distribute their product. The results demonstrated that farmers who are keen to receive technical assistance participate in the marketing organizations. These coffee marketing organizations should look for ways to improve the extension component through training and knowledge transfers to smallholder farmers.

Ngabitsinze (2012) in his study mentions that, the participation in speciality coffee marketing channels and participation in cooperatives both serve to increase prices received by producers. The study also showed that the level of incomes between small farmers who were not cooperatives members was different from small farmers who participate in cooperatives system. Membership in the cooperative increases the possibility to produce high quality of coffee cherries and to receive a good level of price, but to become a member of those cooperatives, small farmers need to have many coffee trees and a good level of education. The study concluded that government of Rwanda could do even more to support the small farmers who are not involved in cooperatives and associations system. The government can assist them by giving the phytosanitary products, transportation assistance, and control seriously the use of phytosanitary products.

Grover *et al.* (2013) revealed that kinnow growers in the state were benefitted by selling their produce through direct marketing/emerging marketing channels (EMC). Despite incurring higher marketing costs, the net price received by them was about 20 per cent higher than those received by farmers who disposed of their produce through traditional marketing channel (TMC) viz., pre-harvest contractors. The share of kinnow growers in the price paid by consumer under TMC was only 33.70 per cent, while the same in case of EMC was 55 per cent. However, the marketing operations of EMC are very limited enabling only a few farmers to secure higher price. He suggested an expansion of such innovative/direct/emerging marketing channels for fruits in an organized manner, coupled with upgraded market infrastructure.

2.3. STUDIES RELATED TO VALUE CHAIN ANALYSIS

Rao et al. (2010) studied the implementation of millets value chain pilot project under the NAIP to create demand for sorghum through diversification in farm production, procurement, ultimately aiming at economic benefits to both farmers and other stakeholders. The inconvenience in the preparation of sorghum foods was the important reason for the decrease in its consumption,

which had been eliminated through development of convenient and ready-to-eat /cook foods. The study observed that linking up of the entire stakeholders through value addition throughout the value chain system would renew and uplift the diminishing sorghum area and production and its ultimate economic benefits to farmers and other stakeholders in the value chain.

Kumar et al. (2012) worked on value chain analysis of maize seed delivery system in public and private sectors in Bihar. The study has mapped the value chain of public and private seed systems by conducting surveys of seed producers, farmers, seed distributors, private seed companies and public research institutions as to understand the delivery system of maize seed in a value chain perspective and has brought out the need for a greater emphasis on integration of different stakeholders involved in the chain. The enabling environment from the government policies to support services needs to be reoriented towards enhancing efficiency in seed delivery in the state.

Kakkar (2014) in his study employed a value chain approach to examine the factors that affect chickpea production, value addition at each stage and marketing of chickpea. The overall results revealed that even though diversified value addition is done for chickpea and margins are high for finished products, due share in the consumer's rupee is not received by the farmers. The study suggested the development of inclusive value chain to safeguard the interest of smallholder farmers, who remain at risk of profiting the least from agriculture.

Mugisha et al. (2014) analysed the value chain for groundnuts in Uganda with the specific objectives of characterizing the key actors along the groundnut value chain; determine the costs and value added along the groundnut value chain; and determine the constraints and opportunities in the value chain and suggest ways to upgrade the chain. The processors were mainly involved in shelling groundnuts in cases where they bought unshelled, milling into flour, packaging and reselling. The main quality attributes considered by the groundnut value chain actors was grain size, cleanliness of the grain, moisture content and grain colour. The different actors performed different activities

along the value chain, and hence incurred different costs. Activities done by the majority of the wholesalers and retailers were sorting, packaging, storing and sometimes shelling.

Luna and Wilson (2015) worked on value chains of coffee in Chiapas, Mexico. They identified fair trade and vertical integration represent two popular approaches for enhancing the incomes of organized farmers in a volatile coffee market as compared to the uncertain plight of independent, non-affiliated growers in the study area. A mixed method approach, utilizing informal interviews and a household survey in Chiapas, Mexico, analyzed three coffee trading regimes: independent, non-affiliated farmers, and growers in cooperatives pursuing a fair trade or vertical integration strategy. Survey and econometric results indicate that concentration on specialty coffee production with a portfolio of foreign contracts is economically preferable to a vertically integrated cooperative, which in turn produces more favorable coffee prices for smallholders than the non-affiliated conventional, coyote-dominated trading system.

Kumari et al. (2018) made an attempt to study “value chain analysis of major pulses in Bihar”. The findings of the study indicated that 90 Per Cent of farmers sold their produce just after harvest to the village trader/in local market to meet out the operational expenditure. Producer’s share in consumer rupee was worked out to only 60 Per Cent through main channel used by the majority of farmers in study area and value addition network indicates that producers share reduced due to higher marketing margins. Further it was also noticed that 30 Per Cent of produce get lost every year before to reach into the market. Appropriate backward and forward linkages of pulse growers with marketing were also analysed to generate better returns from pulses. There is a need to enabling environment through the government policies to support services for enhancing marketing efficiency of selected market in Bihar.

Anggadwita *et al.* (2019) analysed the value chain model in coffee shop business in Bandung by mapping the input-output relationship, and identifying

strength factors along the value chain. The results showed that the main activities and supporters in the coffee shop value chain in Bandung involve four main actors, namely local coffee farmers, coffee traders, processing industries, and coffee shops. The procurement of raw materials for roasting can be met from local coffee farmers and local coffee traders. The coffee production process runs quite well because each shop has baristas with modern and manual coffee-making techniques. The process of raw material procurement and product distribution can be fulfilled due to the support of access and adequate shop facilities. Production technology used is still semi-modern. The ordering technology of coffee products is still semi-modern and not digital, so it needs to be developed to produce a regular and systematic product ordering and recording. In addition, the coffee shops have also had good human resources by having an expert roaster and the baristas are reliable in processing and manufacturing of coffee products. This research is expected to be a reference for further research on exploration of solutions in overcoming management and operational problems in coffee shops. In addition, a series of identification of value chain processes in this study is expected to provide added value for both business and consumers in coffee shops.

Chengappa *et al.* (2019) made an attempt to study “value chain analysis of conventional, certified, and organic coffee in India”. The findings of the study indicated that coffee value chains are largely diffused in nature with limited coordination in terms of quality and specifications in the conventional chain. Coordination is stronger in certified and organic chains, but incentives and motivation for upgrading largely stem from individual efforts to add value rather than those taking place at the chain level. Clearly, organic and certified coffee proved beneficial as compared to conventional coffee in terms of gains to the actors and sustainability point of view. There is a potential niche for India to develop eco-friendly coffees by leveraging the natural environment and biodiversity present in its coffee growing region – Western Ghats, a hotspot of biodiversity. These suggest that integrating sustainability principles in a broad-

based branding strategy could be difficult at the level of the chain without institutional support.

Grant Thornton (2019) conducted a study on value chain analysis of bengal gram in Rajasthan where RACP was operating. The findings of the study reported that in gram value chain, farmers were not getting higher remuneration or value for their produce due to lack of direct linkages with processors or consumer market. The report suggested that these weak linkages can be removed with the intervention opportunities such as setting up a FPC in the cluster and then tie up of FPCs through FCSC with firms like Patanjali, Tata, dal mill associations/MSME firms, housing societies in urban areas and retail outlets. There is also scope for facilitation of start-ups from among FPOs or individual entrepreneurs in secondary processing of value-added products of chickpea like dal, besan and roasted gram, etc. This would spur vertical business integration and diversify portfolios to reduce their vulnerabilities.

2.4. STUDIES RELATED TO CONSTRAINTS FACED BY DIFFERENT ACTORS IN THE VALUE CHAIN.

Tiwari (2010) in his study entitled, agricultural policy review for coffee promotion in Nepal, highlights that coffee is one of the important cash generative crops in the mid hills of Nepal. Coffee, being an important high value crop, is mostly grown in marginal areas with minimum use of improved technologies. In line with the focus of agricultural policies, the concerned organizations have not taken adequate initiatives for the promotion of coffee cultivation. In Nepal majority of coffee is wet processed, which is considered best method for good quality coffee. However, there is lack of updated manpower and improved technologies to work in this area. As a result of which, quality of Nepalese coffee is below international standard. Around 65 percent of Nepalese coffee is exported and the rest amount is processed and supplied in the domestic market.Majority of coffee is exported through personal contact of traders rather than institutionalized marketing channel. Therefore, there is gap between what policies have stated and what actually is implemented in the real fields for the promotion of coffee.

Smith (2010) in his study entitled, the evolution of coffee markets for sustainable development: a Honduran cooperative‘s experience with fair trade, explores the barriers coffee farmers of cooperative Copan in western Honduras face in effectively participating in the fair trade market, as well as the opportunities fair trade offers in improving the conditions of these farmers and the environment. It also highlights the political and economic relationships that constitute the global coffee industry and the many links between points of production and consumption along the coffee value chain. Fair Trade has become an important alternative trade strategy in the world economy as it confronts the power inequalities and exploitations within the North-South trade relations.

Hazarika (2011) in her study on changing market scenario for Indian tea found that in the recent past due to oversupply of tea against demand, the market strategy has shifted from the seller market to the buyer market. Though export market of Indian teais losing its position, the next alternative will be domestic market, which has shown a trend in increase in demand. The tea producers should try to understand market demand which is very important for long term sustainability of the industry. If they take proper initiative in the marketing field, they can achieve higher margin of profit.

Kodigehalli (2011) in his study on value chain analysis for coffee in Karnataka, India, highlights that the coffee undergoes various processing stages by the time it reaches the consumer. At each stage the value added to it increases and takes a new form. It is clear that although, market is the major player, trust between producers and intermediaries play a major role in the transaction. In Indian coffee market, most of the produce is intended to exports. Quality standards play an important role in gaining access to international producers. However, small producers are yet to reach the standards required for the international market and are getting a smaller share in the profit of the value addition process. The study mentioned that collective action of the producers helps them to increase the bargaining power and to get a higher share in the value chain process.

Dowdall (2012) in his study entitled, small farmer market knowledge and specialty coffee commodity chains in western highlands Guatemala, highlights that for producers motivated by their new status as self-employed, landowning, capitalist coffee growers, specialty coffee presents an opportunity to proactively change the way they participate in the international market. Now responsible for determining their own path, many producers have jumped at the chance to enhance the value of their product and participate in the new 'fair trade' market. But recent trends in the international coffee price have led many producers to wonder why their efforts to produce a certified FairTrade and organic product are not generating the price advantage they had anticipated.

Mohan *et al.* (2013) while studying the marketing of Indian spices as a challengein India have opined that there is tremendous importance of spices; it is rather unfortunate that the sector has not achieved the required level of development becauseof the problems in the marketing, supply chain, exports, pre and post harvesting activities. On the one hand they have to deal with hundreds of small-scale farmers who want a good price for their produce. On the other hand, exporters need to deliver products that comply with quality requirements and increasingly with social and environmental standards of volatile markets. This requires costly quality management systems and training of farmers.

Perke et al. (2017) studied constraints in production and marketing of soybean in Hingli district of Maharashtra. The overall results showed that major constraints felt by soybean growers in production were 75.83 per cent soybean growers faced the problem of attack of insect, pest and diseases on soybean crop followed by low prices of soybean at the time of harvesting faced by 71.66 per cent. Soybean growers about 62.50 per cent expressed as non-availability of labour at the time of harvest and day to day fluctuations in the price of soybean was also a problem expressed by 60.83 per cent of soybean growers. Nearly 54.16 per cent of the farmers had sold their soybean just after harvesting because of lack of storage facilities as major problem. Similarly, 41.66 per cent soybean growers expressed that weed problem. 33.33 per cent soybean growers faced the constraint of high transport charges. 26.66 per cent growers face the

problem of high labour charges and followed by high commission charges by 16.66 per cent of soybean growers.

Gohain and Singh (2018) conducted a study on analysis of problems and constraints faced by farmers in marketing of paddy, wheat, maize and cotton in Punjab. The results from the study indicated that the most important problem identified by the farmers in the marketing of paddy and wheat was the delay in procurement of paddy in the markets followed by the deduction of payments by commission agents due to higher moisture content in the grains. However, the major problem during marketing of basmati was the exploitative practices by the intermediaries followed by lack of public procurement. The problem faced by majority of farmers in the marketing of maize and cotton was the lack of public procurement of the produce and lack of remunerative price of the crop respectively.

Kumar *et al*. (2019) studied the constraints faced by the farmers in production and marketing of vegetables in Haryana. The major marketing related constraints faced by farmers were lack of market information, higher price fluctuations, higher amount of price spread, malpractices in weighing and storing of vegetables, problem of storage facilities, lack of processing units, high cost of labour, high transportation cost and delay in payments.

Das and Mishra (2019) highlighted that the highest value addition took place at industry level and the net incomes of small tea growers and green leaf collectors were Rs. 2.63 and Rs. 1.86 per kilogram of green tea leaves respectively; and for processors, wholesalers and retailers these were Rs. 20.00, Rs. 2.50 and Rs. 4.00 per kilogram of made tea, respectively. They relieved that non-availability of workers in the peak plucking season, lower price of green tea leaves, non-settlement of land records of the small tea growers in the government offices and high price fluctuation of green tea leaves were the common problems faced by the small tea growers during production and marketing of green tea leaves.

Chapter – III

Material and Methods

Chapter- III

MATERIAL AND METHODS

The present study was carried out in Andhra Pradesh with special emphasis on Visakhapatnam district and specially on Araku valley region. An attempt has been made in this chapter to describe the sampling design, nature of data collection and various analytical tools, being employed in achieving the objectives of the present study in the following:

3.1 Sampling design

3.2 Study period

3.3 Collection of data

3.4 Tools of analysis

3.5 Terms used in the study

3.1 SAMPLING DESIGN

Purposive sampling, probability proportional and snow ball sampling techniques were used for selection of farmers and different actors/players required for the study. Two mandals in the district were selected based on the maximum area under coffee Plantation. Similarly, following the same criterion two villages in each mandal were selected. A total of four villages were selected. In each village the coffee growers were identified. Among them sample farmers were selected based on the criteria of total number of coffee growers in each village by using probability proportional sampling technique. The required number of farmers was selected from each village by interview method thus making a total sample of 60.

3.1.1 Selection of District

In Andhra Pradesh coffee plantation is mainly observed in the Visakhapatnam and some parts of East Godavari. Among the major coffee

growing districts, Visakhapatnam was selected for the present study as it stands first in area and production of coffee in Andhra Pradesh.

3.1.2 Selection of Mandals

The second stage of sampling pertains to the selection of the mandals. Two mandals from Visakhapatnam viz., Araku velly and Paderu were selected as they happen to contribute sizably to area and production of coffee in the district. This data is obtained from the respective Coffee Board of India offices.

3.1.3 Selection of Villages

The selection of villages formed the third stage of sampling. Two villages from each mandal namely Siragam and Vanthamuru villages from Araku valley mandal, Minumuluru and Gurramgaruvu villages from Paderu mandal were selected as they were the highest Coffee plantation villages in the respective mandals.

3.1.4 Selection of Farmers

From each village, sample farmers were selected based on the criteria of total number of coffee growers by using probability proportional sampling technique. The required primary data is obtained from selected number of farmers from each village by interview method making a sample of 60.

3.1.5 Selection of actors/Stakeholders

The present study also intended to study the different stakeholders involved at different stages of the value chain of coffee, their roles and key activities. After identifying different value chains of coffee in study area, a sample of traders (4), Roasters (2) and Exporter (1) were identified and selected through snowball sampling technique. Additional to this interacted with the different government agencies like Girijana cooperative corporation (GCC), Coffee Board of India, Integrated Tribal Development Agency (ITDA) and facilitators like NGOs, FPOs in the study area.

3.2 STUDY PERIOD

The primary data was collected from the sample respondents in respect of production and marketing of chickpea pertain to the agricultural year 2020-21.

3.3 COLLECTION OF DATA

Both primary and secondary data was collected for the present study. Primary data was collected from the selected farmers, traders, processors, wholesalers, Exporters, ITDA and GCC through survey method with the help of pre-tested schedules designed for the purpose. Similarly, secondary data was collected from the Coffee Board of India, Govt. of A.P.

A separate set of interview schedules were prepared for farmers and for the intermediaries. The interview schedule for farmers covered the aspects such as general farm and household characteristics, socioeconomic parameters like education, primary and secondary occupation, details on marketing of coffee, problems in production, processing and marketing etc. The schedule for intermediaries covered the aspects such as quantity and quality of coffee handled, and the problems faced by them in the value chain of coffee.

3.4 TOOLS OF ANALYSIS

Keeping in view the objectives of the study, appropriate statistical methods were employed to analyse the data. The analytical techniques used in the study are presented below:

3.4.1 Annual Growth Rate

Annual growth rate is used to measure the change in area, production and productivity of coffee plantation over the period of a year. The formula to calculate annual growth rate uses the previous year as a base.

Annual Growth rate= (Present year - Previous year area or production and or productivity of coffee)/ (Previous year area or production and or productivity of coffee) *100

3.4.2 Compound Annual Growth Rate Analysis

In order to find out the compound growth rates with respect to area, production and productivity of chickpea, exponential function was used:

$$Y_t = ab^t$$

Where,

Y_t = Area, production and productivity of the coffee in year t (dependent variable)

a = Intercept

b = Regression coefficient

t = Year which takes value (t=1,2,3 … … n) (independent variable)

Logarithmic transformation was applied to the above exponential function and hence, the estimating equation was

$$\log Y_t = \log a + t \log b$$

The equation was estimated by ordinary least square technique (OLS). Compound growth rate (g) was then estimated by

$$g\hat{} = (b\hat{} - 1)100$$

Where,

g^ = Estimated compound growth rate in per cent per year and

b^ = Anti log of b

3.4.3 Price Spread Analysis:

Information on prices prevailed and the costs involved in marketing of coffee at different stages of value chain were collected from the farmers, Local-trader, GCC, NGOs/Facilitators, Local- Roasters, Aggregators, Exporter and retailers. The cost of marketing included transport, weighing, loading and unloading, packing, storage, losses due to spoilage and other incidental expenses incurred for marketing the produce. In the process of value chain of

coffee, the difference between price paid by the consumer and that received by the coffee grower for an equivalent quantity of produce was defined as “price spread”. Data on profits of the various market functionaries involved in moving the produce from the initial point of production till it reached the ultimate exporter were collected and in the domestic value chain it covers the consumer purchase price. In this study, sum-of-average gross margin method was used in the estimation of price spread.

