

# Value Chain Study of Onion of Chikmagalur, Karnataka

2017-18

Under MIDH Project



BY

National Horticultural Research and Development Foundation,  
"Bagwani Bhawan", Plot No. 47, Institutional Area, Pankha Road, Janakpuri, NEW DELHI-110058.  
Tele.No:- 011-28524150, 28522211

# VALUE CHAIN STUDY OF ONION OF CHIKMAGALUR, KARNATAKA

- Published by: **Dr. P. K. Gupta, Director (Acting)**  
National Horticultural Research and Development Foundation  
Bagwani Bhawan, Plot No-47, Pankha Road, Institutional Area,  
Janakpuri, New Delhi-110058  
Phone: 011-28524150,28522211  
Telefax: 011-28525129  
Email: delhi@nhrdf.com  
Website: www.nhrdf.org
- Guidance: **Sh. Dinesh Kumar, IAS**  
Joint Secretary (MIDH),  
Ministry of Agriculture & Farmer Welfare,  
Government of India
- Complied by: **Dr. P. K. Gupta, Director (Acting)**  
**Dr. S. K. Singh, Deputy Director (Seed)**  
**Dr. S. K. Tiwari, Sr. Technical Officer, (Horticulture)**
- Consultant: **Dr. Dhayan Singh, Principal Scientist, (Retd.)**  
ICAR-IARI, New Delhi
- Coordinator: **Sh. Sudhir Kumar Singh,**  
Senior Programmer, NHRDF
- Surveyor: Food and Agribusiness Strategic Advisory and Research (FASAR),  
Division of YES BANK, Limited, New Delhi.
- Year of Survey: **2017-18**
- Financial Support: Department of Agriculture & Farmers Welfare,  
Ministry of Agriculture and Farmer Welfare,  
Government of India  
(Under MIDH Scheme)

## Acknowledgements

It gives us great pleasure to present the report, 'Value Chain Study of Onion of Chikmagalur, Karnataka' for the year 2017-18. We extend our heartiest thanks to all the stakeholders involved in providing inputs which have gone into the formulation of this report.

At the outset, we would like to thank the Food and Agribusiness Strategic Advisory and Research (FASAR) Division of YES BANK Limited for undertaking this study. Their professional approach right from initiation, execution and submission of the report is highly appreciated.

We would also like to thank all stakeholders for the study including Mission Director, Department of Horticulture, Government of Karnataka, Department of Agriculture, Chikmagalur District, APMC officials, market intermediaries and onion farmers across Chikmagalur district. Their inputs, feedback and suggestions have been invaluable in identifying gaps and formulating actionable recommendations for this report.

We sincerely hope and believe that the findings and recommendations of this report will help to further the cause of Honourable Prime Minister's vision of doubling farmers' income by 2022 as well as provide relevant insights in dovetailing to the recently initiated 'Operation Greens' under the Union Budget 2018-19. We believe this report will serve as a valuable resource, providing the necessary framework to inform various stakeholders across the onion value chain in Karnataka as well as other states across India.

# Contents

List of Exhibits .....	6
List of Acronyms .....	8
Executive Summary .....	9
<b>1. Introduction .....</b>	<b>11</b>
<b>1.1. Project Background .....</b>	<b>11</b>
<b>1.2. About National Horticultural Research &amp; Development Foundation (NHRDF).....</b>	<b>11</b>
<b>1.2.1. NHRDF Mandate.....</b>	<b>11</b>
<b>1.3. Objectives .....</b>	<b>12</b>
<b>1.4. Scope of Work.....</b>	<b>12</b>
<b>1.5. Approach and Methodology .....</b>	<b>13</b>
<b>1.5.1. Secondary research and Literature Review .....</b>	<b>13</b>
<b>1.5.2. Primary Research .....</b>	<b>14</b>
<b>1.5.3. Sampling Plan .....</b>	<b>15</b>
<b>1.6. Significance of the study .....</b>	<b>16</b>
<b>1.7. Limitations of the study .....</b>	<b>16</b>
<b>2. Study Region .....</b>	<b>17</b>
<b>2.1. Location.....</b>	<b>17</b>
<b>2.2. Topography &amp; Agro climatic details .....</b>	<b>18</b>
<b>2.3. Connectivity &amp; Logistics.....</b>	<b>18</b>
<b>2.3.1. Air Connectivity .....</b>	<b>18</b>
<b>2.3.2. Rail &amp; Road Connectivity .....</b>	<b>18</b>
<b>2.4. Demographic &amp; Socioeconomic Characteristics.....</b>	<b>19</b>
<b>2.5. Agriculture Scenario .....</b>	<b>20</b>
<b>2.6. Horticulture Scenario in Chikmagalur District .....</b>	<b>23</b>
<b>2.6.1. Agri Marketing Infrastructure in Chikmagalur District .....</b>	<b>24</b>
<b>3. Analysis of Primary Survey .....</b>	<b>27</b>
<b>3.1. Socio Economic Profile of Onion Farmers.....</b>	<b>27</b>
<b>3.2. Land Holding Pattern &amp; Irrigation .....</b>	<b>28</b>
<b>3.3. Field Preparation .....</b>	<b>28</b>
<b>3.3.1. Seasonality.....</b>	<b>28</b>
<b>3.3.2. Production Practices.....</b>	<b>28</b>
<b>3.3.2.1. Production Details .....</b>	<b>28</b>
<b>3.3.2.2. Field Preparation.....</b>	<b>30</b>
<b>3.3.2.3. Seed/Planting Material.....</b>	<b>30</b>

3.3.2.4.	Seed Treatment .....	30
3.3.2.5.	Application of Inputs .....	31
3.3.2.6.	Cost of Cultivation .....	33
3.4.	Post-Harvest Management and Marketing .....	33
3.5.	Availability & Access to Credit .....	34
3.6.	Training & Capacity Building .....	36
3.6.1.	Extension Services .....	36
3.6.2.	Farmer Groups .....	38
3.7.	Government Support .....	38
4.	Value Chain Analysis of Onion .....	39
4.1.	Cost of Cultivation at farm level .....	39
4.2.	Transportation & Packaging .....	39
4.3.	Marketing Channels .....	40
4.4.	Price Buildup .....	40
4.5.	Onion Crop – Basic Economics .....	40
5.	Challenges across the Onion Value Chain .....	41
5.1.	Production & Inputs .....	41
5.2.	Labour .....	43
5.3.	Post-Harvest Management .....	43
5.4.	Value Addition & Processing .....	44
5.5.	Market Access & Market Price .....	45
6.	Recommendations .....	45
6.1.	Production & Inputs .....	45
6.2.	Labour & Farm Mechanization Innovations .....	46
6.3.	Post-Harvest Management .....	46
6.4.	Value Addition & Processing .....	46
6.5.	Market Access & Market Price .....	46
Annexures	.....	48
A.	Onion Farmers Consulted .....	48
B.	Input Suppliers Consulted .....	53
C.	Agricultural Produce Market Committee (APMC) Visited .....	53
D.	Key Data Tables .....	55

## List of Exhibits

Exhibit 1: Scope of Work for the Study .....	12
Exhibit 2: Approach & Methodology for the study .....	14
Exhibit 3: Value Chain Analysis for Onion in Chikmagalur District - Sampling Coverage.....	15
Exhibit 4: Location of Chikmagalur District and its blocks .....	17
Exhibit 5: Major Roadways & National Highways in Chikmagalur District .....	18
Exhibit 6: Socioeconomic characteristics of Chikmagalur District .....	19
Exhibit 7: Land Use Pattern - Chikmagalur District (2014-15) .....	20
Exhibit 8: Area, Production and Yield of Major Crops in Chikmagalur District - 2013-2014.....	21
Exhibit 9: Production of major crops in Chikmagalur District vis. a vis. Karnataka.....	22
Exhibit 10: Area, Production & Yield of key Horticultural Crops - Chikmagalur District.....	23
Exhibit 11: Horticulture in Chikmagalur District - Area, Production and Yield (2015-16).....	24
Exhibit 12: Available Marketing infrastructure facilities in Chikmagalur District.....	25
Exhibit 13: Major Vegetable Crops Production Statistics 2015-16.....	26
Exhibit 14: Vegetable-wise share in Area & Production – Chikmagalur District .....	26
Exhibit 15: Onion Farmers in Chikmagalur – Literacy & Gender Profile .....	27
Exhibit 16: Onion Farmers in Chikmagalur - Caste Profile.....	27
Exhibit 17: Onion Farmers in Chikmagalur - Land Holding Pattern .....	28
Exhibit 18: Seasonality of Onion farming in Chikmagalur .....	28
Exhibit 19: Variety of Seed used in Onion Cultivation – 2016-17, 2015-16, 2014-15 .....	28
Exhibit 20: Reasons for Preference of Seed Variety & its Sources .....	29
Exhibit 21: Onion Farming in Chikmagalur - Major Chemicals used for Seed Treatment.....	30
Exhibit 22: Onion Farming in Chikmagalur - Usage of Chemical Inputs .....	31
Exhibit 23: Average Price and Usage of Chemical Inputs in Onion Cultivation .....	31
Exhibit 24: Onion Farming in Chikmagalur - Usage of Inputs for Crop Protection.....	32
Exhibit 25: Onion Farming in Chikmagalur - Major Pesticides and their average market costs .....	32
Exhibit 26: Onion Farming in Chikmagalur - Average Cost of Production (Rs. per kg.) .....	33
Exhibit 27: Components of Cost of Onion Production in Chikmagalur.....	33
Exhibit 28: Suggestions for easy disposal of produce in market at better price.....	34
Exhibit 29: Onion Farming in Chikmagalur - Sourcing of Agricultural Loan.....	35
Exhibit 30: Hindrances Faced in Availing Agriculture Loans .....	35
Exhibit 31: Onion Farmers in Chikmagalur - Training & Capacity Building .....	36
Exhibit 32: Post Extension Changes in Farming Practices.....	37
Exhibit 33: Farmer Producer Organisations - Benefit to Farmers .....	38
Exhibit 34: Schemes availed by onion farmers in study region.....	38
Exhibit 35: Onion Packing in Specialised Perforation Bags, Tarikere, Chikmagalur District .....	39
Exhibit 36: Avg. Price Buildup in supply chain of Onion - Chikmagalur District to Bangalore .....	40
Exhibit 37: Basic Crop Economics - Onion .....	40
Exhibit 38: An Onion Farm in Kadur Block, Chikmagalur District .....	41
Exhibit 39: Onion Farming in Chikmagalur - Key Challenges: Production .....	42
Exhibit 40: Key Challenges: Usage of Organic & Chemical Inputs.....	42
Exhibit 41: Key Challenges faced by Onion farmers in Chikmagalur: Labour .....	43
Exhibit 42: Hired Labour involved in Topping of Harvested Onion, Kadur Block, Chikmagalur District ..	43
Exhibit 43: Key Challenges: Post-Harvest Management .....	44
Exhibit 44: Key Challenges: Market Intelligence .....	45
Exhibit 45: List of Onion Farmers Consulted.....	48
Exhibit 46: List of Input Suppliers Consulted.....	53

Exhibit 47: List of APMCs Consulted.....	53
Exhibit 48: Major Fruit Crops Production Statistics 2015-16.....	55
Exhibit 49: Fruit wise share in Area & Production – Chikmagalur District .....	55
Exhibit 50: Major Plantation Crops Production Statistics 2015-16 .....	56
Exhibit 51: Plantation Crop wise share in Area & Production – Chikmagalur District .....	56
Exhibit 52: Major Spices Crops Production Statistics 2015-16 .....	57
Exhibit 53: Spice-wise share in area & production – Chikmagalur District.....	57
Exhibit 54: Major Commercial Flowers Production Statistics 2015-16 .....	58
Exhibit 55: Commercial Flower-wise share in area & production – Chikmagalur District .....	58

## List of Acronyms

APEDA - Agricultural and Processed Food Products Exports Development Authority  
ATMA - Agriculture Technology Management Agency  
DAP - Diammonium Phosphate  
DoAHDF - Department of Animal Husbandry, Dairying & Fisheries  
DoGR - Directorate of Onion and Garlic Research  
FYM - Farm Yard Manure  
GAP - Good Agricultural Practices  
GBY - Gramin Bhandaran Yojana  
ha. - Hectare  
HMNEH - Horticulture Mission for North East and Himalayan States  
IIHR - Indian Institute of Horticultural Research  
INM - Integrated Nutrition Management  
IPM - Integrated Pest Management  
KVK - Krishi Vigyan Kendra  
MoAFW - Ministry of Agriculture and Farmers Welfare  
MIDH - Mission for Integrated Development of Horticulture  
MOP - Muriate of Potash  
NAIS - National Agriculture Insurance Scheme  
NARP - National Climate Change Adaptation Research Plan  
NFSM - National Food Security Mission  
NHB - National Horticulture Board  
NHM - National Horticulture Mission  
NHRDF - National Horticultural Research and Development Foundation  
PMFBY - Pradhan Mantri Fasal Bima Yojana  
Qtl - Quintal  
RGM - Rashtriya Gokul Mission  
RKVY - Rashtriya Krishi Vikas Yojana  
RRB - Regional Rural Bank  
SAU - State Agriculture University  
SSP - Single Super Phosphate



## Executive Summary

Chikmagalur is one of the major districts in the state of Karnataka around 200 km from the state capital of Bangalore. As of 2015-16, area under horticulture production covered around 6.7% of the area coverage of the state. From the production point of view, the district produces about 2,19,017 MT of horticulture produce and contributes 1% to the production basket of the state. Onion, is one of the primary horticultural crops cultivated in the district accounting to around 33% of the total area as well as production of the district. Hence, under the aegis of the Ministry of Agriculture and Farmers Welfare, the *National Horticultural Research and Development Foundation (NHRDF)* in collaboration with the Karnataka State Horticultural Mission was mandated to conduct a detailed value chain assessment of onion crop in Chikmagalur district. Pertaining to the same, NHRDF engaged with the Food and Agribusiness Strategic Advisory Research (FASAR) division of YES BANK to carry out the study.

The major focus of the study was to conduct a detailed value chain assessment of onion crop in the district covering the entire chain, right from FARM to FORK including production practices, land and cropping patterns, post-harvest practices and marketing, value addition and access to credit and policy interventions. Enhancement of value chain management with backward and forward linkages was emphasized so that farmers may get better remunerative prices for their produce. Also, it was critical to assess the new farming practices deployed, farmer awareness related to market intelligence and benefit schemes, adoption of technology and immunity to climate resilience. For the same, a judicious approach comprising of secondary and primary survey concerning onion farmers and other stakeholders (market intermediaries, processors, service providers) in the district. Key insights into all aspects of onion farming were collected, collated, validated and based on which major challenges were identified post which recommendations were drafted thereby intending to strengthen the onion value chain in the district.

Assessing the value chain of onion, major challenges were identified across the chain; including production highlighting lack of usage of transplanting and use of conventional seeds, lack of penetration of modern irrigation methods and non-adherence to Good Agricultural Practices (GAP). The unique climatic conditions in the district warrant specific interventions in terms of seed genotype and irrigation methods. Instances of disease infestation such as Onion Purple Blotch (*Stemphylium* Blight) disease had an adverse effect on the old onion cultivars with less resistance. Dependence on external labour especially during the critical periods of planting followed by harvesting adds to the cost of cultivation and reduces margin to the farmer. Production and inputs aside, the primary value addition at the farm level is minimal. Awareness pertaining to proper storage as well as lack of visibility of onion marketing at local APMCs compels the farmer to resort to its sale at Hassan and Bangalore markets. Post farm level, secondary/tertiary processing avenues were also found to be limited. Owing to its unique seasonality and market arrival compared to other states, the Chikmagalur onion is not able to command desired prices in the market as a result of these lacunae. This, with an overall lack and awareness regarding adequate market information results in low income realization to the farmer.

- It is essential that the NHRDF, IIHR and SAUs developed improved onion varieties which are more suited to the local agro climatic conditions. Onion varieties with resistance to diseases such as Onion Purple Blotch (*Stemphylium* Blight) & pests such as thrips, on farm seedling production and distribution to farmers at minimum price should be promoted. Also, practice of transplanting along with its advantages and impact on farmers' income should be highlighted to the farmers. Demonstration farms need to be established in key production clusters to showcase GAP techniques and to promote a network of farmer groups who could promote these approaches to their peers. Establishment of high-tech nurseries in the production clusters will not only ensure supplies of improved quality seedlings to the farmers but also generate additional employment opportunities. It is also recommended to promote IPM and INM at the grassroots level.
- Establishment of custom hiring in major production clusters in the blocks of Kadur & Tarikere will not only help farmers (especially small & marginal) dependency on human labors but also bring efficiency in farm operations and reduce cost of production significantly.
- It is also recommended to establish post-harvest handling infrastructure such as low cost onion storage units in the vicinity of Kadur which is a major cluster for onion along with the neighboring taluka of Tarikere. The facility should be equipped with primary value addition facilities such as sorting, grading, loading-unloading platform and reefer transports if applicable. Establishment of such a facility will not only provide opportunities to farmers by limiting distress sale but also increase shelf life, reduce post-harvest losses and maintain quality.
- It is highly suggested to implement a processing facility in the vicinity of Kadur taluka in Chikmagalur district. Farmers in the form of FPOs, in key growing areas linked through contract farming with the onion processing industry supply chain would be great support for the expansion of the domestic onion processing sector. Processed products made out of onion holds immense demand in the local and international markets. Dried Onion flakes, onion powder, onion paste and onion slices is a major component of Indian curries, savories, Ready-to-Eat (RTE) products as well as dry preparations.
- In order to bring transparency and efficiency in the mandi operations, all major F&V markets needs to be equipped with basic infrastructure facilities including electronic weigh bridges, electronic display; sorting/grading/waxing machines auction platforms, cold storages, farmer's rest house, canteen etc. and dedicated market intermediaries

We hope that the findings of this study, the recommendations suggested along with the untiring efforts of the farmers' and his surrounding ecosystem would contribute to achieving an overall sense of wellness and help in better income realization thereby contributing to the Government's vision of '*Doubling Farmers' Income by 2022*'.

# 1. Introduction





## 1.1. Project Background

Under the aegis of Horticulture Division, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation & Farmers Welfare, The National Horticultural Research and Development Foundation (NHRDF), New Delhi has mandated the Food and Agribusiness Strategic Advisory and Research division of YES BANK Limited to conduct a detailed value chain assessment for Onion in Chikmagalur district in Karnataka state.

## 1.2. About National Horticultural Research & Development Foundation (NHRDF)

The National Horticultural Research and Development Foundation (NHRDF) was established by National Agricultural Co-operative Marketing Federation of India Ltd. (NAFED) and its associate shippers on 3<sup>rd</sup> November, 1977 under Societies Registration Act, at New Delhi. The aim of establishment of NHRDF is to guide the farmers, exporters and others concerned for improving the productivity and quality of horticultural crops in order to make available sufficient quantity for domestic requirement and also to boost up export of onion and other such export oriented horticultural crops in the country. NHRDF is also a National Level Agency (NLA) under Mission for Integrated Development of Horticulture (MIDH) and National Vegetable Initiative for Urban Cluster, of Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers' Welfare, Government of India, New Delhi. The NHRDF provides services to the farmers through research and developmental activities such as seed production of different crops especially vegetable crops, vermicompost, and bio-pesticide production and its distribution and laboratory services. Through these services some revenue is generated to build up revolving fund for further expansion of research and development activity by NHRDF. The research and developmental programmes were initially started on onion and garlic was included in the mandate crops. In view of the vast export potential, the NHRDF has also extended its R&D programmes on some other export-oriented vegetable crops like okra, french bean, chilli, capsicum, drumstick, tomato, bitter gourd etc.

