Final Report
On
Doubling Farmers' Income: Issues and Strategies for Maharashtra State

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List of Abbreviations

APEDA - Agricultural and Processed Food Products Exports Development Authority
APMC – Agriculture Produce Marketing Committee
ATMA - Agriculture Technology Management Agency
BSLLD - Basic Statistics for Local Level Development
CAIM - Convergence of Agriculture Interventions in Maharashtra
DIDF - Dairy Processing & Infrastructure Development Fund
DoAHDF – Department of Animal Husbandry, Dairying & Fisheries
FAIDF - Fisheries and Aquaculture Infrastructure Development Fund
GBY - Gramin Bhandaran Yojana
Ha. - Hectare
INM - Integrated Nutrition Management
IPM - Integrated Pest Management
JSA - Jalyukt Shivar Abhiyan Program
KCC – Kisan Credit Card
KVK - Krishi Vigyan Kendra
MIDH – Mission for Integrated Development of Horticulture
MNREGA - Mahatma Gandhi National Rural Employment Guarantee Act
MoAFW – Ministry of Agriculture and Farmer Welfare
NAIS - National Agriculture Insurance Scheme
NARP - National Climate Change Adaptation Research Plan
NAPCC - National Action Plan on Climate Change
NFSM - National Food Security Mission
NICRA - National Initiative on Climate Resilient Agriculture
NHB - National Horticulture Board
NHM - National Horticulture Mission
PGH – Plant Growth Hormone
PMFBY – Pradhan Mantri Fasal Bima Yojana
PMKSY - Pradhan Mantri Krishi Sinchayee Yojana
PPPIAD - PPP-Integrated Agri Development in Maharashtra
RADP - Rainfed Area Development Programme
RKVY – Rashtriya Krishi Vikas Yojana
RRB – Regional Rural Bank

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Executive Summary

Agriculture & allied activities sector is the primary constituent of the economy. The state of Maharashtra is the leading contributor to the national GDP. The advance estimates of the real Gross State Domestic Product (GSDP) i.e. at constant (2011-12) prices' for 2017-18 is expected to be INR 19,59,920 crore with growth of 7.3% over 2016-17. About 25% of the workers in the State are cultivators and another 27% are agricultural laborers. The aim of "Doubling of Farmers' Income by 2022" shall have a direct impact on a large share of population. It is, therefore, necessary to accelerate growth in the agriculture & allied activities sector, enhancing the incomes of the farmers ensuring income security. When compared to the national average, the state of Maharashtra performs better in terms of non-farm and farm incomes (except income from animal farming) (Maharashtra State – INR 88,620 Vs All India - INR 77, 112) as on 2012-13. The incomes vary considerably depending on the type of land holdings in the region. The average consumption expenditure stood at INR 69,144 which amounts to ~78% of the total income.

The National Bank for Agriculture and Rural Development (NABARD) is actively involved in promoting sustainable and equitable agriculture and rural prosperity through effective credit support, related services, institutional development and other innovative initiatives across the agricultural value chain. NABARD had engaged the Food & Agribusiness Strategic Advisory and Research (FASAR) division of YES BANK Limited to analyse the key issues and conceptualize actionable strategies for doubling farmers' income in the state of Maharashtra.

Chapter 1 of the report presents the **Introduction and Background of the Study.** When compared to the national average, the state of Maharashtra performs better in terms of non-farm and farm incomes (except income from animal farming). The incomes vary considerably depending on the type of land holdings in the region. Small and marginal farmers (< 2 Ha.) are highly dependent on non-farm income sources, while medium & semi medium category farmers (2 to 10 Ha) &large Farmers (> 10 Ha.) have a major chunk of their income coming in from cultivation related activities. Animal farming still contributes ~11% only to small, marginal, medium and semi medium farmers. The state of Maharashtra, owing to climate change and fluctuating monsoon patterns has a vast area which gets drought affected every year. The level of agricultural distress in the affected regions results in less income realization, loss of crop and lower productivity thereby exposing the farmer to numerous risks, agricultural, social and economic. Hence, the assessment of farm incomes and actionable strategies to double the farmers' incomes in the State assumes paramount importance.

Chapter 2 highlights the **Approach and Methodology** adopted for the study. NABARD sponsored research study 2017-18 on "Doubling Farmers' Incomes: Issues and Strategies for Maharashtra State" has attempted a) to assess farmers' incomes through farm (agriculture, horticulture, animal husbandry etc.) and non-farm sources (salaries, rent, wages, income from

handloom/handicraft, small enterprises etc.), socio economic profile, ownership of assets et al, b) to understand the factors of cost of production, marketing, selling price, fluctuations, post-harvest management etc, c) identify the challenges faced by the farmers for each of the income sources (farm as well non-farm) and d) to provide recommendations to overcome the challenges and prepare roadmap/action plan for the state so that farmers' income is enhanced over the years. Akola, Latur, Nashik and Sangli districts were selected as sample districts for study. Basis the suitable representation of agro climatic zones and conditions in the state as also developmental stages, irrigation status and agrarian distress, these districts were classified under the following clusters: a) Prosperous regions of Western Maharashtra and Khandesh which included Nashik and Sangli and b) Distressed regions of Vidarbha and Marathwada which included Akola and Latur. Around 836 farmers were extensively surveyed from these districts through structured primary questionnaires. The study has covered women headed household to the extent of 7% of the total sample covered. In addition, various stakeholders across the value chain including processors, financial institutions, processors, market officials, infrastructure and service providers, NGOs and trusts, FPOs/FPCs were consulted to have holistic view of the challenges and recommendations in the sample districts and State.

Chapter 3 showcases the **Overview of Cluster Districts and Survey Observations**. The chapter covers district wise existing agriculture scenario including agro climatic zones and conditions, cropping pattern, livestock sector, food processing, agri marketing infrastructure and non-farm sources of incomes. The section also sheds light on the findings of the Farmers' Survey undertaken along with key challenges faced by the farmers in the four districts. The various parameters assessed as part of the survey included a) Socio-Economic profile of the farmers b) Land Holding and Cropping Pattern c) Irrigation Situation d) Agri Marketing support and infrastructure e) Livestock activities f) Policy Support and Private Sector participation g) Credit and Insurance h) Distress Situation i) Income & Expenditure trends and assessment j) Assessment of Non-Farm Incomes and factors impacting it. It was found that the average net income of the farmer household in Akola district was found to be INR 3,96,114 with 37% contribution from agri activities followed by wage income (32%), Non-Farm sector (NFS) initiatives (26 %) and Allied activities (6%). The average net income of the farmer household in Latur district was found to be INR 2,39,519 with 28% contribution from agri activities followed by Allied activities (25%), wage income (23%) and NFS activities (24%).The average net income of the farmer household in Nashik district was found to be INR 4, 41, 416 with 51% contribution from agri activities followed by NFS activities (18.5%), wage income (15.4%) and allied activities (14.9%).The average net income of the farmer household in Sangli district was found to be INR 5, 38, 621 with 33% contribution from agri activities followed by NFS activities (30%), wage income (20%) and allied activities (17%).

Chapter 4 is devoted to **Cluster Wise Recommendations and Strategies for enhancing the farmers' income in Maharashtra**. The cluster wise specific recommendations and general recommendations applicable to all the clusters for enhancing farm income have been detailed out in this section. These recommendations have been aimed at a) Linking Farmers to Market, Pricing and Monetization Benefits b) Cost Reduction c) Application of Risk Mitigation/Management and d) Increasing Productivity. An indicative budgetary allocation of INR 933 crores have been envisaged in the areas of livestock production and processing, farm level storage infrastructure and connecting farmers to electronic markets for better price discovery. The cluster wise key recommendations and action plans to improve the farm income include:

A. Prosperous regions of Western Maharashtra and Khandesh

1. Improved Access to Farm Level Storage Infrastructure for Fruits and Vegetables
2. Development of Farmer Producer Companies (FPCs) through commodity based cluster model

B. Distressed regions of Vidarbha and Marathwada

1. Development of end to end Dairy Value Chain in distressed districts of Vidarbha and Marathwada
2. Promotion of scientific Goat Meat Value Chains in distressed districts of Vidarbha and Marathwada
3. Development of Sericulture Clusters in Marathwada & Vidarbha Regions
4. Promotion of Dry land farming
5. Promote Micro-Irrigation Management

C. General Recommendations (Applicable to all the Clusters)

1. Strengthening of Minimum Support Price (MSP) Procurement Support in Maharashtra
2. Connect Farmers to Electronic Markets for Better Price Discovery and Access to Large number of buyers
3. Improve the Penetration and Administration of Crop Insurance
4. Promote Warehouse Receipt Financing (WRF)
5. Enhancement of Institutional Credit
6. Capacity Building, Skill Building & Extension Services
7. Promote Common Service Centre Model

The key recommendations and action plans to improve the non-farm income include:

1. Promote Agri/Rural based Tourism in Potential Regions
2. Setting of Rural Transformation Centers (Taobao Model)

Chapter 1: Introduction & Background of the study

1.1. Introduction

India is an agriculture based economy. The dependence of the populace especially in the rural segment on the sector is immense. The sector along with its allied verticals is also a key source of raw material for many agri based enterprises and a foreign exchange earner for the country. The national and regional economy experiences a multiplier effect as a result of agricultural sector. At the center of all this, the Indian farmer has never had a tangible '*income security*'. It is high time that interventions and strategies be put in place which may enable the farmer to achieve this which would having a lasting effect on the overall wellness, risk taking appetite and higher productivity on all counts. **The Government of India's (GoI) initiative to 'Double Farmers' Income by 2022' marking the country's 75th year of independence** is a welcome directive which would aim to benefit the Indian Farmer through interventions from FARM to FORK.

The National Bank for Agriculture and Rural Development (NABARD) is actively involved in promoting sustainable and equitable agriculture and rural prosperity through effective credit support, related services, institutional development and other innovative initiatives across the agricultural value chain. NABARD had engaged the Food & Agribusiness Strategic Advisory and Research (FASAR) division of YES BANK Limited to analyse the key issues and conceptualize actionable strategies for doubling farmers' income in the state of Maharashtra. The key objectives of the study included:

Objective 1: Detailed understanding and assessment of farmer incomes through farm (agriculture, horticulture, animal husbandry etc) and non-farm sources (salaries, rent, wages, income from handloom/handicraft, small enterprises etc), socio-economic profile, ownership of assets et al.

The focus for the study was to understand all the relevant dynamics related to farmer income in the study region. This was assessed via pre-defined survey tools and covered the following:

- Demography, Socio-economic status, Average land holding, Land use pattern, Cropping pattern and acreages, Production and productivity, Production practices, Income trends and composition over the last few years, On farm losses, Distress situation assessment, Ownership of assets, Credit availability.

**Sources of farm income include those from agriculture, horticulture, animal husbandry etc., while Non-farm income include salaries, rent, wages, income from handloom/handicraft, small enterprises etc.*

Objective 2: Assessment of factors of cost of production, marketing, selling price, fluctuations, post-harvest management.

The assessment was done pertaining to the following parameters:

- Production quantum, Crop varieties, Use of inputs, Cost of Production, Marketable Surplus, Post-harvest management, Price realization, Price fluctuation, Current marketing channel, Key Stakeholders involved in the value chain, Infrastructure availability, Government support and Knowledge dissemination

Objective 3: Identification of challenges faced by the farmers for each of the income sources (farm as well non-farm)

The assessment had identified the key challenges and risks that the farmers face in their farm as well as non-farm activities including those on the aspects of:

- Production, Post-harvest management, Marketing, Value addition, Finance, Quality, Infrastructure, Social challenges, Skilling, Technology.

Objective 4: Provide recommendations to overcome the challenges and prepare the roadmap/action plan for the state so that farmers' income is enhanced over the years.

Basis the primary and secondary research conducted during the study, the recommendations and strategies were proposed for the state to achieve a desired target of doubling farmers' income by 2022. This section entails specific recommendations with key stakeholders who shall implement the strategy.