Total Cost of Marketing

The total cost incurred on marketing either in cash or in kind by the producer (seller) and by the various intermediaries involved in the sale and purchase of commodity till it reaches the ultimate consumer, may be follows:

$$C= C_f + C_{m1} + C_{m2} + C_{m3} \ldots .. \ldots + C_{mn}$$

Where,

C = Total cost of marketing of the commodity

C_f = Cost paid by the producer from the time the produce leaves the farm till he sells it

C_{mn} = Cost incurred by the nth middlemen in the process of buying and selling the product

3.4.4 Markov Chain Analysis

The India arabica coffee importing countries has been categorized into top nine countries and the rest as others viz. viz., Italy, Belgium, Germany, U.S. A, Switzerland, United Kingdom, France, Australia, Russian Federation and the remaining countries were categorized under others. To assess the direction of trade and changing pattern of Indian arabica coffee among the importing regions Markov chain analysis was employed.

Markov chain analysis is engaged to analyse the structural changes in a system whose progress can be measured in a single outcome variable. This is the method of predicting the behaviour of a variable by analysing the past

behaviour of that variable. The estimation of transitional probability index is central to the Markov chain analysis. The elements Pij of the matrix P will indicate the switching of exports from country i to country j by the wearing of time. The row elements will indicate the retention probabilities and loss of trade, while the column elements will indicate the retention probabilities and the gain of the trade with the during the study period. The diagonal elements of the matrix P will indicate the retention probabilities of respective regions. Therefore, examination of the diagonal elements will show the loyalty of an importing country towards a commodity.

In this study the average Indian arabica coffee exports to a particular country were considered to be a random variable which depends only on its past exports to that country, which can be algebraically denoted as

$$E_{jt} = \sum_{i=1}^{n} E_{it-1} * P_{ij} + e_{jt}$$

whereas,

$\sum_{jt}$: exports from India during the year t to jth region.

E_{it}-1: export to ith region during the year t-1.

P_{ij}: the probability that exports will shift from ith region to jth region.

E_{jt} : Error term which is statistically independent of Eit-1.

n : the number of importing regions and

t : the number of years considered for the analysis.

Transitional probabilities that can be arranged in (c×r) matrix with the following properties.

$$\sum_{i=1}^{n} P_{ij} = 1$$

Where, $0 \leq Pij \leq 1$

Thus, the expected export shares of each region during the period ‘t’ were obtained by multiplying the exports to those regions in the previous period (t-1) with the transitional probability matrix.

There are a handful approaches to calculate the transitional probabilities of Markov chain model like Bayesian maximum likelihood, weighted restricted least squares, unweighted restricted least squares etc. In the present context Minimum Absolute Deviation (MAD) was used to calculate transitional probabilities which minimize the sum of absolute deviations.

The conventional linear programming techniques were used as this satisfies the properties of transitional probabilities of non-negativity restriction and sum constraints in estimation. The linear programming formulation is stated as

$$\text{Min, } O\ P^* + I\ e$$

Subject to,

$$X\ P^* + V = Y$$

$$GP^* = 1$$

$$P^* \geq 0$$

Where,

P*: vector of the probabilities Pij

O: vector of zero

I: an appropriately dimensional vectors of areas

e: vector of absolute error

Y: vector of exports to each region

X: block diagonal matrix of lagged Y values

V: vector of errors

G: a group matrix to add row elements of P arranged in P* to unity.

Prediction quantities of Indian arabica coffee exports to different regions were estimated by using:

$$B_t = B_o * T$$

$$B_{t=1} = B_{t+i-1} * T$$

Where,

B0: Quantity of exports in base years

B t+i: Quantity of arabica coffee exports in next year (prediction)

T: Transitional probability matrix.

3.4.3 Descriptive Analysis

Averages and percentages were used to examine the characteristics of sample farm households such as age, literacy status and size of operational holdings, production and marketing of coffee cost of coffee production.

3.5. TERMS USED IN THE STUDY

The following are the terms and concepts used in the present study.

3.5.1 Markov chain analysis

A method used to forecast the value of a variable whose future value is influenced only by its current position or state, not by any prior activity that led the variable to its current position or state.

3.5.2 Transitional probability matrix

A matrix which represents one step probabilities

3.5.3 Direction of trade

Change in the export of commodity among the importing regions year-on-year

3.5.4 Parchment coffee

Coffee obtained after removal of top layers of the coffee cheery.

3.5.5 Social Infrastructure

It covers Health care, Education, employment for self-sustain etc.

Chapter – IV

Results & Discussion

Chapter-IV

RESULTS AND DISCUSSION

Keeping in the view of presenting the findings of the study, the data was analyzed by using appropriate analytical tools. The findings of the study are discussed under following sections.

4.1. Growth rates in terms of area, production and productivity of Indian coffee.

4.2. Socio-economic characteristics of the sample farmers.

4.3. Identification of actors in Araku Coffee value chain

4.4. Mapping and analyzing of existing coffee value chains in Araku valley.

4.5. Constraints in different stages of Araku valley coffee value chain.

4.1. GROWTH RATES IN TERMS OF AREA, PRODUCTION AND PRODUCTIVITY OF INDIAN COFFEE

4.1.1. Growth Rates in terms of Area, Production of Indian Coffee from 2000-01 to 2020-21

The secondary data pertaining to area and production of Indian coffee from 2000-01 to 2020-21 was obtained from Coffee Board of India. The annual growth rates and Compound Annual Growth Rate (CAGR)s were calculated for the data obtained and the results were presented in Table 4.1.

A perusal of Table 4.1., inferred that the annual growth rates of area under coffee were highly fluctuating during the study period i.e., from 2000-01 to 2020- 21. A significant increase in the annual growth rate of cultivated area under coffee was observed in the year 2016-17 (3.22 per cent) and a significant decrease in the annual growth rate of cultivated area under coffee was observed in the year 2002- 03 (-0.04 per cent). During the study period, a significant increase in the annual growth rate of coffee production was

observed during the year 2020-21 (12.08 per cent) and the significant decrease was observed in the year 2016-17 (-10.34 per cent).

The calculated CAGR of cultivated area under coffee from 2000-01 to 2020-21 was 1.59 per cent. This indicated that a minor increase in area under coffee in India was over the last 21 years. The CAGRs of Indian coffee production and productivity during the study period was 1.01 per cent and -0.57 per cent respectively. This shows that productivity was decreased though the production had increased during the study period. This was because of new coffee plantations were fallen up, coffee start bearing only after 3 years of plantation.

Growth rates of area, production and productivity of Indian coffee from 2000-01 to 2020-21 is depicted in Fig 4.1.

Table 4.1 Growth rates of area, production and productivity of Indian coffee from 2000-01 to 2020-21.

Year	Area (ha)	Annual growth rate (Per Cent)	Production (MT)	Annual growth rate (Per Cent)	Productivity (Kg/ha)	Annual growth rate (Per Cent)
2000-01	313934		301200		959	
2001-02	320737	2.17	300600	-0.20	937	-2.29
2002-03	320615	**-0.04**	275275	-8.42	859	-8.32
2003-04	325124	1.41	270500	-1.73	832	-3.14
2004-05	333338	2.53	275500	1.85	826	-0.72
2005-06	341351	2.40	274000	-0.54	803	-2.78
2006-07	343040	0.49	288000	5.11	840	4.61
2007-08	344508	0.43	262000	-9.03	761	-9.40
2008-09	350500	1.74	262300	0.11	748	-1.71
2009-10	355502	1.43	289600	10.41	815	8.96
2010-11	360485	1.40	302000	4.28	838	2.82
2011-12	368687	2.28	314000	3.97	852	1.67
2012-13	376305	2.07	318200	1.34	846	-0.70
2013-14	381304	1.33	304500	-4.31	799	-5.56
2014-15	386195	1.28	327000	7.39	847	6.01
2015-16	397147	2.84	348000	6.42	876	3.42
2016-17	409924	**3.22**	312000	**-10.34**	761	**-13.13**
2017-18	413020	0.76	316000	1.28	765	0.53
2018-19	416741	0.90	319500	1.11	767	0.26
2019-20	418167	0.34	298000	-6.73	713	-7.04
2020-21	422924	1.14	334000	**12.08**	790	**10.80**
Compound annual growth rate (Per Cent)	**1.59**		**1.01**		**-0.57**	

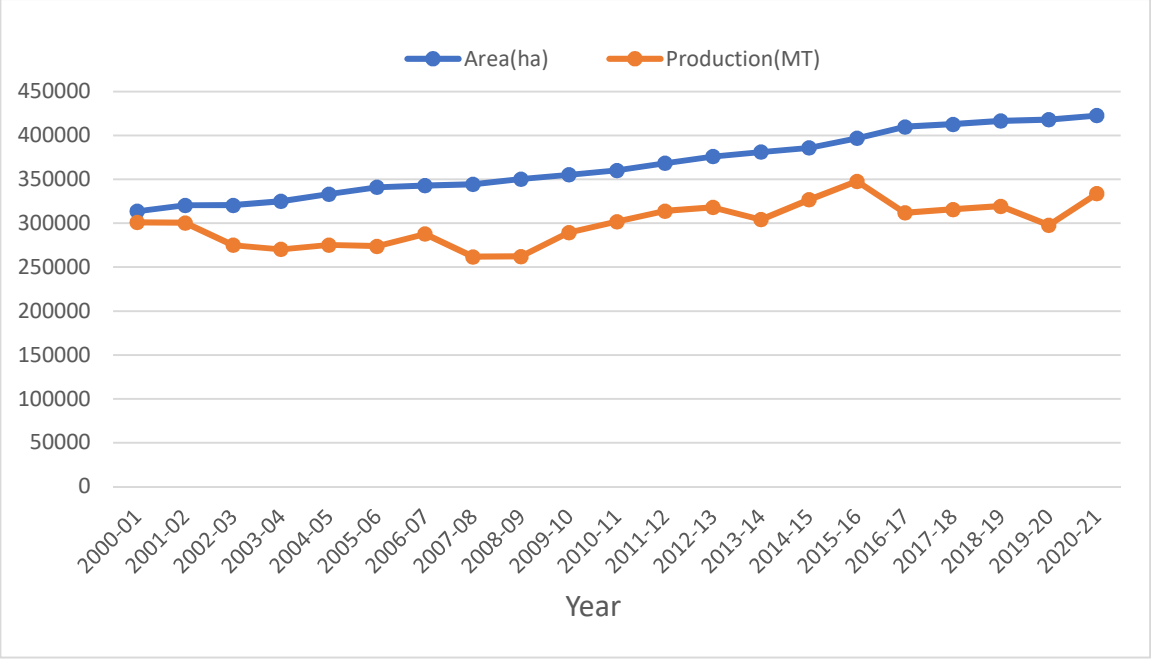

Fig. 4.1 Area and production of Indian coffee from 2000-01 to 2020-21.

Source-www.indiacoffee.org

4.1.2. Compound Annual Growth Rates of Area Under Arabica Coffee, Robusta coffee and Total coffee from 2000-01 to 2020-21

The data pertaining to area under arabica coffee and robusta coffee from 2000-01 to 2020-21 was collected from coffee Board of India. The compound annual growth rates are computed from the data obtained and the results were tabulated in table below.

Table 4.2 Compound annual growth rates of area under arabica coffee, robusta coffee and Total coffee from 2000-01 to 2020-21

Year	Area in hectares		
	Arabica	**Robusta**	**Total**
2000-01	**146502**	**167432**	313934
2001-02	149056	171681	320737
2002-03	146780	173835	320615
2003-04	148389	176735	325124
2004-05	153280	180058	333338
2005-06	151547	189804	341351
2006-07	151861	191179	343040
2007-08	151013	193495	344508
2008-09	156421	194079	350500
2009-10	159828	195674	355502
2010-11	163737	196748	360485
2011-12	169906	198781	368687
2012-13	176131	200174	376305
2013-14	181129	200175	381304
2014-15	185978	200217	386195
2015-16	192734	204413	397147
2016-17	195412	214512	409924
2017-18	198671	214349	413020
2018-19	202218	214523	416741
2019-20	203546	214621	418167
2020-21	**207060**	**215864**	422924
Compound annual growth rate (Per Cent)	2.07	1.74	1.59

(Source-coffee Board of India)

From the Table 4.2 it can be inferred that during the study period i.e., from 2000-01 to 2020-21. the cultivation area under arabica coffee was recorded highest in the year 2020-21 (207060 hectares) and the lowest was observed in the year 2000-01 (146502 hectares). The highest cultivated area under robusta coffee was observed in the year 2020-21 (215864 hectares), while the lowest was observed in the year 2000-01(167432 hectares).

The results of CAGRs of area under both arabica and robusta coffee were 2.07 per cent and 1.74 per cent during the study period i.e., from 2000-01 to 2020- 21. The CAGR of Arabica coffee was higher than robusta coffee, which indicated that area under arabica coffee had increased more compared to area under robusta coffee.

The cultivated area of both arabica and robusta combinedly from 2000-01 to 2020-21 had shown a CAGR of 1.59 per cent indicating a moderate increase in total area during study period. Area cultivated under arabica, robusta and total coffee from 2000-01 to 2020-21 is depicted in Fig 4.2

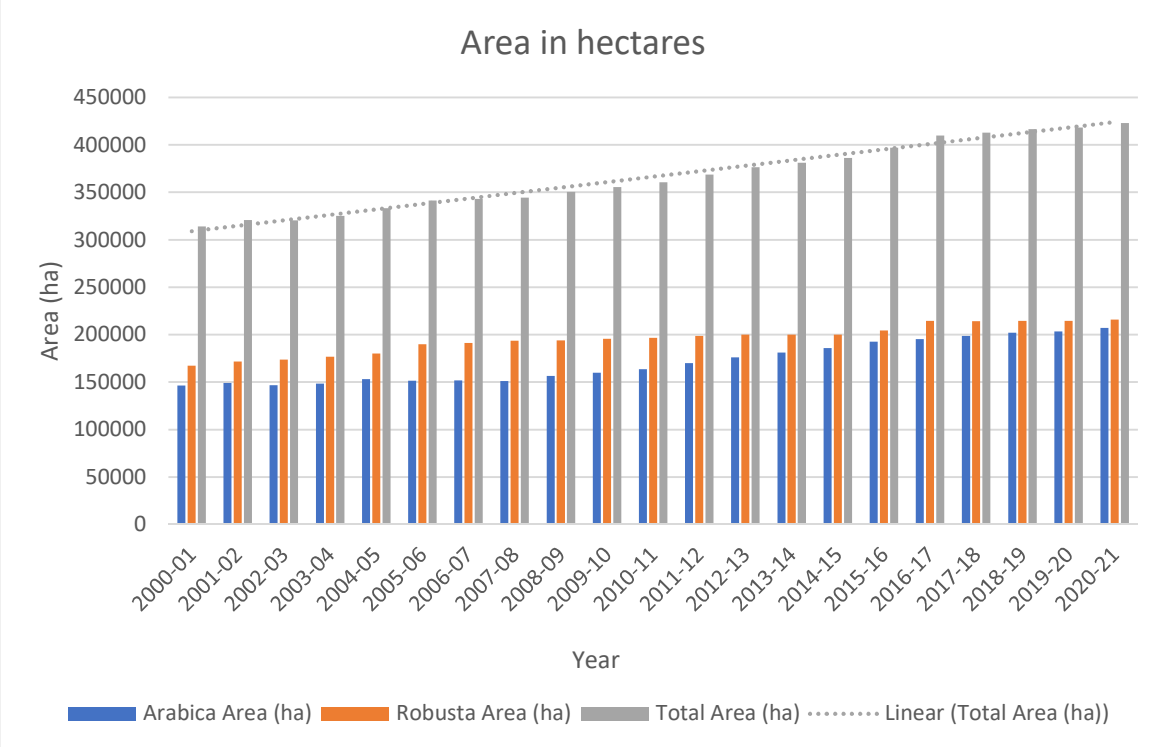

Fig 4.2 Area under Arabica, Robusta and total coffee in India from 2000-01 to 2020-21.

4.1.3. Compound Annual Growth Rates of Production of Arabica, Robusta and Total coffee from 2001-02 to 2020-21.

The secondary data pertaining to production of arabica and robusta coffee from 2001-02 to 2020-21 was obtained from coffee Board of India. The compound annual growth rates were estimated and the results are presented in the Table 4.3.

From the Table 4.3 it can be inferred that, over the study period i.e., from 2001-02 to 2020-21, the production of arabica coffee was recorded highest in the year 2001-02 (121050 metric tonnes) and the lowest production in the year 2008-09 (79500 metric tonnes). The highest production of robusta coffee during the study period was recorded in the year 2015-16 (244500 metric tonnes) and the lowest was recorded in the year 2003-04 (168550 metric tonnes). The total coffee during the study period has shown a record highest production of 348000 metric tonnes were recorded in the year 2015-16 and lowest production of 262000 metric tonnes was recorded in the year 2007-08.

The CAGR arabica coffee and robusta coffee production from 2001-02 to 2020- 21 were -0.47 per cent and 1.77 per cent respectively. The CAGR of production of robusta coffee was higher than arabica coffee which indicated that production of robusta coffee had increased more than the production of arabica coffee during the study period. The overall coffee production had shown a CAGR of 1.01 per cent indicating a moderate increase in production during the study period.

Production of arabica, robusta and overall coffee from 2001-02 to 2020-21 is illustrated in Fig.4.3.