### 1.2.1. NHRDF Mandate

	Undertaking / conducting research or providing facilities in research and scientific investigations for the growth and development of varieties of different export oriented horticultural crops
	Establishment of institutes, laboratories, research centres, model farms, and study teams for promoting better quality and higher yield of horticultural produce, better packaging, suitable transportation and shipping to improve the shelf life of the produce and conducting experiments and providing funds for such research work and to educate farmers and disseminate technical know-how and results derived by conducting training programmes, seminars, farmers' meets etc.
	Investigating and conducting research experiments for assessing demands of the horticultural produce of the Indian origin in foreign countries by conducting extensive survey and undertake research and development of horticultural produce with export potential and to motivate farmers to grow such varieties of horticultural produce with the object of further developing horticultural exports from India
	Preparation, editing, printing, publishing and circulating books, research papers and periodicals bearing upon the growth and development of horticultural produce or other

	scientific and research activities connected therewith, and to establish and maintain collections, libraries, statistics, scientific data and other information relating thereto
✚	Conducting all aspects of scientific research and developmental activities in the field of horticulture or otherwise conducive to the objectives of the NHRDF provided, however that none of the activities of NHRDF will be undertaken for profit nor shall it involve any profit motive. Provided, however, that the NHRDF may receive nominal service charges, wherever found necessary in the interest of maintaining financial stability of the NHRDF
✚	The NHRDF shall provide extended services to the farmers in the form of research and developmental activities such as seed development, vermicompost, bio-pesticide production and distribution and other laboratory services for which NHRDF may collect revenue from the farmers so as to establish a revolving fund or credit to corpus fund for further expansion of research and developmental activities

### 1.3. Objectives

The specific objectives of the value chain study are as follows:

Detailed value chain studies are to be mandated in respective clusters for onion considering the parameters (but not restricted to) as given:

- ❖ To map the movement of price and journey of the raw materials from farmers to commission agent, traders, exporters, processors, wholesalers, retail chains and ultimately to the end consumer
- ❖ To identify specific gaps and lacunae in the value chain of onion crop in Chikmagalur district
- ❖ To provide suggestions and recommendations to strengthen the value chain of onion in Chikmagalur district leading to better price realization and increase in farmer's income.

### 1.4. Scope of Work

The scope of work for the value chain study of onion crop in Chikmagalur district of Karnataka is as given below:

*Exhibit 1: Scope of Work for the Study*

STUDY AREAS
a) On Farm Constraints
b) Non-Farm Constraints
c) Logistical Constraints
d) Current status of onion supply chain in the study region
e) Agri-input sources, brands and companies
f) Cost of Production and margins distribution among stakeholders
g) Losses/Wastage from harvest to consumption
h) Key areas of intervention and policy recommendation
i) Constraints in market linkages
j) Factors that influence price of Onion

- ❖ Production and post-production practices
  - Land Preparation & Holding
  - Cropping Pattern and Seasonality
  - Cost of production and Post-Harvest Management Practices - Inputs, Seed, Planting Material, Fertilizer, Labour Cost, and Transportation
  - Overall crop economics
- ❖ Price fluctuations
- ❖ Forward and backward linkages
- ❖ Markets, channels, stakeholder players and margins
- ❖ Logistical channels
- ❖ Losses and price mark-ups
- ❖ Infrastructure availability in the region
- ❖ Identification of challenges and gaps in the value chain
- ❖ Existing scenario of training & capacity building
- ❖ Availability of credit & extension services
- ❖ Key recommendations to strengthen the onion value chain

## 1.5. Approach and Methodology

- ❖ The study as explained above required in-depth value chain analysis of “specific commodity” in “specific cluster” in term of deeper understanding of production, intermediation, product flow, value addition at each level, wastages at each level, price mark-up, roles being played by each value-chain player as well as factors affecting the value chain (pre-harvest operations, post-harvest management, procurement, handling infrastructure, logistics, marketing & sales, services, technology, human resources management) including climate change, developing strategies, backward & forward linkages, capacity building, access to funds etc.
- ❖ In order to achieve the desired objectives of the assignment, a judicious approach was followed, wherein both wider and deeper understanding of the onion value chain could be captured. Therefore, the study was based on combinations of research methods including:

### 1.5.1. Secondary research and Literature Review

This step served as a preface of the study, providing basic understanding of the cluster (Chikmagalur: Kadur & Tarikere) and state overall thereby helping in development of the approach for detailed value chain study. The secondary information helped in understanding the onion crop profile including climatic conditions, area, production volumes, seasonality, post-harvest infrastructure, markets, market arrivals & prices, marketing infrastructure, logistics, storages available for specific crops in specific markets. Relevant data was collected from National Horticultural Research and Development Foundation (NHRDF), National Horticulture Board (NHB), National Horticulture Mission (NHM), Karnataka State Horticulture Mission Agency, District Horticulture Department,

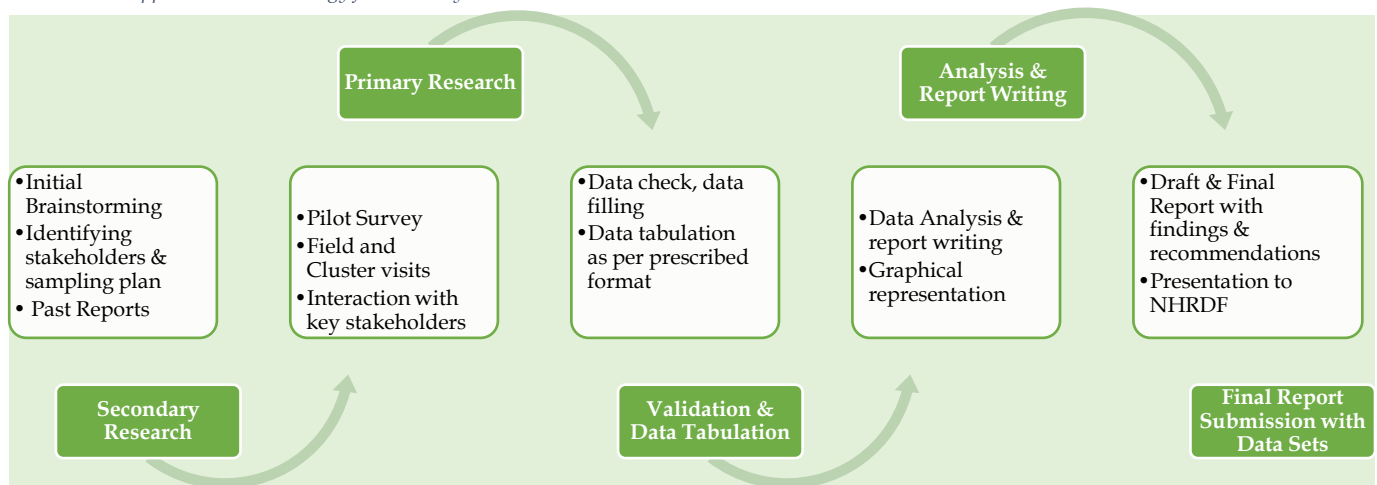
APMC, Agricultural and Processed Food Products Exports Development Authority (APEDA), other datasets

### 1.5.2. Primary Research

Interactions were held with all the stakeholders given below in the identified cluster and the region helped to gather information on the situation of horticulture across the onion value chain. This led to finding out the gaps and suggestions provided by all the stakeholders

- a. Face to face interviews of onion growing farmers
- b. Intermediary stakeholders such as inputs suppliers
- c. Government officials such as APMC, district horticulture department etc.

Exhibit 2: Approach & Methodology for the study



### 1.5.3.Sampling Plan

Primary research was carried out in the district in identified clusters growing onion crop. A predefined sample size for each stakeholder was deliberated and approved by NHRDF post which, the field exercise commenced. Post commencement, it came to light that onion is primarily grown only in two blocks in Chikmagalur district (Kadur & Tarikere). Also, stakeholders (other than onion farmers) were not found to be operating in these clusters. Hence, after due approvals and discussion, all stakeholders were covered only from 2 blocks: Kadur & Tarikere which contributed to the maximum production of onion crop in the district. A brief snapshot of the actual sampling coverage is provided below:

*Exhibit 3: Value Chain Analysis for Onion in Chikmagalur District - Sampling Coverage*

Name of Block	Name of Villages	Sample Size
<b>KADUR</b>	Abbinaholalu, Arehalli, Naga Gohdanahalli, Basur, Biluwala, Chik Basur, Kedigere (5 farmers per village)	35
	Giriyapura, Hirenallur, Chikkanallur, Kurubagare, Jiganihalli, Narsipura, Bandi Koppalu (6 farmers per village)	42
<b>TARIKERE</b>	Bankana Katte, Kanabagatte, M.Hosahalli, Narayonapura (5 farmers per village)	20
	Begur, Chikkannavangala, Chinnapura, Gadihalli, Gaworapura, Hebbur, Hirekannavangala, Jahur Hosahalli, Javoor, Katiganere, Malenahalli, Mugali, Sollapura, Thamatada Halli, Thimmapura, Yane Hosur (6 farmers per village)	96
	Sowthanahalli	7
<b>Total farmers</b>	-	<b>200</b>
<b>Total APMC</b>	-	<b>2</b>
<b>Seed/input suppliers</b>	-	<b>8</b>
<b>Wholesalers*</b>		<b>NIL</b>
<b>Retailers*</b>		<b>NIL</b>
<b>Processors*</b>		<b>NIL</b>
<b>TOTAL SURVEYED</b>		<b>210</b>

Note: All data presented in this report are based on primary survey conducted in the study region from 6th to 15<sup>th</sup> Sept, 2017

\* Owing to unique market dynamics in the district, these stakeholders were not found to be functional in the study region

## 1.6. Significance of the study

- ❖ The study intended to provide off-the-ground information on the necessary economic and market factors that influences the cultivation of a major crop like onion when it came to a district like Chikmagalur. Being a major onion growing cluster in the state of Karnataka, inputs to streamline the existing value chain with interventions would go a long way in contributing to increase in farmer income, better price realization, reduction in losses and promoting healthy competition in the market.
- ❖ The study generated valuable information on onion production and its value chain that helped yield outcomes of great assistance to concerned authorities to make relevant decisions to intervene in the development of onion return and value chain and designing of appropriate policies and strategies. The findings of the study would also be useful to producers, traders, consumers, exporters, processors, service providers, market intermediaries and marketing agents to better assess and make astute business decision making.

## 1.7. Limitations of the study

- ❖ The coverage of stakeholders for the study, though intended to envelope all blocks in Chikmagalur district, was revised owing to inputs and approvals from Karnataka State Horticulture Mission Agency and NHRDF. Hence, two out of seven intended blocks were covered.
- ❖ Also, as discovered later in the field, the intended stakeholders under focus were unavailable in the cluster due to the dynamics of the existing value chain. Hence, stakeholders such as Collection Agents, Retailers, Wholesalers, Exporters, Processors were not covered under the field survey exercise
- ❖ The limited literacy levels of the farmers was a slight hindrance in data collection. Some respondent farmers faltered in furnishing accurate data related to inputs usage, Scheme & Policy awareness, extension services, credit facilities in the region. However, these parameters were validated through interactions with few progressive farmers and Block level Horticulture Department officers.



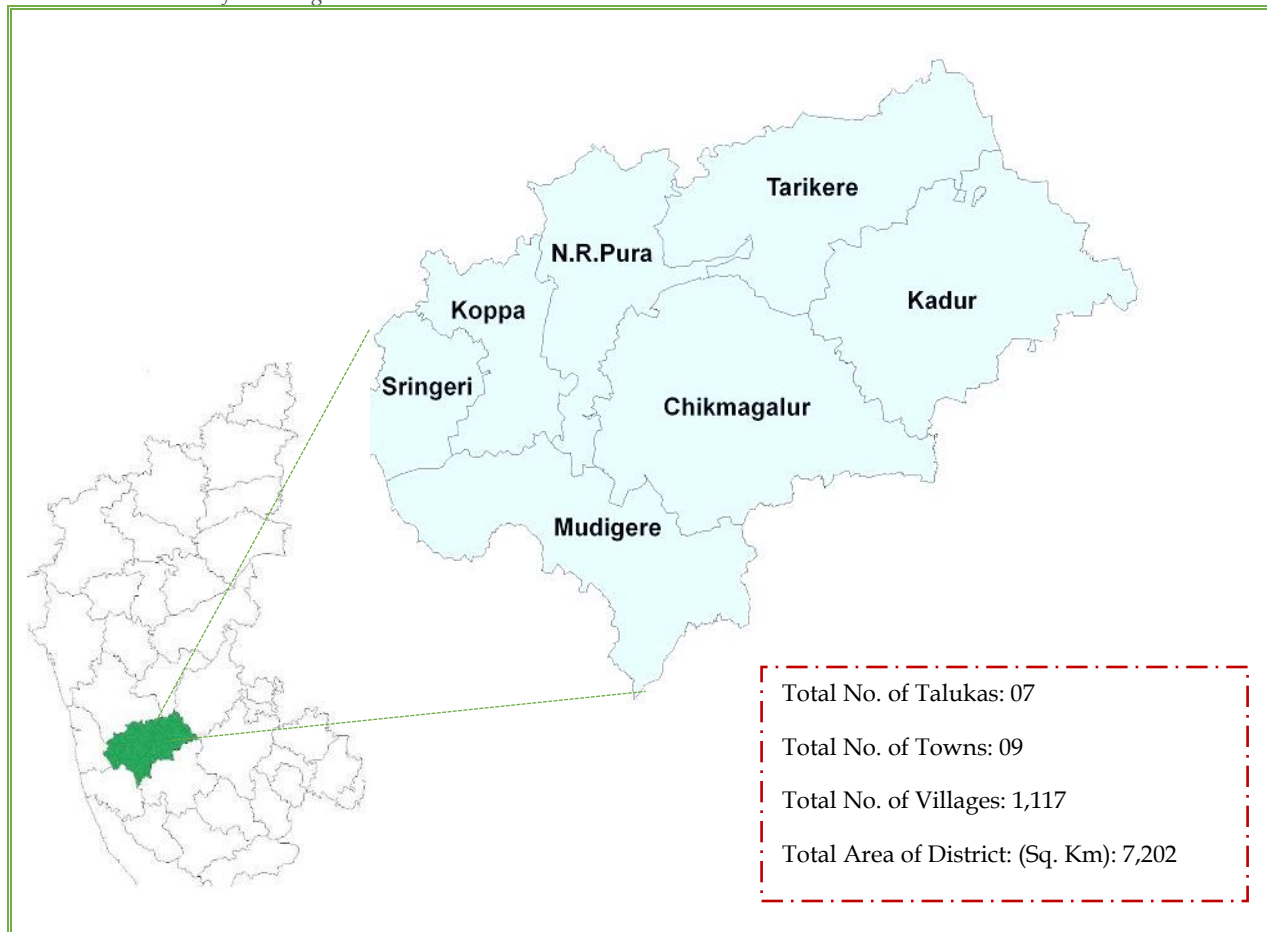
## 2. Study Region

Chikmagalur district was called Kadur district till the year 1947. It is situated roughly in the south-western part of Karnataka state. A large area of this district is 'malnad', i.e., a largely forested hilly region of heavy rainfall. The district takes its name from the headquarters town of Chikmagalur which literally means younger daughter's town – Chikka + Magala + Ooru-(in Kannada). Chikmagalur is one of the major onion growing clusters in Karnataka with a yield of 1,05,368 MT spread across an area of 5,988 Ha. as of year 2015-2016.

### 2.1. Location

Chikmagalur district stretches from east to west at about 138.4 km. while from north to south it lasts for around 88.5 km. The district's boundaries towards the East has Tumkur district, to the South lies Hassan district, to the West lie the W. Ghats which separates it from Dakhina Kannada, to the North East lies Chitradurga district with Shivamoga capping of the north.

Exhibit 4: Location of Chikmagalur District and its blocks



Source: GIS map Gallery

## 2.2. Topography & Agro climatic details

- The district is situated between 12° 54' and 13° 53' North and between 75° 04' and 76° 21' East longitude. Average temperature ranges from minimum 21 °C to maximum of 31°C. Average rainfall stands at 1925 mm with major rivers flowing through the area being Nethravathi, Tungabhadra, Vedavathi, Vagachi, and Hemavathi. The district is renowned for its Coffee cultivation.
- This district has a geographical area of 7,202 sq. km. (~7,22,075 ha) The district is rich in iron, magnetite and granite deposits. Black soil is found around Baba Budan Giri Hills whereas Red and Gravel soil are found in the southern parts of the district. The agro climatic zone (NARP) includes Hilly zone (KA-9), Southern transition zone (KA-7) and Central dry zone (KA- 4)

## 2.3. Connectivity & Logistics

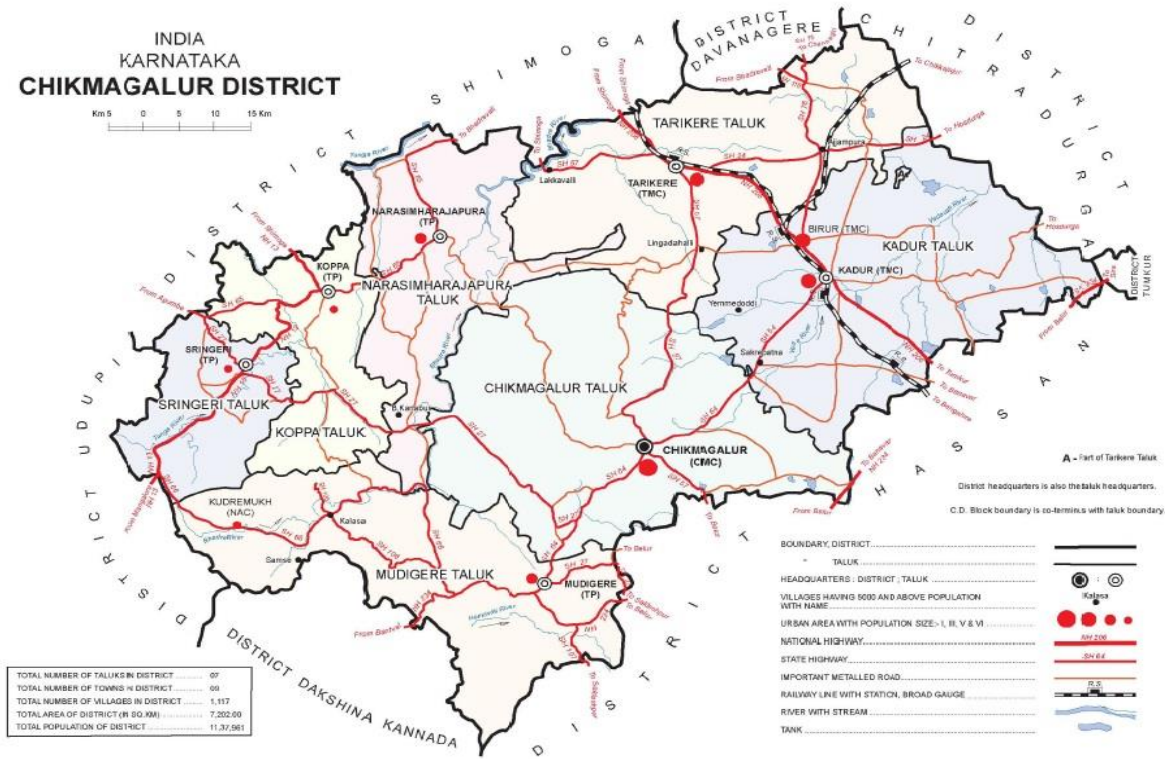
### 2.3.1. Air Connectivity

- The nearest commercial airports are situated at Bengaluru (~265 km) and at Mangalore (159 km). Looking at the development in the region in terms of coffee plantations and horticulture output with potential for trade, upgradation and improvement of air connectivity would be highly beneficial.

### 2.3.2. Rail & Road Connectivity

- Major railway heads include Birur, Kadur, Tarikere, Devanur, Ajjampur, Sivapur, Ballekere Halt & Karanahalli which connects most towns and villages in the district.