1.2. Review of Literature

One of the major policy initiatives of the National Democratic Alliance government in the agricultural sector is that of doubling farmers' incomes by 2022. The need to focus on farmers' incomes instead of production or the growth rate in agriculture stems from the fact that there has been agrarian distress in the sector for the last two decades. Official recognition of the distress and the agrarian crisis came in the form of a NSSO (National Sample Survey Office) survey in 2003, which reported that 40% of Indian farmers disliked farming as a profession due to its low profits, high risk, and the lack of social status and, therefore, would like to leave it at the first opportunity. The need to focus on farmers' incomes also stems from the fact that a very large proportion of farming households in most of the central and eastern states (23%–45%) live below the poverty line (BPL), higher than the national average (22.5%). The proportion of BPL farming households (17.5%–22.5%), even in some of the so-called agriculturally progressive states, such as Gujarat, Karnataka, Maharashtra and Tamil Nadu is close to the national average. Further, the gap between farm and non-farm incomes has grown over the decades, from a ratio of 1:3 in the mid-1980s to 1:4.08 in the middle of last decade, and 1:3.12 in 2011–12.

Agricultural strategy in the country during the planned development era has been to ensure food security and farmers have responded to the nation's needs well and adopted Green Revolution technology. While the country achieved commendable position in food production, farming itself turned non-profitable overtime due to rising costs and uneconomical holdings. Enhancing incomes of the farmers and ensuring their income security, thus, has been of concern to all. Unless farmers' income increases substantially, distress cannot be tackled. The National Commission on Farmers under the chairmanship of Dr. M. S. Swaminathan has addressed the

issue of distress and farmers' welfare through a series of recommendations. The Hon'ble Prime Minister in an address to farmers in District Sheopur in Madhya Pradesh exhorted to double the incomes of farmers by 2022. Subsequently, the announcement was formalized in the Union Budget 2016-17 stating that an important objective of the Government is to double the income of farmers by the year 2022.

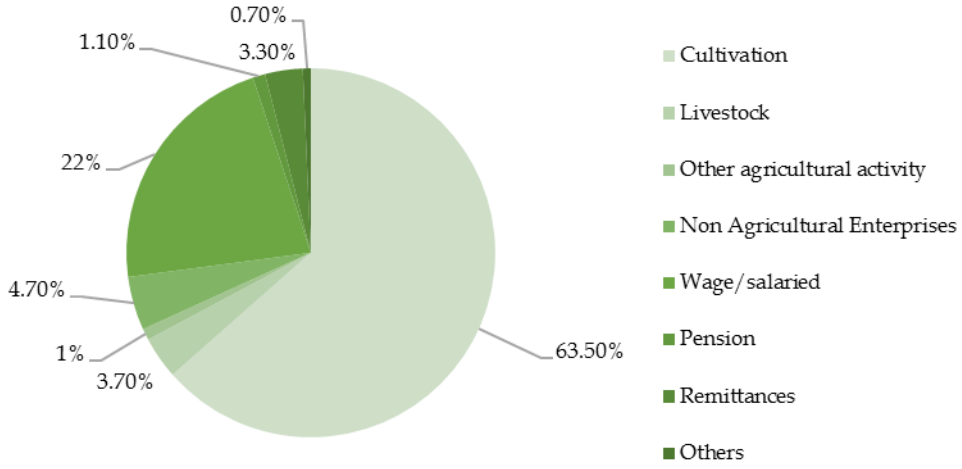
It is estimated that doubling incomes in nominal terms requires 6 years and, in real terms, 13 years, and it is going to need longer time frames in both respects for marginal and small farmers. Further, it would need varied time frames across different states depending on the state-level growth rates of farming household incomes—which vary from 6.7% in West Bengal to 17.5% in Haryana in nominal terms, with the average for India being 11.8%—and on the absolute levels of farmer household income. Annual income per cultivator increased from INR 12,365 in 1993–94 to INR 1,20,193 by 2015–16, at current prices. However, at real prices, the increase has been from INR 21,110 to INR 44,027 during this period. This shows that farmers' average real incomes doubled only over a period of 22 years. Even the total farm income of all farmers at real prices just about doubled during this period, from INR 3 lakh crore to INR 6 lakh crore. This works out to a growth rate of 3.4% a year per cultivator and 3.13% for total farmer income over the period.

1.3. Farmer's Income in India[1]

- The major source of income for the farmers was cultivation which accounted for ~46 to 48% during 2002-03 & 2012-13.
- Major gain was in the share of income from animal farming from 4% in 2002-03 to 12 % in 2012-13.
- A decline was noticed in the share of wages as well as non-farm business between the years. As farm size increased, the share of income from cultivation increased during both the years. Smaller the farm holding, diversified are the income sources.
- Landless households diversified their income sources increasing the share of animal farming significantly from 5 % to 26 %
- In India, the total farmer income in 2002-03 stood at INR 25,380 while in 2012-13, it rose up to INR 77,124, showing a real CAGR of 5.20%.

[1] *Doubling Farmers' Income: Strategy and Prospects, Ramesh Chand, Member, NITI Aayog*
Doubling Farmers' Income: Way Forward, KJS Satyasai, and Sandhya Bharti, Issue – XIV, March – April 2016

Exhibit 1: Distribution of agricultural household by source of income - India



Source: *Doubling Farmers' Income: Strategy and Prospects, Ramesh Chand, Member, NITI Aayog*
Doubling Farmers' Income: Way Forward, KJS Satyasai, and Sandhya Bharti, Issue – XIV, March – April 2016

- In Maharashtra, the total income in 2002-03 stood at INR 29,556 while in 2012-13, it rose up to INR 88,620, showing a real CAGR of 5.66%

It is estimated that doubling real farmers' income till 2022-23 over base year 2015-16, requires annual growth rate of ~10.41% in farmer's income which indicates sharp acceleration in growth. The major avenues within agriculture for growth are:

a) Improvement in productivity
b) Resource use efficiency or Total Factor Productivity, saving production costs
c) Remunerative prices of crops
d) Increasing cropping intensity
e) Diversification of high value crops and non-farm income
f) Technological integration
g) Conversation and better utilization of available natural resources (soil, water)

The total income per an average agricultural household grew annually at 11.75% from to INR 77,112 during 2012-13 from INR 25,380 during 2002-03.However, when measured in real terms (after neutralizing the effect of inflation), the income growth was 5.24% and doubling of income would take 14 years at this rate. Large farmers took less number of years to double their incomes compared to lower marginal farmers.

Table 1: Income of farmers and growth during last decade

Size class of land possessed (hectares)	Total annual income (INR) per agricultural household		CAGR (%)	Real CAGR (%)	Doubling time@ nominal growth	Doubling time@ real growth
	2002-03	2012-13				
Landless (<0.01 hectares)	16,560	54,732	12.70	6.19	5.80	11.54
Lower Marginal (0.01-0.40)	19,596	49,824	9.78	3.27	7.43	21.54
Upper Marginal (0.41-1.00)	21,708	62,964	11.24	4.73	6.51	15.01
Small (1.01-2.00)	29,916	88,176	11.42	4.91	6.41	14.47
Semi-medium (2.01-4.00)	43,068	128,760	11.57	5.06	6.33	14.03
Medium (4.01-10.00)	68,172	235,644	13.20	6.69	5.59	10.70
Large (>10.00)	116,004	496,656	15.65	9.14	4.77	7.92
All sizes	25,380	77,112	11.75	5.24	6.24	13.56

Source: Computed from NSSO (2005 & 2014). Situation Assessment Survey, Report No. 497(59/33/5) & 69(70/33/1)

The growth rates in income of farm households across major states of the country varied from 6.71% in West Bengal to 17.48% in Haryana. Income doubling time is 8 to 11 years for states like Assam, Bihar, J&K, Jharkhand and West Bengal. For all other states doubling time is around 6 years or less. However, the lowest real growth rate recorded was less than 1% in Assam and the highest was 9.81% for Madhya Pradesh. The doubling time is beyond 10 years except for Andhra Pradesh, Madhya Pradesh, Odisha and Rajasthan where it is possible to double real income within 10 years.

Table 2: Level of Income of farm holdings (Rs) and doubling time (Years) – Maharashtra Vs All India

State	Total annual income (INR) per agricultural household		Nominal CAGR (%)	Real CAGR (%)	Doubling time@ given CAGR	Doubling time@ given CAGR
	2002-03	2012-13			Nominal	Real
Maharashtra	29,556	88,620	11.61	5.66	6.31	12.58
All India	25,380	77,112	11.75	5.24	6.24	13.56

Source: Computed from NSSO (2005 & 2014). Situation Assessment Survey, Report No. 497(59/33/5) & 69(70/33/1)

As per NITI Policy Paper No.1/2017 on Doubling Farmers' Income: Rationale, Strategy, Prospects and Action Plan, March 2017 by Dr. Ramesh Chand, member of the National Institution for Transforming India (NITI) Aayog, the country requires an annual growth rate of 10.4% in agriculture to double the income of farmers by the year 2022, as per the directive of Honourable Prime Minister Narendra Modi. The seven pronged strategy for doubling farmers' incomes include:

- Big focus on irrigation with large budgets, with the aim of "*per drop, more crop*"
- Provision of quality seeds and nutrients based on soil health of each field.
- Large investments in warehousing and cold chains to prevent post-harvest crop losses.
- Promotion of value addition through food processing
- Creation of a national farm market, removing distortions and e-platform across 585 stations.
- Introduction of a new crop insurance scheme to mitigate risks at affordable cost
- Promotion of ancillary activities like poultry, beekeeping and fisheries.

1.4. Farmer's Income in Maharashtra – Overview of Agriculture & Allied Activities

Table 3: Expected Rates of Growth – Maharashtra State Economy

Sector of State Economy	Expected Rate of Growth (%) 2017-18
Agriculture & Allied Activities	-8.3% (due to comparatively less rains (84.3 per cent of the normal monsoon)
Services	9.7%
Industry	6.5%

Source: Economic Survey of Maharashtra, 2016-17

Agriculture & allied activities sector is the primary constituent of the economy. Any situational change in this sector has a multiplier effect on the entire economy. The annual average share of gross value added of 'Crops' sub-sector in the total Gross State Value Added (from2011-12 to 2016-17) is about 7.8% while the average annual growth rate is about 1.7%. The state of Maharashtra is the leading contributor to the national GDP. The advance estimates of the real Gross State Domestic Product (GSDP) i.e. at constant (2011-12) prices' for 2017-18 is expected to be INR 19,59,920 crore with growth of 7.3% over 2016-17. Agriculture & allied activities has seen a drop on account of a bad monsoon though in previous year (2016-17) it was proposed to grow at 12.5%, which was higher than both, the Services and Industry Sectors. About 25% of the workers in the State are cultivators and another 27% are agricultural laborers. The aim of "Doubling of Farmers' Income by 2022" shall have a direct impact on a large share of population. It is, therefore, necessary to accelerate growth in the agriculture & allied activities sector, enhancing the incomes of the farmers ensuring income security. The key characteristics of the agriculture economy for the State of Maharashtra are provided below:

- Agricultural Census 2010-11 indicates that out of 1.37 crore total operational holdings in the State, 78.6% belonged to marginal and small farmers with land holding less than or equal to two ha. The land utilization statistics for 2014-15 shows that out of the total 307.58 lakh ha geographical area of the State, the gross cropped area was 232.73 lakh ha while the net area sown was 173.45 lakh ha (56.4%). The irrigated area in command area under the jurisdiction of Water Resources Department, Government of Maharashtra (GoM) is 39.47 lakh ha in 2016-17

Table 4: Major fruit crops in Maharashtra (Area)

Name of Crop	Area (lakh ha.)
Mango	1.57
Orange	1.08
Sweet Orange	0.33
Pomegranate	1.41
Banana	0.82
Sapota	0.16
Grapes	1.04
TOTAL	7.42

- The GoM has undertaken a programme to promote horticulture development through establishment of nurseries and granting capital subsidy to small & marginal as well as SC & ST farmers, to encourage them to grow selected fruit crops. This programme was linked with Employment Guarantee Scheme (EGS) since 1990-91, which is subsequently linked with Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA). As a result of various initiatives over a period of time, the area under fruit crops has increased from 2.42 lakh ha in 1990-91 to 18.55 lakh ha upto 2016-17.

- Under Paramparagat Krishi Vikas Yojana, funds of INR 140.72 crore are sanctioned by GoI for three years (from 2016-17 to 2018-19) for organic farming. Also, 932 clusters are to be formed (each of 50 acre area) and 20,346 ha area covered as per Participatory Guarantee Systems (PGS) organic certification and 40,762 farmers have been included.

- Milk, eggs and meat are the main livestock products which contribute a lot in day to day life. The data for last 15 years shows that production of these items has been increasing consistently in the State with CAGR of 3.7%, 3.6% and 8.1% respectively. Dairying is an important secondary source of income for rural households and has assumed a major role in providing employment and income generating opportunities. The State ranks seventh in milk production in India with total production of 10.5 million metric tonnes as on 2016-17.