Table 4.3 Compound annual growth rates of production of Indian Arabica, Robusta and total coffee from 2001-02 to 2020-21

Year	Production in metric tonnes		
	Arabica	**Robusta**	**Total**
2001-02	**121050**	179550	300600
2002-03	102125	173150	275275
2003-04	101950	**168550**	270500
2004-05	103400	172100	275500
2005-06	94000	180000	274000
2006-07	99700	188300	288000
2007-08	92500	169500	**262000**
2008-09	**79500**	182800	262300
2009-10	94600	195000	289600
2010-11	94140	207860	302000
2011-12	101500	212500	314000
2012-13	98600	219600	318200
2013-14	102200	202300	304500
2014-15	98000	229000	327000
2015-16	103500	**244500**	**348000**
2016-17	95000	217000	312000
2017-18	95000	221000	316000
2018-19	95000	224500	319500
2019-20	87000	211000	298000
2020-21	99000	235000	334000
Compound annual growth rate (Per Cent)	-0.47	1.77	1.01

(Source-coffee Board of India)

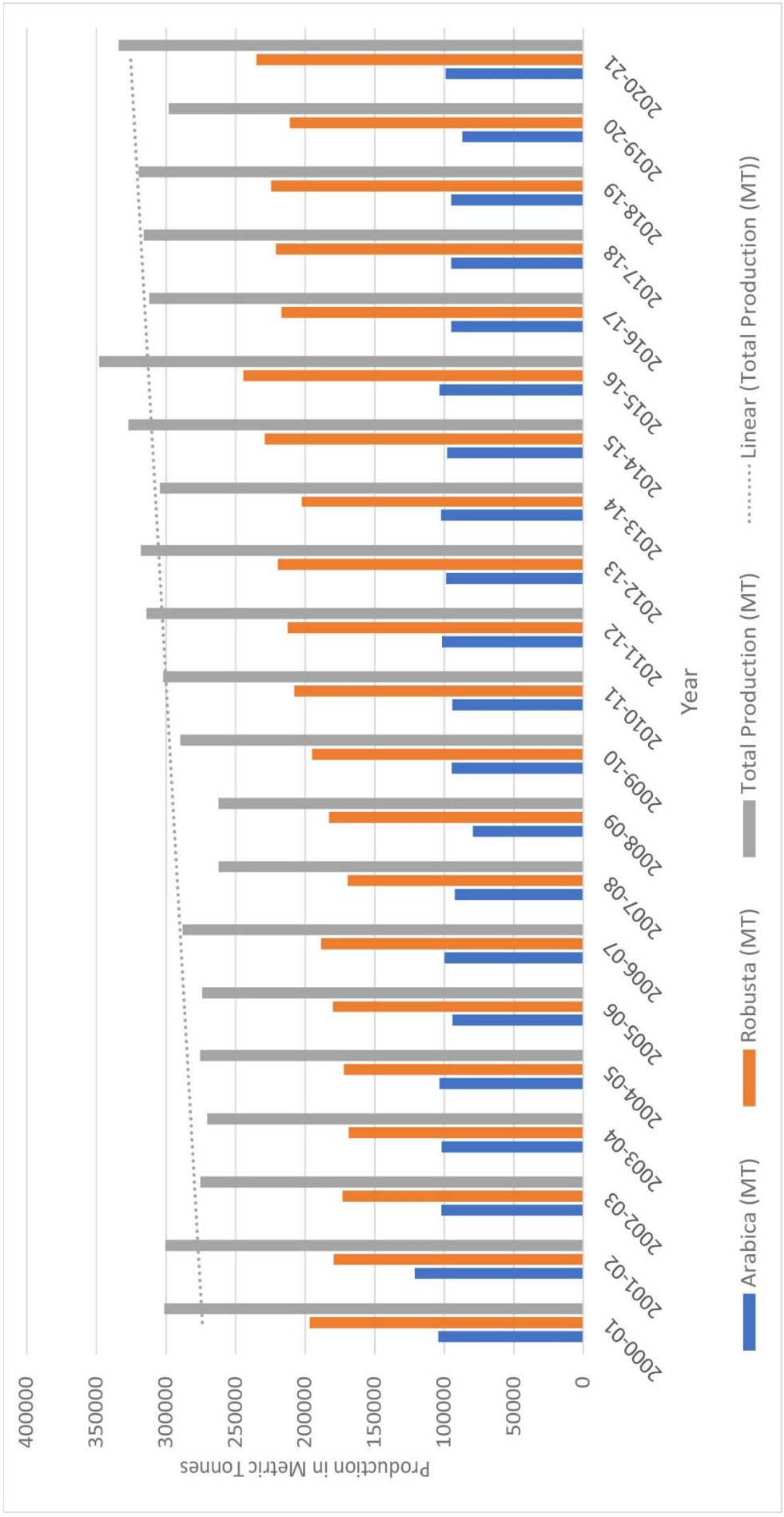

Fig 4.3 Production of Arabica, Robusta and total coffee in India from 2000- 01 to 2020-21

4.1.4. Growth Rates of area under Arabica and Robusta coffee in the state of Andhra Pradesh 2010-11 to 2020-21.

The secondary data pertaining to area under arabica and robusta coffee in the state Andhra Pradesh from 2010-11 to 2020-21 was obtained from the database of coffee Board of India. The annual growth rates and CAGRs were estimated for the data and presented in Table 4.4.

Thus, it can be inferred that the annual growth rates of area under arabica and robusta coffee in Andhra Pradesh were highly fluctuating during the study period i.e. from 2010-11 to 2020-21. A significant increase in the annual growth rates of area under arabica coffee was observed during the year 2012-13 (13.10 per cent) and a significant decrease in annual growth rates of arabica coffee was observed in the year 2019-20 (3.71 per cent).

Table 4.4 Growth rates of area planted under Arabica and Robusta coffee in Andhra Pradesh from 2010-11 to 2020-21.

Year	Area under Arabica and Robusta coffee in hectares			
	Arabica	Annual growth rate (Per Cent)	Robusta	Annual growth rate (Per Cent)
2010-11	35159	-	268	-
2011-12	37487	6.62	268	0.00
2012-13	42398	**13.10**	268	0.00
2013-14	47099	11.09	268	0.00
2014-15	51807	10.00	267	**-0.37**
2015-16	54777	5.73	267	0.00
2016-17	57857	5.62	267	0.00
2017-18	61063	5.54	264	**-1.12**
2018-19	64674	5.91	264	0.00
2019-20	67075	**3.71**	264	0.00
2020-21	71149	6.07	264	0.00
CAGR	7.29		-0.19	

(Source-Coffee Board of India)

Area under robusta coffee stands constant manner in annual growth rates and slight decrease in annual growth rates of area under robusta coffee was observed during the years of 2014-15 and 2017-18 with growth rates of -0.37 per cent and -1.12 per cent respectively.

The results of compound annual growth rates of area under arabica and robusta coffee in Andhra Pradesh from 2010-11 to 2020-21 were 7.29 per cent and -0.19 per cent respectively. This inferred that over the eleven years i.e., from 2010- 11 to 2020-21, the cultivated area under arabica coffee annual growth rate was increased and negative compound annual growth rate was observed for the robusta coffee.

The compound annual growth rates of area under arabica and robusta coffee in Andhra Pradesh is illustrated in Fig 4.4

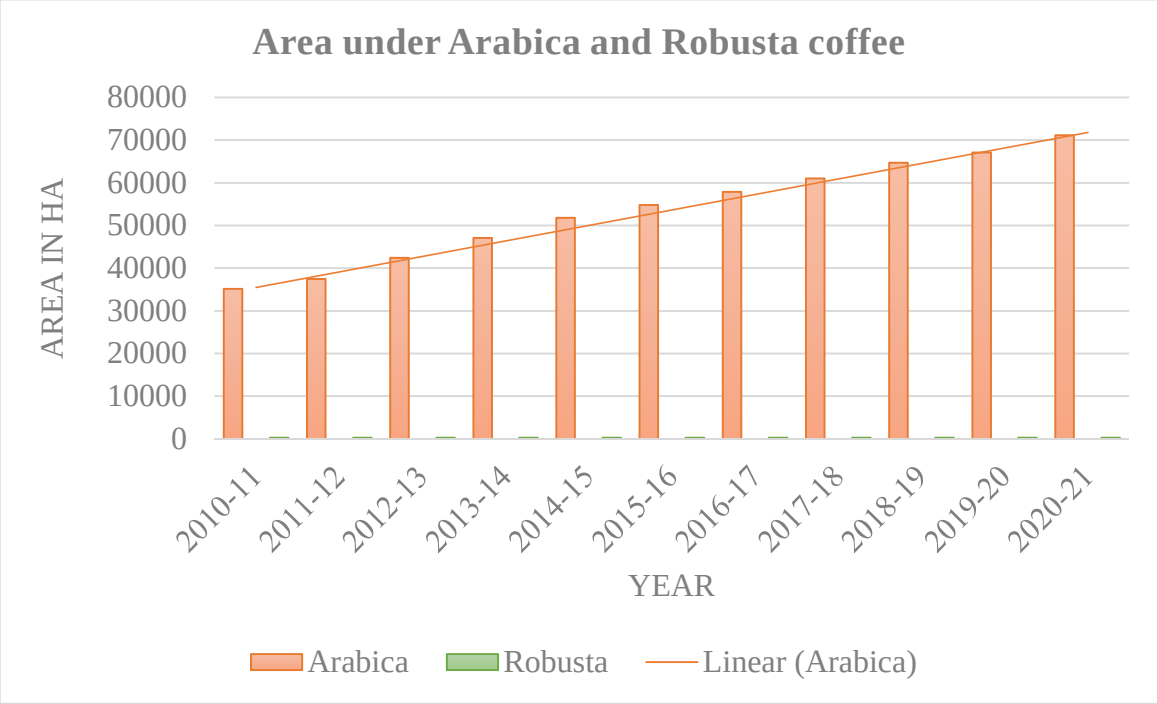

Fig 4.4 Area planted under Arabica and Robusta coffee in the state of Andhra Pradesh From 2010-11 to 2020-21.

4.1.5. Growth Rates of production under Arabica and Robusta coffee in Andhra Pradesh From 2010-11 to 2020-21.

The secondary data pertaining to production under arabica and robusta coffee in the state Andhra Pradesh from 2010-11 to 2020-21 was obtained from the database of coffee Board of India. The annual growth rates and CAGRs were estimated for the data and presented in Table 4.5.

Thus, it can be inferred that the annual growth rates of production under arabica and robusta coffee in Andhra Pradesh were highly fluctuating during the study period i.e., from 2010-11 to 2020-21. A significant increase in the annual growth rates of production under arabica coffee was observed during the year 2015-16 (24.15 per cent) and a significant decrease in annual growth rates of arabica coffee was observed in the year 2019-20 (-4.42 per cent).

Table 4.5 Growth rates of production under Arabica and Robusta coffee in Andhra Pradesh from 2010-11 to 2020-21.

Year	Production under Arabica and Robusta coffee in Metric Tones			
	Arabica	Annual growth rate (Per Cent)	Robusta	Annual growth rate (Per Cent)
2010-11	5685	-	65	-
2011-12	5885	3.52	85	30.77
2012-13	5890	0.08	30	**-64.71**
2013-14	7250	23.09	70	133.33
2014-15	7370	1.66	55	-21.43
2015-16	9150	**24.15**	50	-9.09
2016-17	9750	6.56	50	0.00
2017-18	9580	-1.74	20	-60.00
2018-19	10850	13.26	50	**150.00**
2019-20	10370	**-4.42**	35	-30.00
2020-21	10700	3.18	30	-14.29
CAGR	7.63		-7.42	

(Source-Coffee Board of India)

Production under robusta coffee significant increase in annual growth rates during the year 2018-19 (150.00 Percent) and slight decrease in production under robusta coffee was observed during the years of 2012-13 (-64.71 Per cent).

The results of compound annual growth rates of production under arabica and robusta coffee in Andhra Pradesh from 2010-11 to 2020-21 were 7.63 per cent and -7.42 per cent respectively. This inferred that over the Eleven years i.e. from 2010- 11 to 2020-21, the production of arabica coffee annual growth rate was increased and negative compound annual growth rate was observed for the robusta coffee.

The compound annual growth rates of production under arabica and robusta coffee in Andhra Pradesh is illustrated in Fig 4.5.

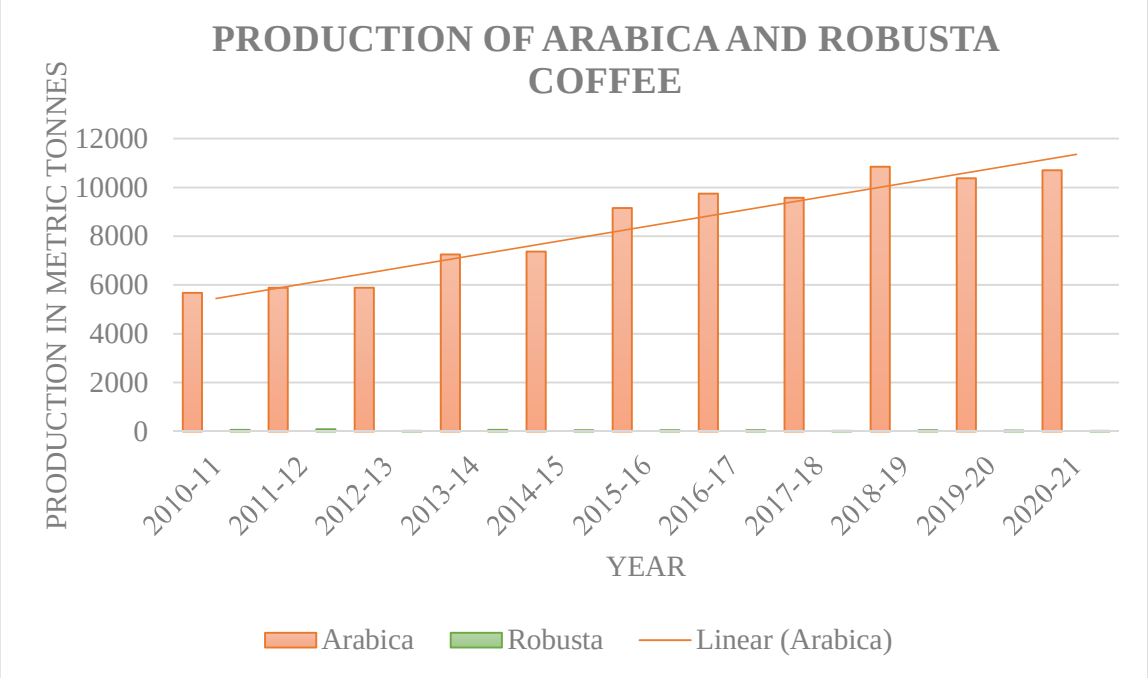

Fig4.5 Production under Arabica and Robusta coffee in the state of Andhra Pradesh From 2010-11 to 2020-21.

4.2. SOCIO-ECONOMIC CHARACTERISTICS OF THE SAMPLE FARMERS.

4.2.1. Age group profile particulars of Coffee growing Farmers

The age of the sample of coffee growing farmers was categorized into four namely, <25 years, 25-45 years, and 45-60 years and >60 years.

The data was analyzed and the results are presented in table 4.1

Table 4.6. Details of age group particulars of sample farmers.

S. No	Age	No of farmers	Per cent (%)
1	Below 25 Years	6	10.0
2	25 to 45 Years	**26**	**43.33**
3	45 to 60 Years	24	40.0
4	More than 60 Years	4	6.67
	Total	60	100

As per the Table 4.6, shows the age group particulars of the sample farmers. Out of 60 sample farmers 43.33 per cent of respondent farmers belonged to 25-45 years age group, 40.00 per cent of sample farmers were between 45-60 years age group, 10 per cent of respondent farmers belongs to below 25 years and 6.67 per cent of respondent farmers were more than 60 years group. Only 6.67 per cent of respondent farmers were of above 60 years age group. It can be inferred that most of the farmers in the age group of 25 to 45 years age.

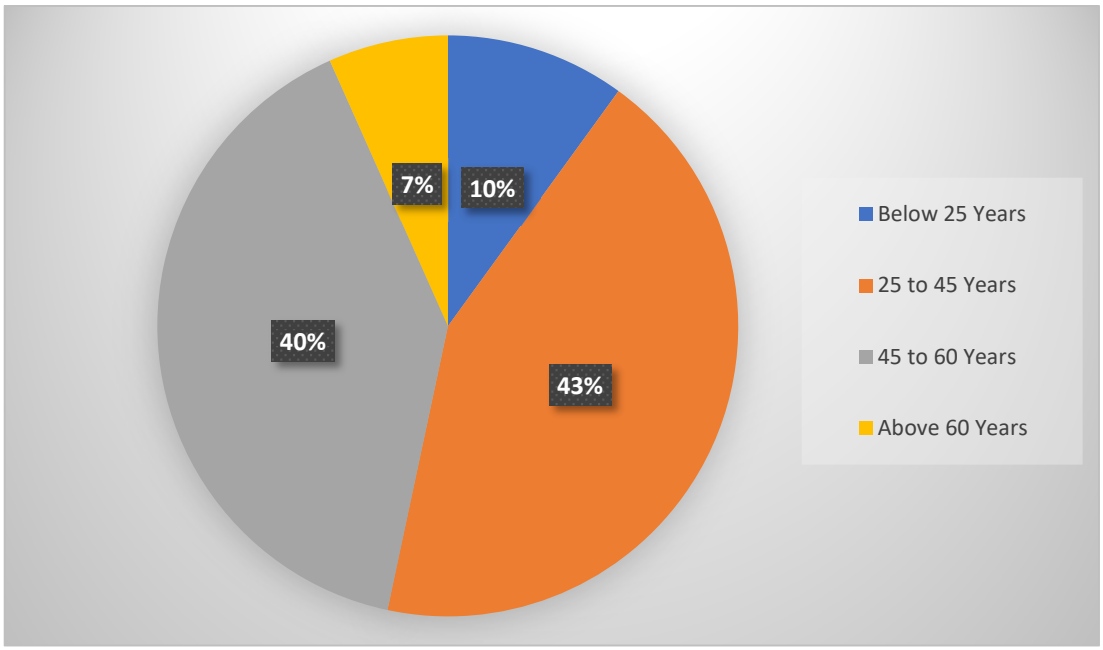

Fig 4.6 Age group profile particulars of coffee Farmers

4.2.2 Literacy Level of Sample Farmers

Based on the education level, the respondent farmers in the study area were categorized into illiterate, primary education, secondary education, intermediate and graduation and above. The data were analyzed and the results are furnished in the Table.4.7.