Exhibit 5: Major Roadways & National Highways in Chikmagalur District



Source: District Census Handbook Chikmagalur, Village and Town Wise Primary Census Abstract (PCA)

## 2.4. Demographic & Socioeconomic Characteristics

- Chikmagalur district with a total population of 11,37,961 stands at 25<sup>th</sup> place in the State comprising 1.9% of the state population. The district has a density of 158 and is third least dense district in the State. It is the only district which has registered a negative growth rate of -0.3%. The district has a literacy rate of 79.2% and is placed at 8<sup>th</sup> rank in the state. The male literacy rate in the district is 85.4% and the female literacy rate is 73.2%.<sup>1</sup>

Exhibit 6: Socioeconomic characteristics of Chikmagalur District

BLOCKS IN CHIKMAGALUR DISTRICT							
Socio Economic Indicator	Kadur	Tarikere	Chikmagalur	N.R. Pura	Koppa	Sringeri	Mudigere
Total Population	2,91,668	2,25,280	3,07,609	66,090	84,882	36,539	1,25,893
Geographical Area (in Sq. km)	1406.44	1222.36	1659.7	733.51	572.12	442.84	1117.98
Number of households	69,575	53,225	74,895	16,566	21,296	9,313	31,215
Literacy Rate (in %)	76%	77%	82%	83%	83%	86%	77%
Population Density (per sq. km)	207.38	184.30	185.34	90.10	148.36	82.51	112.61

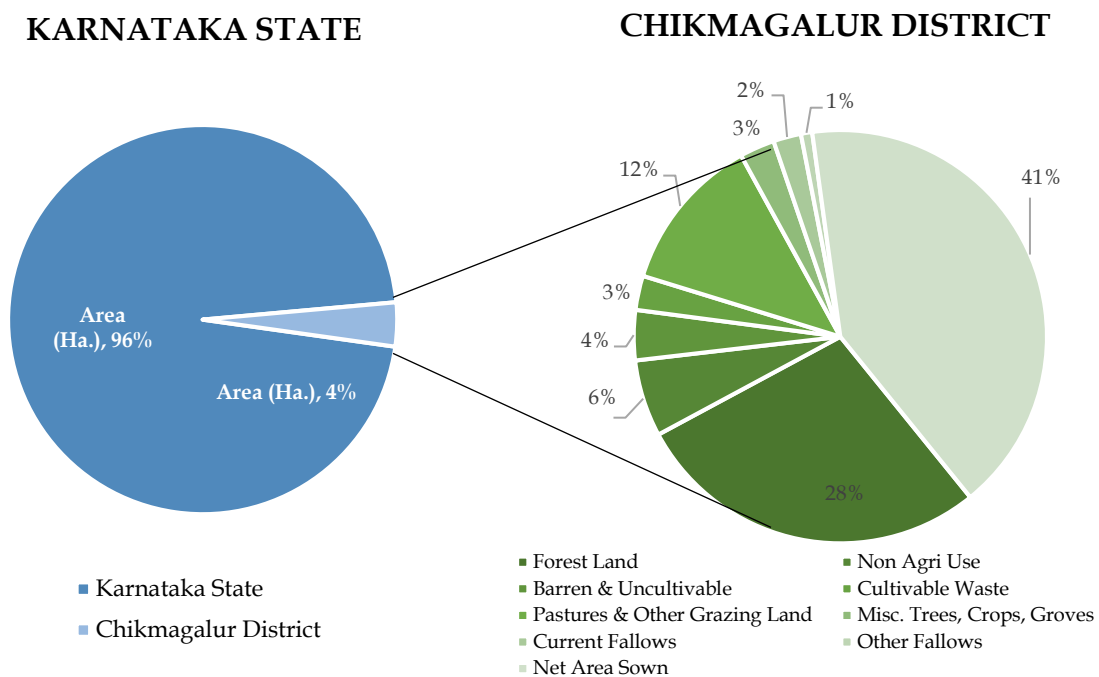
Source: District Census Handbook Chikmagalur Village and Town Wise Primary Census Abstract (PCA)

## 2.5. Agriculture Scenario

Agricultural production in Chikmagalur district is spread over three primary seasons - namely Kharif, Late *kharif* and *Rabi*. The agro climatic conditions and soil in the district makes it suitable for cultivation of different types of crops such as:

- Cereals - Rice, Ragi, Jowar, Maize & Minor millets
- Pulses - Red Gram, Horse Gram, Green Gram, Avare, Blackgram & Bengalgram.
- Oil seeds - Ground Nut, Sesame, Sunflower, Castor, Safflower and Nizer.
- Commercial crops - Sugarcane, Cotton, And Tobacco.
- Plantation crops - Coffee, Tea, Areca Nut and Coconut.

Exhibit 7: Land Use Pattern - Chikmagalur District (2014-15)



Source: Profile of Agriculture Statistics, Karnataka State, Karnataka State Department of Agriculture, Bengaluru

- ❖ The total area coverage under Cereals<sup>2</sup> in Chikmagalur district stands at ~1, 14,821 ha with a total production of 2,65,614 MT as of 2015-16.
- ❖ The total area coverage under Pulses<sup>3</sup> in Chikmagalur district stands at ~41,543 ha with a total production of 31,229 MT as of 2015-16.
- ❖ The total area coverage under Oilseeds<sup>4</sup> in Chikmagalur district stands at ~17,467 ha with a total production of 10,911 MT as of 2015-16.
- ❖ The total area coverage under Fibre<sup>5</sup> crops in Chikmagalur district stands at ~3,564 ha with a total production of 71,663 MT as of 2015-16.

<sup>2</sup> Paddy, Jowar, Bajra, Maize, Ragi, Wheat, Navane, Save

<sup>3</sup> Tur, Blackgram, Horsegram, Greengram, Avare, Cowpea, Bengalgram, Other pulses

<sup>4</sup> Groundnut, Castor, Sesame, Linseed, Soyabean, Niger seed, Rapeseed & Mustard Seed, Sunflower, Safflower

<sup>5</sup> Cotton, Tobacco, Sugarcane

## 2.5.1. Agriculture Profile – Cereals, Pulses, Oilseeds & Fibre Crops in Chikmagalur District

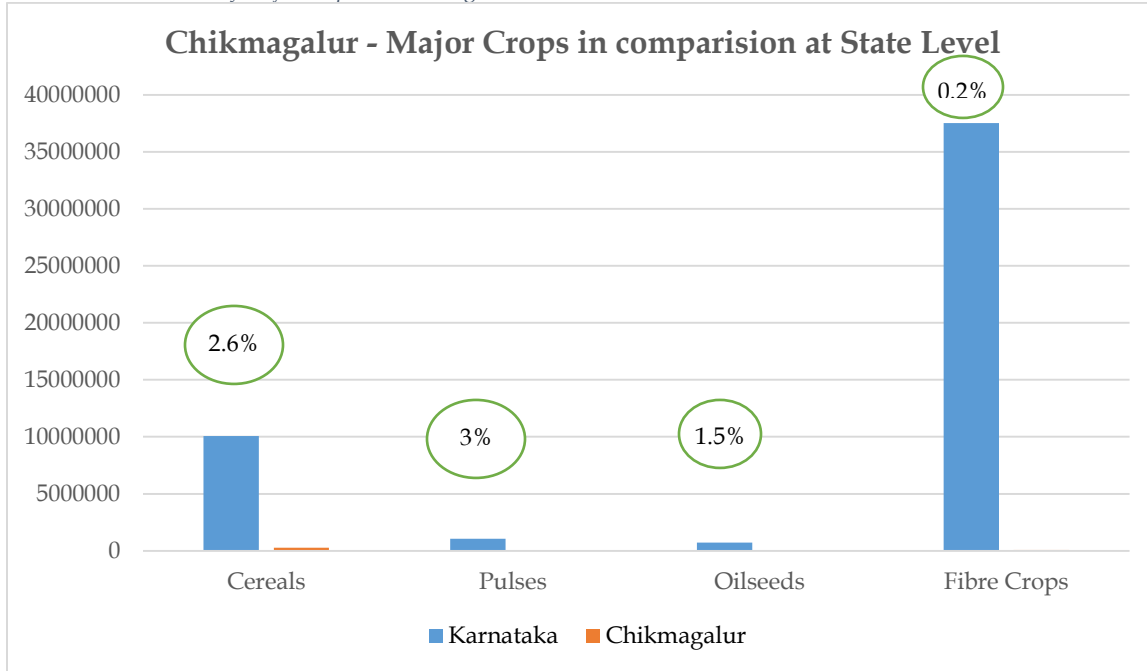
Exhibit 8: Area, Production and Yield of Major Crops in Chikmagalur District - 2013-2014<sup>6</sup>

CATEGORY	Area (in ha)	Production (in MT)	Avg. Yield (MT/ha.)	% of State Production
<b>A CEREAL CROPS</b>				
Paddy	33,036	1,32,459	4.01	3%
Jowar	9,756	9,000	0.92	1%
Bajra	0	0	-	0.0%
Maize	25,831	61,668	2.39	2%
Ragi	43,660	60,847	1.39	5%
Wheat	0	0	-	0.0%
Navane	35	9	0.26	0.2%
Save	2,503	1,631	0.65	26%
<b>B PULSES</b>				
Tur	7,682	3,780	0.49	1.6%
Blackgram	439	190	0.43	0.8%
Horsegram	10,345	6,849	0.66	9%
Greengram	4,919	1,994	0.41	5%
Avare	3,689	1,795	0.49	2%
Cowpea	895	330	0.37	1%
Bengalgram	13,249	15,985	1.21	3%
Other pulses	325	306	0.94	18%
<b>C OILSEEDS</b>				
Groundnut	5,851	3,844	0.66	1%
Castor	418	220	0.53	4%
Sesame	5,858	5,198	0.89	21%
Linseed	16	2	0.13	0.3%
Soyabean	0	0	NA	0.0%
Niger seed	218	73	0.33	4%
Rapeseed & Mustard Seed	18	4	0.22	1%
Sunflower	5,088	1,570	0.31	1%
Safflower	0	0	NA	0.0%
<b>D FIBRE CROPS</b>				
Cotton	1,364	1,867	1.37	0.2%
Sugarcane	2,181	69,785	32.00	0.2%
Tobacco	19	11	0.58	0.02%

Source: Fully Revised Estimates of Principal Crops in Karnataka for the Year 2013-2014, Directorate of Economics and Statistics Bangalore

The district contributes to around 2.6% of cereals, 3% of pulses, 1.5% of oilseeds and around 0.2% to fibre crops produced in the state

Exhibit 9: Production of major crops in Chikmagalur District vis. a vis. Karnataka



Source: Statistical Abstract of Karnataka

## 2.6 Horticulture Scenario in Chikmagalur District

Suitable soil and climate makes Chikmagalur one of the better acclimatized districts to support horticultural cultivation in the state of Karnataka. Different sources have been analyzed to compile the data of area and production of different horticultural crops in the district such as National Horticulture Board and District Horticulture office.

According to the data available for 2015-16, horticultural crops cover 1,38,407 ha<sup>7</sup>, constituting 6.7% of the total horticulture area of the state. From the production point of view, the district produces about 2,19,017 MT of horticulture produce and contributes 1% to the production basket of the state.

Exhibit 10: Area, Production & Yield of key Horticultural Crops - Chikmagalur District

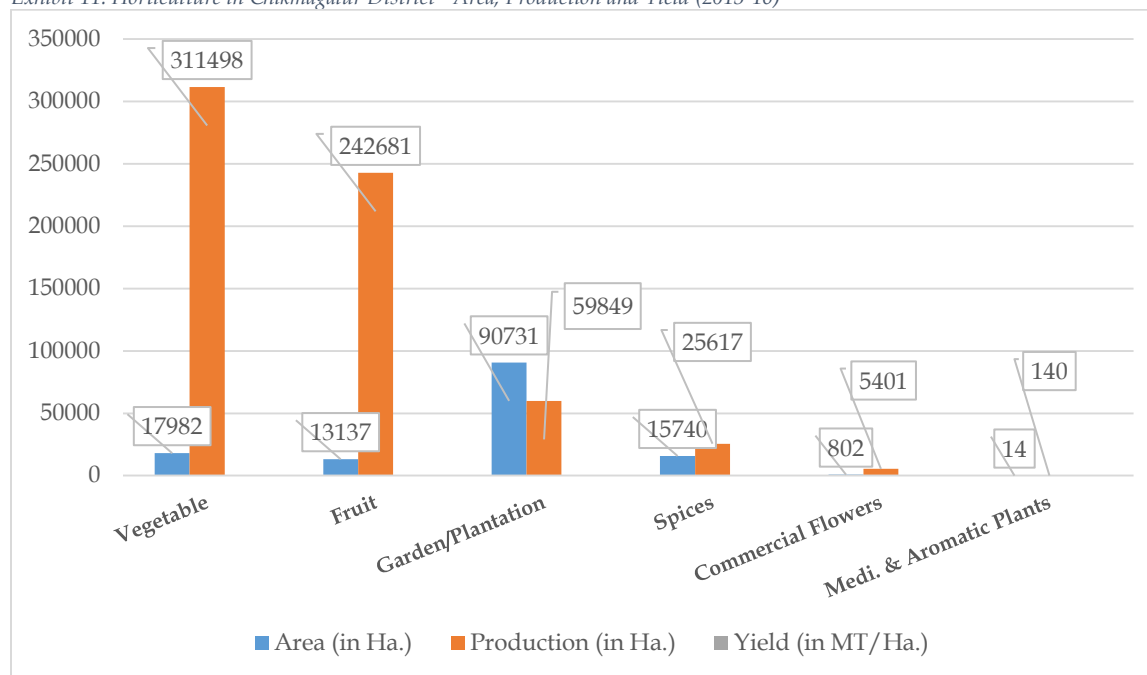
BLOCK	Fruit Crops			Vegetable Crops			Spice Crops			Plantation Crops			Commercial Flowers			Medicinal & Aromatic Plants			TOTAL		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Chikmagalur	3971.04	79588.98	20.04	6321.17	102737.53	16.25	4183	11033	2.64	3155	1279	0.41	387	2912	7.53	0	0	NA	18016	197550	10.96
Kadur	1239.2	21635.45	17.46	4316	64711	14.99	318	896	2.81	43906	21241	0.48	294	1650	5.62	8	80	NA	50081	110212	2.20
Koppa	910.02	16374.37	17.99	87	1153	13.25	1717	610	0.35	6225	4976	0.80	4	0	0.00	6	60	NA	8944	23112	2.58
Mudigere	1614	40962.54	25.38	40	438	10.95	4773	3871	0.81	2928	2860	0.98	6	0	0.00	0	0	20	9367	48192	5.14
N. R. Pura	904	8194	9.06	529	15255	28.84	1005	3802	3.78	4824	3256	0.67	0	0	-	0	0	NA	7262	30507	4.20
Sringeri	444.81	11743.1	26.40	116	1809	15.60	2528	1131	0.45	3395	1904	0.56	2	9.00	4.50	0	0	NA	6486	16597	2.56
Tarikere	4054	64183	15.83	6573	125396	19.08	1216	4275	3.52	26298	24333	0.93	110	830.00	7.55				38251	219017	5.73
<b>TOTAL</b>	13137	242681	18.47	17982	311498	17.32	15740	25617	1.63	90731	59849	0.66	802	5401	6.73	14	140	20	138407	645187	4.66

Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer. Area= ha. Production=MT & Yield=MT/ha.

Within the horticulture sector of the district, Fruit crops contribute to 9% area and 38% production, Vegetable Crops contribute to 13% area and 48% production, Spices contributes to 11% area and 4% production, Garden/Plantation Crops contribute to 66% area and 9% of the production and Commercial flowers contributing to 1% each to state area and production.

<sup>7</sup> State Horticulture Department - Statement showing the taluka-wise & the Crop-wise Area, Production, Yield and Value of Horticultural Crops, in Chikmagalur District of Karnataka State, as on 31-3-2016

Exhibit 11: Horticulture in Chikmagalur District - Area, Production and Yield (2015-16)



Source: Deputy Director of Horticulture, Chikmagalur

### 2.6.1. Agri Marketing Infrastructure in Chikmagalur District

In order to reduce the price gap between producers and consumers through reduction in intermediation of supply chain, create alternative marketing channels and promote investment on development of marketing infrastructure with private sector participation, Karnataka State Agricultural Marketing Board (*Krishi Maratavahini*) has deregulated marketing of fruits and vegetables in the Agricultural Produce Market Committee (APMC) yards with the objective of establishment of Market Yards, submarket yards and developing and maintaining the market yards and sub market yards to enforcing the regulatory measures in respect of sale and purchase of Agricultural produce brought by the farmers to the market yards, providing a platform to ensure competitive prices, correct weighing, payment and creating an exploitation free atmosphere by preventing illegal activities in the marketing of agricultural produce. Regulating the activities of warehouses by enforcing the licensing conditions, establishment and maintenance of laboratories for the purpose of grading of agricultural produce in the State.

There are 3 agriculture mandis (APMCs) with their working jurisdiction as under:

Kadur APMC is 2 km from city centre while Chikmagalur APMC Yard is around 36 km from Kadur and 68 km from Tarikere respectively which are the two major onion growing clusters in the region. These APMC, however, in spite of being situated in onion growing clusters do not see an inflow of the crop. Instead, Areca nut, Coconut, Cotton, Oilseeds and Pulses are the major commodities arriving in the markets.



Exhibit 12: Available Marketing infrastructure facilities in Chikmagalur District

Sl. No.	Block	APMCs		Traditional Outward Markets
		Main Market	Rural market/ Haat Bazar	
1	Chikmagalur	Chikmagalur	Entire Chikmagalur Taluka	Udupi, Tamil Nadu, Maharashtra, Kerala, Gujarat, Delhi
2	Kadur	Kadur	Kasaba Hobli, Hire Nahur, Ajjampore, Shivani, Birur	-
3	Tarikere	Tarikere	Areas in and around Tarikere	Maharashtra, Tamil Nadu, Delhi

Source: Stakeholder Discussions during primary survey September 5, 2017

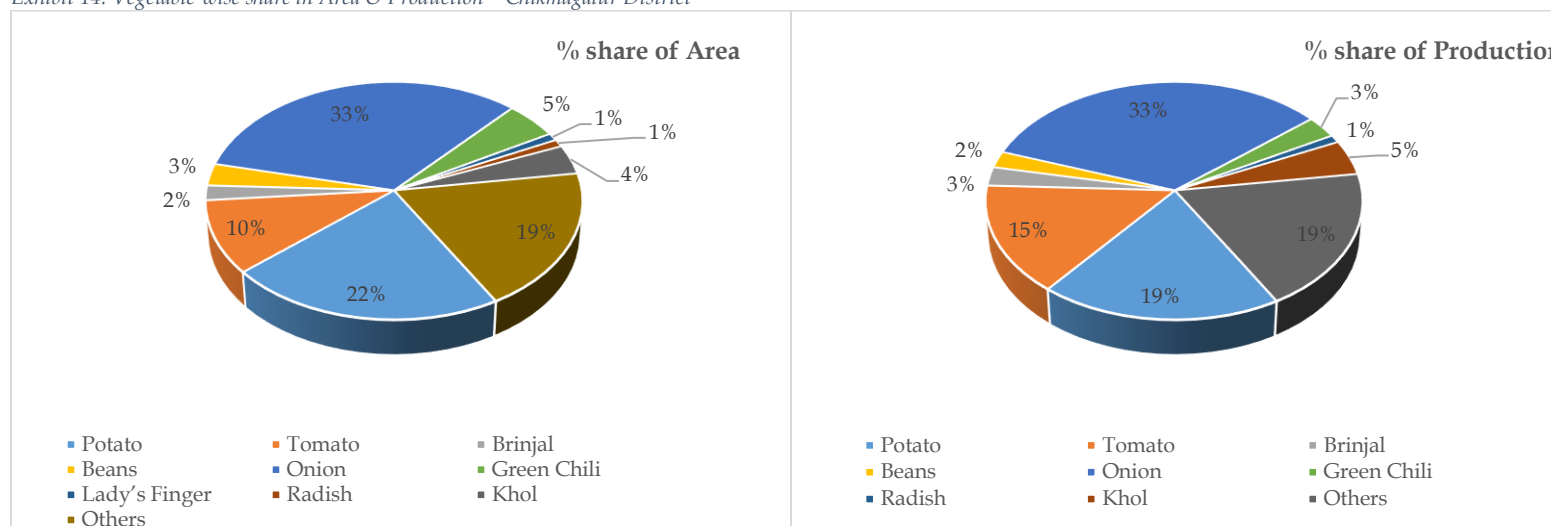
On the basis of discussions with onion farmers and personnel from APMC, it is revealed that onion farmers do not utilize APMC facilities within the district for marketing of their onion produce. All farmers prefer to transport their produce to Bangalore APMC which is almost ~200 km away citing slightly better prices and more demand as compared to Chikmagalur. Market intermediaries in the district do not generate enough demand for the onion harvest which results in a glut and the farmers prefer moving to Bangalore and selling it at the prevailing price with negligible prior market intelligence and information. Also, substandard infrastructure, lack of transparency in transactions and mistrust in local intermediaries were cited as important reasons by farmers to prefer outstation markets to send their produce.