- The State has a coastline of 720 km with 173 fish landing centres. Sericulture is also an upcoming agro-based industry which has high potential to generate employment opportunities in rural areas.

Table 5: Fishery & Sericulture in Maharashtra

Industry	Area (lakh sq. km)	Production
Marine	1.12	6.63 lakh MT
Inland	4.19	
Brackish	0.10	
Sericulture	-	231 MT

- Maharashtra is the leading state in agricultural diversity, including cash crops with agro-based industries, although it is primarily dependent on the vagaries of nature, i.e., agriculture is mainly rain fed. Hence, Agriculture is facing problems of natural calamities. During the year 2015 and 2016, the State experienced unprecedented drought, hail storm, unseasonal rains, etc. As a result, farmers are facing severe agriculture distress and many a time, causing stress and strain.

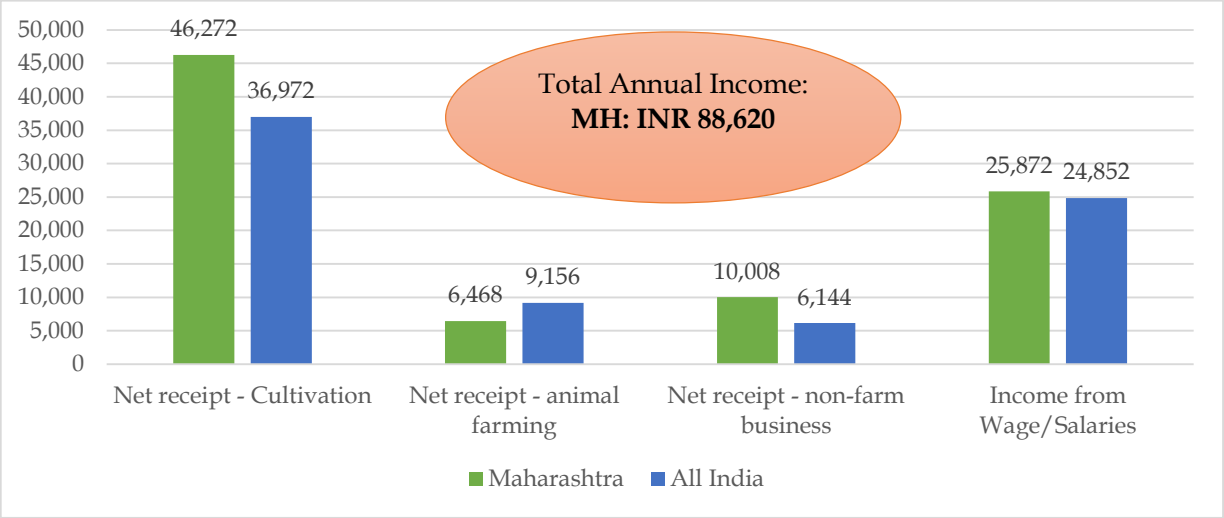
A farm household earns its incomes from various sources. The current study will analyse the following sources of income:

- **Income from cultivation** – This is the income a household earns from cultivation of various crops. These could be seasonal crops or annual crops. Also, some of these will be food crops, a part of which could be used for own consumption of the household. The total value from cultivation is the sum of value from sale of primary products and sale of by-products, if any. The costs incurred in cultivation includes a variety of things like seed costs, fertilizer costs, manure costs, pesticide costs, interest, costs of irrigation, cost incurred in hiring machinery, minor repairs, hired labour, animal labour and so on. The total costs is subtracted from the total value is used to arrive at the total income from farming.
- **Income from livestock** – This is the income a household earns from sale of various products like milk, eggs and live animals. Total value from this income source is calculated as the total value of milk, eggs, live animals etc. The costs incurred will include cost of animal

feeds, veterinary charges, labour charges and other expenses. The total costs are subtracted from total value to obtain net income from animals.

- **Income from wages and salary**- This is the income derived by various household members employed in labour outside their household –either in other's fields or in nonfarm enterprises.
- **Income from nonfarm business** – This is the income that the household earns by engaging in nonfarm businesses.

Exhibit 2: Source of Farmer Income in Maharashtra viz. a viz. India



Source: NSSO Report 70 round: Sources of Annual Income, Share & Growth in farmers income in Maharashtra

When compared to the national average, the state of Maharashtra performs better in terms of non-farm and farm incomes (except income from animal farming). The incomes vary considerably depending on the type of land holdings in the region. The average consumption expenditure stood at INR 69,1442 which amounts to ~78% of the total income. A snapshot of income sources according to land holdings of farmers in Maharashtra is captured in the following table:

Table 6: Sources of income for Small & Marginal, Medium & Semi Medium & Large farmers in Maharashtra Yr. 2012–13 (%)

Sr. No.	Category of Farmer	Cultivation	Animal Farming	Non-Farm Business	Wages & Salaries
1	Small & Marginal	36.2%	11.2%	13.2%	39.3%
2	Medium & Semi Medium	68.8%	10.2%	-	12.6%
3	Large Farmers	92.9%	1.4%	3.7%	-

Source: Report of the Committee on Doubling Farmers' Income, Vol II, Inter-linkages between Input Costs, Diversification, Capital Formation and Income

[2]*Key Indicators of Situation of Agricultural Households in India, NSSO 70th Round*

The table above clearly shows that small and marginal farmers (< 2 Ha.) are highly dependent on non-farm income sources, while Medium & Semi medium category farmers (2 to 10 Ha.) & Large Farmers (> 10 Ha.) have a major chunk of their income coming in from Cultivation related activities. Animal farming still contributes ~11% only to small, marginal, medium and semi medium farmers. The state of Maharashtra, owing to climate change and fluctuating monsoon patterns has a vast area which gets drought affected every year. The level of agricultural distress in the affected regions results in less income realization, loss of crop and lower productivity thereby exposing the farmer to numerous risks, agricultural, social and economic.

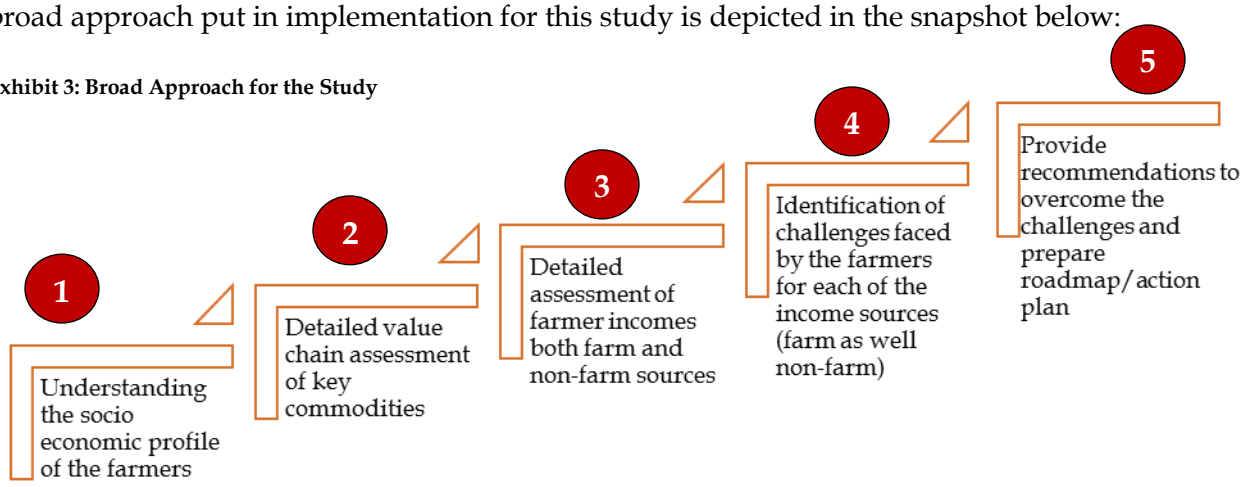
In order to cope with the agricultural distress and provide an impetus to agriculturalists in the state, it is essential to have a broad vision to Empower small and marginal farmers by moving forward from subsistence farming, increasing risk taking appetite, facilitating bearing of agricultural shocks and reducing dependence on wages and salaries.

Chapter 2: Approach & Methodology

2.1. Approach

In order to have a long term strategic road map in place to identify existing gaps and devise recommendations and suggest stakeholders to improve farm and non-farm income, it is essential to have a holistic overview of the entire agrarian scenario from FARM to FORK. The broad approach put in implementation for this study is depicted in the snapshot below:

Exhibit 3: Broad Approach for the Study



Study Region

To devise a strategy to double farmers' income in the state of Maharashtra by 2022, it is critical to execute a grassroots level study to achieve the expected outcome. Considering the sheer size & reach of the state as well as constraints of time, it was unviable to conduct a study across the state.

Exhibit 4: Agro Climatic Zones of Maharashtra

Source: www.mahaagri.gov.in

Maharashtra has a large size and varied topography. The rainfall in the state varies from 500 mm in Eastern Maharashtra day zone to 4000 mm in Ghat zone. Soils vary from laterites in coastal region, red or light brown in the high areas to heavy black soils of varying depths in plateaus. Maharashtra has been divided into nine agro climatic zones on the basis of annual rainfall soil types, vegetation and cropping pattern. [3]

Four key Geographical areas (districts) were shortlisted in due consultation with NABARD based on state divisions, representation of agro climatic zones and agricultural distress levels faced. In identifying the districts, it was ensured to cover regions representing diverse agro climatic zones of the state as well as including a district which was agriculturally distressed.

Table 7: Agro Climatic Zones & Geographical Clusters - Study Region

Name of Zones	District	Cluster	Unique Characteristic/s
▪ **Central Maharashtra Plateau Zone /Assured Rainfall Zone**	Akola	Vidarbha	Agriculturally distressed and backward
	Latur	Marathwada	Agriculturally distressed and backward
▪ **Western Maharashtra Plain Zone** ▪ **Transition Zone -1** ▪ **Transition-2** ▪ **Sub-Montane Zone** ▪ **Western Ghat Zone**	Nashik	Khandesh	Agriculturally prosperous and advanced
	Sangli	Western Maharashtra	Agriculturally prosperous and advanced

Source: www.mahaagri.gov.in

2.2. Methodology

The study deployed a judicious mix of primary and secondary researches to collect, collate, analyse and validate key data points and information pertaining to the project objectives.

Sampling Plan

Modified Probability Proportional to Size (PPS) sampling method was used for the present study. Probability proportional to size (PPS) takes varying sample sizes into account. This helps to avoid under-representing one subgroup in a study and yields more accurate results. When samples from different sized subgroups are used and sampling is taken with the same probability, the chances of selecting a member from a large group are less than selecting a member from a smaller group. This is known as probability proportional to size (PPS). The key advantages of this method are:

- Representation of samples chosen.
- No biasedness in selection of villages.

[3] *http://www.agriinfo.in/default.aspx?page=topic&superid=1&topicid=426*

- Logistically convenient as it avoids traveling to multiple villages reducing cost & time.
- Coverage of all blocks in the district.

It was ensured that the survey respondents also covered women farmers wherever possible. Focused Group Discussions (FGDs) and stakeholder workshops were conducted in each district as well.