Table 4.7 Details on literature level of sample farmers

S. No	Education	Frequency (No. of farmers)	Per cent (%)
1	Illiterate	**36**	**60**
2	Primary Education	6	10
3	Secondary Education	10	16.67
4	Intermediate	5	8.33
5	Graduation and above	3	5.0
	Total	60	100

The results presented in Table 4.7., 60 per cent of sample farmers were of illiterate, 16.67 per cent of sample farmers were Secondary educated, 10 per of sample farmers had education up to Primary level, 8.33 per cent of sample farmers having Intermediate level of education and only 5 per cent of the sample farmers had graduation and above level of education. So, it was observed that, as majority of the farmers were Illetrates.

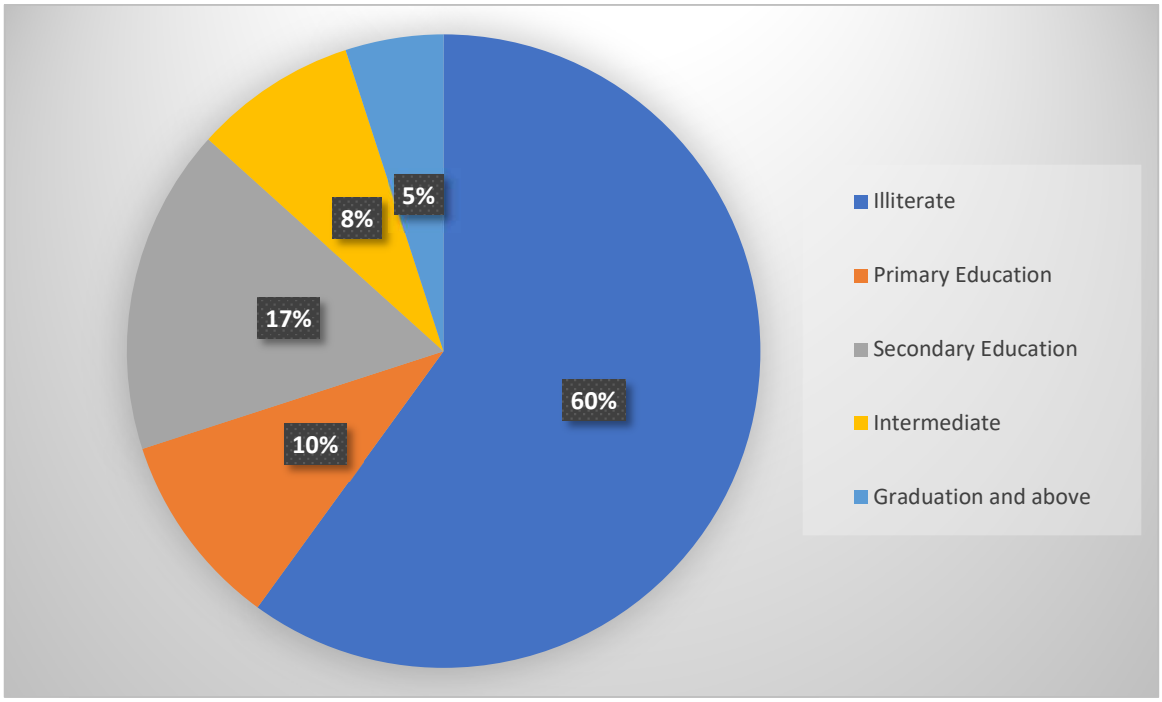

Fig 4.7 Literacy Level of Sample Farmers

4.2.3 Family Size of respondent Farmers

The data regarding family size of the respondent farmers were classified into four categories *viz.*, Below 4 members, 4-6 members, more than 6 members based on the number of members in the family. The data collected were analyzed and presented in the Table 4.8.

Table 4.8 Details on Family Size of the Sample Famers

S. No	Family size	Frequency (Number of farmers)	Percent (%)
1	Below 4 members	30	50
2	4 to 6 members	28	46
3	More than 6 members	2	4
	Total	60	100

A glance of Table 4.8, 50 per cent of the sample respondents were in the category of Below four members followed by 46 per cent of respondents with 4 to 6 members in family size. 4 per cent of the sample farmers had more than 6 members. The family size revealed that majority of sample coffee growing farmers ranges above 6 members.

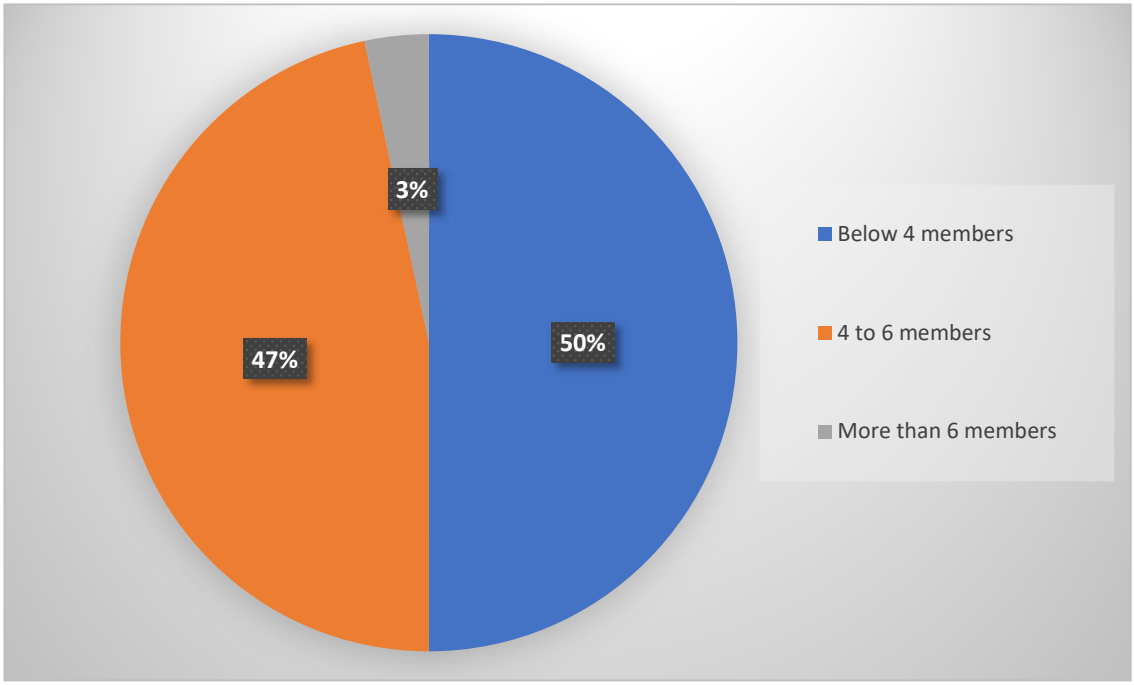

Fig 4.8 Family Size of Respondent Farmers

4.2.4 Gross Annual Income levels of Sample Farmers

In this regard, gross annual income of the sample farmers was collected and classified into four classes *viz.*, below 1,00,000, 1,00,000-2,00,000, 2,00,000-3,00,000 and above 3,00,000. The results were presented on the following Table 4.9.

Table 4.9 Details on Gross Annual Income of the Respondent Farmers

S. No	Gross Annual Income	Frequency (No. of farmers)	Percent (%)
1	Below 1,00,000	8	13.33
2	1,00,000-2,00,000	**32**	**53.33**
3	2,00,000-3,00,000	18	30.00
4	Above 3,00,000	2	3.34
	Total	60	100

Table 4.9 shows that, about 53.33 per cent of sample farmers were in the 1,00,000- 2, 00,000 categories, while 30 per cent of sample farmers annual income was between 2,00,000 to Rs 3,00,000 category. The annual income of 13.33 per cent of the respondent farmers was below 1,00,000 categories and the remaining 3.34 per cent had gross annual income respondent farmers were above 3,00,000. Hence, majority of sample farmers gross annual income ranges between Rs 1,00,000 – Rs. 2, 00,000.

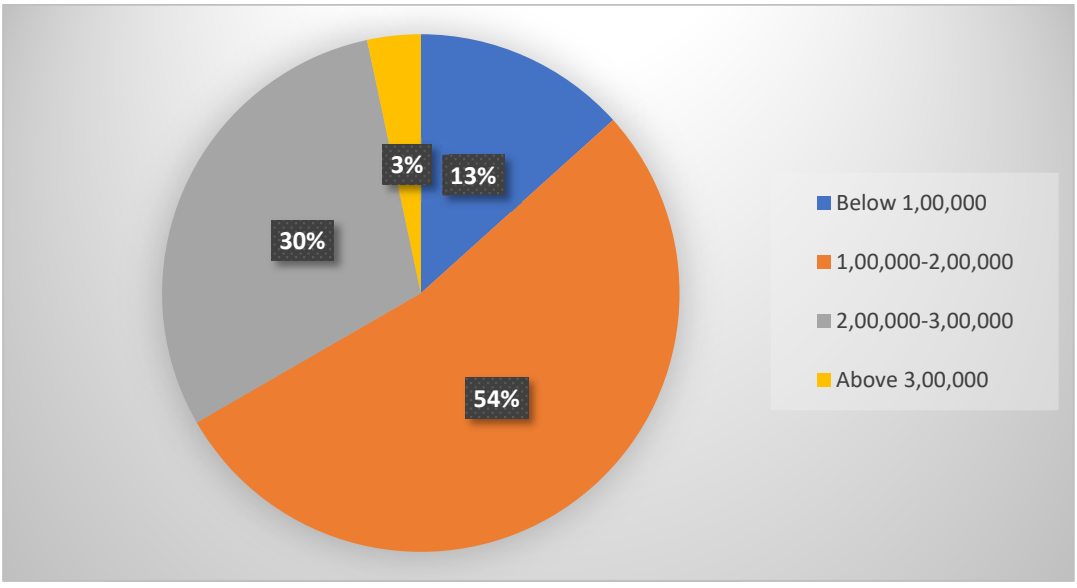

Fig 4.9 Gross Annual Income Particulars of Sample Farmers

4.2.5 Operational Landholdings of Sample Farmers

The data about operational land holdings of sample farmers were collected and divided into three categories *viz.*, marginal (< 2.5 acres), small (2.5-5 acres) and large farmers (> 5 acres) and the results are presented in Table 4.10.

Table 4.10. Operational landholdings of sample farmers

S. No	Landholding (acres)	Frequency (No. of farmers)	Per cent (%)
1	Marginal (< 2.5 acres)	**51**	**85.00**
2	Small (2.5 - 5 acres)	8	13.33
3	Large (> 5 acres)	1	1.67
4	Total	**60**	**100**

A glance of Table 4.10. represents the operational land holding of sample farmers. Out of total 60 sample farmers, 85 Per Cent of farmers were marginal farmers with land holding of below 2.5 acres, 13.33 Per Cent of farmers were small farmers having land holding of 2.5- 5 acres and only 1.67 Per Cent of the sample were large farmers having more than 5 acres. The operational land holding showed that majority of sample farmers were marginal farmers having operational land holdings less than 2.5 acres.

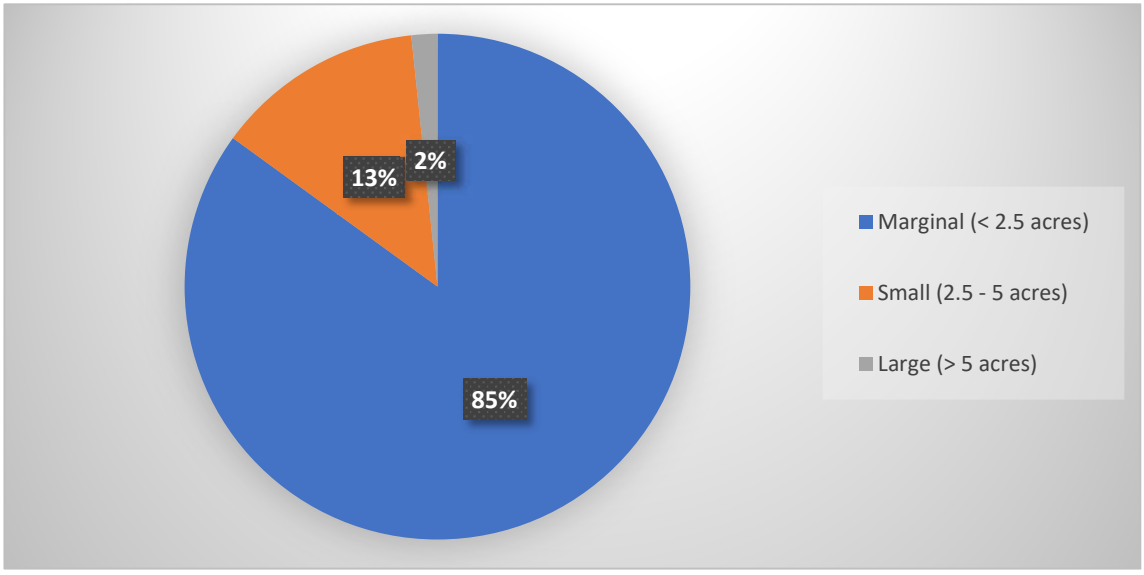

Fig 4.10 Operational Landholdings of Sample Farmers

4.2.6 Farmers experience in cultivating coffee in the study area

Experience of the coffee growing farmers have been classified into four groups *viz.*, Less than 5 year, 5-10 years, 10-15 years and more than 15 years. The related data were collected and presented in the Table 4.11.

Table 4.11 Details on experience in coffee cultivation among sample farmers.

S. No	Experience in coffee cultivation	Number	Per cent (%)
1	Less than 5 years	3	5.00
2	5-10 years	**37**	**61.66**
3	10-15 years	8	13.34
4	More than 15 years	12	20.00
	Total	60	100

As per the Table 4.11, shows that 61.66 per cent of the sample farmer have farming experience of 5-10 years, 20 per cent having more than 15 years farming experience of coffee, 13.34 per cent respondent farmers were having farming experience of 10-15 years and 5 per cent of respondent farmers had less than 5 years of experience. The farming experience of majority of the respondent farmers has 5-10 years' experience in coffee cultivation.

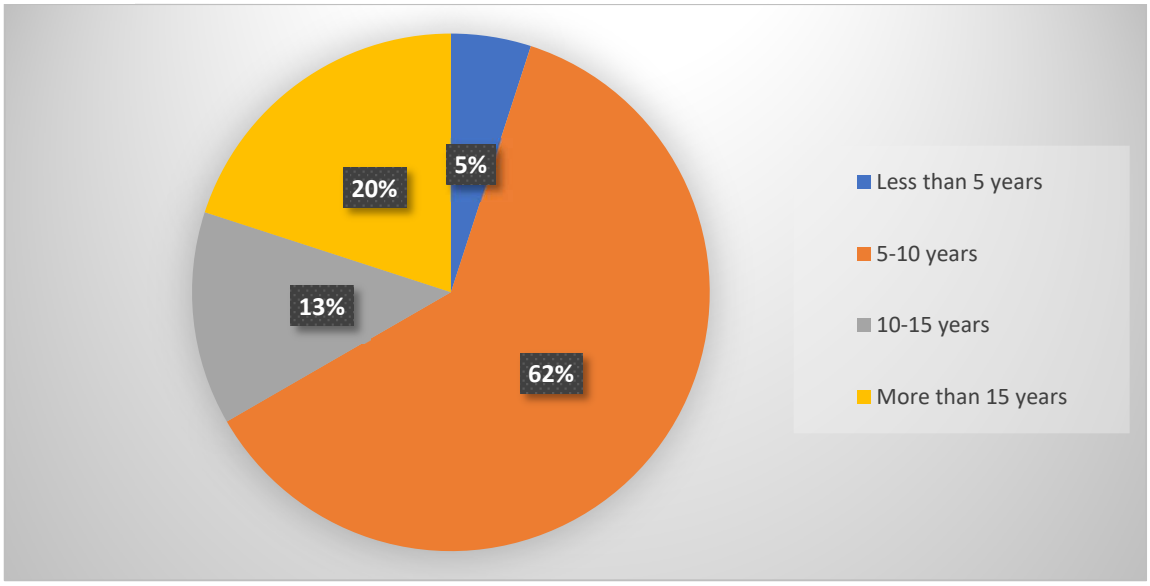

Fig 4.11 Farmers Experience in cultivating coffee in the study area

4.3 IDENTIFICATION OF ACTORS AND ROLES IN ARAKU COFFEE VALUE CHAIN

The major actors in araku coffee value chain have been identified and the data was collected regarding various activities along the value chain and roles played by the respective actor in the value chain. The same has been presented under following.

4.3.1 Major actors identified in Araku coffee value chain

The data regarding various activities performed by various actors along the coffee value chain have been identified. The role played by various actors have been analyzed and presented in the following sub sections for ease of presentation.