Exhibit 13: Major Vegetable Crops Production Statistics 2015-16

VEGETABLE	Potato			Tomato			Brinjal			Beans			Onion			Green Chili			Lady's Finger			Radish			Khol <sup>8</sup>			Others		
Block	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Chikmagalur	1783	22186	12	1108	24067	22	161	4108	26	432	4968	12	178	3119	18	155	2242	15	87	741	9	199	2393	12	654	14162	22	1917	30649	265
Kadur	800	11400	14	549	16470	30	135	2700	20	68	1224	18	1550	17050	11	581	5810	10	47	376	8	67	871	13	26	527	20	610	9623	87
Tarikere	1473	26514	18	265	6215	23	23	690	30	45	450	10	4260	85200	20	107	1284	12	-	-	0	-	-	0	13	250	19	417	3496	86
Mudigere	0	0	0	0	0	0	-	-	0	-	-	0	0	0	0	12	60	5	-	-	0	-	-	0	0	0	0	35	441	48
Koppa	0	0	0	0	0	0	7	140	20	12	96	8	0	0	0	-	-	0	11	66	6	-	-	0	0	0	0	86	1258	102
Sringeri	0	0	0	0	0	0	3	400	133	35	315	9	0	0	0	-	-	0	5	38	8	-	-	0	0	0	0	110	1432	99
N.R. Pura	0	0	0	0	0	0	-	-	0	-	-	0	0	0	0	-	-	0	18	144	8	-	-	0	0	0	0	336	12591	53
<b>TOTAL</b>	<b>4056</b>	<b>60100</b>	<b>15</b>	<b>1922</b>	<b>46752</b>	<b>24</b>	<b>329</b>	<b>8038</b>	<b>24</b>	<b>592</b>	<b>7053</b>	<b>12</b>	<b>5988</b>	<b>105369</b>	<b>18</b>	<b>855</b>	<b>9396</b>	<b>11</b>	<b>168</b>	<b>1364</b>	<b>8</b>	<b>266</b>	<b>3264</b>	<b>12</b>	<b>693</b>	<b>14939</b>	<b>22</b>	<b>3510</b>	<b>59489</b>	<b>304</b>

Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer.

Exhibit 14: Vegetable-wise share in Area & Production – Chikmagalur District



Source: Deputy Director of Horticulture, Chikmagalur

<sup>8</sup> Cabbage & Cauliflower

### 3. Analysis of Primary Survey

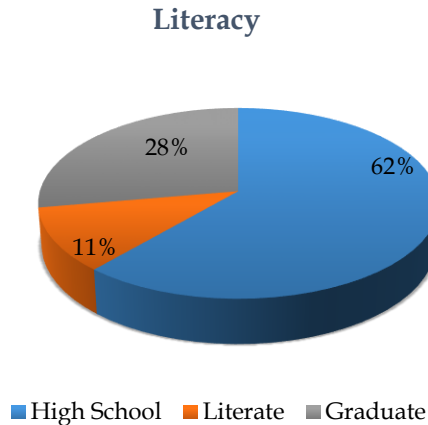
All the findings represented below are based on the primary survey of onion farmers and other stakeholders undertaken in Chikmagalur district.

#### 3.1. Socio Economic Profile of Onion Farmers

Majority of Onion growers in the district belongs to small and marginal category (~72%) followed by about 28% as large onion growers.

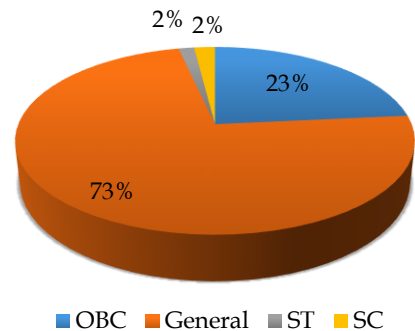
- ✓ **Literacy Rate:** As per the primary survey, majority of the farmers (about 62%) were high school pass followed by ~28% of the farmers as graduate.
- ✓ **Gender:** Majority of the farmers surveyed were male accounting to almost 97% of the total sample size

*Exhibit 15: Onion Farmers in Chikmagalur – Literacy & Gender Profile*



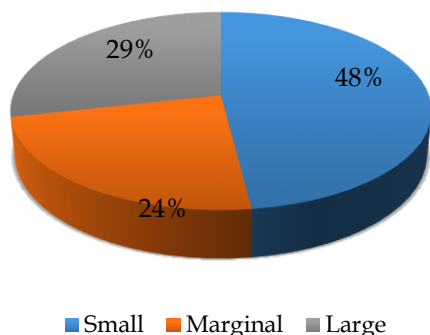
*Exhibit 16: Onion Farmers in Chikmagalur - Caste Profile*

73% of the respondents were found to belong to the general category, followed by OBC Category contributing to 23% while the Scheduled Caste and Scheduled Tribes combined contributed to only 4% of the total sample surveyed.



### 3.2. Land Holding Pattern & Irrigation

Exhibit 17: Onion Farmers in Chikmagalur - Land Holding Pattern



Majority of the cultivated area is under is rain fed followed by irrigation through wells/ tube wells. High costs and shortage of irrigation water source were cited to be the major reasons for non-usage of micro irrigation and other advanced irrigation models. The major mode of irrigation in the area was found to be rain fed. During the study period and preceding to it, the rains were found to be fluctuating and below par. Micro irrigation and drip irrigation models were found to be almost non-existent. Do to over dependence on rains, the crop cycle suffers adversely.

**Average years of growing Onion:** The average number of years the farmers had been involved in Onion cultivation in the region came to about ~ 24 years.

### 3.3. Field Preparation

#### 3.3.1. Seasonality

Exhibit 18: Seasonality of Onion farming in Chikmagalur

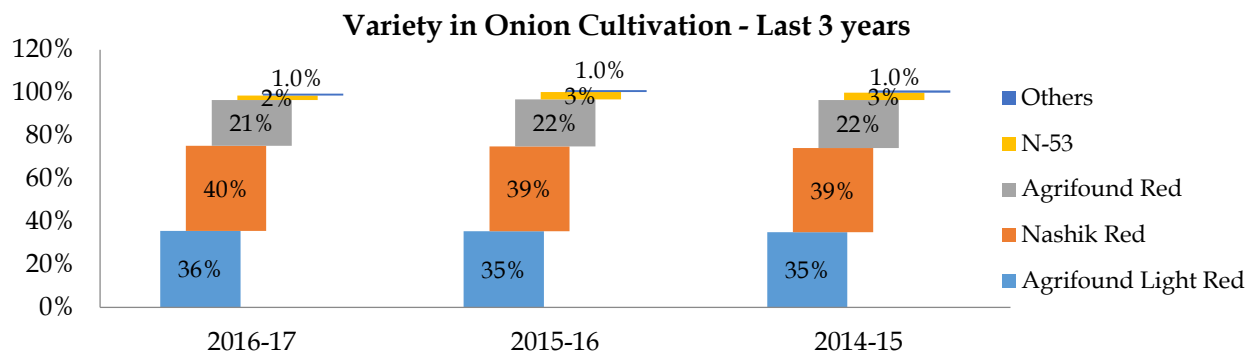
SEASON	Jan	Feb	Mar	April	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
<b>Onion</b>												
Transplanting												
Sowing												
Harvesting												

#### 3.3.2. Production Practices

##### 3.3.2.1. Production Details

The seed rate is 10.5 kg/ha. The onion seed are broadcasted in the month of May and June during *khari*, the harvesting starts from the month of September and extends till November. Agrifound Light Red, Nashik Red and Agrifound Red are the major varieties of onion in the study region.

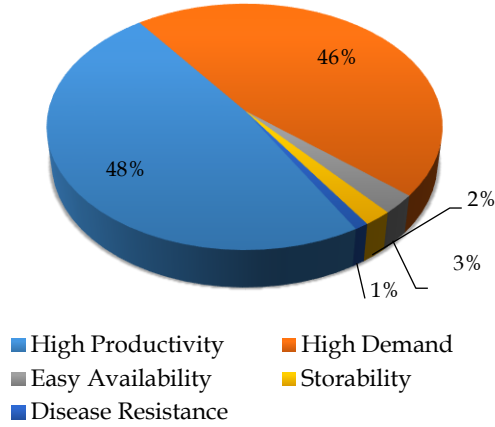
Exhibit 19: Variety of Seed used in Onion Cultivation - 2016-17, 2015-16, 2014-15



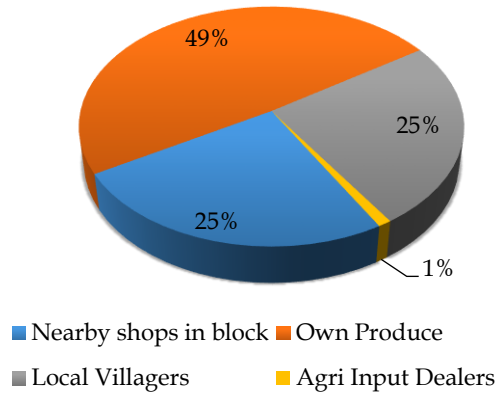
48% of the respondents cited High productivity followed 46% of the respondents quoted higher demand in the market as the major seed selection criteria.

Exhibit 20: Reasons for Preference of Seed Variety & its Sources

### Reasons - Preference of Variety



### Sourcing of Seed



### 3.3.2.2. Field Preparation

Onion farmers in Chikmagalur were found to make use of long running practices as well as adapting to new practices of land preparation for sowing in terms of, levelling of land, ploughing, and bed preparation as well as sowing.

### 3.3.2.3. Seed/Planting Material

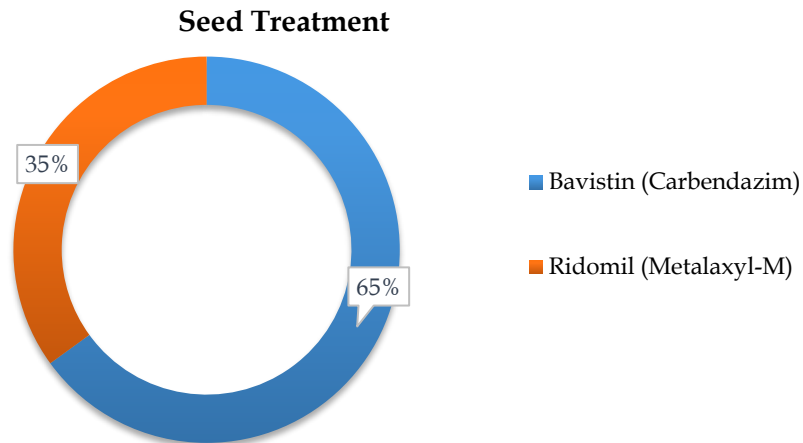
The major varieties of Onion seed preferred are Agrifound Light Red, Agrifound Red and Nashik Red. As per the analysis carried out of the findings of the primary survey, almost a blanket coverage of use of OPV seeds is seen. It is a largely accepted practice and farmers prefer OPV seeds over others. Almost 95% of the seeds are self-produced seeds and rest 5% is sourced from local input suppliers.

### 3.3.2.4. Seed Treatment

In terms of seed treatment, almost 45% of the respondents replied that they are aware of seed treatment methods and their advantages. However, it came to be known that in terms of execution, only 22% of the respondents agreed to having used any seed treatment measures.

High prices of fungicides and insecticides as well as limited availability were cited as the major reasons. A summary of the major varieties used is depicted below:

Exhibit 21: Onion Farming in Chikmagalur - Major Chemicals used for Seed Treatment



### 3.3.2.5. Application of Inputs

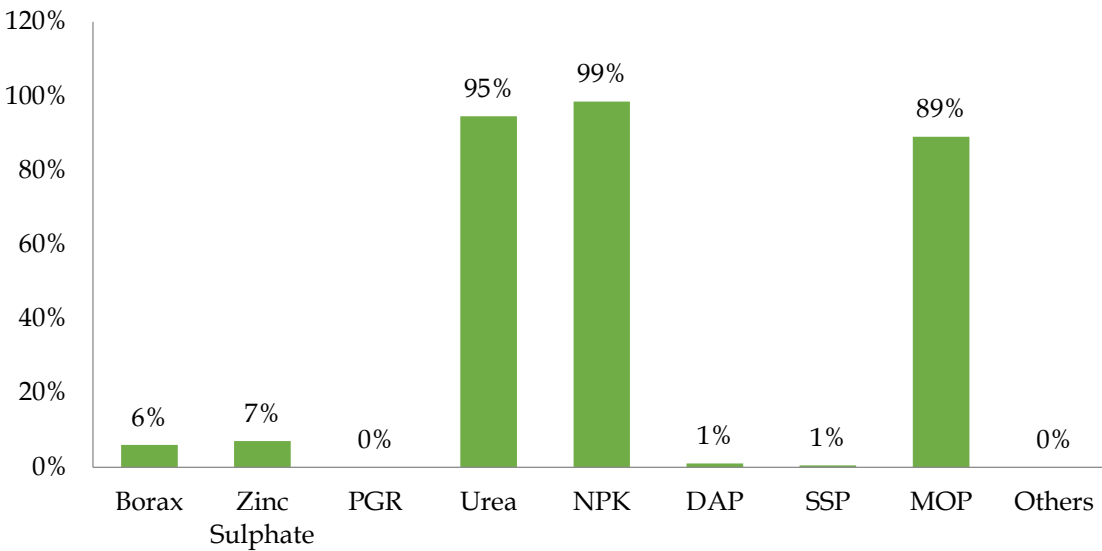
#### 3.3.2.5.1. Organic Manure

Usage of organic manure was restricted to application of farm yard manure primarily with all the surveyed farmers agreeing to its usage. Application of bio fertilizers, Plant Growth Regulators and Vermicompost was not reported during the primary survey. These are primarily utilized from own resources or from village level shops or outlets.

#### 3.3.2.5.2. Chemical Inputs

Urea enjoys an overwhelming response in onion cultivation in terms of usage of inputs which are chemical based. This is followed by Diammonium Phosphate (DAP), NPK, Single Super Phosphate (SSP), Muriate of Potash (MOP) and Zinc Sulphate.

Exhibit 22: Onion Farming in Chikmagalur - Usage of Chemical Inputs



Average price (in Rs.) and usage (per hectare) of these chemical inputs in the market were found to be as follows:

Exhibit 23: Average Price and Usage of Chemical Inputs in Onion Cultivation

Sr. No.	Name of Chemical Input	Average Usage (kg/ha.)	Price (Rs. per kg/lt)
1.	Borax	4.33	428
2.	Zinc Sulphate	7.64	95
3.	Urea	108.99	7
4.	NPK	171.95	24
5.	Diammonium Phosphate (DAP)	144.32	25
6.	Single Super Phosphate (SSP)	200.00	14
7.	Muriate of Potash (MOP)	172.39	18

### 3.3.2.5.3. Crop Protection

Onion Purple Blotch (*Stemphylium* Blight) continues to be the major disease affecting onion cultivation with 76% of the respondents reporting the disease in the study region. The major pest infestation includes that of thrips and mites for which the major pesticides used is Karate. For treatment of Onion Purple Blotch, the fungicides used are Kavach, UL-45, Ridomil and Saaf.

Exhibit 24: Onion Farming in Chikmagalur - Usage of Inputs for Crop Protection

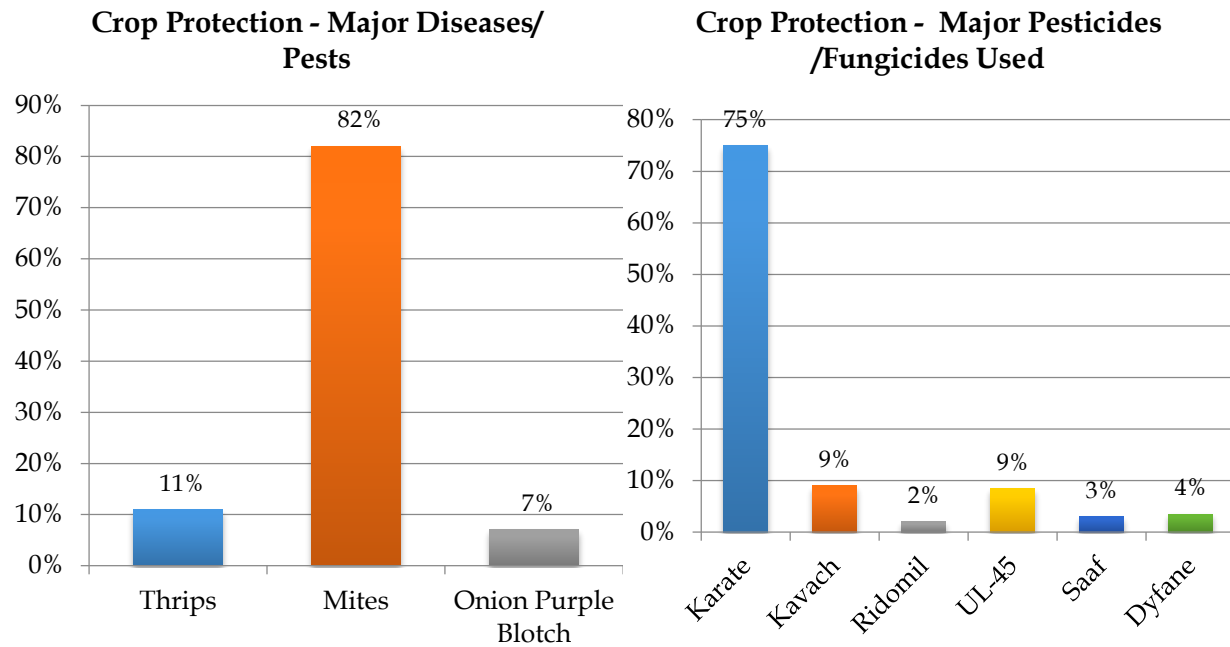


Exhibit 25: Onion Farming in Chikmagalur - Major Pesticides and their average market costs

Sr. No.	Name of Insecticide	Average Price (Rs. per litre/kg)
1.	Karate	1106.67
2.	Kavach	1122.22
3.	Ridomil	1050.00
4.	Saaf	1133.33
5.	UL-45	1046.67
6.	Dyfane	1071.43



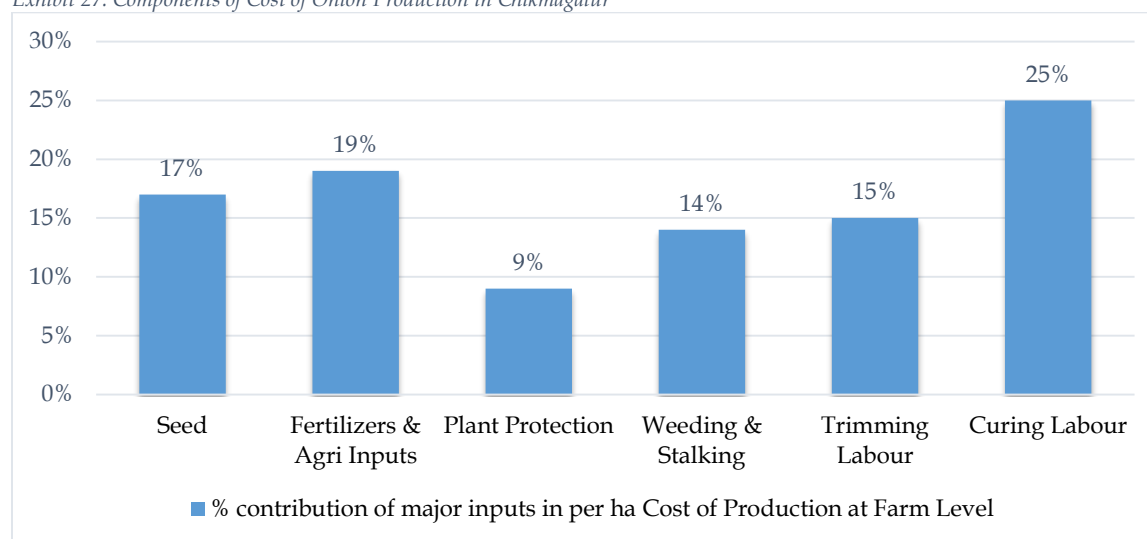
### 3.3.2.6. Cost of Cultivation

Price build-up of various vegetables in the region at farmers level depends on the usage of inputs like type of seeds (local/HYVs), fertilizers (NPK), crop protection chemicals (insecticide/pesticide/fungicide), irrigation etc. besides inputs labour, packing, transportation also adds up in the price. Cost of Production consists of cost of seed, fertilizers and agri inputs, plant protection measures, crop protection, labour for value addition. Labour contributes the maximum to the price buildup of cost of production.