Table 8: Sample Distribution Covered

Sr. No.	Name of District	Blocks covered (nos.)	Villages covered (nos.)	Farmer Sample Coverage (nos)
1.	Akola	7	20	**210**
2.	Latur	9	20	**201**
3.	Nashik	11	20	**225**
4.	Sangli	7	20	**200**
	TOTAL	**34**	**80**	**836**

Secondary Research

This step provided a basic understanding of state, production clusters, crop profile in the identified project districts, existing levels of production and surplus, marketing infrastructure available, infrastructure facilities for logistics, storage and marketing and non-farm sources of income. Secondary Research entailed data collection from the following sources

Table 9: Indicative List of Secondary Sources of Information

Secondary Source	Key data points collected
• National Sample Survey Organization • Economic Survey of Maharashtra 2016-17 • NITI Aayog • Department of Agriculture, Cooperation and Farmers' Welfare • National Bank for Agriculture and Rural Development • Maharashtra Agricultural Competitiveness Project • Ministry of Rural Development • District Handbook/Statistical Abstracts	• Major crops and production clusters • Population growth trends • Farmers' income trends • State GDP : National GDP • Current area, production and productivity, • Marketing surplus, markets, marketing channels, trade • Existing infrastructure • Current status of the pre and post-harvest handling infrastructure, logistics, level of processing and basic facilities • Others

Primary Research

The base year for Primary Research has been considered to be 2016-17. The survey was carried out with all key stakeholders through in-depth face to face interviews conducted through administration of structured questionnaires having both quantitative and qualitative set of questions. YES BANK devised a robust questionnaire design post discussion and receipt of inputs key stakeholders and NABARD. [4]

Questionnaire Design

YES BANK devised a robust questionnaire design post consultation with NABARD. These were primarily structured questionnaires based on which information from farmers and other stakeholders was captured during field visits. The major sections of the questionnaires are tabulated below: (*A copy of the detailed questionnaire used for farmer survey is attached as Annexure B):*

Table 10: Key Parameters for the Farmer Survey

Section Number	Name of Section	Data Points Covered
Section 1	Respondent Information	•Demographic & General Details
Section 2	Household Profile	•Education & Occupation of Lead respondent & household members
Section 3	Details of Land Holding	•Land Ownership Details
Section 4	Sources of Irrigation	•Ownership & Sources of irrigation
Section 5	Cropping Pattern	•Cost of Cultivation •Inputs Usage •Seeds Usage •Labour •Adoption of Farm Management Practices •Post-Harvest Management Activities •Transportation to Market •Market & Marketing •Distress Situation
Section 6	Animal Husbandry	•Ownership of livestock •Production details (milk/eggs etc.)
Section 7	Details of Non-Farm Income Sources of Farmer and Household	
Section 8	Details of Monthly Household Expenditure Details	
Section 9	Credit & Banking	•Source of Loan •Purpose of Loan
Section 10	Possession of Assets	•Ownership Details
Section 11	Major Challenges	
Section 12	Government Support	•Awareness & benefit of government schemes
Section 13	Income Trends	•Income trends (Past/Present)

[4]The district wise list of other stakeholders contacted is provided is provided as Annexure A

In addition to understanding the farm level dynamics and income levels, a specific segment in the questionnaire also focused on assessing the avenues of non-farm income. These could include entirely non-farm based activities such private service, artisanship, contract labour, government service amongst others. This was essential to the study so as to understand the contribution, if any, of non-farm income sources to the income basket of a farming household, its relevance, comparison to farm income, scope for sustained employment and challenges faced.

Field Team Deployed

Students from Vaikunth Mehta National Institute of Co-operative Management (VAMNICOM) and Symbiosis Institute of International Business (SIIB) were selected for conducting farmers' survey under supervision and monitoring by YES BANK. One district in-charge from YES BANK and 3 field survey personnel from each of these institutions were deployed in each district thereby taking the total field team to 16 resources. The team validated the data through calls, correcting discrepancies if any, and enter the coded data in MS Excel format for ease in analysis.

Overall Study Design

Exhibit 5: Overall Study Design for the Study

Step-I	Step-II	Step-III	Step-IV	Step-V
Secondary Research & discussions with NABARD ○ Identification of stakeholders and liaison ○ Initial brainstorming to collate, identify and understand project expectations, on ground scenario, policy level plans and holistic scenario. ○ Key studies and reports to be referred ○ Travel and survey plan, identification of beneficiaries, ○ Survey tool design	**Primary Research& stakeholder interviews** ○ Interaction with farmers ▪ FPOs ▪ Market Intermediaries; ▪ Service providers; ▪ Financial Institutions; ▪ Government Officials;	**Data validation and documentation** Data check for proper filling, missing value, outliers and consistency ○ Data coding, spot checks, back tracking and rectifications ○ Tabulation in prescribed format in MS Excel	**Statistical Analysis** ○ Qualitative/Quantitative analysis of data collected from secondary and primary research using basic statistical tools	**Compilation and Report submission** ○ Report writing on the key findings ○ Graphical representation of key quantitative findings. ○ Draft Report with Key recommendations ○ Inclusion of suggestions by NABARD on draft report ○ Submission of final report along with revised suggestions and recommendations

Chapter 3: Overview of Cluster Districts and Survey Observations

3.1. Akola

3.1.1. Overview of Akola District

- **Agro Climatic Zones:** Central Maharashtra Plateau Zone (MH-7) as per National Agriculture Research Project (NARP) and Western plateau and hills region, Maharashtra (IX) as per Planning Commission. The normal annual rainfall varies between 750 and 1000 mm. The soils are basically derived from volcanic trap rocks which are quite fertile.

Exhibit 7: Land Holding Pattern - Akola District

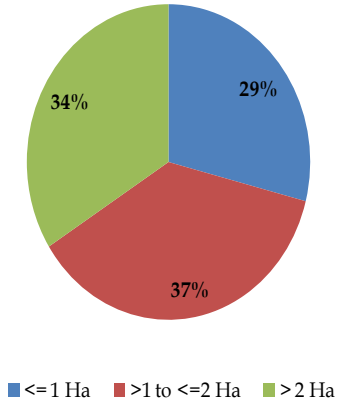
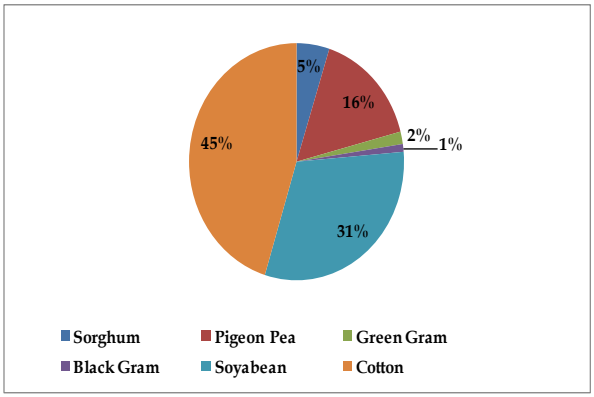


Exhibit 6: Cropping Pattern - Akola District



Source: Base Potential Linked Credit Plan (2017-22), Akola

- **Horticulture development:** ~35% area falling in Akot, Telhara, Balapur and Murtijapur tehsils is salinity affected hampering the production of other High Value Crops (HVC) including fruit crops though potential of dry land horticulture cultivation of orange, custard apple, lime, pomegranate etc exists in the district accounting for 5.5% of the net sown area of the district.

- **Animal Husbandry Sector:** Dairy development is underdeveloped on account of lack of organized marketing channels, lower productivity and mono-cropping pattern leading to scarcity of fodder. Buffaloes constituted almost 50 % of the total milk production of 908.05 lakh kgs which is 0.95% of total state milk production during the year 2014-15. Goat rearing activity is undertaken throughout the district. The demand for eggs is met by suppliers located outside the district. Unsuitable climatic conditions on account of harsh temperatures and humidity conditions, poultry farming has not been yet commercialized in the district.

- **Distress Situation:** The district experiences extremes in climatic situations. Though an assured rainfall zone (average rainfall of 809 mm), large variation in rainfall and its

distribution is experienced in the district. The drought like situation in the district in the past years has adversely affected the rural economy and development of various sectors.

- **Agri Marketing Infrastructure:** The presence of 7 main market yards in all the blocks provide regulated channel for marketing of commodities like cotton, soyabean, pulses etc. However, practice of storing of produce for realizing better prices is sparsely seen. With only one cold storage unit present in the district for storage of fruit crops like banana and vegetables, the storage infrastructure has been inadequate in the district resulting in lesser price realizations by the farmers.

- **Food Processing:** District is one of the major hubs for pulses processing with 102 units where almost 60 % is the surplus available for value addition apart from oil seed processing.

- **Diversification:** Diversification in cropping pattern to increase the farmers' income is sparsely seen in the district on account of agro climatic conditions, lack of processing and storage infrastructure and lack of organized marketing channels for smaller volumes. As per Comprehensive District Agri Plan (2012-13 to 2016-17), the average net income of the farmers when considered taking in to account the allied activities stood at INR 29,564.

- **Non-Farm Activities:** Being one of the agri distressed districts of the State and Vidarbha region in specific, the significance of non-farm sector is even more pronounced in the region. Close to 2,428 MSMEs and 17 large industries established in the district provide employment to around 22,000 persons and 1,900 persons respectively.

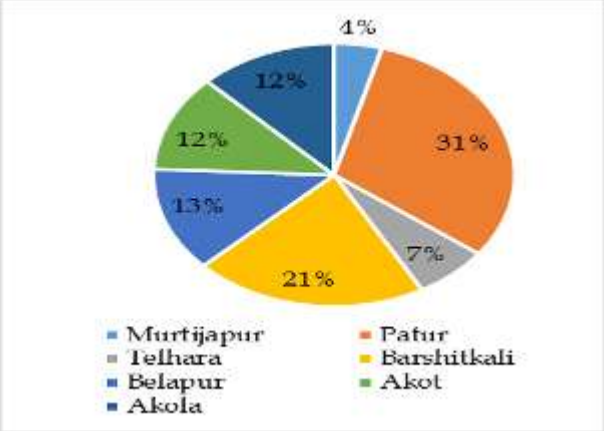
- The most important small scale industries in the district are dal mills, oil pressures, confectionery, *Bidi* making, saw mills, soap making, metal plating and engineering. In case of the cottage and small scale industries sector handloom, khadi and village industries, handicrafts, shoemaking, carpentry, brick-making, pottery and oil mills are some of the important industries located in Akola, Akot, Balapur and Murtijapur tehsils. Wage labour, private service and shop keeping are some of the key non-farm activities undertaken by the farmers.

3.1.2. Survey Observations

3.1.2.1. Socio Economic Profile of the Farmers

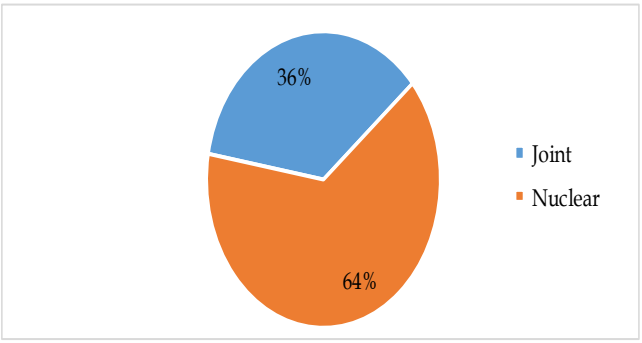
The key parameters analyzed under this section included demographic information, social category of the household, family structure, annual household expenditure and possession of assets. The key findings have been explained below:

Exhibit 8: Block wise Respondents - Akola District



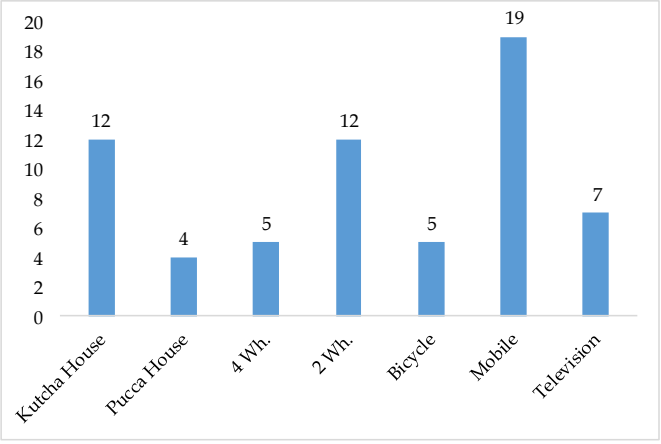
Gender – The decisions related to agriculture and allied activities decisions are taken and driven by male members. Female members in the family has very limited role in the decision making process. Agriculture was the primary occupation of all the respondents. Around 210 farmers were covered during the course of the primary survey in Akola district.

Exhibit 9: Family Structure wise distribution of the Households (%) - Akola District



Family Structure- 64 % of the respondents belonged to the nuclear family and the balance 36% belonged to joint family. The analysis of the family members revealed that on an average 4 family members were adults with 2 members involved in farming activities and 1 member unemployed.

Exhibit 10: Ownership of assets - Akola District (nos.)