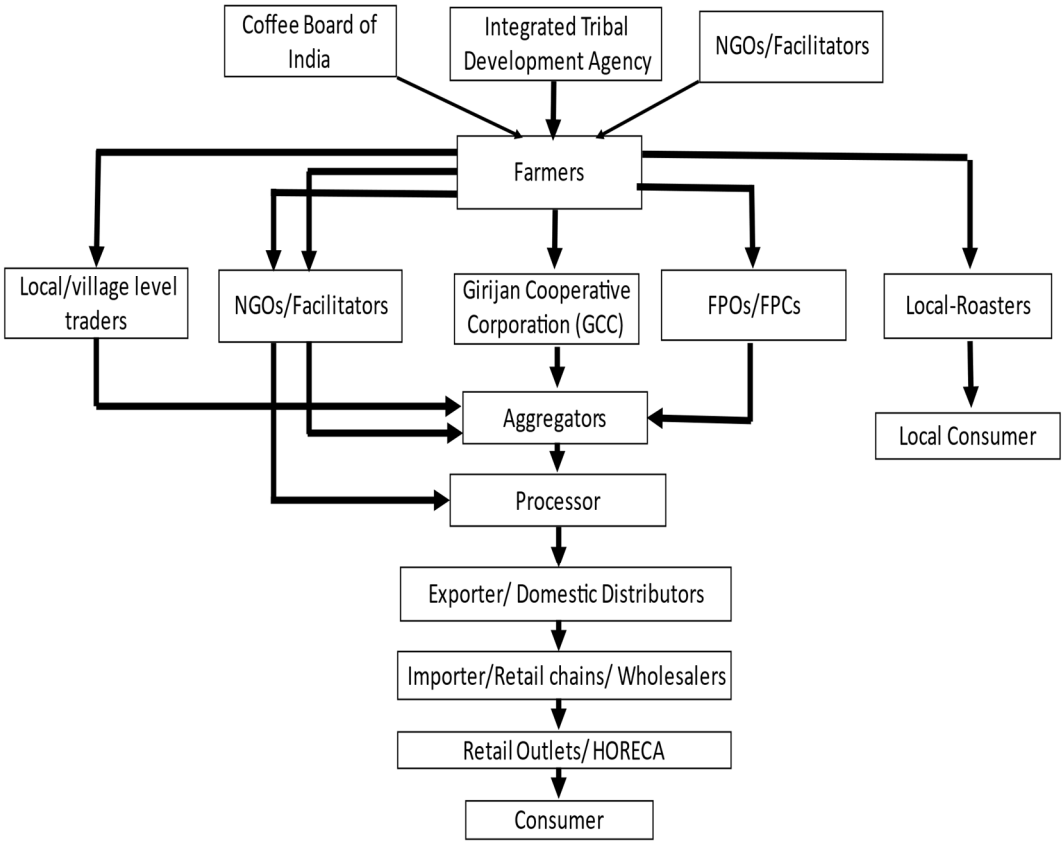

FIGURE 4.12. Major actors identified in Araku coffee value chain

Major actors in araku coffee value chain were identified through movement of coffee from the producer and services provided by the actors along the value chain. The different actors were Coffee Board of India,

Integrated Tribal development Agency, NGOs/ Facilitators, Local traders, GCC (Girijan Cooperative Corporation), FPOs (Farmers Producer Organization), Local Roasters, Aggregators, Processors, Exports, Domestic/international Retail chains and consumers.

4.3.1 Functional Generic worksheet of identified actors indicating roles in araku valley coffee value chain.

The data regarding the roles performed by major players identified in araku coffee value chain have been collected and classified based various activities performed in the value chain and presented in functional Generic worksheet. The Table no 4.12 below represents the Functional generic work sheet indicating various activities and roles played by the respective actor in the value chain.

INPUT SUPPLIERS:

Input suppliers, plays a key role in providing all input requirements by the farmers to grow coffee. The key input suppliers in the araku coffee value chain are Integrated Tribal Development Agency (ITDA), Coffee Board of India and Few NGOs like Naandi Foundation etc., These agencies provide quality coffee saplings to the farmers. As the araku coffee grown in the natural forest environment, it is cultivated using very limited inputs. Further, these agencies promote coffee in tribal areas to counter the podo cultivation. So, they also provide necessary other inputs like providing Black pepper saplings etc.,

Producers:

The major producers of Araku coffee are the tribal communities living in the eastern ghats of Andhra Pradesh. There are around two lakh farmers involved in this production process and making a living out of this. The tribal farmers were mainly involved in podo cultivation. To prevent this, these farmers were encouraged to take up coffee cultivation.

Primary Aggregator:

The coffee cultivation in Araku valley is a non-traditional coffee grown in forest land in natural environment. Primary aggregator collects the low quantities of coffee from the farmers. The key primary aggregators in araku coffee value chain were NGOs, GCC, Local traders, FPOs and Local Roasters.

Primary Processor:

Primary processor collects the freshly picked coffee cherries. The process is done through two methods i.e., Wet and dry methods. In wet method coffee cherries were pulped and fermented to get the green bean coffee. Where in dry process the cherries were dried on the concrete platforms later followed with hulling to get the parchment coffee. The major primary processors identified in the araku value chain were farmers, NGOs like Nanndi, Local Roasters and Aggregator.

Market facilitators:

There are no proper organized markets in the tribal areas, the coffee cherries were procured by various actors. Local traders were major procurers for Araku coffee who collected the coffee cherries at farm or villages in an unorganized manner. The market facilitators are those players, who were trying to organize the market facilities to the farmers through creating awareness on quality maintenance, right time of picking etc., and they are also trying to link with the other actors in the value chains. Major market facilitators of araku value chain were local village traders, GCC and Facilitators, FPOs. These marketing facilitators were trying to create better linkages with the aggregators, processors and exports to for better price and efficient marketing mechanism for the farmers.

Table 4.12 Functional Worksheet of the identified araku valley coffee value chain actors:

"Farm to cup" value chain actors of araku value chain

Form		Saplings	Cherry coffees		Pachment and green bean coffee				Coffee powder, Roasted bean, Instant coffee, Liquid coffee, coffee beans					Coffee drink	All forms
Function		Input supply	Production	Primary aggregation	Primary processing	Marketing	Aggregating	Coffee Curing	Value addition	Domestic fulfilment	Internation fulfilment	Wholesale	Retailing	Brewing	consumption
Actors	ITDA														
	Coffee Board														
	NGOs														
	Coffee farmers														
	Local traders														
	FPOs														
	GCC														
	Local Roasters														
	Coffee curing units														
	Domestic coffee processor														
	Exporter														
	International coffee processor														
	Domestic and international Retail chains/ whole salers														
	Domestic and international Retailers														
	HORECA/QSR chains														
	Consumer														
Roles		Input suppliers	Producer	Primary aggregator	Primary processor	Marketing facilitator	Aggregator	Coffee Curers	Local roaster/ Industrial processor	Distributor	Exporter	Wholesaler	Retailer	HoReCa	Consumer

Aggregators:

Araku coffee is grown in non-traditional area small and marginal tribal farmers in forest land in natural environment. The volumes harvested by the farmers are too low and the picking quantity size varies from 100-150 kgs. Aggregating these small quantities of handpicked coffee cherries was main exercise observed in the araku coffee growing area, aggregator pool the small quantities procured by the other actors GCC, NGOs, FPOs, Local traders to make a sizable lot for suitable for processing and export. Aggregators apart from accumulation of both green coffee and coffee cherries, also play the role of primary processor thorough processing coffee cherries to Parchment coffee beans and green coffee beans. Aggregator also take up coffee curing process based on the destinations. Further aggregator fulfills domestic needs directly by selling to Industrial processor and international destinations through selling to exporters. Most of the aggregators are also acting as coffee curers and exports in the value chain. These aggregators are majorly interested in taking time value, form value and place value advantage of araku coffee value chain.

Coffee Curers:

Curing process includes hulling, grading, color sorting. The primary processed coffee beans are not suitable for export. Most of the aggregators are also playing the role of coffee curers. After curing the coffee would be in the form of parchment and green bean coffee in various grades based on size, colour, origin of coffee, and type of coffee. These curers shall also blend the coffee beans as per the requirement of the importer or processor and also arrange for logistics for physical movement of huge volumes of coffee.

Local roaster:

Local roaster collects very low volumes of coffee cherries, further process them as green beans or parchment coffee beans by acting as primary processor. They roast the beans and convert the coffee beans in coffee powder. These local roasters fulfill needs nearby consumer around 50-100 km range from the production area.

Industrial processor:

Industrial processor handles huge volumes of coffee beans grown in various parts of Indian along with araku coffee beans. The majorly take form value of the coffee beans. These industrial processor process wide range of coffee products like coffee powder, instant coffee powder, liquid coffee in various blends as per customer taste and preferences. There are domestic coffee processor and international coffee processor to change the coffee form as per the consumer needs of the markets they serve. The major industrial coffee processor in India are TATA coffee, Nescafe, BRU, Country bean coffee etc., In India these industrial processors are banding and marketing these final coffee products to consumers through various marketing channels. Few coffee processors are also performing white labeling services.

Distributors:

Distributors mainly focus on the domestic fulfillments needs and wants of the consumers with in the countries geographic regions. The key distributors of araku coffee value chain are coffee curers and domestic coffee processors.

Exporter:

Exporters are mainly focused on the international destinations like Italy, Switzerland, Sweden, UAE and various other parts of the world. Being araku coffee was recognized with geo indication tag and specially known for its naturally grown arabica coffee. Exporter will procure the coffee from the aggregators and few aggregators were also acting as exporters by directly exporting the cured coffee beans.

Wholesalers:

Wholesalers were dealing with the forward linkage of the markets to industrial processors by handling larger quantities in the domestic and international retail chains of value-added coffee. They fulfill the needs of the

consumers worldwide. They reach the consumer through retailers and HORECA players.

Retailers:

Retailers handle small quantities of value-added coffee products; they procure these products from wholesalers they are in direct contact with consumers. Therefore, they play a key role in fulfilling the consumer's needs. There are retailers in both domestic and international destinations. Local roaster acts as a retailer in selling their value-added products in the radius of 50-100 kilo meters.

HoReCa:

HoReCa players i.e., Hotels, Restaurants, and cafes were key players in brewing and serving coffee in various forms as per the consumer preference. The Main function involved in this actor was procuring quality coffee and brewing of coffee and serving the consumers.

Consumer:

Araku coffee, is naturally grown coffee known for its special aroma. The consumer prefers to consume in araku coffee in various forms coffee powder, instant coffee, liquid coffee. But worldwide araku coffee in has recognition form distinct aroma.

4.4 MAPPING AND ANALYZING OF EXISTING COFFEE VALUE CHAINS IN ARAKU VALLEY.

The value chains have been mapped the relations between various identified players, movement of the coffee, services offered by players to handle various forms of coffee to various destinations across the globe. The relations among the araku coffee actors have been explained and classified based on nature of the value chain.

4.4.1. Mapping of various value chains of araku valley coffee:

The Araku valley coffee value chain mainly involves around the tribal farmers, promoting agencies that were encouraging them to take the coffee farming through providing various interventions in the production and machinery. The key players across the value chain are the input suppliers, farmers, the primary processors. After primary processing value chain drives towards the Marketing channels, Aggregators, exporters, domestic processors, international processors, retailers and FMCG's to reach the end key player the consumer. Detail flow of coffee is depicted in the figure 4.13.

The function of input suppliers is crucial in meeting all the farmers' input needs for growing coffee. The Integrated Tribal Development Agency (ITDA), the Coffee Board of India, and a few non-governmental organizations (NGOs), such as the Naandi Foundation, Tanzer, Girijan Vikas etc., are the main input suppliers in the araku coffee value chain. The growers receive quality coffee saplings from these organizations. The coffee production in araku valley mainly was encouraged an objective of discourage the podo cultivation, deforestation of forest lands by the tribal farmers. As a result, they also supply other important inputs, such as Black pepper seedlings, etc.

ITDA Provides assistance for taking up fencing through coffee farms to demarcate individual tribal holdings along with input materials provides subsidies on processing equipment viz., pulpers, to the farmers and the coffee board provides drying platforms to the farmers for the drying of the coffee beans.

NGOs such as Naandi, Tanzer, Girijan Vikas, Koval Foundation supports the tribal farmers by providing inputs and social infrastructure and also helping them in the marketing of the produce. These organization generate revenues through participating in coffee value chain and reinvest in developing social infrastructure particularly in health, school education and supporting the girl child.

The tribal groups residing in Andhra Pradesh's eastern ghats are the main producers of Araku coffee. Involved in this production process and relying on it for their livelihood are about two lakh farmers. As a part of inter-cropping the tribal farmers are also trained to cultivate black pepper in addition with the rich forest produce to reap benefits. Tribal farmers harvest the fresh matured coffee beans will be processed in two methods i.e., Wet and dry methods. In wet method coffee cherries were pulped and fermented to get the green bean coffee. Where in dry process the cherries were dried on the concrete platforms later followed with hulling to get the parchment coffee. This primary process will be done in the farmer level, NGOs and aggregators.

Araku coffee is grown in non-traditional area small and marginal tribal farmers in forest land in natural environment. The volumes harvested by the farmers are too low and the picking quantity size varies from 100-150 kgs. Aggregating these small quantities of handpicked coffee cherries was main exercise observed in the araku coffee growing area. There are no proper organized markets in the tribal areas, the coffee cherries were procured by various actors. Local traders were major procurers for Araku coffee who collected the coffee cherries at farm or villages in an unorganized manner.

The market facilitators are trying to organize the market facilities to the farmers through creating awareness on quality maintenance, right time of picking etc., and they are also trying to link with the other actors in the value chains. Major market facilitators of araku value chain were local village traders, GCC and Facilitators, FPOs. These marketing facilitators were trying to create better linkages with the aggregators, processors and exports to for better price and efficient marketing mechanism for the farmers.

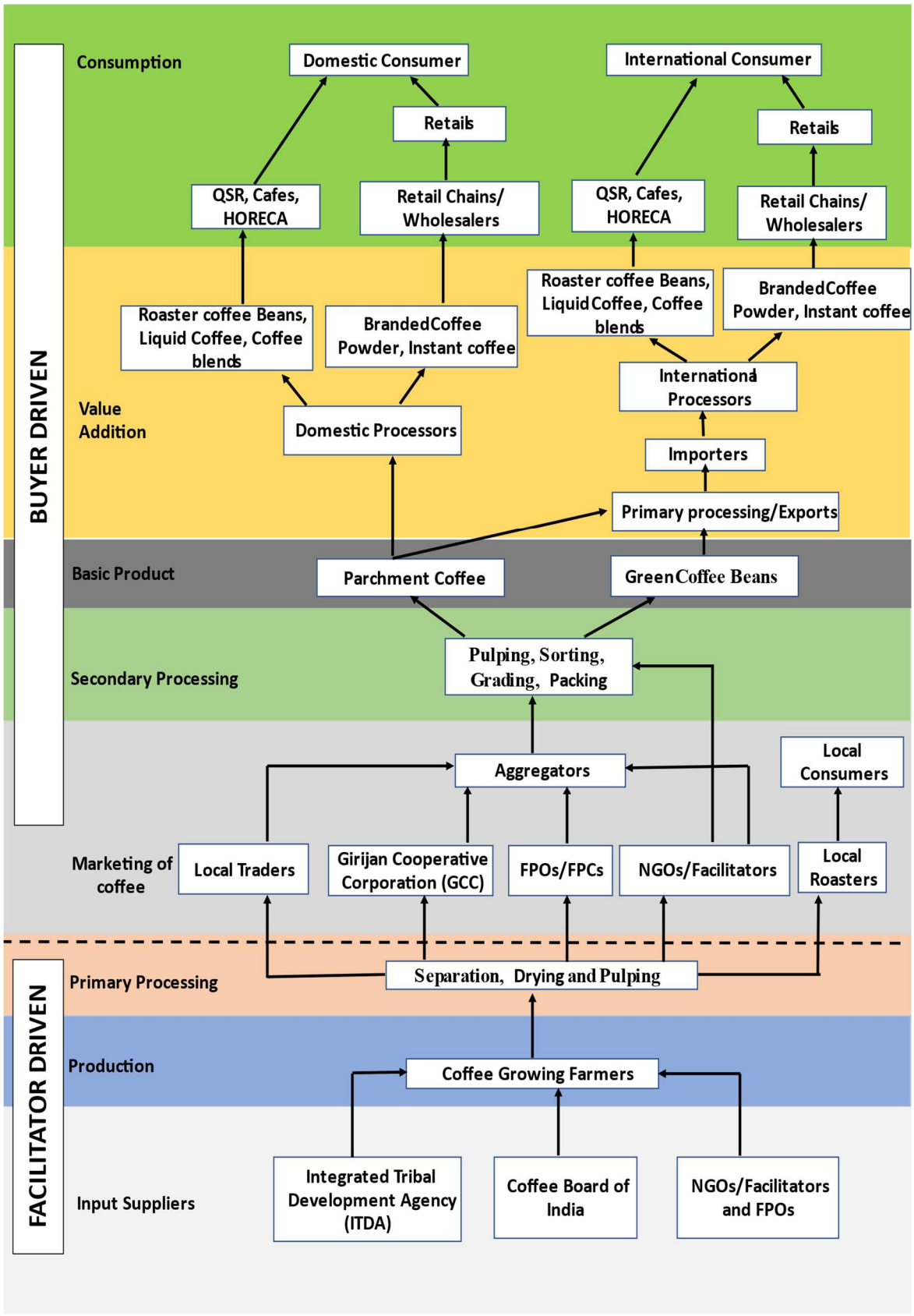

Figure 4.13. Mapping of araku valley coffee

Aggregators procure most of the produce at farm gate prices through GCC, NGOs, FPOs, Local traders and involve in processing of the raw coffee cherries into products like Parchment coffee beans, green coffee beans, coffee curing process based on the destinations. Further aggregator fulfills domestic needs directly by selling to Industrial processor and international destinations through selling to exporters. Most of the aggregators are also acting as coffee curers and exports in the value chain. Further these finished products become the major raw material for the tertiary processors to produce various products of coffee like liquid coffee, coffee powder, roasted coffee beans, instant coffee. The Aggregators in fulfilling the local demand through trade the raw coffee beans to the domestic processors and retailers. Further the aggregator and coffee curing units are involved in exporting the produce to different countries like Italy, Switzerland, Sweden, UAE and various other parts of the world after grading and sorting for maintaining standards are per importing country norms. The exported produce is then further processed to various forms of products and reach to the end consumer through wholesalers, retail chains, retailers and HORECA sector.