Exhibit 26: Onion Farming in Chikmagalur - Average Cost of Production (Rs. per kg.)

Particulars	Amount (in Rs.)	Price Mark up (per kg)	% contribution
Seed	0.59	0.59	17%
Fertilizers & Agri Inputs	0.68	1.27	19%
Plant Protection	0.33	1.6	9%
Weeding & Stalking	0.50	2.1	14%
Trimming Labour	0.53	2.63	15%
Curing Labour	0.90	3.53	25%
<b>COST OF CULTIVATION</b>	<b>3.53</b>	<b>-</b>	<b>-</b>

Exhibit 27: Components of Cost of Onion Production in Chikmagalur



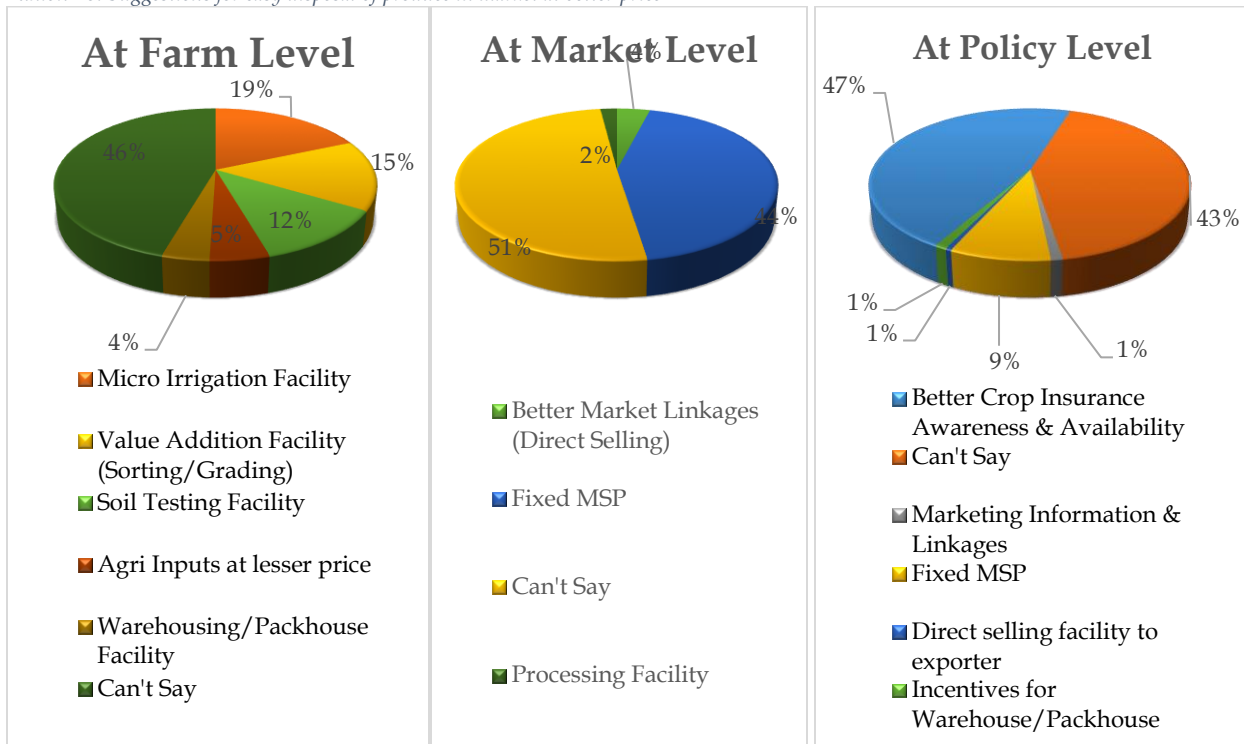
### 3.4. Post-Harvest Management and Marketing

- When it came to ancillary agricultural infrastructure to support agriculture and allied activities, the presence was found to be present. The respondents reported awareness and presence of a soil testing lab in the vicinity of their operations (51%). These respondents had made use of this facility but however, only 43% of them found it to be useful. These facilities were reported to be existing in both, Tarikere and Kadur which are major clusters in the district growing onion.

- Agri Clinic: 14% of the respondents reported availability of an Agri Clinic in their vicinity. Around 13% of the respondents found its services to be useful to them in their farming operations.
- Disease Forecasting Unit, Plant Health Unit, Bio Control Laboratory, cold storage, organic certification facility, ripening chamber, primary processing center, and mobile processing center were found to be non-existent in the study region. All of the respondents responded in the negative when it came to their availability.

As a result of the same, the respondents were then probed regarding their expectations Farm, Market and Government/Policy Level. The findings are summarized in the diagrams below:

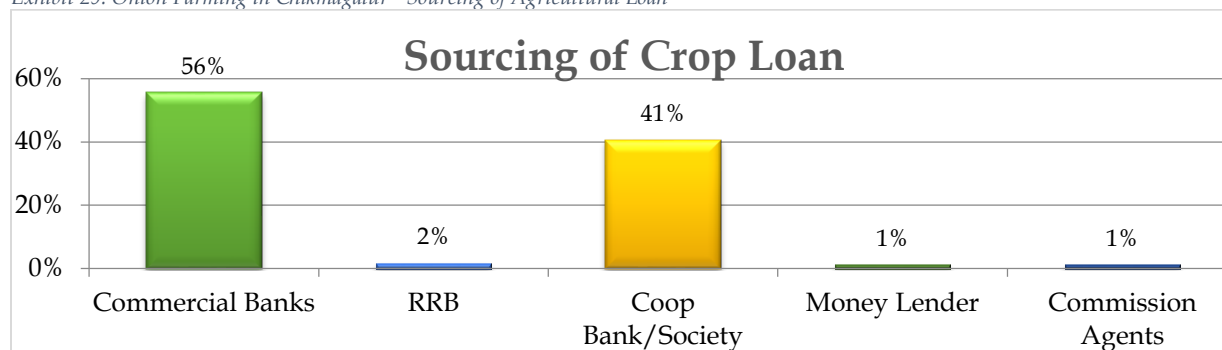
Exhibit 28: Suggestions for easy disposal of produce in market at better price



### 3.5. Availability & Access to Credit

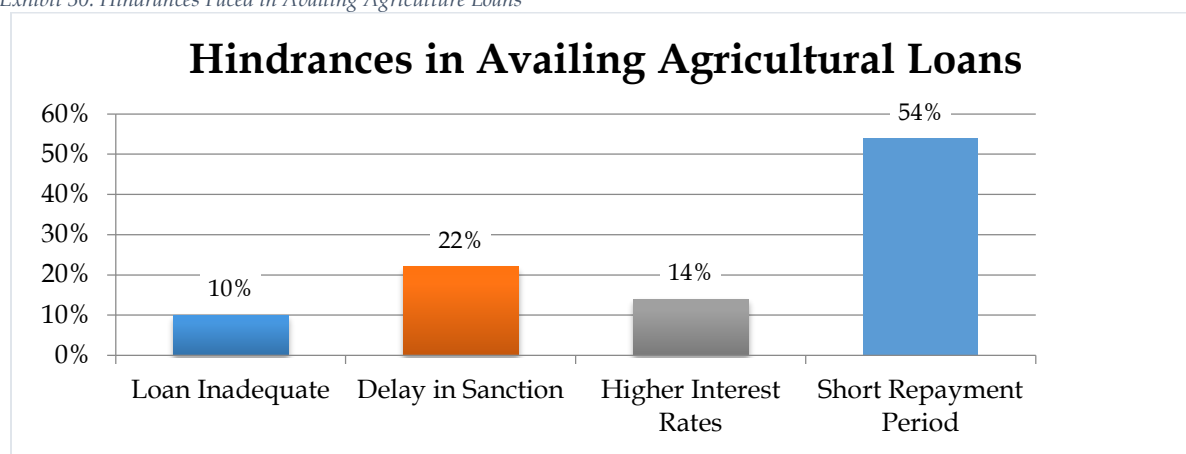
67% of the respondents agreed to having availed crop loan. These were availed through a mix of resources namely Commercial Banks, Regional Rural Banks (RRBs), Cooperative Banks/Society, Money Lenders and Commission Agents. The trend of sourcing such loans is depicted below:

Exhibit 29: Onion Farming in Chikmagalur - Sourcing of Agricultural Loan



- ✓ Average Rate of such loans came to about ~6%.
- ✓ Also, it was studied whether any issues were faced while sourcing of such financial assistance from registered bodies. Around 28% of the respondents concurred that few hindrances were faced. Several reasons were cited which ranged from inadequate repayment period to delay in loan amount sanctioning. A break up of such factors playing a role in grant of loans to onion farmers in the region is summarized below:

Exhibit 30: Hindrances Faced in Availing Agriculture Loans



In terms of crop insurance, the share of those who have availed these services was found to be around 20%. Awareness regarding crop insurance benefits, its processes and documentation as well as general market information pertaining to it was highlighted by the farmers to be the major issue in less insurance coverage. It was suggested that a mass campaign regarding improvement in awareness of insurance schemes and its benefits needed to be carried out at the farmer level.

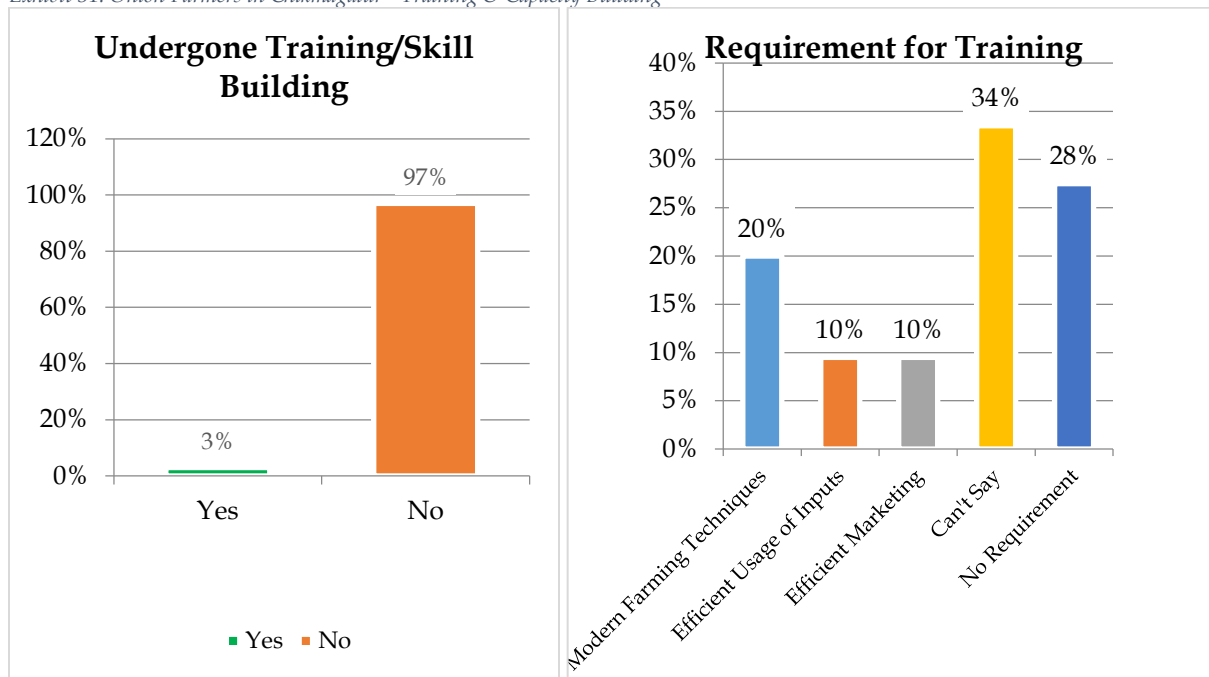
### 3.6. Training & Capacity Building

Benefit of skill building and training programmes by the farmers was found to be negligible with only 3% of the respondents agreeing to having undergone some kind of training in the recent past. These were found to be primarily conducted under the MIDH programme through state and district level departments. All the respondents who underwent training confirmed that they found it to be beneficial in terms of:

- Improvement and learning about modern farming practices
- Understanding benefits of better quality seed.

Regarding expectations in terms of training and capacity building, it was cited that training regarding modern and up to date farming techniques to enhance productivity and yield is of utmost importance with around 20% of the responses highlighting such a requirement. This was followed by information dissemination regarding efficient usage of agri inputs and robust market information and linkages. This would help in forming robust linkages with the market and processors thereby increasing potential for better income realization to the farmer. A large share of almost 60% of the respondents showed lesser interest in such training and capacity building initiatives.

Exhibit 31: Onion Farmers in Chikmagalur - Training & Capacity Building

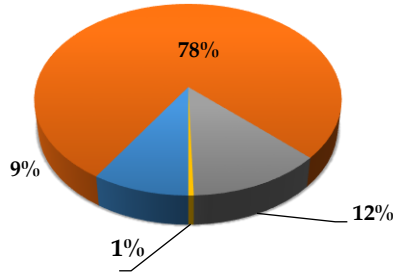


#### 3.6.1. Extension Services

Almost all of the respondents agreed to having sought extension services from Government Departments or Agencies to understand and address problems related to their onion cultivation operations. These were sought from multiple resources such as State Agriculture Dept., NGOs, Krishi Vigyan Kendra's, Academic & Research Institutions, ATMA, Dealer/distributors, NHRDF, Plant Clinic, Govt. Extension Officers etc.

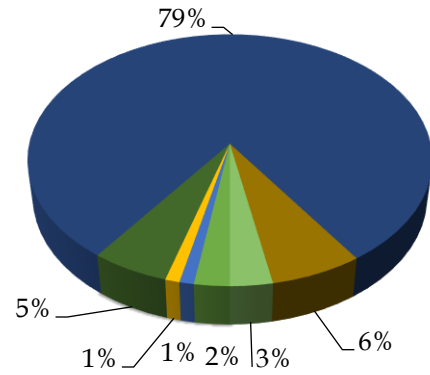
Exhibit 32: Post Extension Changes in Farming Practices

### Post Extension Changes in Farming Practices



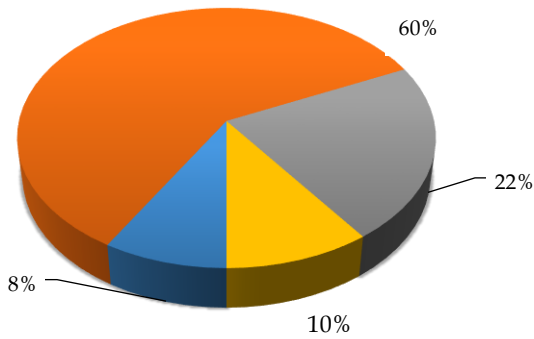
- Adoption of new varieties of seeds
- Increase in Productivity
- New Cropping Patterns
- Better Utilization of Available Schemes

### Sources of Extension Services



- State Agriculture Dept.
- KVKs
- Dealers/Distributors
- NGO (Govt & Private)
- Universities
- NHRDF

### Satisfaction post Implementation of Farming Practices

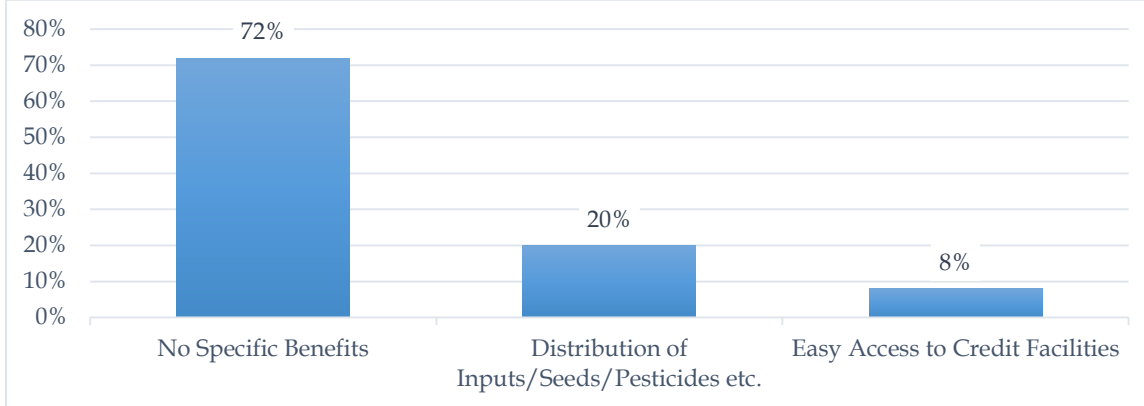


- Always
- Most of the time
- Sometimes
- Not At All

### 3.6.2. Farmer Groups

16% of the respondents concurred that they are aware of Farmer Producer Organisations (FPOs) existing in their vicinity/village. Of these, only 10% of the respondents responded to being a part of such a group of farmers in the village. A snapshot depicting the advantages of being a part of such an FPO is shown below:

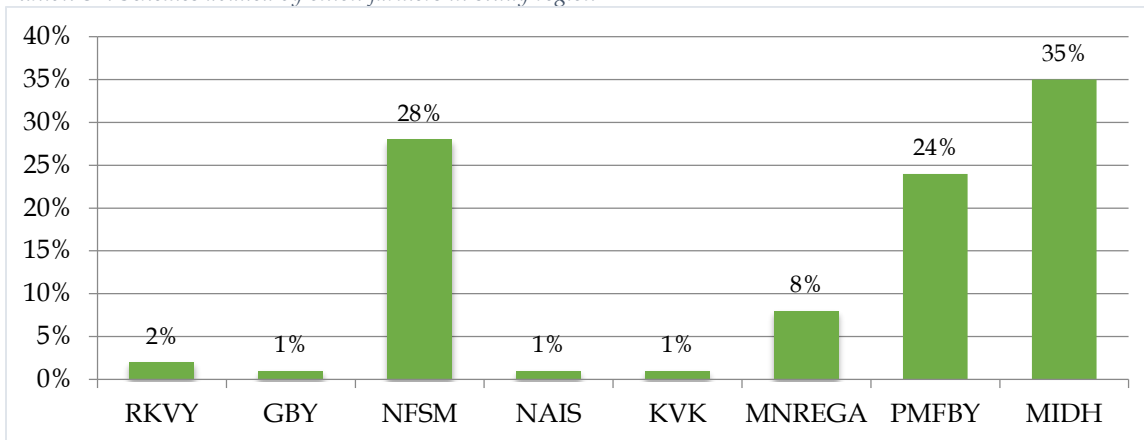
Exhibit 33: Farmer Producer Organisations - Benefit to Farmers



### 3.7. Government Support

There are numerous schemes under implementation by various State and Central level bodies which are of assistance to farmers ranging across extension, post-harvest management, marketing linkages and access to financial assistance. Around 52% of the respondents agreed to having availed such schemes while 48% denied having utilized any such schemes. 3% of the farmers reported access to Soil Health Card. A brief snapshot of various schemes utilized by the onion farmers in the study region is depicted below:

Exhibit 34: Schemes availed by onion farmers in study region



## 4. Value Chain Analysis of Onion

### 4.1. Cost of Cultivation at farm level

Price build-up of various vegetables in the region at farmers level depends on the usage of inputs like type of seeds (local/HYVs), fertilizers (NPK), crop protection chemicals (insecticide/pesticide/fungicide), irrigation etc. besides inputs labour, packing, transportation also adds up in the price. Cost of production consists of cost of seed, fertilizers and agri inputs, plant protection measures, crop protection, labour for value addition. Labour contributes the maximum to the price buildup of cost of production. The average cost of production at farm level came to Rs. 3.53 per kg.