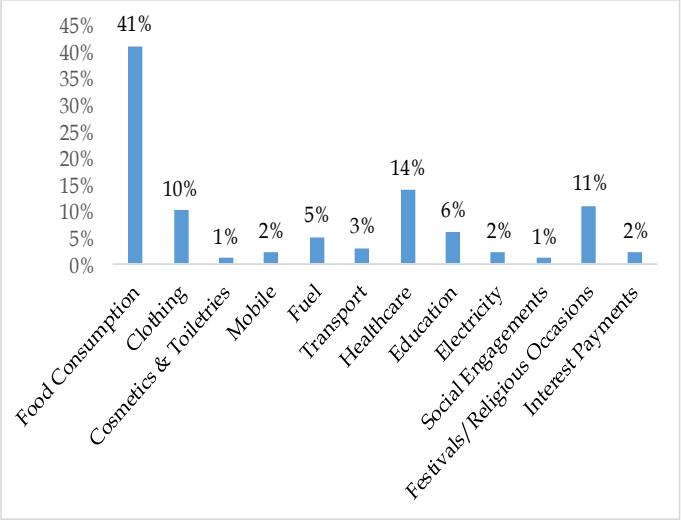


Possession of Assets - The possession of assets by the farmers shows that they have agricultural land as well as mobile phones. The percentage of the farmers possessing various types of assets are Sprinkler (70.5%), Television (66.7%), Two-wheelers (58.1%), Pumps for irrigation purposes (53.8%), Pucca House (47.6%), Bicycles (45.7%) and Kuccha House (43.3%). Due to lower penetration of farm mechanization primarily on account of mono-cropping pattern, merely 3.81% of the farmers had tractors for their farm management operations. Only 8.1% of the farmers owned cattle sheds as dairying has not been the major commercial enterprise in the district. It was also observed that farmers never sold these assets to

cope up during the financial distress situations but only to satisfy their personal aspirations like availing exchange scheme benefits etc.

Annual Household Expenditure - It was found that the maximum annual expenses were incurred on Food Consumption (41%) and balance 59 % on Non-Food items including Health care (14%), Festivals and Religious festivals (11%), Clothing (10%), Education (6%), Fuel (5%), Transport (3%), Electricity (2 %), Mobile (2%), Interest Payments (2%), Cosmetics and Toiletries (1%) and Social Functions and Rituals (1%). The same has been schematically represented in Exhibit herewith.

Exhibit 11: Annual Household Expenditure Distribution - Akola District



3.1.2.2. *Assessment of Farm Incomes and Factors Impacting the Farm Incomes*

Land Holding and Cropping Pattern - The distribution of land holding in Akola District is provided below:

Table 11: Distribution of the Land Holdings – Akola District

Classification of Holding	Holding		Area	
	Nos	% to Total	Ha.	% to Total
Marginal Farmer (< = 1 Ha)	47	22	46.8	6
Small Farmer (>1 to <=2 Ha)	58	28	103.7	14
Medium Farmer (>2 to <=5 Ha)	47	22	169.1	23
Other Farmer (>5 Ha)	58	28	414	56
Total	**210**	**100**	**733.6**	**100**

The cultivated land was owned by all the 210 respondents with an average land holding of 3.5 hectares. Out of the total cultivable area of 733 hectares, around 68% land is irrigated and the balance 32% as non-irrigated area.

Cropping Pattern and Cost of Cultivation - The cropping pattern followed by the farmers in the study area was assessed on the parameters of area under cultivation, production, markets and average selling price. The average area under cultivation was highest in Cotton (3.58 hectare followed by Red Gram (2.37 hectares), Soybean (1.96 hectares) and Green Gram (1.58 hectares).

Table 12: Average Area under Cultivation, Production and Cost of Cultivation* - Akola District

Name of the Crop	Average area under cultivation (Hectares)	Average Production (Quintals per ha)	Average Cost of Cultivation (INR per ha)
Red Gram	2.37	6	13,113
Soyabean	1.96	14	18,285
Green Gram	1.58	5	14,230
Tomato	0.4	20	23,646
Cotton	4.07	58	29,022

**Cost of cultivation includes cost of seeds, irrigation, fertilizers, insecticides, labour and manure.*

A breakup of the cost of production & post-harvest costs of major commodities in Akola district as per primary survey is depicted in the table below. (Only primary crop grown has been considered)

Table 13: Akola District: Cost of Production & allied costs of major commodities (INR/Ha.)

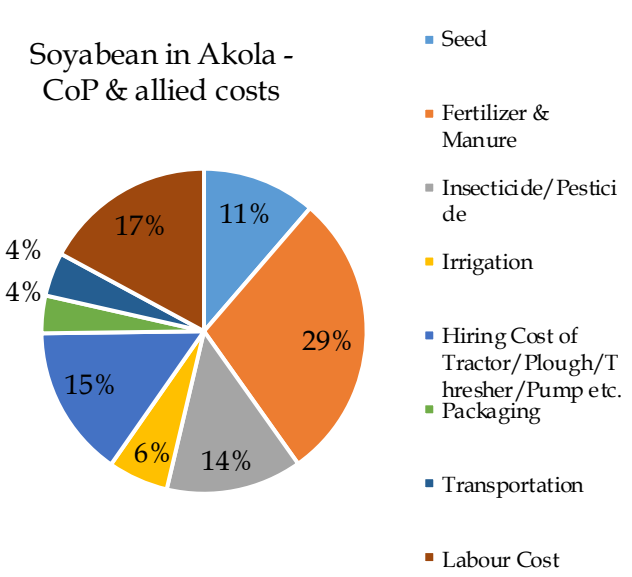
Cost Head (INR/ha)	Soyabean	Red Gram	Green Gram	Tomato	Cotton
Seed	2,695	865	1,877	238	5,663
Fertilizer & Manure	6,869	3,131	2,298	9,522	16,408
Insecticide/Pesticide	3,218	2,675	2,011	7,935	1,013
Irrigation	1,430	1,330	1,436	1,488	1040
Labour Cost	4,073	5,111	6,607	4,463	2,835
Hiring Cost of Tractor/Plough/Thresher/Pump etc.	3,595	1,741	1,915	1,984	926
Packaging	891	217	211	218	NA
Transportation	1,036	1,166	958	992	1,138
TOTAL	**23,807**	**16,236**	**17,313**	**26,840**	**29,022**

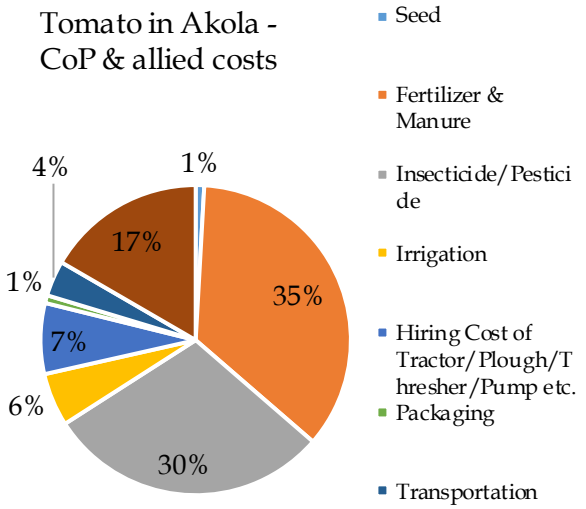
Fertilizer and Manure costs contributed approximately 29%, 19% and 13 % of total production costs for soyabean, red gram and green gram respectively. This is due to the fact that farmers prefer adding additional inputs to improve productivity and protection against disease resistance though these measures only help in vegetative growth and not in yield. Lack of awareness regarding adequate dosage unnecessarily contributed to an escalated cost of production of these crops in Akola district.

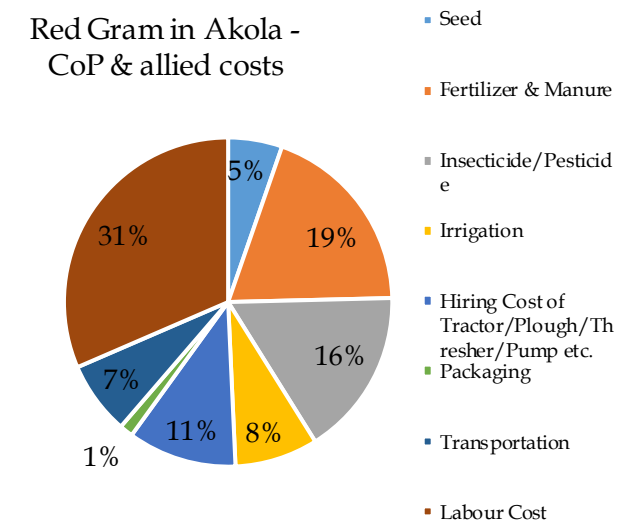
Labour employed in cultivation of crops- The labour intensity was captured across crop value chains undertaken by the farmers though measurement of the labour mandays and average labour cost per man-day. The labour involvement has been highest across intercultural operations followed by harvesting, sowing, land preparation and input application. Labour component forms a major component in cultivation cost contributing ~ 30-40 % of the cultivation costs. Timely availability of the labour and the cost is not predictable during the time of sowing as well as harvesting. This is one of the critical reasons for higher cost of cultivation thereby impacting the incomes of the farmers adversely.

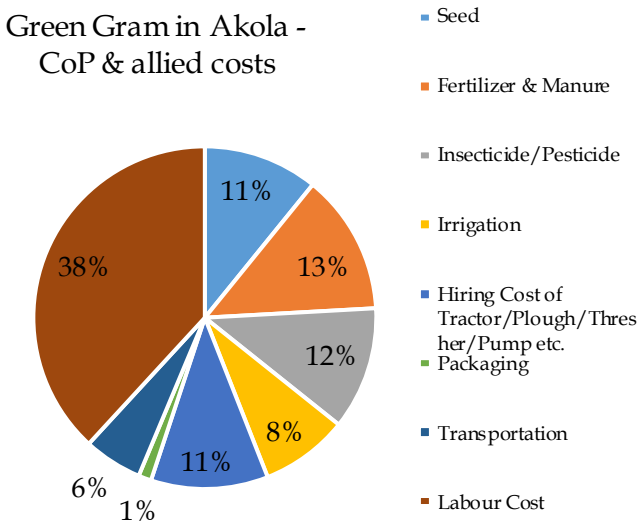
The graphs below depict the cost of cultivation to farmer with added cost heads post production viz. equipment cost, packaging and transportation.

Exhibit 12: Distribution of CoP & allied costs for major commodities in Akola district





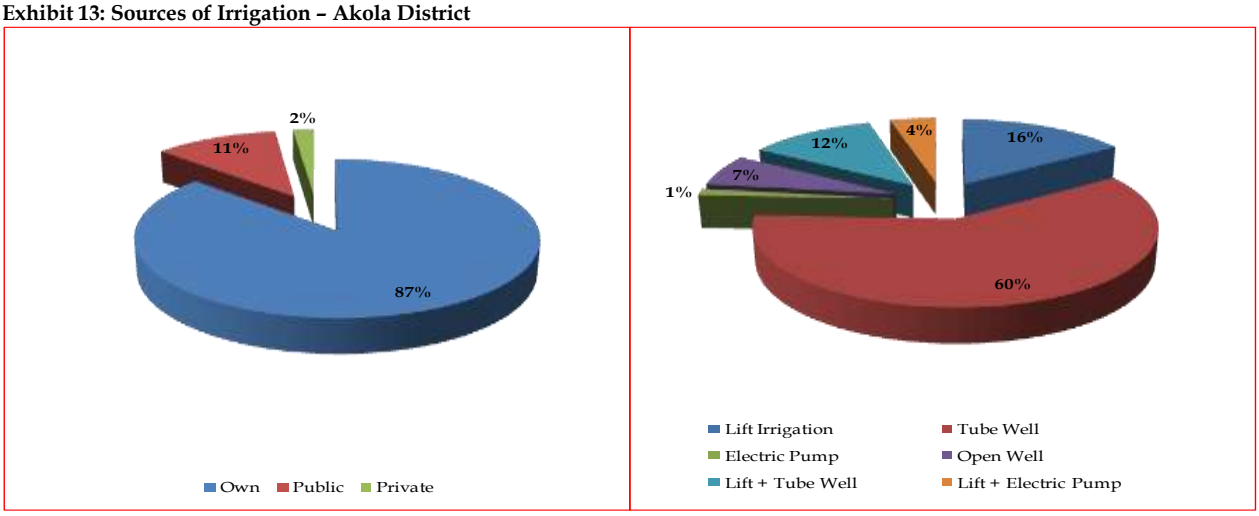




Type of Seeds Used - Red Gram, Green Gram, Horse Gram and Vegetables were the crops where the traditional seeds were adopted by the farmers owing to low consumption of fertilizers and water apart from long life. The use of hybrid seeds was observed in Soybean, Cotton, Tomato and Jowar owing to more yield and safety from pests and diseases. Soybean and Tomato farmers used traditional seed varieties too for the cultivation. Around 16 % of the farmers used GM (Bt Cotton) seeds for cotton with majority of the farmers adopting hybrid seeds. The cost of seeds contributed from 18-27% of the total cost of cultivation.