4.4.2. Analysis of coffee value chains in Araku valley

The value chain analysis is mainly focused on relationship between the actors in each value chain. The same were the presented in the following

4.4.2.1 Value chains in araku coffee

Six Value Chains for Araku coffee were identified in the study area. These value chains were differentiated based on the number of the nodes in the chain and the role of actors in each chain, The overall chain existed in the study area are illustrated in the fig. 4.14

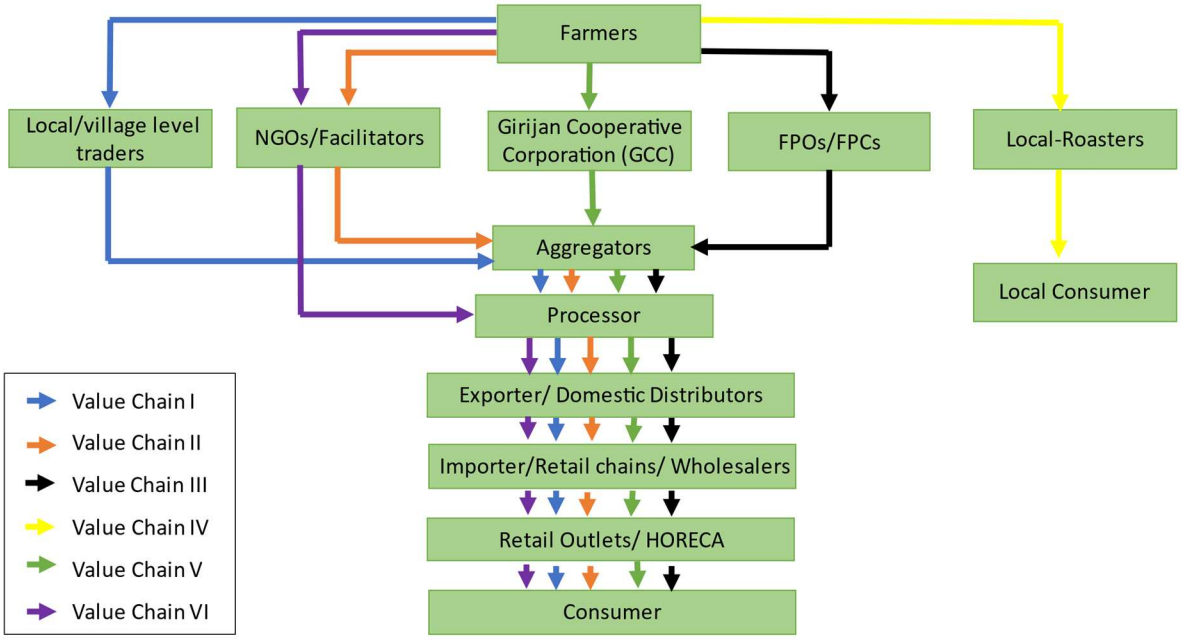

Figure 4.14. value chains in araku coffee

4.4.2.1.1 Coffee value chain I

The 1st coffee value chain involves the tribal Farmers, Local/village level traders, Wholesalers, Processing Unit, Domestic Retails and Exports are the stake holders. Value chain 1 is depicted in the figure 4.15.

Farmers

Farmers are involved in cultivation, Production and harvesting of coffee cherries. The farmers are encouraged in coffee plantation were supported by the coffee board of India and ITDA (Indian Tribal Development Agency), Some NGOs like Naandi Foundation. The tribal farmers shall take care the coffee plantation and pick cherries in the peak season. The farmers in this value chain harvest the matured cherries and process in two ways i.e., wet process and dry process. In wet process the farmers were first fermented the berries for two to three days later they will start pulping with the pulpers to obtain coffee beans. In dry process the cherries were dried in the cement platforms later followed with hulling to get the coffee beans. The dry process yields parchment coffee and wet process yields green bean coffee. In this

value chain the farmers sell harvested fresh raw coffee cherries, parchment coffee and green bean coffee and sale it to the local traders at farm gate. This value chain was major value chain handling more than 70 Per Cent of raw coffee cherries harvested in araku coffee value chain.

Figure 4.15 Coffee value chain I

Local Traders

Local traders purchased small quantities of raw cherries, green bean coffee and parchment from the tribal farmers from their villages and it was later aggregated to once place to dispatch. Before purchasing the quality will be assessed by the trader and takes the packed coffee beans in 50-kilogram bags and sold to the Aggregators.

Aggregators

Aggregator procure the coffee cherries from the local traders from the study area and it was later sent it to the processor for curing units for the cleaning, color sorting, Grading and packing. Aggregator take up coffee curing process based on the destinations. Further aggregator fulfills domestic needs directly by selling to Industrial processor and international destinations through selling to exporters. Large Aggregators will act as the exporters.

These industrial processor process wide range of coffee products like coffee powder, instant coffee powder, liquid coffee in various blends as per customer taste and preferences. Final consumer will get the produce through retail outlets and HoReCa.

30 percent of the farmers in the sample size felt that traders are the ones who gives best price in the value chain when compared with the other stakeholders.

4.4.2.1.2 Coffee value chain II

Figure 4.16 Coffee value chain II

This chain was more prominent coffee value chain that existed in all the areas of study area. The chain includes Farmers, NGOs/Facilitators, Aggregators, Processors, Domestic distribution, exporter, retail chains, retail outlets and final consumer as its stakeholders. Diagrammatic presentation of value chain 2 is presented in the figure 4.16. In this value chain the farmers sell harvested fresh raw coffee cherries to the NGOs at farm gate. NGOs/Facilitators will further process the coffee cherries into Parchment coffee and green bean coffee and supplied to aggregator further process to reach the end consumer through different actors. This value chain was major value chain handling more than 20 Per Cent of raw coffee cherries harvested in araku coffee value chain.

20 percent of the farmers in the sample size felt that NGOs/Facilitators are the ones who gives best price in the value chain when compared with the other stakeholders.

NGOs such as Naandi, Tanzer, Girijan Vikas, Koval Foundation supports the farmers by providing inputs and social infrastructure like health

and providing school education to the tribal children especially focused on girl's child, and also helping them in the marketing of the produce.

4.4.2.1.3 Coffee value chain III

In this Chain FPOs will carried out the functions of local traders. farmers sell harvested fresh raw coffee cherries, parchment coffee to the NGOs at farm gate and sells to the aggregator. Aggregator will take up coffee curing process based on the destinations. Further aggregator fulfills domestic needs directly by selling to Industrial processor and international destinations through selling to exporters. Large Aggregators will act as the exporters.

These industrial processor process wide range of coffee products like coffee powder, instant coffee powder, liquid coffee in various blends as per customer taste and preferences. Final consumer will get the produce through retail outlets and HoReCa.

Figure 4.17 Coffee value chain III

10 percent of the farmers in the sample size felt that FPOs/FPCs are the ones who gives less price in the value chain when compared with the other stakeholders.

4.4.2.1.4 Coffee value chain IV

Figure 4.18 coffee value chain IV

This is an important and quite interesting value chain and major value chain handling less than 10 Per Cent of parchment and green bean coffee produced by farmers thereby encourage primary processing by farmers in the value chain. Coffee beans were directly purchased by the Local Roasters and further processed into various forms like coffee powder with the different combinations of chicory, chocolates, roasted beans, instant coffee. As Araku was a tourist place of Andhra Pradesh the retails were done directly by the roasters through retail outlets to consumers. This value chain is important as it forms mainly and developing domestic market through branding araku coffee. The diagrammatic representation of the chain presented in the figure 4.18.

4.4.2.1.5 Coffee value chain V

Figure 4.19 Coffee value chain V

This value chain was major value chain handling more than 20 of parchment coffee in araku coffee value chain. The Girijan cooperative corporation (GCC) collects the coffee beans from the farmers at the local level

on a regular basis and in turn supply the same to aggregators. Aggregator take up coffee curing process based on the destinations. Further aggregator fulfills domestic needs directly by selling to Industrial processor and international destinations through selling to exporters. Large Aggregators will act as the exporters. The diagrammatic representation of the chain presented in the figure 4.19.

These industrial processor process wide range of coffee products like coffee powder, instant coffee powder, liquid coffee in various blends as per customer taste and preferences. Final consumer will get the produce through retail outlets and HoReCa.

These GCC will also work with tribal farmers not only to market coffee but also the forest products collected and produced by the tribals. The GCC main objective is to development of the tribal farmers. 20 percent of the farmers in the sample size felt that GCC are the ones who gives best price and sometimes they will give bonus price per kilogram in the value chain when compared with the other stakeholders.

4.4.2.1.6 Coffee value chain VI:

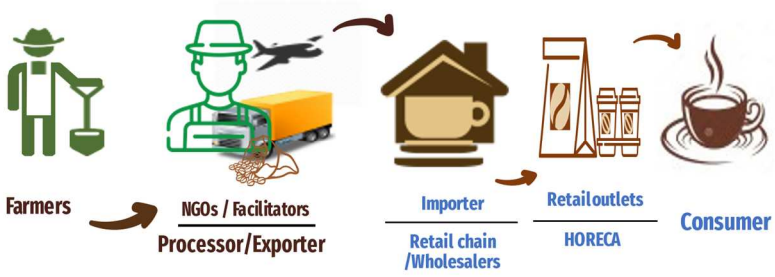

Figure 4.20 Coffee value chain VI

This value chain was major value chain handling about 20 Per Cent of raw coffee cherries harvested in araku coffee value chain. Few districts level NGO's collect the quality coffee cherries and beans from farmers at regular intervals and process the beans at their own processing units where the beans are processed as coffee powder and various forms, which is branded as

"Araku Coffee" exported. On the other hand, facilitators provide trainings, health care programs to tribal farmers and educational support to the tribal girls. The facilitators are working towards improvement of quality of coffee through various interventions.

20 percent of the farmers in the sample size felt that NGOs/Facilitators are the ones who gives best price in the value chain when compared with the other stakeholders. This value chain mainly focuses towards exports to meet the international customer needs, similarly it creates a brand for the araku coffee in international markets.

4.4.2.2 CLASSIFICATION IDENTIFIED ARAKU COFFEE VALUES BASED ON NATURE OF VALUE CHAINS:

Araku valley coffee value chains were classified into three major categories like facilitator driven, buyer driven and processor driven. Based on the nature major player driving the value chain operations.

Table 4.13 Classification identified Aarau coffee values based on nature of value chains

S. No	Value chains	Facilitator driven	Buyer driven	Processor driven
1	Value chain I			
2	Value chain II			
3	Value chain III			
4	Value chain IV			
5	Value chain V			
6	Value chain VI			

In the value chain II and VI are the facilitator driven, which were mainly driven by non-Government officials (NGOs) in the form of suppling saplings of coffee, seeds, providing marketing facilities, processing facilities. While the value chains I, III, V are the buyer driven here buyers like GCC, Local traders, FPOs, NGOs and Local roasters are major actors driving the

value chain. The value chain IV was majorly driven by processor, it was the local roaster. Farmers shows more interest towards to the facilitators driven value chains because they will get benefited directly.

4.4.3. Price spread across various value chains

The data regarding prices, costs and margins at various players across the six following value chains have been collected and analysis and presented as following.

4.4.3.1 Price spread across the value chain I

The prices, costs and margins at various players in value chain I have been collected and analyzed and presented in table 4.14. The major players of value chain one is

Value chain I: Farmer ⟶ Local Trader ⟶ Aggregator ⟶ Exporter

Table 4.14: Price spread of value chain I

S.No	Particulars	Rupees/Quintal	Percentage
1	Farmer cost	810	2.05
2	Price received by producer	27000	68.27
3	Local Trader Purchase price	27000	68.27
4	Cost of Local Trader	435	1.10
5	Net margin to the Local Trader	1115	2.82
6	Aggregator purchase price	28550	72.19
7	cost incurred by Aggregator	1600	4.05
8	Net margin to the Aggregator	1350	3.41
9	Exporter purchase price	31500	79.65
10	Exporter Cost	2560	6.47
11	Net Margin of Exporter	5190	13.12
12	Exporter selling price	39550	100.00
13	Price spread	12550	31.73

Source: Own compilation

Note: Price received by the producers: Rs.270 per kg.

From the table no 4.14 it can be inferred that the major costs incurred by Producer include: transportation, bagging charges, labour charges for loading and unloading which accounts to 2.05 Per Cent of the consumer price.

The producer share in consumer rupee in value chain-1 was 68 per cent wherein the total cost incurred by producer accounted for 2.05 per cent of consumer's price. The cost and margins incurred by the local trade accounts to 1.10 Per Cent and 2.82 Per Cent respectively of the total consumer price. The major costs incurred by the local aggregator are transportation, labour charges, packing material cost. The costs and margins of aggregator accounts to 4.05Per Cent and 3.41 Per Cent respectively. The major cost incurred by the aggregator are transportation, loading and unloading charges, storage charges, rent of warehouse, insurance. The exporter costs were 6.47Per Cent and margin of the exporter were 13.12Per Cent of the consumers rupee. The major cost incurred by the export are interest, duties, container charges, transportation charges, shipping charges. The Price spread across the value chain was found to be 31.73Per Cent.

4.4.3.2 Price spread across the value chain II

The prices, costs and margins at various players in value chain II have been collected and analyzed and presented in table 4.15.

Value chain II: Farmer ⟶ GCC ⟶ Aggregator ⟶ Exporter

Table 4.15: Price spread of value chain II

S.No	Particulars	Rupees/Quintal	Percentage
1	Farmer cost	810	2.09
2	Price received by producer	25500	65.89
3	GCC Purchase price	25500	65.89
4	Cost of GCC	510	1.32
5	Net margin to the GCC	1990	5.14
6	Aggregator purchase price	28000	72.35
7	cost incurred by Aggregator	1680	4.34
8	Net margin to the Aggregator	1320	3.41
9	Exporter purchase price	31000	80.10
10	Exporter Cost	2560	6.61
11	Net Margin of Exporter	5140	13.28
12	Exporter selling price	38700	100.00
13	Price spread	13200	34.11

Source: Own compilation

Note: Price received by the producers: Rs.255 per kg.

From the table no 4.15 it can be inferred that the major costs incurred by Producer include: transportation, bagging charges, labour charges for loading and unloading which accounts to 2.09 Per Cent of the consumer price. The producer share in consumer rupee in value chain-2 was 65.89 per cent wherein the total cost incurred by producer accounted for 2.09 per cent of consumer's price. The cost and margins incurred by the GCC accounts to 1.32 Per Cent and 1.54 Per Cent respectively of the total consumer price. The major costs incurred by the local aggregator are transportation, labour charges, packing material cost. The costs and margins of aggregator accounts to 4.34Per Cent and 3.41 Per Cent respectively. The major cost incurred by the aggregator are transportation, loading and unloading charges, storage charges, rent of warehouse, insurance. The exporter costs were 6.61Per Cent and margin of the exporter were 13.28Per Cent of the consumers rupee. The major cost incurred by the export are interest, duties, container charges, transportation charges, shipping charges. The Price spread across the value chain was found to be 34.11Per Cent.

4.4.3.3 Price spread across the value chain III

The prices, costs and margins at various players in value chain III have been collected and analyzed and presented in table 4.16.

Value chain III: Farmer ⟶ FPOs/FPCs ⟶ Aggregator ⟶ Exporter

From the table no 4.16 it can be inferred that the major costs incurred by Producer include: transportation, bagging charges, labour charges for loading and unloading which accounts to 1.55 Per Cent of the consumer price. The producer share in consumer rupee in value chain-3 was 66.16 per cent wherein the total cost incurred by producer accounted for 1.55 per cent of consumer's price. The cost and margins incurred by the FPOs accounts to 1.15 Per Cent and 5.85 Per Cent respectively of the total consumer price. The major costs incurred by the local aggregator are transportation, labour

charges, packing material cost. The costs and margins of aggregator accounts to 4.20 Per Cent and 2.54 Per Cent respectively. The major cost incurred by the aggregator are transportation, loading and unloading charges, storage charges, rent of warehouse, insurance. The exporter costs were 6.61Per Cent and margin of the exporter were 13.59Per Cent of the consumers rupee. The major cost incurred by the export are interest, duties, container charges, transportation charges, shipping charges. The Price spread across the value chain was found to be 33.84 Per Cent.

Table 4.16: Price spread of value chain III

S.No	Particulars	Rupees/Quintal	Percentage
1	Farmer cost	610	1.55
2	Price received by producer	26000	66.16
3	FPOs Purchase price	26000	66.16
4	Cost of FPOs	450	1.15
5	Net margin to FPOs	2300	5.85
6	Aggregator purchase price	28750	73.16
7	cost incurred by Aggregator	1650	4.20
8	Net margin to the Aggregator	1000	2.54
9	Exporter purchase price	31400	79.90
10	Exporter Cost	2560	6.51
11	Net Margin of Exporter	5340	13.59
12	Exporter selling price	39300	100.00
13	Price spread	13300	33.84

Source: Own compilation

Note: Price received by the producers: Rs.260 per kg.

4.4.3.4 Price spread across the value chain IV

The prices, costs and margins at various players in value chain IV have been collected and analyzed and presented in table 4.17.

Value chain IV: Farmer ⟶ NGOs/Facilitators ⟶ Aggregator ⟶ Exporter

Table 4.17: Price spread of value chain IV

S.No.	Particulars	Rupees/Quintal	Percentage
1	Farmer cost	400	1.05
2	Price received by producer	24000	62.83
3	NGOs Purchase price	24000	62.83
4	Cost of NGOs	950	2.49
5	Net margin to NGOs	2650	6.94
6	Aggregator purchase price	27600	72.25
7	cost incurred by Aggregator	1650	4.32
8	Net margin to the Aggregator	1050	2.75
9	Exporter purchase price	30250	79.19
10	Exporter Cost	2600	6.81
11	Net Margin of Exporter	5300	13.87
12	Exporter selling price	38200	100.00
13	Price spread	14200	37.17

Source: Own compilation

Note: Price received by the producers: Rs.240 per kg.

From the table no 4.17 it can be inferred that the major costs incurred by Producer include: bagging charges, labour charges for loading and unloading which accounts to 1.05 Per Cent of the consumer price. The producer share in consumer rupee in value chain-4 was 62.83 per cent wherein the total cost incurred by producer accounted for 1.05 per cent of consumer's price. The cost and margins incurred by the NGOs accounts to 2.49 Per Cent and 6.94 Per Cent respectively of the total consumer price. The major costs incurred by the local aggregator are transportation, labour charges, packing material cost. The costs and margins of aggregator accounts to 4.32 Per Cent and 2.75 Per Cent respectively. The major cost incurred by the aggregator are transportation, loading and unloading charges, storage charges, rent of warehouse, insurance. The exporter costs were 6.81Per Cent and margin of

the exporter were 13.87 Per Cent of the consumers rupee. The major cost incurred by the export are interest, duties, container charges, transportation charges, shipping charges. The Price spread across the value chain was found to be 37.17 Per Cent.