### 4.2. Transportation & Packaging

Onion crop is harvested and stored in heap up areas in make shift shades or in the field itself. Since the harvesting is done during the rainy season, the humidity levels are considerably high. For curing, the humidity should be low. With no proper infrastructure for curing, the harvest keeps lying in heap up area and undergoes distress due to higher internal respiration. Also, onion

*Exhibit 35: Onion Packing in Specialised Perforation Bags, Tarikere, Chikmagalur District*



having unique storage requirements, makes farmers use specialized perforation bags which cost around Rs. 30 for a 60 kg unit. This is a major cost incurred by the farmer.

Prior to transportation, the harvest is categorized into three categories based on bulb size. These are:

- A Grade: > 60 mm
- B Grade: 3-50 mm
- C Grade: < 30 mm

The farmers pool their produce and rent trucks with a carrying load of 10 MT. The average cost incurred here is Rs. 0.9-1 per kg. The produce is sent to Bangalore APMC. Majority of the farmers prefer sending their harvest to Bangalore rather than local APMCs due to lack of local demand. Few large farmers also have direct contact with traders in Delhi, Maharashtra, Kerala and Tamil Nadu and dispose their produce to those traders during season.



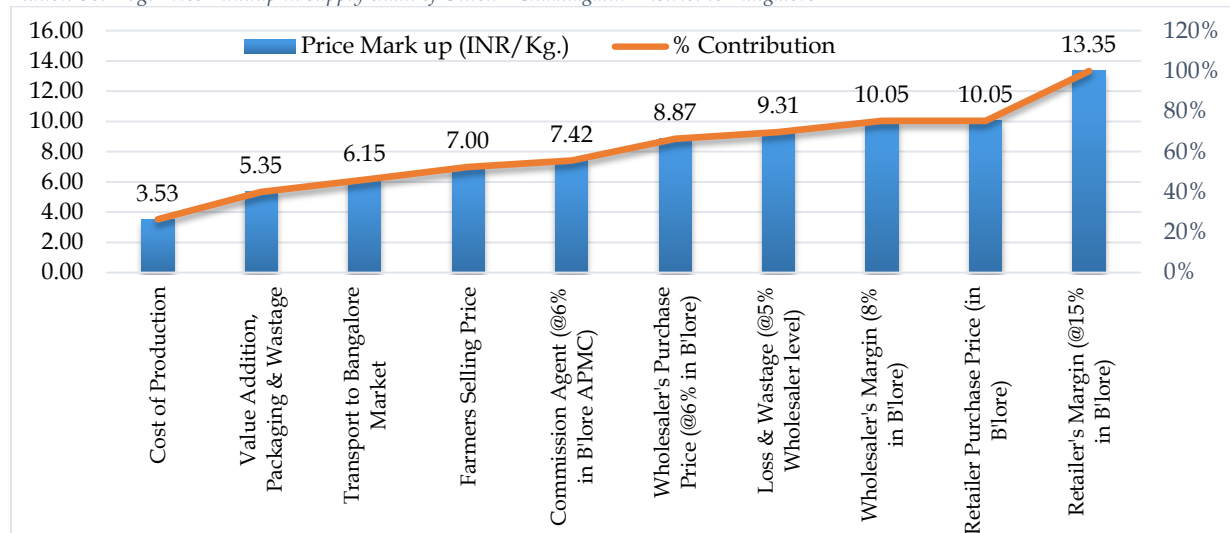
### 4.3. Marketing Channels

Like other agricultural commodities, marketing is playing very important role for the sale of onion. Local market intermediaries general less demand due to high glut of onion after harvesting. The Chikmagalur district lacks basic infrastructural facilities for the marketing of vegetables including onion. The produce is marketed to Bangalore APMC directly by the farmers after first level sorting/grading and packaging. The farmers sell it off in Bangalore at substandard rates as a result of panic selling.

### 4.4. Price Buildup

The following section summarizes the price buildup of onion crop (per kg.) from farm to consumer. Here, the average retail price to consumer for Bangalore has been considered. Since various market intermediaries such as traders, wholesalers and retailers are negligible in the study region, the feedback and market information from similar stakeholders and onion farmers sending their produce to Bangalore has been considered.

Exhibit 36: Avg. Price Buildup in supply chain of Onion - Chikmagalur District to Bangalore



### 4.5. Onion Crop - Basic Economics

Based on the sample survey of around 200 onion farmers in the study region, the following statistics were derived.

Exhibit 37: Basic Crop Economics - Onion

Per ha cost of cultivation (A)	Per ha yield in kg	Average Price Realized (Rs./kg)	Gross income per ha (B)	Net income per ha (C) = (B)-(A)
1,00,475	13,889	11	1,44,888	44,413

The cost of cultivation per hectare includes cost for preparation of land, seeds/planting material, fertilizers/pesticide application, irrigation, labour cost and transportation costs. The net income achieved by the farmer is ~44% of the total cost of cultivation incurred by the onion farmer on a per hectare basis.



## 5. Challenges across the Onion Value Chain

Exhibit 38: An Onion Farm in Kadur Block, Chikmagalur District

### 5.1. Production & Inputs

The climate in the study region of Chikmagalur is unique when compared to other onion growing areas of the state (Gadag, Chikkaballapur) as well as other clusters in India. Onion is primarily a Kharif crop when it comes to Chikmagalur. The climate is normally dry but has cooler pre monsoons when the sowing takes place in May-

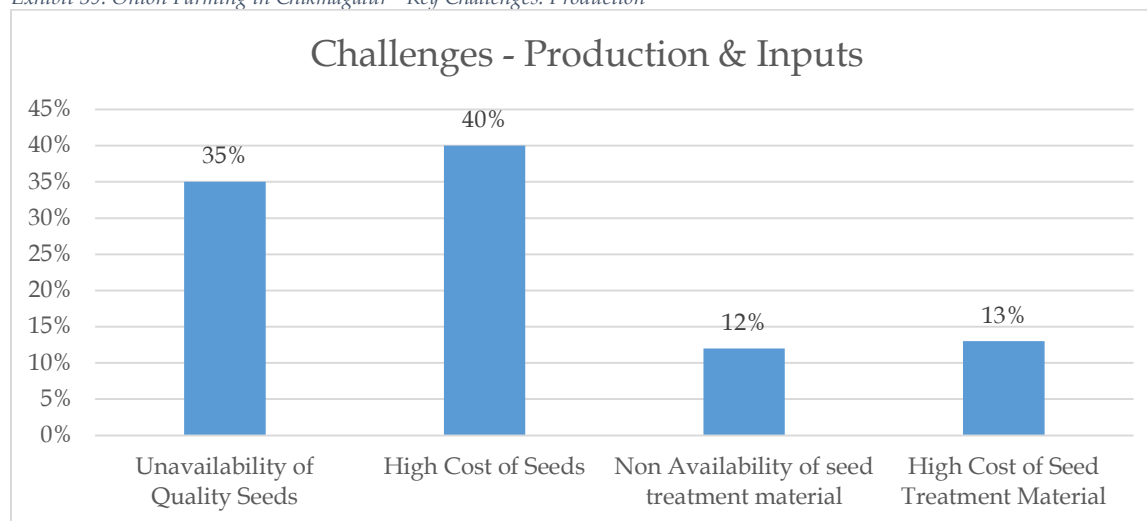


June (South West Monsoon) while the harvesting takes place between September to November which witness rainfall intermittently due to the North East Monsoon. Production of seed starts from February-March with an average viability period of 4 months.

Even now, a majority of the farmers in the region use their own seeds or those sourced from local sources which are neither certified nor labelled. The genotype of the variety is also not maintained or remains unknown. The practice of transplantation is not evident in the study region. The farmers are not found to be aware of the advantages of hybrid seeds and hence, prefer to stick to the conventional seeds only. Also, it was cited that the hybrid seeds from famous brands available in the market are not suited to the local climate and geography. These seeds seem to perform well in other regions but not in areas of the study region.

Since the viability of the onion seed is very short compared to other crops, the seed producing companies are not successful in terms of volume of sale. Also, due to traditional methods of harvesting and usage of conventional seeds, the onion crop is affected with various diseases and pests such as Onion Purple Blotch (*Stemphylium* Blight), Thrips and sometimes due to Mites.

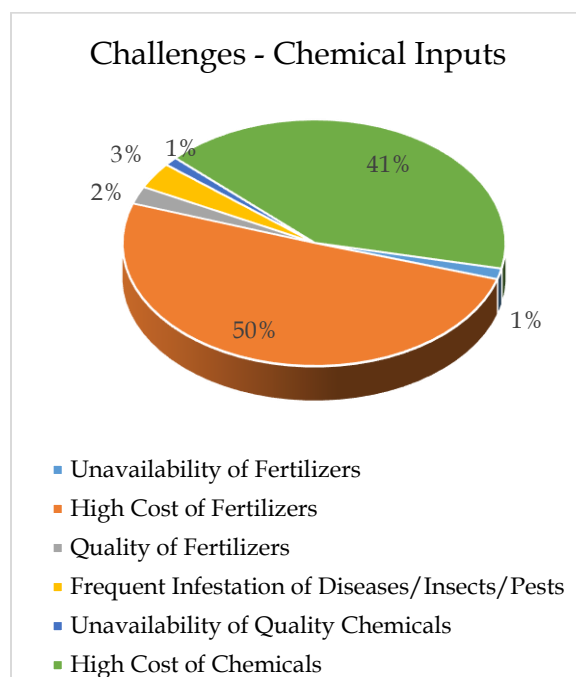
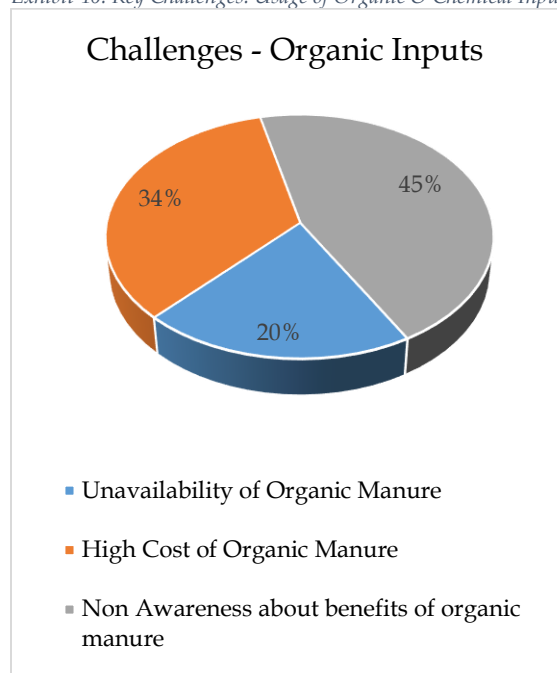
Exhibit 39: Onion Farming in Chikmagalur - Key Challenges: Production



Also, onion sowing is done by broadcasting method. This reduces the quality of the bulb for which adequate spacing between the plants and ridge sowing is suggested. This is hardly followed leading to a below par harvest of onion.

Farmers prefer conventional manure and inputs such as FYM and Urea which is used abundantly. The average application of FYM per hectare per season was found to be around 6 MT.

Exhibit 40: Key Challenges: Usage of Organic & Chemical Inputs



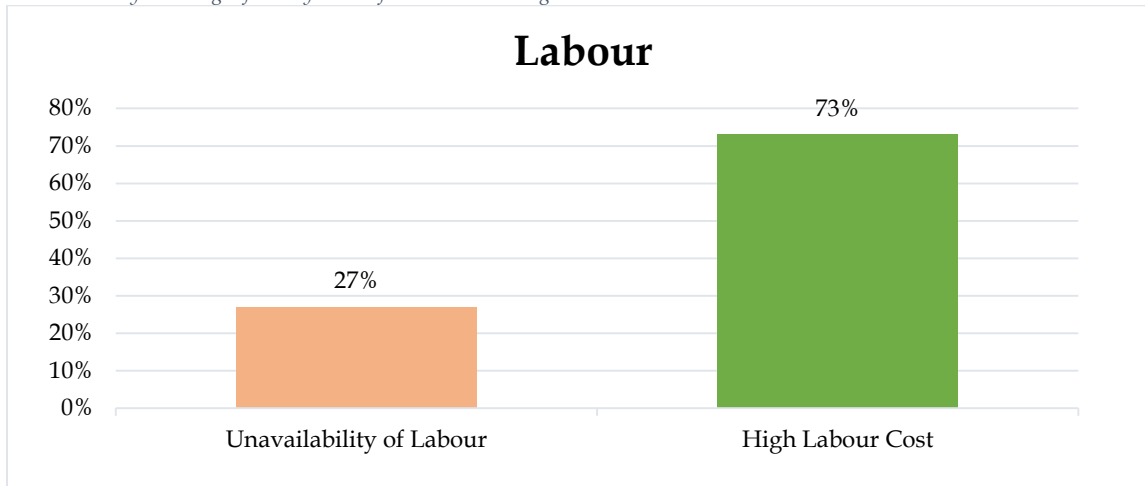
## 5.2. Labour

Operation wise labour management in onion cultivation is done through a mix of in house as well as hired labour. Majority of the farmers depended on outside laborers rather the family laborers in the task of onion production. The costs involved per hectare of cultivable land for different operations is summarized below:

- Intercultural operations which involved Ploughing, harrowing as well as weeding and mulching it was reported that an average of 57 man-days were utilized across the entire crop cycle.
- For the process of sowing an average of 5.2 man-days of labour was utilized
- For the process of harvesting an average of 70 man-days of labour was utilized
- Post Harvesting, Topping, Curing and Value Addition (Involves preliminary sorting and grading) consumed an average of 21 man-days

Average man-day cost for a male laborer came to about Rs. 382 while for a female laborer it came to Rs. 280. Considerable labour costs reduce margins for farmers and are a dis-incentive for farmers who may wish to get into onion production. Conventional onion harvesting and post harvesting operations like trimming of root and grading requires skilled manpower which has become scarce in the vicinity of the study region. This leads to loss of quality and increase in overall cost of production.

Exhibit 41: Key Challenges faced by Onion farmers in Chikmagalur: Labour



## 5.3. Post-Harvest Management

Onion is a perishable commodity under adverse conditions due to lack of proper post-harvest handling infrastructure, farmers not only suffers physical losses and quality

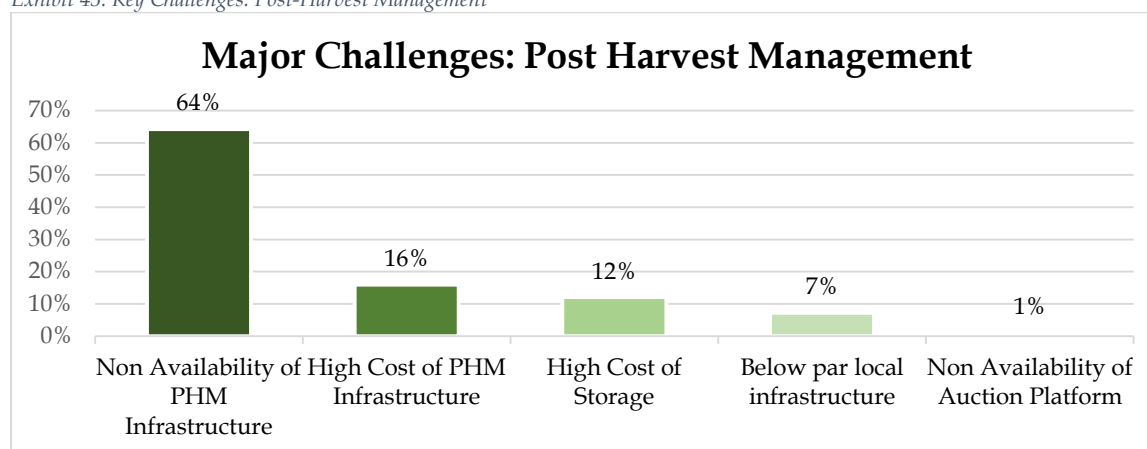
Exhibit 42: Hired Labour involved in Topping of Harvested Onion, Kadur Block, Chikmagalur District



but also bound to sell their produce immediately after harvest at a price commanded and dictated by the traders. Farmers are handicapped and dependent on market intermediaries due to lack of post-harvest handling and processing infrastructure in the district. Due to presence of rain during the harvesting period, the moisture content in the onion bulb is high. For the process of curing, the humidity should be low. Hence, since moisture content is more in the bulb, the natural respiration of the bulb goes up, leading to building up of heat in the collection area, leading to deterioration of the bulb.

As a result of this handicap, the farmer prefers to sell off the produce with the nearest APMCs in Hassan and Bangalore. Also, storage of onion requires specific technical criteria to be adhered to in terms of temperature, air circulation and humidity, without which the heap area/storage suffers in terms of quality loss. The cost of storage of specialized perforation bags (in place of conventional gunny bags) @Rs. 30 per 60 kg unit is also on the higher side causing a dent in the farmer’s pocket. From the farmer feedback collected, it came to light that with adequate curing process and storage, it may lead to a 30% raise in farmer income on average.

Exhibit 43: Key Challenges: Post-Harvest Management



#### 5.4. Value Addition & Processing

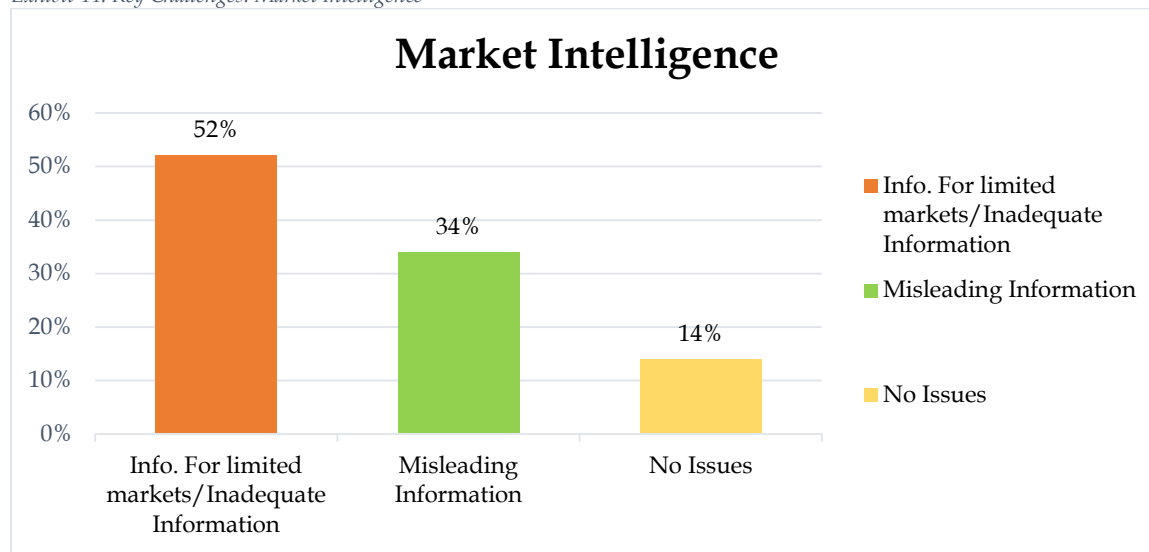
The onion coming out of the study region as well as the state of Karnataka has a good position & potential as it enters the market after the seasonal produce of other major onion producing states such as Gujarat and Maharashtra is coming to an end. The farmers have the leeway to command better prices for their produce. Onion varieties in Chikmagalur see use and disposal primarily in the fresh market. A key constraint to production of process able varieties is the lack of processing industries in the area as well as lack of facilities for any primary, secondary or tertiary value addition. There is major demand for processed onion products such as onion flakes, onion powder and dried onion slices which are used in a variety of curries, savorys and dishes both in India and the global market, primarily the US and EU.