Sources of Irrigation - Around 87 % of the respondents had their own irrigation facility and balance relying on public irrigation facilities available like canals. The key sources of irrigation include Tube Well (60%) followed by Lift Irrigation (16%). Around 12 % of the respondents use both Tube well and Lift irrigation facilities. Around 47% of the respondents were able to avail the irrigation water ranging from 7 to 9 months, 31% from 10-12 months and 22% from 4 to 6 months. As per the survey, Sprinkler and Drip are the widely used irrigation systems adopted by the farmers. 96% of the farmers found Sprinkler systems to be beneficial mainly procured from Government sources (72%). However, the proportion of the farmers availing the subsidy for the purchase of sprinkler systems is merely 16%. 64% of the farmers found Drip systems to be beneficial with farmers procuring from both Government and private sources with close to 27% of the farmers availing the subsidy.

Exhibit 13: Sources of Irrigation – Akola District



Agri Marketing Support and Infrastructure - The average selling price and Minimum Support Price (MSP) for various crops has been captured in the table below. Comparing the average selling price of the commodities, it can be seen that except for cotton, most of the crops are sold by the farmers at below MSP price mainly to the commission agents and the wholesalers. It was also observed that whereas entire cotton produced is sold in the market, 92% of the production of soybean, 75% of the red gram, 94% of the green gram and 53% of the

production of vegetables is sold in the market and the remaining is retained for household consumption and next sowing.

Table 14: Average Selling Price and MSP (in INR per quintal) – Akola District

Name of the Crop	Average Selling Price (INR per quintal)	MSP (INR per quintal)	% Difference in Price Realization
Cotton	4,050	3,860	+5%
Red Gram	3,750	5,050	-26%
Soyabean	2,534	2,775	-9%
Green Gram	4,766	5,225	-9%
Vegetables	3,033	--	-
Tomato	1,200	--	-

Most of the regulated markets/wholesale markets where farmers used to sell their produce was equipped with the following facilities except drying platform and cold storage facilities. Some of the facilities present in Akola APMC visited are given below:

1) Auction Hall
2) Auction platform
3) Banks
4) Boring Well
5) Canteen
6) Godown
7) Grading Unit
8) Sale House
9) Weigh Bridge
10) Vegetable Market

In few markets, godowns infrastructure was absent. As per discussions with APMC officials, e-NAM has been operational in Akola APMC with facilities of e-auction hall, assaying facilities, weighing facilities. However, the details on commodities traded through e-NAM platform in Akola APMC couldn't be verified.

None of the farmers stored the produce at farm level for any of the crops except soybean where around 10.3% of the farmers stored the produce at farm level. Cleaning was the basic activity carried out for soybean, green gram and red gram. Sorting was carried out for tomatoes.

Delay in payment (39%), delay in the sale of the produce (26%), lack of transparency in better price realizations (19%) and levy of unauthorized charges (13%) are key reasons cited by the farmers in not receiving a fair dealing through marketing channels available. Majority of the farmers (73%) experienced the gap of 2-7 days in the realization of the price against the produce sold followed by the gap up to 1 day (18%). The remaining farmers (8%) witnessed the time gap above 15 days.

While vegetables and tomatoes were sold in nearby market on same day, jowar, horse gram, cotton, red gram and soybean were sold by the farmers within 15 days of harvest. Whereas, around 3 % of the crop was lost on account of transportation in vegetables, tomatoes, horse gram and red gram; cotton and soybean witnessed 1-5% loss during transportation.

Exhibit 14: Crop Wise Selling Behaviour – Akola District

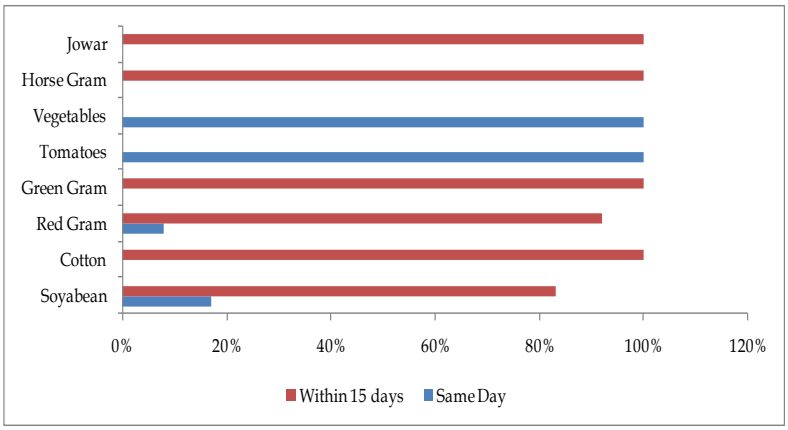
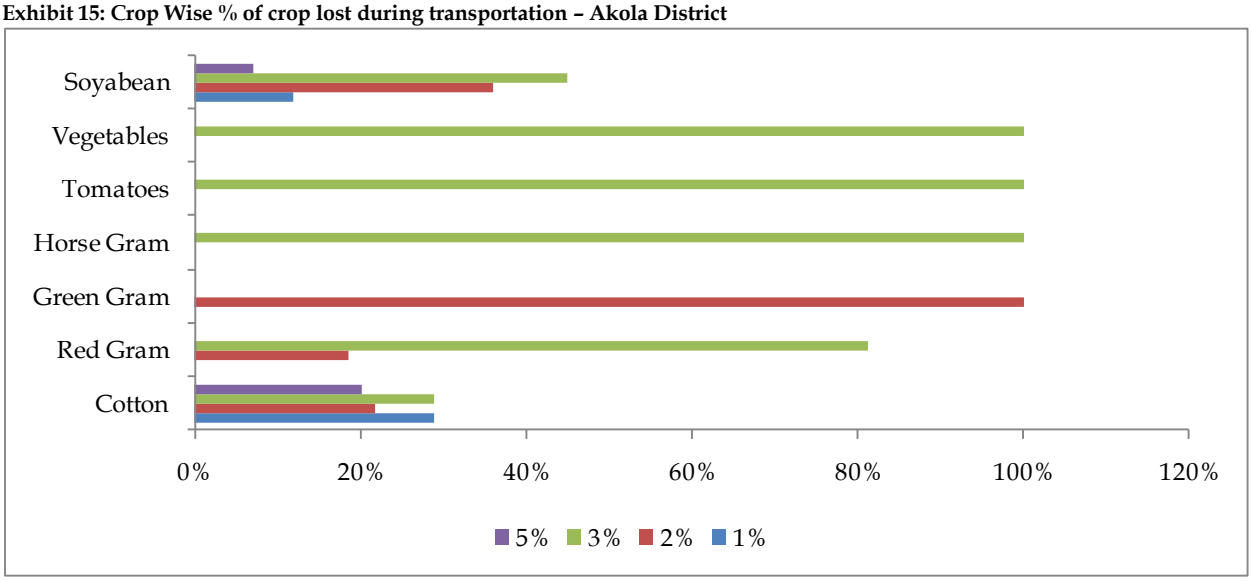
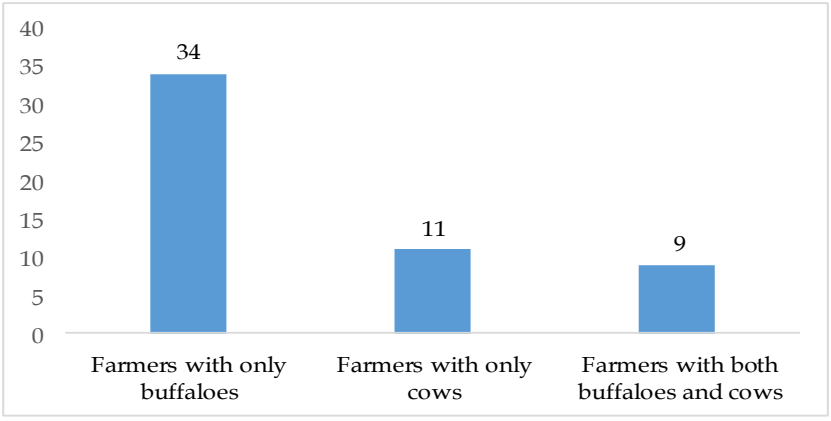


Exhibit 15: Crop Wise % of crop lost during transportation – Akola District



3.1.2.3. Farm Incomes from Allied Activities – Animal Husbandry

Exhibit 16: Cattle Possession – Akola District (nos.)



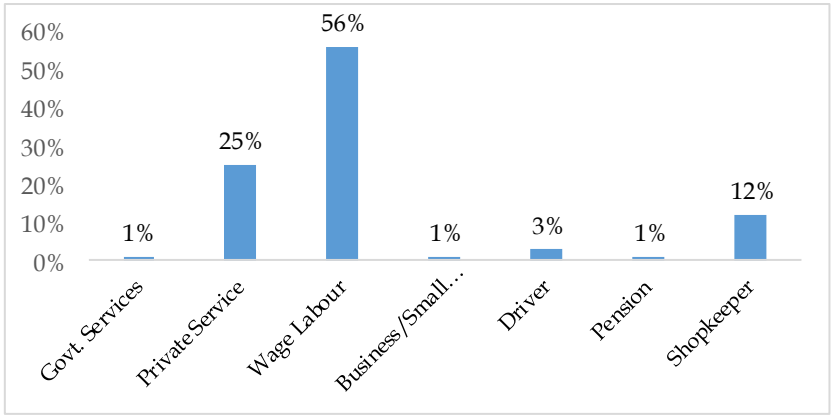
The district accounts for almost 50 % milk production by buffaloes followed by indigenous cows at 35 % owing to agro climatic conditions prevailing in the region. Dairy is the major activity under Animal Husbandry sector offering good scope for employment and providing additional income to the farmers. However, only 26 % of the respondents undertook dairying to have additional

income source. It has been observed that the average holding size of buffaloes and cows is 2 and 3 respectively mainly for subsistence activities. The average milk yield per day is 6 kgs and 2 kgs for buffaloes and cows respectively. None of the farmers reared goatery and poultry activities despite having good potential in the district.

3.1.2.4. Assessment of Non-Farm Incomes and Factors Impacting the Non-Farm Incomes

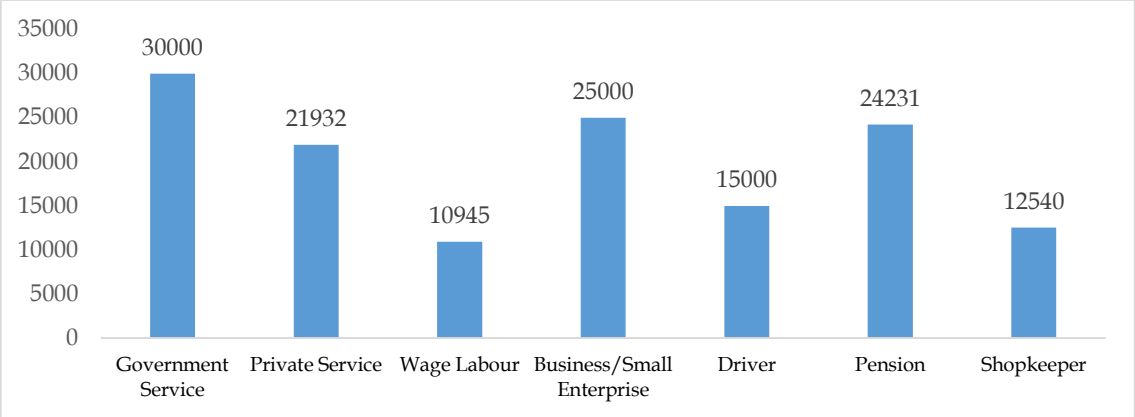
The key non-farm sources of income include wage labour, private service and shop keeping constituting 56 %, 25 % and 12 % of the target respondents. Other sources of non-farm income include driver, business/small enterprises, pension and Government service constituting remaining 7 % of the sample size.

Exhibit 17: Sources of Non-Farm Income - Akola District



The average income has been found to be highest in Government service followed by Business/Small enterprises, Pension, Private Service, Shop Keeping and Wage Labour. The number of months of employment ranged from 6-12 months giving the farmers getting assured non-farm sources of income for almost half of the year. Labour availability has been the key issue in Akola district and hence, there is always the demand of wage labour. Inconsistent income has been the key issue in wage labour whereas in other services, farmers are not able to concentrate on farm level operations. Lack of funds for day to day operational activities is the key issue amongst the farmers undertaking business or managing small enterprises.