4.4.3.5 Price spread across the value chain V

The prices, costs and margins at various players in value chain V have been collected and analyzed and presented in table 4.18.

Value chain V: Farmer ⟶ Local Roaster ⟶ Consumer

Table 4.18: Price spread of value chain V

S.No	Particulars	Rupees/Quintal	Percentage
1	Farmer cost	610	0.87
2	Price received by producer	26000	37.14
3	Local roaster Purchase Price	26000	37.14
4	procurement cost	490	0.70
5	Processing cost	12000	17.14
6	conversion losses	7698	11.00
7	marketing cost	13500	19.29
8	margin on coffee beans	10312	14.73
9	Consumer cost of roasted beans	70000	100.00
10	Price Spread	44000	62.86

Source: Own compilation

Note: Price received by the producers: Rs.260 per kg Parchment coffee.

From the table no 4.18 it can be inferred that the major costs incurred by Producer include: bagging charges, labour charges for loading and unloading which accounts to 0.87 Per Cent of the consumer price. The producer share in consumer rupee in value chain-5 was 37.14 per cent wherein the total cost incurred by producer accounted for 0.87 per cent of consumer's price. The cost and margins incurred by the local roaster accounts to 0.70 Per

Cent, 17.14, 11.00, 19.29 and 14.73 Per Cent respectively of the total consumer price. The major costs incurred by the local roaster are transportation, labour charges, Processing cost, conversion losses include the vaporization losses in roasting process, marketing cost for branding, maintenance of store and packing material cost. The Price spread across the value chain was found to be 62.86 Per Cent.

4.4.3.5 Price spread across the value chain VI

The prices, costs and margins at various players in value chain VI have been collected and analyzed and presented in table 4.19.

Value chain VI: Farmer ⟶ NGOs/Exporter

Table 4.19: Price spread of value chain VI

S.No	Particulars	Rupees/Quintal	Percentage
1	Farmer cost	400	1.05
2	Price received by producer	24000	62.99
3	NGOs Purchase price	24000	62.99
4	Cost of NGOs/Exporter	4600	12.07
5	Processing of coffee by NGOs/Exporter	4900	12.86
6	Net margin to NGOs/Exporter	4600	12.07
7	NGOs/Exporter selling price	38100	100.00
8	Price spread	14100	37.01

Source: Own compilation

Note: Price received by the producers: Rs.240 per kg Parchment coffee.

From the table no 4.19 it can be inferred that the major costs incurred by Producer include: bagging charges, labour charges for loading and unloading which accounts to 1.05 Per Cent of the consumer price. The producer share in consumer rupee in value chain-6 was 62.99 per cent wherein the total cost incurred by producer accounted for 1.05 per cent of consumer's price. The cost, processing and margins incurred by the NGOs acts as the exporter's accounts to 12.07 Per Cent,12.84 Per Cent and 12.07 Per Cent respectively of the total consumer price. The major cost incurred by the

NGOs/exporter are loading and unloading charges, storage charges, rent of warehouse, insurance and curing, interest, duties, container charges, transportation charges, shipping charges. The Price spread across the value chain was found to be 37.01 Per Cent.

4.4.4. Direction of trade of Indian arabica coffee exports

99 percent of araku coffee were arabica variety as per the coffee board of India. Markov chain approach is used to estimate the structural change in a system through time in terms of a variable having single outcome by using transitional probability matrix that helps to predict the future changes also.

Globalization and liberalization led to a dynamic change in the trade of commodities in the international markets. Documentation of those changes in the trade will aid in framing and implementing of trade and promotion policies of a nation. To overcome the difficulties in recording these changes in the trade, Markov chain analysis was employed which provides a probability approach to explain the changes. Getting probability matrix would be the central to Markov chain analysis, as it indicates the changes in trade and helps to decide the promotional policies and strategies to retain and increase the export to a particular country.

First order Markov chain analysis was employed to estimate the dynamics of trade and changing pattern of Indian arabica coffee exports to different export destinations.

The trend in retaining current market shares, gains and losses of Indian arabica coffee imports from a particular country to other was estimated from transitional probability matrices.

The actual quantity of Indian arabica coffee exports to different countries was taken to estimate the transitional probability matrix for the study period calendar year 2015 to 2021. The transitional probability matrix explained the changing behavior of Indian arabica coffee among the importing regions indicating the direction of trade in the study period.

Table 4.20 Transitional Probability Matrix of Indian Arabica Coffee

	ITALY	BELGIUM	GERMANY	U.S.A.	SWITZERLAND	UNITED KINGDOM	FRANCE	AUSTRALIA	RUSSIAN FEDERATION	Others
ITALY	**0.45216**	0.02122	0.15277	0.20191	0.06336	0.04772	0.00000	0.06086	0.00000	0.00000
BELGIUM	0.28488	**0.00000**	0.68316	0.00000	0.00000	0.01956	0.00000	0.01240	0.00000	0.00000
GERMANY	0.00000	0.22705	**0.20326**	0.51348	0.02982	0.00000	0.02639	0.00000	0.00000	0.00000
U.S.A.	0.00000	0.75171	0.00000	**0.00000**	0.00000	0.00000	0.04095	0.00000	0.20735	0.00000
SWITZERLAND	1.00000	0.00000	0.00000	0.00000	**0.00000**	0.00000	0.00000	0.00000	0.00000	0.00000
UNITED KINGDOM	0.00000	0.62129	0.00000	0.00000	0.00000	**0.00000**	0.00000	0.00000	0.25231	0.12640
FRANCE	0.00000	0.00000	0.00000	0.60217	0.00000	0.39783	**0.00000**	0.00000	0.00000	0.00000
AUSTRALIA	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	**0.00000**	0.00000	1.00000
RUSSIAN FEDERATION	0.00000	0.50457	0.00000	0.00000	0.00000	0.00000	0.05813	0.00000	**0.02029**	0.41701
Others	0.00000	0.43967	0.00000	0.15978	0.11912	0.07866	0.13517	0.00000	0.00000	**0.06760**

The row elements of the matrix indicate the retaining shares of a countries and losses to other countries, whereas column elements indicate the retaining share and also gains from other regions. The diagonal elements of the matrix indicate the retention of imports of a particular country. The transitional probability matrices for Indian arabica coffee were estimated. The transitional probability matrix for Indian arabica coffee exports was furnished in Table 4.20

The matrix indicated the detailed direction and changing behavior of arabica coffee exports. The export destination countries of Indian arabica coffee were categorized into 10 countries viz., Italy, Belgium, Germany, U.S.A, Switzerland, United Kingdom, France, Australia, Russian Federation and the remaining countries were categorized under others.

Italy was one of the largest and consistent importers of arabica coffee and retained 45.21 percent of its previous share. It gained a share of about 100 percent from Switzerland and 28.48 percent from Belgium. It also lost a share of 20.19, 15.27, 6.3, 6.0, 4.7 percent to the USA, Germany, Switzerland, Australia and 4.71 percent to United Kingdom.

Germany also retained 20.32 percent of its previous share. It also gained about 68.31 percent from Belgium and 15.27 percent Italy. It also lost 51.34 percent to the USA, 22.70 percent to Belgium, 2.98 percent to Switzerland and 2.63 percent to France.

Russia retained about 2.02 percent of its previous share and gained 25.23 percent from United Kingdoms and 20.73 percent from the USA. It also lost 50.45, 5.81 and 41.70 percent to Belgium, France and other countries respectively.

No other major importing country held the importing share constantly. Other countries pool retained share of 6.76 percent as it gained 41.70 and 12.64 percent from Russia and the UK respectively. In the same period, it also

lost 43.96 percent to Belgium, 15.97 percent to Germany, 13.51 percent to France, 11.91 percent to Switzerland and 7.86 percent to the UK.

Belgium gained 75.17, 62.12, 50.45, 22.70, 2.12, 43.96 43.96 percent from the USA, UK, Russia, Germany, Italy and other countries respectively. It also lost 43.96 percent to Belgium, 15.97 percent to the USA, 13.51 percent to France, 11.91 percent to Switzerland and 7.86 percent to the United Kingdom.

The USA gained 60.21 percent from France, 51.34 percent from Germany, 20.19 percent from Italy and 15.97 percent from other countries. It also 75.17, 20.73 and 4.09 percent to Belgium, Russia and France respectively.

Switzerland gained 6.33 percent from Italy, 2.98 percent from Germany and 11.91 percent from other countries. It lost 100 percent of its share to Italy.

The United Kingdom gained 39.78 percent from France, 4.71 percent from Italy, 1.95 percent from Belgium and 7.86 percent from other countries. It also lost 62.12, 25.23 and 12.64 percent to Belgium, Australia and other countries respectively.

France gained 5.81, 4.09, 2.63, 13.51 percent from Russia, the USA, Germany and other countries respectively. It also lost to 60.21 and 39.78 percent to the USA and the UK respectively.

Australia gained 6.08 and 1.23 percent from Italy and Belgium respectively and lost 100 percent of its share to other countries during the study period.

4.5. CONSTRAINTS IN DIFFERENT STAGES OF ARAKU VALLEY COFFEE VALUE CHAIN.

Qualitative questions were asked to assess the perception of the different stakeholders about production, Processing and marketing constraints and this data was analyzed using Garrett ranking method. The results were presented in Tables.

4.5.1. Farmers perception on constraints in production:

The result from the Table 4.14 indicates the various constraints experienced during production, Processing and marketing of the produce by the coffee farmers in the study area. It is clearly seen from Garrett scores presented in the Table 4.21 that at the production level the greatest challenge faced by farmers is Lack of Credit (68.00), where in several farmers cannot have good enough credit to purchase the quantity inputs required to increase the production of coffee. This complements the second biggest constraint the farmers reported as the high prevalence of pests and diseases (67.00) such as borer in the stem. The farmers also raised that they are not going for increase in the area of coffee due to lack of training and advisory services (46.66). Many of the farmers also complained about knowledge on selective picking of ripened coffee cherries (39.60), undesirable climatic factors (27.20) are also a constraint faced by them during production.

Table 4.21 Farmers perception on constraints in production of Coffee (n=60)

S.no	Particulars	Garrett score	Ranking
1	Lack of credit	68.00	1
2	Incident of pest and diseases	67.00	2
3	Lack of training and advisory services	46.66	3
4	Knowledge on Selective picking of ripened coffee cherries	39.60	4
5	Undesirable climatic factor	27.20	5

4.5.2. Farmers perception on constraints in processing of produce

The result from the Table 4.22 indicates the various constraints experienced during Processing by the coffee farmers in the study area. It is clearly seen from garrett scores presented in the Table 4.22 that at the production level the greatest challenge faced by farmers is non-availability of

hand -pulpers and other machinery (72.00), where in several farmers didn't have any machinery for pulping of the Cherrie coffee. This complements the second biggest constraint the farmers reported as the cost of machinery is high (62.33), The cost of machinery is not affordable because the price of the pulper is in lakhs. The farmers also raised that they are unaware of technically how to process the coffee (50.00). More of labour intensive for processing of coffee (33.20). Many of the farmers also complained about lack of coffee cherries availability (31.46), is also a constraint faced by them during processing, this is due to the peak season to get the cherries is November to march and rest of the time is lean there is no production of coffee.

Table 4.22. Farmers perception on constraints in processing of produce (n=60)

S.no	Particulars	Garrett score	Ranking
1	Non-availability of hand -pulpers and other machinery	72.00	1
2	Cost of machine is high	62.33	2
3	Lack of technical know how about the method	50.00	3
4	More labor intensive	33.20	4
5	Availability of coffee cherries is less	31.46	5

4.5.2 Farmers perception on constraints in Marketing of produce

The marketing constraints faced by the coffee farmers are presented in Table 4.23. The farmers complained about the lack of good transport facilities (70.00) was the major constraint which makes them have less connectivity to the different markets. Many of the farmers also complained about the lack of marketing facilities near to the production places (65.00) which resulted in low marketing efficiency of the produce.

Table 4.23. Farmers perception on constraints in Marketing of produce(n=60)

S.no	Particulars	Garrett score	Ranking
1	Lack of good transport facilities	70.00	1
2	Lack of marketing facilities	65.00	2
3	Lack of skill in marketing	42.53	3
4	High transport cost	39.06	4
5	Lack of interest	32.40	5

The third most constraint is lack of knowledge in marketing by the farmers (42.53), the coffee farmer feels that they require more knowledge on selling their produce. Many of the farmers also indicated that the transport cost is high (39.06), lack of interest (56.28), pose as important constraints in marketing their produce.

4.5.4 Constraints of local trader while purchasing produce from farmers in the value chain of coffee (n=4)

The result from the Table 4.24 indicates the various constraints experienced while purchasing produce from farmers by the local traders in the study area. It is clearly seen from garrett scores presented in the Table 4.24 that at the production level the greatest challenge faced by trader is lack of adequate storage facilities (81.50), Due to hill station many of the traders are felt that the transportation is major problem. This complements the second biggest constraint the trader reported as high transport cost (77.50), The trader also raised that poor availability of transportation (73.75), Lack of credit (73.25). Many of the trader also complained about quality related problems (67.25), is also a constraint faced by them during trading, this is due to harvesting of Non matured cherries, not maintaining proper moisture. Lack of marketing (65.75). traders were least bothered about market because as season arrives the wholesalers will directly contact them.

Table 4.24. Constraints faced by local traders.

S.no	Particulars	Garrett score	Ranking
1	Lack of adequate Storage facilities	81.50	1
2	High Transport Cost	77.50	2
3	Poor availability of Transportation	73.75	3
4	Lack of Credit	73.25	4
5	Quality related Problems	67.25	5
6	Lack of Marketing	65.75	6

4.5.4 Constraints of Roasters while purchasing produce from farmers in the value chain of coffee (n=2)

As shown on the below table 4.25. the severity of constraints can be demonstrated on a quality scale. Issue tending rather to the scale are relatively unproblematic to overcome and thus cannot be regarded as critical constraint, all issues tending to the relatively critical can be regarded as critical issue for the roasters at the value chain. High end machinery cost was highly critical issue as the availability of suitable machinery was difficulty and were costly for the roasters, Electrical consumption is highly critical issue and major cost occurs while processing.

Lack of technical man power is an Issue, but not critical, roaster can train locally available human resource. Quality of the coffee is not a critical issue and managed by the roasters. Timely availability of raw materials is not often and the roasters doesn’t feel it as a critical issue.

Table 4.25. Constraints faced by the Roasters.

S No	Constraints faced by Roasters	Issue type
1	High end machinery cost	Highly critical issue as the availability of suitable machinery was difficulty and were costly
2	Electricity Consumption	Highly critical issue is electricity cost was major cost while processing
3	Lack of technical man power	Issue, but not critical, can train locally available human resource.
4	Quality of the produce	Issue, but not critical, more efforts needed to procure quality produce
5	Timely availability of raw materials	Issue, but not critical, as need to compete with local traders and maintain good relation with farmers

4.5.4. Constraints Faced by exporter of Araku coffee:

As shown on the below table 4.26 the severity of constraints can be demonstrated on a quality scale. Issue tending rather to the scale are relatively unproblematic to overcome and thus cannot be regarded as critical constraint, all issues tending to the relatively critical can be regarded as critical issue for the exporters at the value chain. Government policies where highly critical issue will change frequently and restriction on the quantum for the exporters, freight charges are costlier and the 50 percent of the value goes to it. Inadequate export promotional measures are another highly critical issue as the low credit access, heavy documentation work for exports and the documentation works takes more time for the process of export. Quality of the coffee is not a critical issue and managed by the exporter.

Table 4.26. Constraints faced by the Exporters

S No	Constraints faced by Exporter	Issue type
1	Government policies with in the country for exporting	Highly critical issue as the government policies will changes frequently and restriction on the quantum
2	Government policies of imported countries	Highly critical issue as the restriction on the quantum and tariff on the coffee keep on changes by the importing countries.
3	Fright charges	Highly critical issue is the transport charges are very high and tariff on the coffee commodity is high.
4	Inadequate export promotional measures	Highly critical issue as the low credit access, heavy documentation process for exports
5	Quality of the produce	Issue, but not critical, as product is naturally grown more efforts needed during production, improving coffee bean quality.

Chapter – V

Summary & Conclusions

Chapter-V

SUMMARY AND CONCLUSION

Coffee is the second most traded commodity after oil on international trade exchanges both in terms of volume and value representing a significant source of income to several developing countries in Africa, Asia and Latin America. Brazil, Vietnam, Colombia, Indonesia, Honduras, Ethiopia, India, Uganda, Peru and Mexico are listed as the top 10 coffee growing countries in these regions (International Coffee Organization). Among the coffee growing countries, Brazil stands first both in area and production. It's share to the total world production was 35. 26 per cent which was followed by Vietnam, Colombia and Indonesia. According to the International Coffee Organization, 100 million people are working in the coffee industry, 20-25 million of whom are small growers.

India ranks seventh position (International Coffee Organization) with a total production of 2,99,280 tons of during the year 2019-20 India accounts for about 3. 02 per cent of world's coffee production. The country's exports during 2020-21 was 1,64,108 GBE (Green Bean Equivalent - Quantity In MT). 5 per cent to the nation's primary sector export earnings. On an average daily number of persons employed in coffee plantations is about 6,64,505 during 2018-19. There are 3,79,697 coffee holdings in India, of which 99 percent are less than 10 hectares in size and they come under the category of small holdings.

The total number of coffee growers in non-traditional areas such as Andhra Pradesh and Odisha were around 1,96,966. Out of them 1,92,864 tribal farmers were exclusively located in the Andhra Pradesh especially Visakhapatnam, is very proud of its “Araku coffee”. While coffee grown in araku is sold at premium prices. The coffee from the Araku Valley is pure arabica with a rare aromatic odour. In 2019, for its special aroma and organic approach to coffee production by the tribals, the Department for the

Promotion of Industry and Internal Trade, under the Ministry of Commerce and Industry, awarded the Geographical Indication tag to araku valley coffee. Approximately 90Per cent of the total production of Araku coffee is exported to countries such as Sweden, Switzerland, Italy, and the United Arab Emirates.