No processing facility was found to be operating in the vicinity of the study region.

## 5.5. Market Access & Market Price

Due to unavailability of storage or processing infrastructure in the vicinity of their areas, the farmers are compelled to take their produce to Bangalore APMC in bulk. The farmers pool their produce, rent vehicles (mostly trucks - 10 MT each) and share the expenses. The average cost per kg of transport to Bangalore comes to around Rs. 1 per kg. Also, in spite of the onion produce from Karnataka holding a good stead in the market due to high demand (as a result of shortage from other areas especially Gujarat and Maharashtra) the farmers are unaware of this and indulge in panic selling. Large number of buyers trying to sell to limited buyers results in less bargaining power. There is negligible access to price information of local and other markets or arrival patterns.

Exhibit 44: Key Challenges: Market Intelligence



## 6. Recommendations

### 6.1. Production & Inputs

1. Develop improved seed variety more suited to local agro climatic conditions through a collaborative effort between Department of Horticulture and local KVKs should. Onion varieties with resistance to diseases such as Onion Purple Blotch (*Stemphylium* Blight) & pests such as thrips, promote on farm seedling production and distribution to farmers at minimum price should be promoted.
2. Practice of transplanting along with its advantages and impact on farmer income should be highlighted to the farmer in terms of price realization and quality of yield. Demonstration farms should be established in key production clusters to showcase GAP techniques and promote a network of anchor farmers who could promote these approaches to smaller farmers.
3. Specific emphasis should be given on adequate spacing between plants (15X10 cm line to plant after raising nursery bed). At present, due to broadcasting method, the uniformity is



not maintained. Mechanical sowing and precision sowing methods need to be highlighted and the farmer should be made aware of its advantages so as to facilitate easy adoption and implementation.

4. High-tech nurseries should be established in the production clusters to ensure supplies of improved quality seedlings to the farmers and also generate additional employment opportunities.
5. Department of Horticulture should create awareness amongst farmers and promote INM and IPM interventions along with the trellising/staking, mulching, micro irrigation & fertigation. This can be done through farm visits, seminars, sensitization programmes and extension activities under the aegis of NHRDF and DoGR.

### **6.2. Labour & Farm Mechanization Innovations**

6. Custom hiring centers should be established (equipped with small farm machines for mechanical sowing, harvesting and trimming) in the major production clusters to reduce dependency on human labour and farm drudgery, bring efficiency in farm operations and reduce cost of production.

### **6.3. Post-Harvest Management**

7. Department of Horticulture should establish post-harvest handling infrastructure such as low cost onion storage units with sorting and grading facilities in the district. Establishment of such a facility will not only provide opportunities to farmers by limiting distress sale but also increase shelf life, reduce post-harvest losses and enhance quality.
8. Ensure availability of specialized perforation bags to farmers at subsidized rates for better storage of onion.
9. Also, as the majority of the area is rain fed, it is recommended to boost micro irrigation and drip sprinkler usage along with construction of community tanks, farm ponds/reservoirs with plastic / RCC lining to ensure better irrigation to onion & other horticulture crops.

### **6.4. Value Addition & Processing**

10. It is highly recommended to implement an onion processing facility in the vicinity of Kadur taluka in Chikmagalur district. FPO model may be considered to aggregate farmers and they should be linked to the processing facility. Such a model would also benefit from contract farming with the onion processing industry supply chain. The FPOs would aggregate the commodity and the entire quantum maybe linked to the processing facility thereby eliminating middlemen and increasing price realization. Processed products made out of onion holds good potential in the local and international markets. Dried Onion flakes, onion powder and onion slices is a major component of Indian curries, savorys, Ready-to-Eat (RTE) products as well as dry preparations.

### **6.5. Market Access & Market Price**

11. Local APMC should focus on onion and other horticultural commodities, have separate infrastructure and market intermediaries as well as increase awareness in the onion farmers

of the region so that they are not compelled to go to distant markets such as Hassan and Bangalore for sale of produce.

## Annexures

### A. Onion Farmers Consulted

Exhibit 45: List of Onion Farmers Consulted

Sr. No.	Block/Taluk	Village	Name of Farmer	Contact No.
1	Kadur	Kurubagere	Suresh Birappa	7411242882
2	Kadur	Kurubagere	Jayanna Birappa	9743262546
3	Kadur	Kurubagere	Thimai Chimaya	8123709862
4	Kadur	Kurubagere	Puttasony Somanya	7022202058
5	Kadur	Kurubagere	Krishna Murty Borappa	9741762386
6	Kadur	Kurubagere	K Nagraj Kare Uliyappa	9242386836
7	Kadur	Basur	Parmeshappa Hellappa	7353554479
8	Kadur	Basur	Krishna Murty Revanna	9164480337
9	Kadur	Basur	Gauri Murti Govindappa	8453776641
10	Kadur	Basur	Chander Shekhar Borappa	9147734990
11	Kadur	Basur	Thammayya Puttappa	9432387325
12	Kadur	Hirenallur	Somappa Rajappa	9161004902
13	Kadur	Hirenallur	Thippesh Hanumthappa	9964637942
14	Kadur	Hirenallur	Suresh Hr. Vevajuppa	8970161433
15	Kadur	Hirenallur	Prathap Basava Rajappa	9164407979
16	Kadur	Hirenallur	Puttaswamy Thimmapha	9167004902
17	Kadur	Hirenallur	Madhu Mohan Kumar Kallyappa	8710015056
18	Kadur	Narsipura	Chandrappa Eishwarappa	9743893341
19	Kadur	Narsipura	Prakash Rajesh	9945523880
20	Kadur	Narsipura	Girish Hiranna	Refused to Share
21	Kadur	Narsipura	Revana Siddapa Siddapa	8861834949
22	Kadur	Narsipura	Ganadharpal Shire Shankar	7996601736
23	Kadur	Narsipura	Girish Shanthadhar	9844181056
24	Kadur	Naga Gohdanahalli	Manju N.S S/O Soorappa	9482341793
25	Kadur	Naga Gohdanahalli	Harish Kumar S/O Nanjudappa	7760001200
26	Kadur	Naga Gohdanahalli	Pradeep Hanumathappu	8722046053
27	Kadur	Naga Gohdanahalli	Manjappa Hanumanthappa	8495897475
28	Kadur	Naga Gohdanahalli	Erappa Mylarappa	9964402897
29	Kadur	Jiganihalli	Shivanna Hanumanthappa	8152080572
30	Kadur	Jiganihalli	Mallik Gwodayya	9591512591
31	Kadur	Jiganihalli	Baabu Milarappa	9880359332
32	Kadur	Jiganihalli	Gudue Senmape	9591512591
33	Kadur	Jiganihalli	Manjappa Kariyappa	9686221023
34	Kadur	Jiganihalli	Anna Gupta Maniyappa	9243398166



35	Kadur	Kedigere	Rajappa Venrateshappa	8151889820
36	Kadur	Kedigere	Hire Nallur Somadasayya	9945583970
37	Kadur	Kedigere	Giniyappa Mudslilingiya	8152022868
38	Kadur	Kedigere	Nine Nallxr Hanumanthappa	9591682423
39	Kadur	Kedigere	Hine Nalar Prabhakara Kip	9962932348
40	Kadur	Arehalli	Manjunathal Lokeshappa	9480788589
41	Kadur	Arehalli	Chetan Shadaksharappa	9481083255
42	Kadur	Arehalli	Onkalaya Eashaya	9591071908
43	Kadur	Arehalli	Milliarun Siddaramappa	Refused to Share
44	Kadur	Arehalli	Veerabgadrappa Ransappa	9611958234
45	Kadur	Abbinaholalu	Savitramma Jayanna	9731415147
46	Kadur	Abbinaholalu	Onkaramma Mallikarjunappa	7892467796
47	Kadur	Abbinaholalu	Yogesha Shivalinga Murthi	7996285466
48	Kadur	Abbinaholalu	Raj Kumar Basuppa	7353470881
49	Kadur	Abbinaholalu	Devindrappa Dadda Basappa	9663108970
50	Kadur	Chikk Basur	Eishwarappa Govindappa	9242077251
51	Kadur	Chikk Basur	Hanuman Thappa Chanorappa	9880546855
52	Kadur	Chikk Basur	Umesha Berappa	7996191806
53	Kadur	Chikk Basur	Hanuman Thappa Pwari Larmappa	8497862588
54	Kadur	Chikk Basur	Rajappa Givindappa	9448669828
55	Kadur	Biluwala	Chandrappa Malleshappa	9611252029
56	Kadur	Biluwala	Narasima Murthy Ramappa	9964074140
57	Kadur	Biluwala	Kaliyappa Kenzahappa	9980973212
58	Kadur	Biluwala	Shil Murthy Hanaya	9448673368
59	Kadur	Biluwala	Murthyappa Dootana	9731923751
60	Kadur	Bandi Koppalu	Parameshappa Gangappa	8050896899
61	Kadur	Bandi Koppalu	Jagdish Malappa	9108593626
62	Kadur	Bandi Koppalu	Prasana Kumar Basappa	9632701361
63	Kadur	Bandi Koppalu	Chikkanna Bipanna	8861601360
64	Kadur	Bandi Koppalu	Devendrappa Sidappa	8197846654
65	Kadur	Bandi Koppalu	Shiva Murthy Basappa	9945050380
66	Kadur	Chikkanallur	Murthy Mthappa	9964404543
67	Kadur	Chikkanallur	Chikayya Doddaya	9611364469
68	Kadur	Chikkanallur	Babusappa Somappa	8970019278
69	Kadur	Chikkanallur	C N Ramappa Nanjappa	7259165484
70	Kadur	Chikkanallur	C K Nagarajappa R Kadappa	9964615749
71	Kadur	Chikkanallur	Halappa Chandrappa	9844714232
72	Kadur	Giriyapura	Chananalikraj Chanaki	9900258297
73	Kadur	Giriyapura	Satish Maheshappa	9902075801

74	Kadur	Giriyapura	Nagrula Maluyappa	9845338250
75	Kadur	Giriyapura	G P Prakash Putappa Barimani	7090083842
76	Kadur	Giriyapura	Ravi G P Puttaswamy	7022596947
77	Kadur	Giriyapura	Chandra Mauli Bidi Basappa	9686622992
78	Tarikere	Chikkannavangala	Umesh Thippeshappa	9242697941
79	Tarikere	Chikkannavangala	Mallesh Parmeshwarappa	9743415935
80	Tarikere	Chikkannavangala	Veerabadrappa Mujabanna	9741701193
81	Tarikere	Chikkannavangala	Veerabadrappa Channabasappa	9242348419
82	Tarikere	Chikkannavangala	Shanta Veerappa Nagappa	8277621305
83	Tarikere	Chikkannavangala	Basavarajappa Rudrappa	8762986308
84	Tarikere	Kanabagatte	Mwonesh K.S Sidda Mallappa	9740890961
85	Tarikere	Kanabagatte	Parameshwarappa Channabasappa	9740609928
86	Tarikere	Kanabagatte	Onkarappu Maileshappa	9241240335
87	Tarikere	Kanabagatte	Nagarore Basappa	9241217916
88	Tarikere	Kanabagatte	Shiva Kumar Chhanhapura	9241643668
89	Tarikere	M.Hosahalli	Prakash Neela Kantappa	8105584644
90	Tarikere	M.Hosahalli	Onkarappa M.N Nagappa	8971788012
91	Tarikere	M.Hosahalli	Maheshwrappa M.P Puttappu	7259385397
92	Tarikere	M.Hosahalli	Mahadolliya Veevga	9449300175
93	Tarikere	M.Hosahalli	Eshwarappa Marvalappa	9449300175
94	Tarikere	Gaworapura	Nanjundayya Veera Baorayya	9008278575
95	Tarikere	Gaworapura	Thimmappa G,C Channabasappa	9632276824
96	Tarikere	Gaworapura	Man Shiddapur Hallappa	8296578549
97	Tarikere	Gaworapura	Dakshanmurthi Crupadappu	9449402675
98	Tarikere	Gaworapura	G.C Renukapa Channabasappa	7022089682
99	Tarikere	Gaworapura	Kiran Shivamurthy	Refused to Share
100	Tarikere	Katiganere	Devraj Eishwarappa	9449045249
101	Tarikere	Katiganere	Devika Nijaguna K.P	9481255655
102	Tarikere	Katiganere	Ragu Nagartappa	7259915332
103	Tarikere	Katiganere	Siddarmampur Gangappu	9480409291
104	Tarikere	Katiganere	Moksh Kumar	9148323179
105	Tarikere	Katiganere	Asha Chand Shekhar	9164388933
106	Tarikere	Bankana Katte	Kuberappa S Sanna Siddappa	9972991256
107	Tarikere	Bankana Katte	Bishwarappa Jogappa	9743357373

108	Tarikere	Bankana Katte	Mahesvarappa Basappu	7349218604
109	Tarikere	Bankana Katte	Shiv Kumar Somshekarappa	7349218515
110	Tarikere	Bankana Katte	Ravi Padiyappa	9945128997
111	Tarikere	Yane Hosur	Thirthesh Ramapur	9902217879
112	Tarikere	Yane Hosur	Bhogeshpar Nimgappa	8971158274
113	Tarikere	Yane Hosur	Chanabasappa Chandrappa	9960949255
114	Tarikere	Yane Hosur	Shashdar Baswarwappa	9164303914
115	Tarikere	Yane Hosur	Prashanth S.O Kumar	8453440585
116	Tarikere	Yane Hosur	Onkar Sanna Nanjappa	9611097791
117	Tarikere	Hirekannavangala	Chethan Shekrappa	7090257589
118	Tarikere	Hirekannavangala	Sanju Gurumurthy	7259552967
119	Tarikere	Hirekannavangala	Chandrashekh Thumppa	9241141220
120	Tarikere	Hirekannavangala	H.Onkrappa Halappa	9243090590
121	Tarikere	Hirekannavangala	Rakesh Lokeshappa	9632607647
122	Tarikere	Hirekannavangala	Pradeep Kumar Somnath	9743838981
123	Tarikere	Hebbur	Shankrappa Rubrappa	9901864222
124	Tarikere	Hebbur	Jagadish Halasiddappa	7760267626
125	Tarikere	Hebbur	Marmuluddapra Rudvappa	9741469499
126	Tarikere	Hebbur	Budrappa Mallappa	8147922795
127	Tarikere	Hebbur	Ravi Kumar Malleshappa	9902173072
128	Tarikere	Hebbur	Revona Siddapa Halasaddappa	9164773260
129	Tarikere	Thimmapura	Basavarasu Rudrappa	9243973754
130	Tarikere	Thimmapura	Annappa Onkarappa	9008722376
131	Tarikere	Thimmapura	Suresh Chahorappa	7760282806
132	Tarikere	Thimmapura	T.C Gireshe Chandrappa	9663767750
133	Tarikere	Thimmapura	Rajappa Gangadhrappa	8105583901
134	Tarikere	Thimmapura	Manju T.S Sshwarappa	8867788481
135	Tarikere	Narayonapura	Chandramwoli Halayya	9980227894
136	Tarikere	Narayonapura	Vijaya Kumar Basangwoda	9945847304
137	Tarikere	Narayonapura	Malleshappa Mangullusidappa	9740318183
138	Tarikere	Narayonapura	Bogeshappa Marwappa	9945509652
139	Tarikere	Narayonapura	Shiva Tansappa Radhappa	8944129725
140	Tarikere	Sowthanahalli	Rajani Kanth Nagendrappa	9972161825
141	Tarikere	Sowthanahalli	Basava Rajappa Siddaramappa	9972993090
142	Tarikere	Sowthanahalli	Manjunath Lokeshappa	8722223698
143	Tarikere	Sowthanahalli	Resh Eshwarppa	9901115000
144	Tarikere	Sowthanahalli	Kumalay Shekraj	9743518301
145	Tarikere	Sowthanahalli	S B Marulappa Basappa	9481590142
146	Tarikere	Sowthanahalli	Kumarappa Siddaramappa	9743515301

147	Tarikere	Chinnapura	Prasanna Eishwarappa	7353897154
148	Tarikere	Chinnapura	Shashidhara Mallikarjunnappa	8746853843
149	Tarikere	Chinnapura	Mallikarjunnappa Sannaputtappa	9164136929
150	Tarikere	Chinnapura	Chander Shekar Nagrish	9164338182
151	Tarikere	Chinnapura	Gonsadharapa Chandrapa	8762436295
152	Tarikere	Chinnapura	Sangappa Rudrappa	9195924140
153	Tarikere	Thamatada Halli	Manjula Shekrappa	9164485085
154	Tarikere	Thamatada Halli	Siddappa Dutta Ramappa	8261251274
155	Tarikere	Thamatada Halli	Ramchandrappa Basappa	9481301601
156	Tarikere	Thamatada Halli	Rudrappa Eshwarppa	9164910246
157	Tarikere	Thamatada Halli	Thipasha Shanthappa	7353109155
158	Tarikere	Thamatada Halli	Naveen Malle Gowdra	9483123221
159	Tarikere	Sollapura	Chidanand Jayanna	9480519891
160	Tarikere	Sollapura	Jayanna Ramappa	8762756279
161	Tarikere	Sollapura	Ragvendra Thikudas	9743842151
162	Tarikere	Sollapura	Borah Kumar Siddamappa	8277147992
163	Tarikere	Sollapura	Shiva Kumar Jayanna	8277148006
164	Tarikere	Sollapura	Ramesh Basappa	8722345001
165	Tarikere	Javoor	Onkarappa Channa Basappa	9901845871
166	Tarikere	Javoor	Shivanandappa Siddappa	9008859663
167	Tarikere	Javoor	Piakasha Rammappa	8970067217
168	Tarikere	Javoor	Prakash Thipasnappa	9035414025
169	Tarikere	Javoor	Devanand Sagar Thippeshappa	9964646984
170	Tarikere	Javoor	Thippeshappa Doddappa	9035967081
171	Tarikere	Jahur Hosahalli	Shashidhar Eishwarappa	9591797085
172	Tarikere	Jahur Hosahalli	H R Rajappa Rudrappa	9743857985
173	Tarikere	Jahur Hosahalli	Basuwarawappa Erappa	9242876450
174	Tarikere	Jahur Hosahalli	Chandrappa Manganappa	9875890270
175	Tarikere	Jahur Hosahalli	Shiva Murthy Malleshappa	9906658550
176	Tarikere	Jahur Hosahalli	Manjappa Chandrappa	8454377284
177	Tarikere	Mugali	Marudappa Thummappa	9071982291
178	Tarikere	Mugali	Nagaraju M R Ramanna	9972715542
179	Tarikere	Mugali	Shantawappa Chanrappa	7259915278
180	Tarikere	Mugali	Gopallappam Mallegwada	9581508535
181	Tarikere	Mugali	Shiva Kumar Shekharappa	8971262178
182	Tarikere	Mugali	Lepakshappa Hanumathappu	9448202976
183	Tarikere	Begur	Girish Marulappa	9743352364
184	Tarikere	Begur	Basavarajappa Rana	9972705815

			Chandrappa	
185	Tarikere	Begur	Eshvarappa Kumarappa	9483043001
186	Tarikere	Begur	Shiv Kumar Najappa	9008050391
187	Tarikere	Begur	Natraj Nanumegowda	9980339747
188	Tarikere	Begur	Nagaraju Chandappa	9740889927
189	Tarikere	Gadihalli	Shiva Murthy Ningappa	9743943970
190	Tarikere	Gadihalli	Umesh G P Parvathappa	8495059546
191	Tarikere	Gadihalli	Sioramappa Veerappa	7760625171
192	Tarikere	Gadihalli	Basuwarappa Shethayappa	9164321902
193	Tarikere	Gadihalli	G R Annappa K Ramappa	9535557017
194	Tarikere	Gadihalli	Thippeshappa Siddaramappa	9164747640
195	Tarikere	Malenahalli	Yogaraj Onkarappa	9972991250
196	Tarikere	Malenahalli	Mallikarjunnappa Ganga Parappa	9880274421
197	Tarikere	Malenahalli	Suresha Gangarappa	9972715556
198	Tarikere	Malenahalli	Basualiyappa Siddaramappa	9482476235
199	Tarikere	Malenahalli	Eshwarappa Chandrappa	9483419177
200	Tarikere	Malenahalli	Jagdish Nanjundappa	9008384820