Exhibit 18: Average Monthly Income from Non-Farm sources (in INR) Akola District

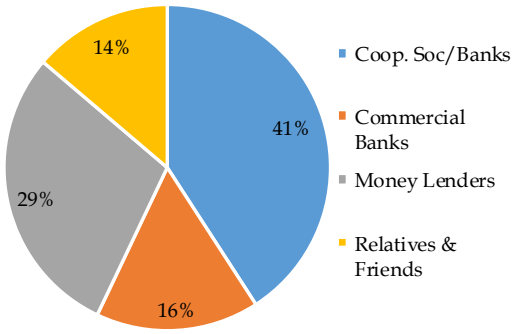


3.1.2.5. Access to Credit

June-July and October- November have been found to be critically/financially constrained months of household on account of expenses required for crop cultivation before onset of Kharif and Rabi season. Farmers usually resort to taking loans to cope up with the constraints in these months.

The key source of availing the finance by the target respondents included Cooperative Societies/Banks, Commercial Banks, Money lenders and Relatives and Friends. 50 farmers (41% of respondents) have taken credit from cooperative societies/banks with 42% of the farmers availing the credit for health care purposes followed by agriculture purposes (36%). The long term relationship with the cooperative banks was the key factor for most of the target respondents to avail the credit from cooperative societies/banks. However, the timely availability of the credit and scale of finance (SOF) was adhered to by the commercial banks compared to the cooperative banks.

Exhibit 19: Sources of Formal and Informal Credit in Akola District



Reliance on commercial banks have been less than cooperative banks and money lenders with only 20 respondents (16% of respondents) availing credit from them for education and agriculture purposes. Relatives and Friends are also considered the important source of availing the informal credit primarily for agriculture purposes with almost 59% of the small and marginal farmers depending upon them. Around 36 farmers (29% of respondents) have revealed that they have obtained the informal credit from the money lenders primarily for the purpose of Health care and Agriculture. The reliance on money lenders have been specifically observed in case of small and marginal farmers (~81%) which don't have adequate formal banking access, quick disbursal from money lenders and trust factor. Money lenders provide loans at an average exorbitant rate of 10 % per month compared to loans from cooperative banks/commercial banks which have average interest rates of 6-7%. The summary of the credit penetration and utilization has been captured in table below:

Table 15: Credit Penetration and Utilization

Name of Sources	Average Loan Size (INR)	Key Purposes of availing loan	Average Interest Rate (%/month)
Money Lender	70,000	Agri – 33% Education – 25% Healthcare – 11%	10

		Household Business – 8%	
Relatives & Friends	24,000	Agri – 76% Education – 24%	7
Cooperative Societies/Banks	40,000	Healthcare – 40% Agri – 36% Education – 8%	6.5
Commercial Banks	40,000	Agri – 40% Healthcare – 30%	6

3.1.2.6. Policy Support and Private Sector Participation

The Government support and private sector participation was analyzed across agriculture value chains viz. Inputs, Animal Husbandry/Vet Services, Infrastructure, Extension, Finance and Marketing. Government has been supporting the farmers in almost all the above areas whereas private sector intervention is only limited to supplying agri-inputs, animal husbandry/veterinary services and finance. No major initiative is taken by private sector towards contract farming or export farming in the district. The Punjabrao Krishi Vidyapeeth along with KVK and ATMA are rendering extension services/guidance to the farmers in Vidarbha area in general and Akola district in particular for adoption of modern farm techniques through various training programmes organized for farmers.

Exhibit 20: Key Reasons for destruction of the crops in Akola District

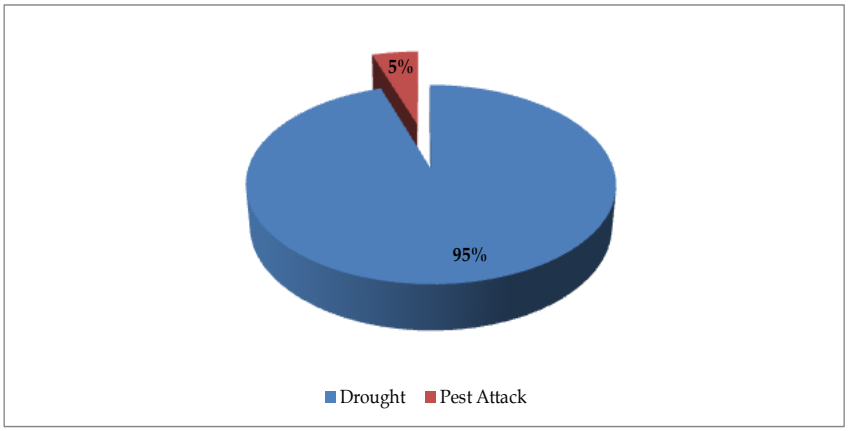
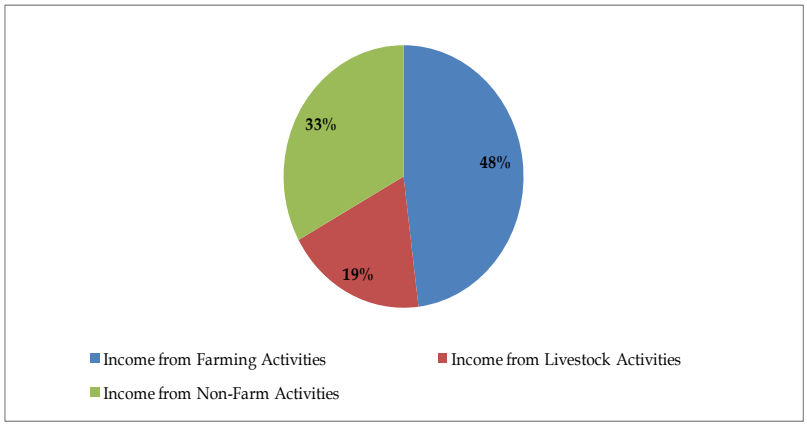


Table 16: Support by Government & Private Sector across Agriculture Value Chain in Akola District

Sr. No	Parameter	Support
1	Inputs	Field demonstrations and consulting.
2	Animal Husbandry/Vet Services	Breeding, Marketing and Veterinary Services.
3	Infrastructure	APMC for marketing
4	Extension	Consultancy, Field demonstrations
5	Finance	Loans and Insurance
6	Marketing	APMC for marketing

On assessment of awareness about the Government schemes and support provided by various institutions and their effective utilization, it has been observed that farmers were aware about various Government schemes like RKVY, MGNREGA, KVK and NAIS. However, the need was felt for effective utilization of the benefits and support provided by the above schemes and support bodies. It was observed that majority of the farmers have not heard about the schemes like Gramin Bhandaran Yojana, NFSM, ATMA and Grameen Beej Yojana.

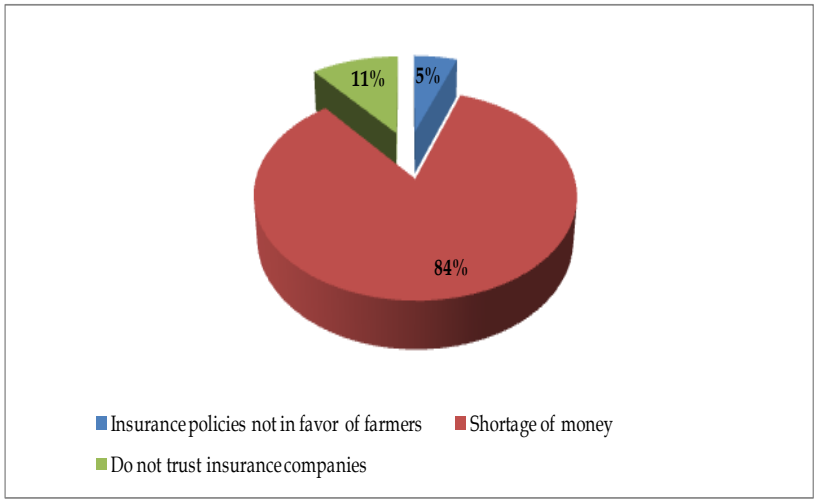
Exhibit 21: Composition of Farmers' Income – Akola District



3.1.2.7. Distress Situation

On assessment of distress situation faced by the target respondents, it was revealed that the close to 10 % of the farmers had suffered crop destruction in last few years. The district is highly vulnerable to climate change implications. Change in the rainfall pattern, reduced rainfall, delay in onset of monsoon, low water availability in existing water bodies due to rainfall shift, early withdrawal are experienced in recent times. 95 % of those affected farmers attributed the income loss on account of drought conditions and balance 5% to pest attacks on crops.

Exhibit 22: Key Reasons for Non-adoption of Crop Insurance by the farmers in Akola District

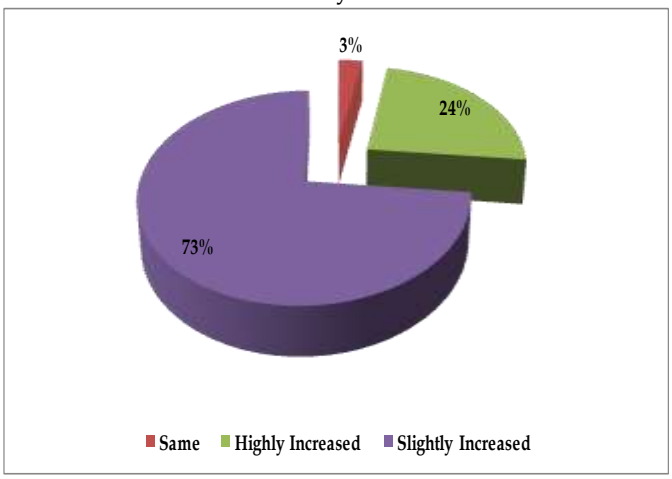


Though all the farmers had heard about the crop insurance and its benefits, merely 12 % of the farmers knew that their crops were insured. About 84% farmers cited the shortage of money to pay the insurance premiums followed by lack of trust on insurance companies (11%) and unfavorable insurance policies (5%) as key reasons for not getting their crops insured. The same has been schematically represented in the exhibit above.

3.1.2.8. *Income Trends*

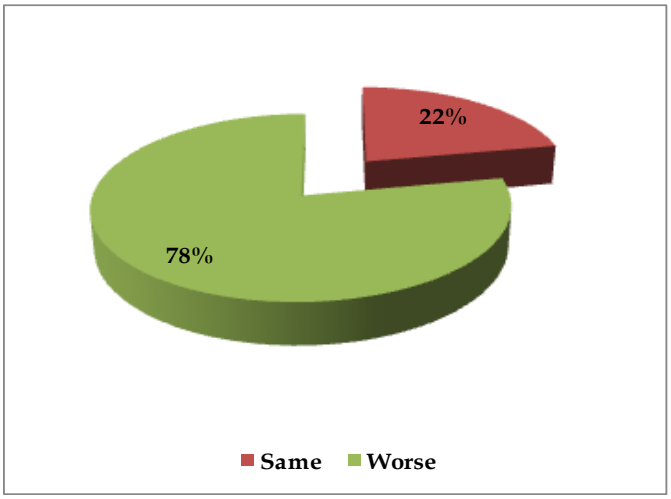
Basis the analysis from the survey, it was found that annual gross income from farming activities constituted 48% of the total income followed by dairy (19%) and non-farm incomes (33%) indicating that distressed district such as Akola, creation of opportunities in rural non-farm sector activities will result in generation of additional income for the farmers.

Exhibit 23: Income trends in last 5 years - Akola District



The qualitative trend on income and expenditure in last five years was captured as shown in beside. It has been observed that 78% of the respondents felt that their income has worsened over last five years with remaining respondents feeling that their income has remained same. Almost 97 % of the farmers have felt that the expenditure has increased over these years along with other expenses resulting in overall declining income trend.