In last few recent years, value chain analysis of different crops received serious attention by the researchers. A better analysis of value chain will help to understand how to improve the farmer's performances in every value adding step. It also provides in-depth understanding how to increase farmer's share. It is important to discover who the actors are, and what their relationships are, to gain a better understanding of where small coffee farmers are in the global value chain, and knowing their issues is essential. Thus, the present study was taken up with the following objectives.

5.1 OBJECTIVES OF THE STUDY

1. to map the existing coffee value chains in Araku valley.
2. to analyze the Araku valley value chain of coffee.
3. to examine the constraints in different stages of Araku valley coffee value chain.

5.2 METHODOLOGY

Visakhapatnam district was purposively selected for the study as the area under coffee cultivation is highest among Visakhapatnam and East Godavari the districts of Andhra Pradesh. Out of all the mandals in the district, two mandals which has highest area under coffee were selected. Similarly, following the same criterion four villages were selected two from each mandal. From these villages, a total of 60 farmers were selected based on the criteria of total number of coffee growers in each village by using probability sampling technique. After identifying the different value chains in marketing of coffee, actors viz., four local traders, two roasters, one exporter were selected for the study. Mostly the freshly harvested raw coffee cherries procured by actors were processed into parchment and green bean coffee in the study area.

Information pertaining to value chains, costs and margins, facilities provided in marketing and value addition was collected from different actors through primary survey. Data was also collected regarding the constraints faced by the farmers and the actors using a pre-structured questionnaire.

The data pertaining to area, production and productivity of chickpea crop in India and Andhra Pradesh from 2000-01 to 2020- 21. was collected from various published reports (Coffee Board of India) and websites (www.indiastat.com). Visakhapatnam district is the largest producer of coffee crop in Andhra Pradesh the data pertaining to area, production and productivity (2010-11 to 2020- 21)

The data was analyzed to attain specific objectives by using Annual growth rates, Compound Annual growth rate analysis, Percentage analysis, Value chain mapping technique, Price spread analysis, Markov chain analysis and Garrett ranking technique.

5.3. MAJOR FINDINGS OF THE STUDY

From the analytical part major findings of the study were briefly stated for a comprehensive review to draw specific conclusions.

5.3.1 Growth rates in terms of area, production and productivity of Indian coffee

5.3.1.1 Growth Rates in terms of Area, Production of Indian Coffee from 2000-01 to 2020-21

The annual growth rates of area under coffee were highly fluctuating during the study period i.e., from 2000-01 to 2020- 21. A significant increase in the annual growth rate of cultivated area under coffee was observed in the year 2016-17 (3.22 per cent) and a significant decrease in the annual growth rate of cultivated area under coffee was observed in the year 2002- 03 (-0.04 per cent). During the study period, a significant increase in the annual growth rate of coffee production was observed during the year 2020-21 (12.08 per cent) and the significant decrease was observed in the year 2016-17 (-10.34

per cent). The calculated CAGR of cultivated area under coffee from 2000-01 to 2020-21 was 1.59 per cent. This indicated that a minor increase in area under coffee in India was over the last 21 years. The CAGRs of Indian coffee production and productivity during the study period was 1.01 per cent and -0.57 per cent respectively.

5.3.1.2 Compound Annual Growth Rates of Area Under Arabica Coffee, Robusta coffee and Total coffee from 2000-01 to 2020-21

The results of CAGRs of area under both arabica and robusta coffee were 2.07 per cent and 1.74 per cent. The cultivated area of both arabica and robusta combinedly from 2000-01 to 2020-21 had shown a CAGR of 1.59 per cent indicating a moderate increase in total area during study period.

5.3.1.3 Compound Annual Growth Rates of Production of Arabica, Robusta and Total coffee from 2000-01 to 2020-21.

The CAGR arabica coffee and robusta coffee production from 2000-01 to 2020- 21 were -0.47 per cent and 1.77 per cent respectively. The CAGR of production of robusta coffee was higher than arabica coffee which indicated that production of robusta coffee had increased more than the production of arabica coffee during the study period. The overall coffee production had shown a CAGR of 1.01 per cent indicating a moderate increase in production during the study period.

5.3.1.4 Growth Rates of area under Arabica and Robusta coffee in the state of Andhra Pradesh 2010-11 to 2020-21.

The annual growth rates of area under arabica and robusta coffee in Andhra Pradesh were highly fluctuating during the study period i.e., from 2010-11 to 2020-21. A significant increase in the annual growth rates of area under arabica coffee was observed during the year 2012-13 (13.10 per cent) and a significant decrease in annual growth rates of arabica coffee was observed in the year 2019-20 (3.71 per cent).

5.3.1.5 Growth Rates of production under Arabica and Robusta coffee in Andhra Pradesh From 2010-11 to 2020-21.

The annual growth rates of production under arabica and robusta coffee in Andhra Pradesh were highly fluctuating during the study period i.e., from 2010-11 to 2020-21. A significant increase in annual growth rates of production under arabica coffee was observed during the year 2015-16 (24.15 per cent) and a significant decrease in annual growth rates of arabica coffee was observed in the year 2019-20 (-4.42 per cent).

5.3.2 Socio-economic characteristics of sample farmers in the study area

The sample size considered for the study was 60 farmers. Their Socio-economic characteristics in terms of age, literacy level, family size, family monthly income, operational land holding experience in coffee cultivation is summarized below.

5.3.2.1. Age group particulars of sample consumers

It has been found that majority of the farmers 43.33 per cent of respondent farmers belonged to 25-45 years age group, 40.00 per cent of respondent farmers were between 45-60 years age group, 10 per cent of respondent farmers belongs to below 25 years and 6.67 per cent of respondent farmers were more than 60 years group.

5.3.2.2. Literacy Level of Sample Farmers

Among the 60 sample farmers revels that 60 per cent of the farmers are illiterates, 16.67 per cent of the farmers hold secondary education, and 10 per cent of the farmers hold a primary education and 8.33 percent holds intermediate degree and 5.00 per cent holds the graduation degree.

5.3.2.3. Family size status of sample consumers

Out of 60 sample farmers, 50 per cent of the respondent farmers were having the family size below 4 members, 46 percent had a family size between 4-6 members and 4 per cent of respondent farmers had a family size

above 6 members. Hence, the family size of majority of the respondent farmers was below 4 members.

5.3.2.4. Gross Annual Income Levels of Sample Farmers

Gross annual income of the 60 respondent farmers is about 53.33 per cent of sample farmers were in the 1,00,000- 2, 00,000 categories, while 30 per cent of sample farmers annual income was between 2,00,000 to Rs 3,00,000 category. The annual income of 13.33 per cent of the sample farmers was below 1,00,000 categories and the remaining 3.34 per cent had gross annual income respondent farmers were above 3,00,000. Hence, majority of sample farmers gross annual income ranges between Rs 1,00,000 – Rs. 2, 00,000.

5.3.2.5. Operational landholdings of sample farmers

The operational land holding of sample farmers. Out of total 60 sample farmers, 85 per cent of farmers were marginal farmers with land holding of below 2.5 acres, 13.33 per cent of farmers were small farmers having land holding of 2.5- 5 acres and only 1.67 per cent of the sample were large farmers having more than 5 acres. The operational land holding showed that majority of sample farmers were marginal farmers having operational land holdings less than 2.5 acres.

5.3.2.6. Farmers experience in cultivating coffee

Framers experience in cultivating coffee is 61.66 per cent of the sample farmer have farming experience of 5-10 years, 20 per cent having more than 15 years farming experience of coffee, 13.34 per cent sample farmers were having farming experience of 10-15 years and 5 per cent of sample farmers had less than 5 years of experience. The farming experience of majority of the sample farmers has 5-10 years' experience in coffee cultivation.

5.3.3. Identification Of Actors and Roles in Araku Coffee Value Chain

Major actors in araku coffee value chain were identified through movement of coffee from the producer and services provided by the actors along the value chain. The different actors were Coffee Board of India, Integrated Tribal development Agency, NGOs/ Facilitators, Local traders, GCC (Girijan Cooperative Corporation), FPOs (Farmers Producer Organization), Local Roasters, Aggregators, Processors, Exports, Domestic/international Retail chains and consumers.

5.3.4. Mapping and analyzing of existing coffee value chains in araku valley.

The value chains have been mapped the relations between various identified players, movement of the coffee, services offered by players to handle various forms of coffee to various destinations across the globe. Mapping of value chain of araku valley coffee in Vishakhapatnam district of Andhra Pradesh is done considering the core value chain functions, actors and the product flows. The core functions or processes involved in the value chain include production of coffee, primary movement of the produce, processing and secondary movement of products to the final consumers. The various value chain actors included input suppliers, producers, marketing facilitators, aggregators, processors, exporters.

5.3.5 Analysis of coffee value chains in Araku valley

Analysis of araku coffee is done through the relations among the actors in each value chains, nature of value chains, price spread among the value chains and direction of trade of arabica coffee.

5.3.5.1 Value chains in araku coffee

Six Value Chains for Araku coffee were identified in the study area. These value chains were differentiated based on the number of the nodes in the chain and the role of actors in each chain.

Value chain I

Framer - Local trader - Aggregator - Processor - Exporter/Domestic distributors -Importer/Retail chains - Retail outlets/HORECA – Consumer

In this value chain the farmers sell harvested fresh raw coffee cherries, parchment coffee and green bean coffee and sale it to the local traders at farm gate. This value chain was major value chain handling more than 70 Per cent of raw coffee cherries harvested in araku coffee value chain.

Value chain II

Framer – NGOs/Facilitators - Aggregator - Processor - Exporter/Domestic distributors - Importer/Retail chains - Retail outlets/HORECA – Consumer

In this value chain the farmers sell harvested fresh raw coffee cherries to the NGOs at farm gate. NGOs/Facilitators will further process the coffee cherries into Parchment coffee and green bean coffee and supplied to aggregator further process to reach the end consumer through different actors. This value chain was major value chain handling more than 20 Per cent of raw coffee cherries harvested in araku coffee value chain.

Value chain III

Framer - FPOs - Aggregator - Processor - Exporter/Domestic distributors - Importer/Retail chains - Retail outlets/HORECA – Consumer

In this Chain FPOs will carried out the functions of local traders. farmers sell harvested fresh raw coffee cherries, parchment coffee to the NGOs at farm gate and sells to the aggregator. Aggregator will take up coffee curing process based on the destinations. Further aggregator fulfils domestic needs directly by selling to Industrial processor and international destinations through selling to exporters. Large Aggregators will act as the exporters.

Value chain IV

Framer – Local Roaster– Consumer

Value chain handling less than 10 Per cent of parchment and green bean coffee harvested in araku coffee value chain. Coffee beans were directly purchased by the Local Roasters and further processed into various forms like coffee powder with the different combinations of chicory, chocolates, roasted beans, instant coffee.

Value chain V

Framer - GCC - Aggregator - Processor - Exporter/Domestic distributors - Importer/Retail chains - Retail outlets/HORECA – Consumer

This value chain was major value chain handling more than 20 Per cent of parchment coffee in araku coffee value chain. The GCC collects the coffee beans from the farmers at the local level on a regular basis and in turn supply the same to aggregators.

Value chain VI

Framer – NGOs/Facilitators - Exporter/Domestic distributors - Importer/Retail chains - Retail outlets/HORECA – Consumer

This value chain was major value chain handling about 20 Per cent of raw coffee cherries harvested in araku coffee value chain. Few districts level NGO's collect the quality coffee cherries and beans from farmers at regular intervals and process the beans at their own processing units where the beans are processed as coffee powder and various forms, which is branded as "Araku Coffee" exported. On the other hand, facilitators provide trainings, health care programs to tribal farmers and educational support to the tribal girls.

5.3.5.2 Classification identified Aarau coffee values based on nature of value chains

In the value chain 2 and 6 are the facilitator driven, which were mainly driven by non-Government officials (NGOs) in the form of suppling saplings of coffee, seeds, providing marketing facilities, processing facilities. While the value chains 1,3,5 are the buyer driven here buyers like GCC, Local traders, FPOs, NGOs and Local roasters are major actors driving the value chain. The value chain 4 was majorly driven by processor, it was the local roaster.

5.3.5.3 Price spread across various value chains

Value chain I: Farmer ⟶ Local Trader ⟶ Aggregator ⟶ Exporter

The producer share in consumer rupee in value chain-1 was 68 per cent wherein the total cost incurred by producer accounted for 2.05 per cent of consumer's price. The Price spread across the value chain was found to be 31.73Per cent.

Value chain II: Farmer ⟶ GCC ⟶ Aggregator ⟶ Exporter

The producer share in consumer rupee in value chain-2 was 65.89 per cent wherein the total cost incurred by producer accounted for 2.09 per cent of consumer's price. The Price spread across the value chain was found to be 34.11Per cent.

Value chain III: Farmer ⟶ FPOs/FPCs ⟶ Aggregator⟶ Exporter

The producer share in consumer rupee in value chain-3 was 66.16 per cent wherein the total cost incurred by producer accounted for 1.55 per cent of consumer's price. The Price spread across the value chain was found to be 33.84 Per cent.

Value chain IV: Farmer ⟶ NGOs/Facilitators ⟶ Aggregator ⟶ Exporter

The producer share in consumer rupee in value chain-4 was 62.83 per cent wherein the total cost incurred by producer accounted for 1.05 per cent of consumer's price. The Price spread across the value chain was found to be 37.17 Per cent.

Value chain V: Farmer ⟶ Local Roaster ⟶ Consumer

The producer share in consumer rupee in value chain-5 was 37.14 per cent wherein the total cost incurred by producer accounted for 0.87 per cent of consumer's price. The Price spread across the value chain was found to be 62.86 Per cent.

Value chain VI: Farmer ⟶ NGOs/Exporter

The producer share in consumer rupee in value chain-6 was 62.99 per cent wherein the total cost incurred by producer accounted for 1.05 per cent of consumer's price. The Price spread across the value chain was found to be 37.01 Per cent.

5.3.5.4 Direction of trade of Indian arabica coffee exports

Italy was one of the largest and consistent importers of arabica coffee and retained 45.21 percent of its previous share. It gained a share of about 100 percent from Switzerland and 28.48 percent from Belgium. It also lost a share of 20.19, 15.27, 6.3, 6.0, 4.7 percent to the USA, Germany, Switzerland, Australia and 4.71 percent to United Kingdom.

5.3.6 CONSTRAINTS IN DIFFERENT STAGES OF ARAKU VALLEY COFFEE VALUE CHAIN.

On the basis of the information collected from the coffee farmers, the major constraints perceived by them during the production were Lack of Credit (68.00), where in several farmers cannot have good enough credit to purchase the quantity inputs required to increase the production of coffee.

This complements the second biggest constraint the farmers reported as the high prevalence of pests and diseases (67.00) such as borer in the stem. In addition to this, Lack of training and advisory services (rank III), Knowledge on Selective picking of ripened coffee cherries (rank IV), Undesirable climatic condition (rank V), were the other major constraints faced by coffee farmers in the study area.

The constraints perceived by the coffee farmers during processing were non-availability of hand -pulpers and other machinery (72.00), Second biggest constraint the farmers reported as the cost of machinery is high (62.33). In addition to this, unaware of technically how to process the coffee (rank III), More of labour intensive for processing of coffee (rank IV), Many of the farmers also complained about lack of coffee cherries availability (rank V).

The constraints perceived by the coffee farmers during marketing were Lack of good transport facilities (rank I), Lack of marketing facilities (rank II), Lack of skill in marketing (rank III), High transport cost (rank IV) and Lack of interest (rank V).

The constraints perceived by the coffee trader is lack of adequate storage facilities (rank I), high transport cost (rank II), poor availability of transportation (rank III), Lack of credit (rank IV), quality related problems (rank V) and Lack of marketing (rank VI).

High end machinery cost was highly critical issue as the availability of suitable machinery was difficulty and were costly for the roasters, Electrical consumption is highly critical issue and major cost occurs while processing. Lack of technical man power is an Issue, but not critical, roaster can train locally available human resource. Quality of the coffee is not a critical issue and managed by the roasters. Timely availability of raw materials is not often and the roasters doesn’t feel it as a critical issue.

Government policies where highly critical issue will change frequently and restriction on the quantum for the exporters, freight charges are costlier

and the 50 percent of the value goes to it. Inadequate export promotional measures are another highly critical issue as the low credit access, heavy documentation work for exports and the documentation works takes more time for the process of export. Quality of the coffee is not a critical issue and managed by the exporter.

5.4 CONCLUSIONS

- The CAGRs of area under Indian coffee from 2000-01 to 2020-21 was 1.59 per cent. This indicated that a minor increase in area under coffee in India was over the last 21 years.
- The age group details that most 43.33 per cent of respondent farmers were falling in the age group between 30-50 years.
- Education status revealed that majority 60 per cent of the farmers are illiterates.
- 50 per cent of the sample farmer were having the family size below 4 members.
- 53.33 per cent of respondent farmers were in the 1,00,000- 2, 00,000 categories.
- 85 per cent of farmers were marginal farmers with land holding of below 2.5 acres.
- Framers experience in cultivating coffee is 61.66 per cent of the sample farmer have farming experience of 5-10 years
- Araku valley coffee has huge demand in the international market for its natural grown coffee.
- Local traders are giving the best prices when compared with the other actors in the different value chains.
- Farmers were showing interest to sell their produce to NGOs/Facilitators even price received by them are low when compared

with the other actors in the value chains because the farmers are benefitted by the social infrastructure provided by the NGOs/Facilitators.

- Local roaster takes very low volume coffee in the value chains and they help in the future for promotion of the araku coffee in the domestic areas for its special aroma and natural way of growing coffee.
- Italy was one of the largest and consistent importers of Indian arabica coffee.

POLICY IMPLICATIONS

1. As araku coffee was naturally grown there should be a proper labelling a product as organic or natural grown is considered a valuable marketing advantage in today's consumers' market.
2. Basic issues like logistics, ware houses and local aggregation need to be addressed.
3. Need of structured markets with transparency on the prices.
4. Encouraging the small-scale industries in the araku region for curing, roasting and value-added products. Which helps in the building of domestic markets with various products.
5. Focus needs to be taken on the promotion of local branding and domestic exports.

Literature Cited

LITERATURE CITED

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