## B. Input Suppliers Consulted

Exhibit 46: List of Input Suppliers Consulted

S.No	Name	Phone/Mobile	Name of Locality/Market	District	Block/Village
1	Kumar	9449541580	Market area	Chikmagalur	Kadur
2	Prabhudev MN	9488733621	Bus Stand	Chikmagalur	Kadur
3	Manjunath Gupta	9845731531	Kadur	Chikmagalur	Kadur
4	Umesh. KS	9449664958	Main market	Chikmagalur	Kadur
5	K. Shanta Murthy	8747863598	Ajjampura	Chikmagalur	Kadur
6	Rudresh. H	9964821146	Thametedrhali	Chikmagalur	Kadur
7	K.V Raju	9972283337	Thametedrhali	Chikmagalur	Kadur
8	Ramapla	9972991301	Bus Stand	Chikmagalur	Ajjampura

## C. Agricultural Produce Market Committee (APMC) Visited

Exhibit 47: List of APMCs Consulted

Sr . No.	Name of APMC	Location	Name of Respondent	Designation	Phone/Mobile	District	Block/Village
1	Chikmagal	Chikmagalur	G.	Director	9844324805	Chikmag	Chikmagalur

	ur		Parameshwarappa			alur	
2	Kadur	Kadur BH Road	Nagarajappa	Internal Auditor	9731144284	Chikmagalur	Kadur

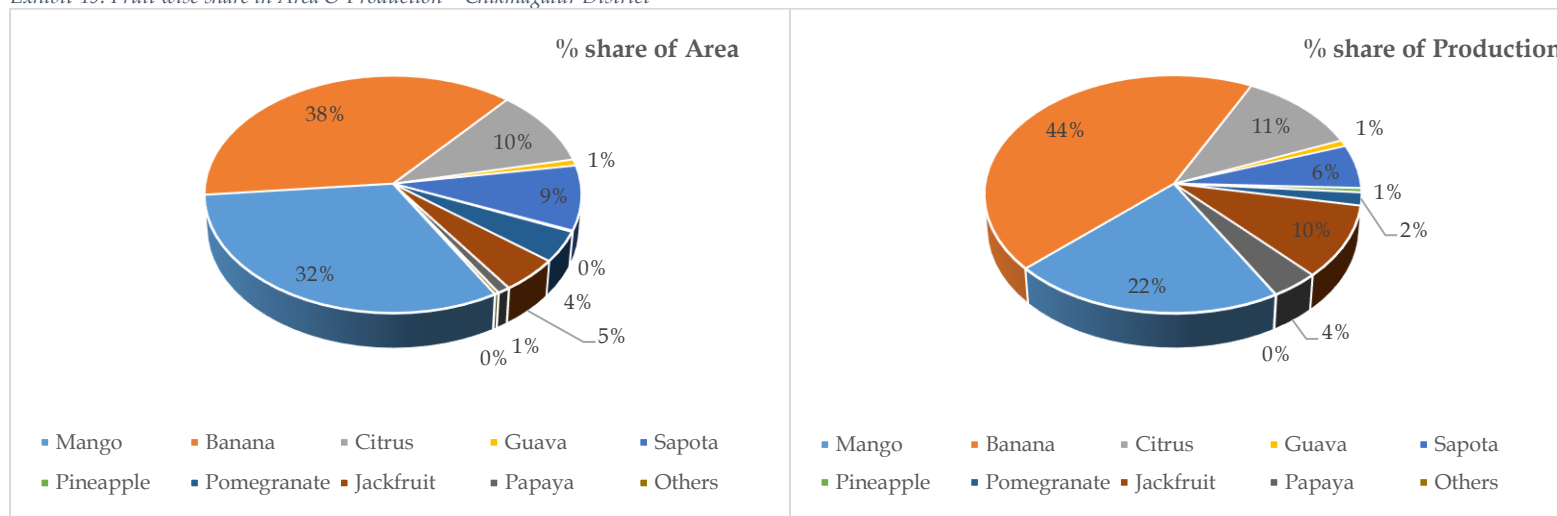
## D. Key Data Tables

Exhibit 48: Major Fruit Crops Production Statistics 2015-16

FRUIT	Mango			Banana <sup>9</sup>			Citrus <sup>10</sup>			Guava			Sapota			Pineapple			Pomegranate			Jackfruit			Papaya			Others <sup>11</sup>		
Block	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Chikmagalur	763	5344	7	1660	39718	23	854	18503	22	64	1083	17	386	3861	10	-	-	0	29	284	10	93	4172	45	81	6324	78	40	299	12
Kadur	392	5586	14	364	7427	20	31	558	18	23	450	20	92	1115	12	-	-	0	212	1533	7	83	2656	32	42	2310	55	0	0	0
Tarikere	2861	40054	14	765	19749	25	9	173	19	9	207	23	90	1080	12	-	-	0	310	2480	8	8	280	35	2	160	80	0	0	0
Mudigere	4	40	10	820	23906	29	384	6799	18	2	30	15	167	1670	10	-	-	0	-	-	0	234	8497	36			0	3	21	7
Koppa	91	637	7	421	4280	10	56	1241	22	9	180	20	198	3960	20	-	-	0	-	-	0	135	6075	45			0	0	0	0
Sringeri	38	288	7	272	6644	24	31	594	19	7	106	16	10	100	10	23	1406	61	-	-	0	56	2205	40	7	400	57	0	0	0
N.R. Pura	32	258	8	647	5176	8	6	40	7	-	-	0	215	2580	12	-	-	0	-	-	0	4	140	35			0	0	0	0
<b>TOTAL</b>	<b>4182</b>	<b>52209</b>	<b>12</b>	<b>4950</b>	<b>106901</b>	<b>21</b>	<b>1371</b>	<b>27908</b>	<b>20</b>	<b>113</b>	<b>2056</b>	<b>18</b>	<b>1158</b>	<b>14366</b>	<b>12</b>	<b>23</b>	<b>1406</b>	<b>61</b>	<b>551</b>	<b>4297</b>	<b>8</b>	<b>612</b>	<b>24024</b>	<b>39</b>	<b>132</b>	<b>9194</b>	<b>70</b>	<b>43</b>	<b>320</b>	<b>12</b>

Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer.

Exhibit 49: Fruit wise share in Area & Production – Chikmagalur District



Source: Deputy Director of Horticulture, Chikmagalur.

<sup>9</sup> Includes Cavendish, others

<sup>10</sup> Includes lemon, mandarin, sweet orange, other citrus

<sup>11</sup> Includes Ber, Fig, Litchi, Grapes, Annoneseous

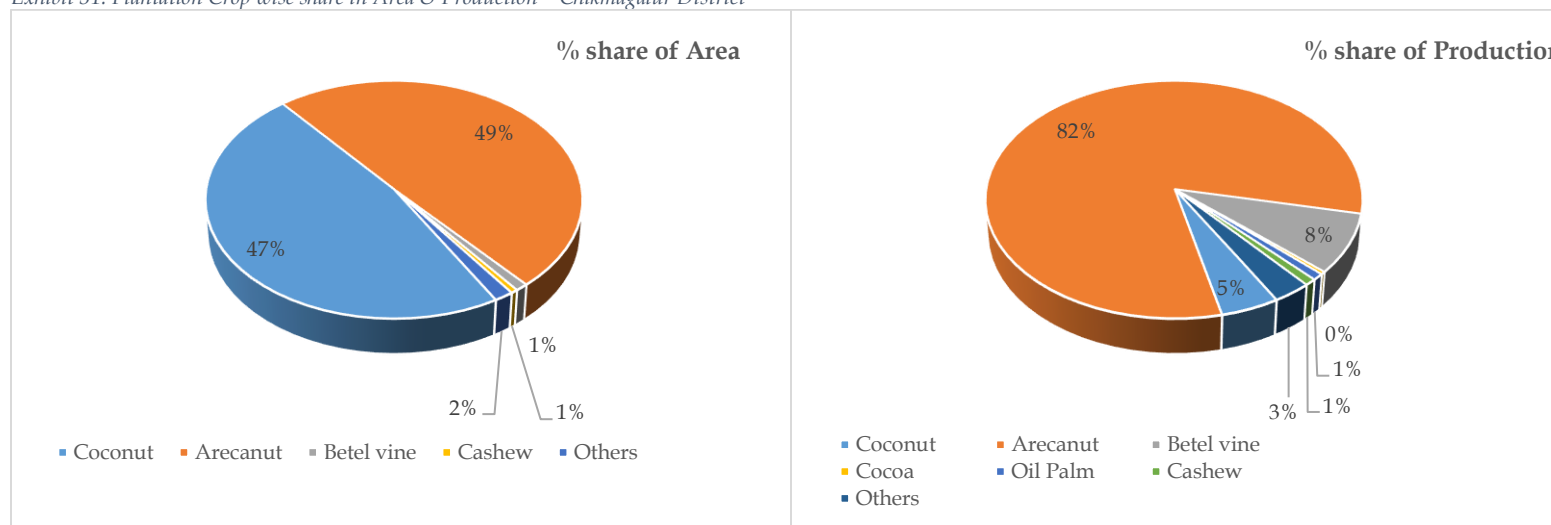


Exhibit 50: Major Plantation Crops Production Statistics 2015-16

PLANTATION CROPS	Coconut			Arecanut			Betel vine			Cocoa			Oil Palm			Cashew			Others		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Chikmagalur	1901	161	0.1	1184	1208	1	-	-	0.00	24	13.50	0.56	0.68	0.00	0.00	44	57	1.3	-	-	0.00
Kadur	29680	2374	0.1	14150	21225	1.5	64	998	15	7	3.6	0.53	0.00	0.00	0.00	5	12	2.3	-	-	0.00
Tarikere	9940	498	0.1	16102	24153	1.5	100	2100	21	75	45	0.60	61	100	1.65	20	35	1.75	0.00	0.00	0.00
Mudigere	185	18	0.1	2666	2839	1.07	60	1500	25	5	~3	0.59	0.00	0.00	0.00	12	18	1.5	-	-	0.00
Koppa	554	44	0.1	5296	4554	~1	45	652	14.5	50	30.24	0.60	64	110	1.73	216	281	1.3	-	-	0.00
Sringeri	510	91	0.2	2490	1624	~1	18	378	21	179	107.40	0.60	76	85	1.13	122	87	~1	0	0	0.00
N.R. Pura	218	17	0.1	2992	676	0.2	0.00	0.00	0.00	78	46	0.59	80	315	3.95	67	134	2	1389	2084	1.50
TOTAL	42988	3205	0.1	44880	56280	1.2	287	5628	19.6	418	249	0.59	281	612	2.18	485	624	1.28	1389	2084	1.50

Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer.

Exhibit 51: Plantation Crop wise share in Area & Production – Chikmagalur District



Source: Deputy Director of Horticulture, Chikmagalur

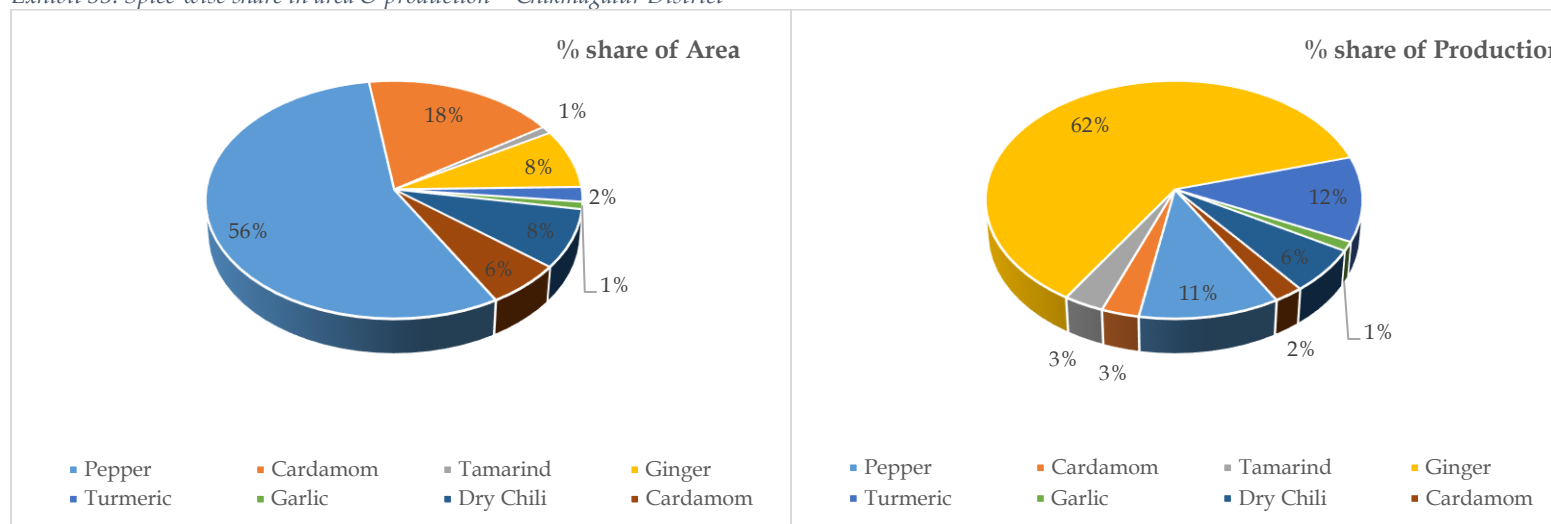


Exhibit 52: Major Spices Crops Production Statistics 2015-16

SPICES	Pepper			Cardamom			Tamarind			Ginger			Turmeric			Garlic			Dry Chili			Other Spices		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Chikmagalur	1940	582	0	357	36	0	60	242	4	753	8663	12	44	348	8	43	321	8	595	606	1	391	235	3
Kadur	-	-	0	-	-	0	44	264	6	14	142	10	4	23	5	1	8	7	144	378	3	111	80	1
Tarikere	168	53	0	0	0	0	64	320	5	271	3252	12	0	0	0	0	0	0	582	582	1	131	68	2
Mudigere	2816	929	0	1770	389	0	-	-	0	150	2550	17	-	-	0	-	-	0	-	-	0	37	22	1
Koppa	1210	254	0	376	30	0	-	-	0	22	259	12	3	36	12	-	-	0	-	-	0	107	71	2
Sringeri	2110	910	0	312	11	0	0	0	0	15	150	10	3	30	10	0	0	0	0	0	0	88	57	2
N.R. Pura	539	173	0	40	4	0	0	0	0	87	1022	12	214	2568	12	0	0	0	0	0	0	125	76	2
<b>TOTAL</b>	<b>8783</b>	<b>2901</b>	<b>0</b>	<b>2855</b>	<b>470</b>	<b>0</b>	<b>168</b>	<b>826</b>	<b>5</b>	<b>1312</b>	<b>16038</b>	<b>12</b>	<b>268</b>	<b>3005</b>	<b>11</b>	<b>44</b>	<b>329</b>	<b>7</b>	<b>1321</b>	<b>1566</b>	<b>1</b>	<b>989</b>	<b>609</b>	<b>4</b>

Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer.

Exhibit 53: Spice-wise share in area & production – Chikmagalur District



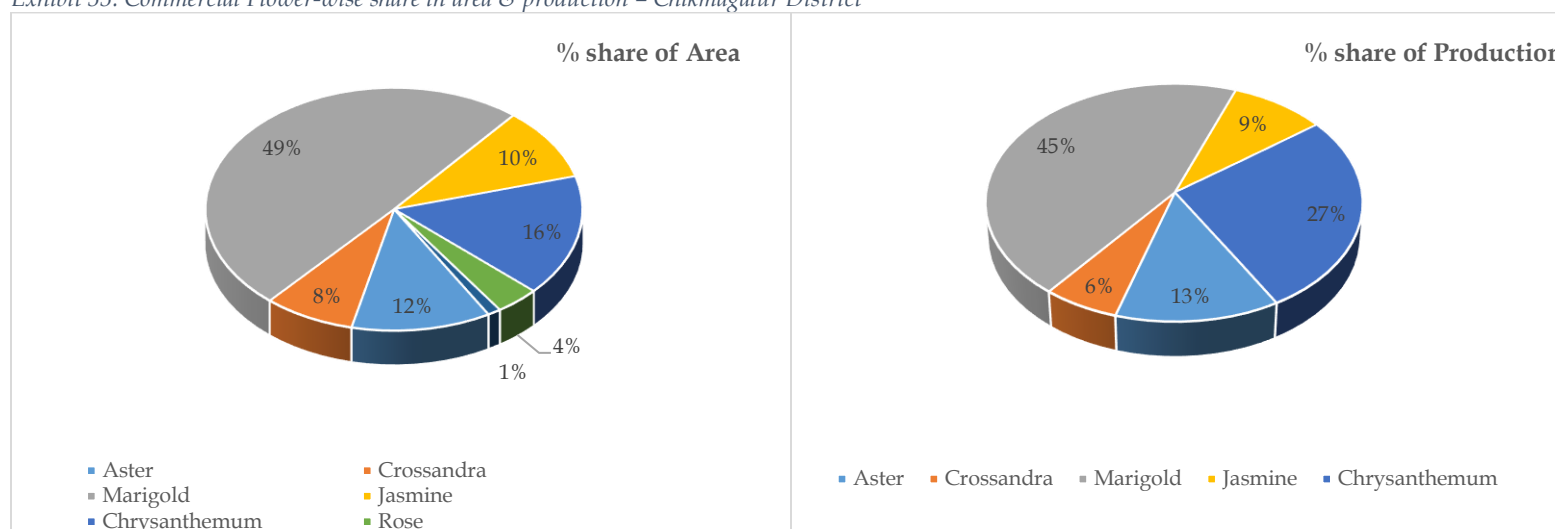
Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer.

Exhibit 54: Major Commercial Flowers Production Statistics 2015-16

COMMERCIAL FLOWERS	Aster			Crossandra			Marigold			Jasmine			Chrysanthemum			Tube Rose			Rose			Other Comm. Flowers <sup>12</sup>		
	Block	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P
Chikmagalur	69	515	8	53	253	5	134	1073	8	47	304	7	54	754	14	1	13	9	29	22	1	0	0	0
Kadur	26	177	7	9	50	6	189	945	5	19	122	7	51	356	7	-	-	0	-	-	0	0	0	0
Tarikere	0	0	0	0	0	0	70	420	6	10	50	5	30	360	12	0	0	0	0	0	0	0	0	0
Mudigere	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	6	4	1
Koppa	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	1	1	1	3	2	1
Sringeri	0	0	0	0	0	0	0	0	0	2	9	5	0	0	0	0	0	0	0	0	0	0	0	0
N.R. Pura	0	0	0	0	0	0	0	0	0	-	-	0	-	-	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>95</b>	<b>692</b>	<b>7</b>	<b>62</b>	<b>303</b>	<b>5</b>	<b>393</b>	<b>2438</b>	<b>6</b>	<b>77</b>	<b>485</b>	<b>6</b>	<b>135</b>	<b>1470</b>	<b>11</b>	<b>1</b>	<b>13</b>	<b>9</b>	<b>30</b>	<b>23</b>	<b>1</b>	<b>9</b>	<b>6</b>	<b>1</b>

Source: Deputy Director of Horticulture, Chikmagalur. Figures have been rounded off to the nearest integer.

Exhibit 55: Commercial Flower-wise share in area & production – Chikmagalur District



Source: Deputy Director of Horticulture, Chikmagalur.

<sup>12</sup> Orchids, Anthurium, Gerbera, Seasonal Varieties