Exhibit 24: Income & Expenditure Trends of the Farmers - Akola District



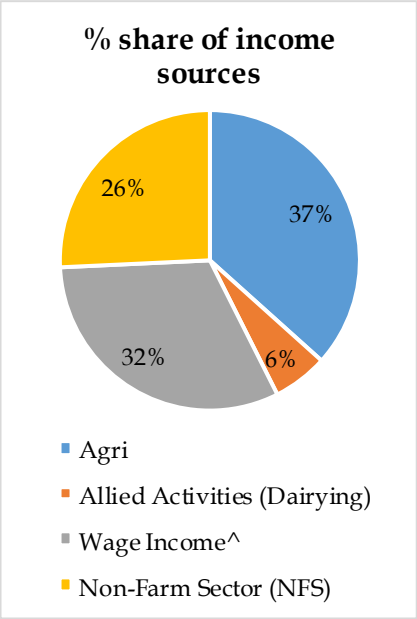
While 96% of the farmers agreed that crop diversification would enhance their agricultural income and they would like to utilize the enhanced income primarily to repay their loans and become debt free, to buy better quality inputs like high quality seeds, fertilizers, pesticides, developing irrigation facilities and savings for future contingencies. The balance respondents who did not agree on relevance of diversification attributed to mainly lack of irrigation facilities and less market price realizations for their produce as the key stumbling blocks for improving their incomes.

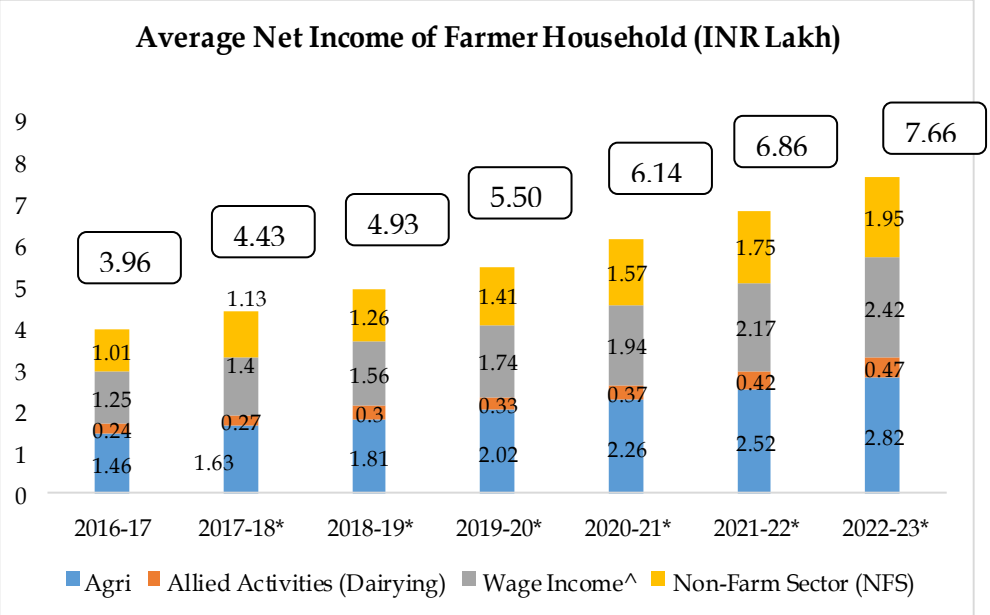
3.1.2.9. *Income Projections*

An attempt has been made to also calculate the net income (net of cultivation costs and net income from livestock farming) along with projections till 2022-23 based on the the assumptions stated below. The income from the agri predominantly comprised of incomes from cropping of Soyabean, Cotton and Pulses in the district. The non-farm sector enterprises comprised of private service, shop keeper, driver, business/small enterprises, Government service, Pension). It was found that the average net income of the farmer household in Akola district was found to be INR 3.96 lakh with 37% contribution from agri activities followed by wage income (32 %),

Non-Farm sector initiatives (26%) and Allied activities (6%). Considering the nominal growth rate of 11.61%, it is projected to almost double the net income levels to INR 7.66 lakh by 2022-23 with appropriate recommendations and strategies. Since, the data pertaining to composition of farmers' income in the State is not available for 2002-03 and 2012-13 to arrive at change in composition of farmers' incomes, the estimations for incomes till 2022-23 is done basis the current composition available as per the survey results.

Exhibit 25: Average Net Income of Farmer Household from various sources in Akola district





Key Assumptions#

- *CAGR Nominal Growth in Income from 2002-03 to 2012-13 for Maharashtra - 11.61%*
- *CAGR Real Growth in Income from 2002-03 to 2012-13 for Maharashtra - 5.66%*
- *Doubling time in years @ nominal CAGR - 6.31*
- *Doubling time in years @ real CAGR - 12.58*

*Projected Net Incomes

^ Gross Incomes wrt Wage Incomes and NFS (Private Service, Shopkeeper, Driver, Business/Small Enterprises, Government Service, Pension)

3.1.3. Key Challenges

a. Technology and Cultivation Practices

- Mono-cropping pattern with cotton and soybean cornering the bulk of the land space (50% and 38%% respectively) due to prevailing soil and agro climatic conditions.
- Lower area under high value crops like fruit crops production on account of saline soil. ~35% area falling in Akot, Telhara, Balapur and Murtijapur tehsils is salinity affected hampering the production of other High Value Crops (HVC) including fruit crops though potential of dry land horticulture cultivation of orange, custard apple, lime, pomegranate etc exists in the district accounting for 5.5% of the net sown area of the district. None of the farmers in the study districts practiced horticulture crops cultivation on account of this constraint.

b. Agri Infrastructure Development

- Post-harvest structure is inadequate in the district. Facilities such as market intelligence systems, warehouses, cold storages are underdeveloped (cold storages are almost absent). Post-harvest processing is often limited to just cleaning or manual sorting. None of the farmers stored the produce at farm level for any of the crops except soybean where around 10.3% of the farmers stored the produce at farm level. Cleaning was the basic activity carried out for soybean, green gram and red gram. Sorting was carried out for tomatoes.

c. Marketing, Prices and Trade

- Contract farming for conventional cotton and organic cotton is done in the Akola, Barshitakli, Balapur and Akot block for Arvind Mills. Basant agro tech is undertaking seed production programmes on contract farming in the district for Cotton, Soyabean, Wheat, Paddy and Gram. Apart from above private players, there is no other private initiative present in the district for contract farming.
- None of the farmers are selling to Government purchase centers on account of issues pertaining to proximity of those centers to the farms, cumbersome procedures in selling to centers and banking facilities.
- Delay in payment (39%), delay in the sale of the produce (26%), lack of transparency in better price realizations (19%) and levy of unauthorized charges (13%) are key reasons cited by the farmers in not receiving a fair dealing through marketing channels available. Majority of the farmers (73%) experienced the gap of 2-7 days in the realization of the price against the produce sold followed by the gap up to 1 day (18%). The remaining farmers (8%) witnessed the time gap above 15 days.

d. Crop Diversification and Post Production Management

- Onion, Summer Groundnut, Jowar and Maize despite having potential in the district is not taken on commercial scale by the farmers on account of lower realizations as in Jowar (INR 1200-1300 per quintal@ 10 quintals per acre), higher seed costs of Summer Groundnut (INR 7000-8000 per acre) and lower price realizations due to high supply-low demand in the market.
- Around 35 % of the area is salinity affected with less drainage hindering the cultivation of horticulture crops severely.
- The average post-harvest loss for cotton ranges between 5-7% with storage being the major cause, for soybean, it ranges between 5 -7% attributable to malpractices by the traders, for red gram it is around 10% with most losses occurring due to poor storage.

e. Access to Credit

- The reliance on money lenders have been specifically observed in case of small and marginal farmers (~81%) which don't have adequate formal banking access, quick disbursal from money lenders and trust factor.

f. Animal Husbandry Management and Integration Farming Systems

- No organized channel for marketing of milk present in the district. Government collection center is defunct.
- Due to prevailing agro climatic conditions (high temperature and high humidity) and demand of buffalo milk, farmers have restricted to buffalo rearing followed by indigenous cattle rearing with low productivity. 26 % of the respondents undertook dairying to have additional income source. The average milk yield per day is 6 kgs and 2 kgs for buffaloes and cows respectively. None of the farmers reared goatery and poultry activities despite having good potential in the district.
- In Akola, the cultivable area of Jowar (main source of fodder) was down by 25% in last five years due to mono-cropping pattern with ~35 % area under cotton and soybean each.
- There is no practice of rationing of feed followed by the farmers which includes providing balanced feed as per age and lactation/dry/pregnancy period of cattle.
- No organized marketing channels for goat meat which has immense potential in the district.

g. Irrigation Management

- Low irrigation penetration, at around 5% of land covered has led to low productivity & high cost of cultivation.
- The district is predominantly rain fed – averaging around 700 mm a year - with only 5% of net sown area irrigated. Most irrigation is ground water irrigation coming from wells.

- The use of sprinkler and drip irrigation systems is prevalent in the region; however, after cost sales services particularly in drip irrigation systems inhibit adoption by the farmers compared to sprinkler irrigation systems.
- 50 % of the surveyed farmers complained about late disbursal of MI subsidy (~ 1 year) under the scheme.
- Government has reduced the benefit to the farmers for constructing farm ponds of area (30*30 m) from INR 80,000 to INR 50,000 which has become unviable proposition for the farmers as water can be harvested in farm ponds/community farm ponds and used for irrigation purposes specifically in the areas which are saline & have the tendency of water logging.

h. Extension Services

- Farmers adopt the traditional package of practices as against the recommended package of practices prescribed by PDKV which strive to reduce the cost of cultivation of key crops by 30 %.
- Fellow farmers, relatives and friends are the key referral points for the farmers for agri related information and technologies which in turn impact the adoption of the best practices in the areas of package of practices and technology adoption.
- A common complaint amongst farmers was the lack of follow-up. While training sessions are useful, the lack of follow up from the university and government agencies like MSAMB, ATMA and KVKs mean farmers struggle to launch new initiatives.

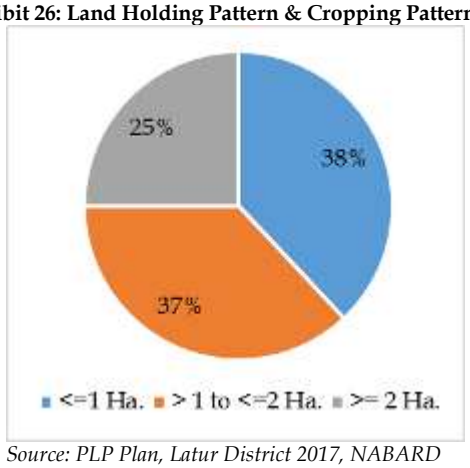
Figure 1: Farmers survey underway in Akola

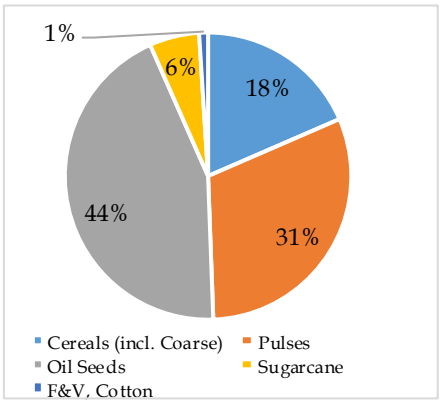
3.2. Latur

3.2.1. Overview of Latur District

- **Agro Climatic Zones:** Based on the rainfall, soil type and vegetation Latur district falls in agro climatic zone VII viz. Central Maharashtra Plateau Zone / Assured Rainfall Zone. Most of the rainfall occurs in the monsoon season from June to September. The normal annual rainfall over the district varies from 650 to 800 mm and it increases from southwest to northeast. The average annual rainfall is around 700 mm.

Exhibit 26: Land Holding Pattern & Cropping Patterns - Latur District





Source: PLP Plan, Latur District 2017, NABARD

- **Horticulture development:** As seen with the cropping pattern, the majority of the area is under cereals and pulses, thereby leaving very less coverage for horticultural and plantation crops. The major fruits and vegetables in the area include grapes, mango, and vegetables like tomato and chilli. Fragmented cultivation of custard apple and pomegranate is also seen in specific blocks namely Chakur. The productivity of fruits in the district stood at 11.6 MT/Ha and for vegetables it stood at 1.4 MT/Ha.

- **Animal Husbandry Sector:** The livestock resources of Latur District states that the total number of livestock stood at 15.34 lakh animals comprising of cattle, buffaloes, sheep, goats, pigs and poultry etc. Dairy is a major activity under animal husbandry sector. However, around 568 milk producer societies in the district are defunct. The demand for eggs is met by suppliers located outside the district. Per capita availability of eggs is only 26 as against state average of 45. 9 mini hatcheries are present in the region. Unsuitable climatic conditions on account of harsh temperatures and humidity conditions, poultry farming has not been yet commercialized in the district.

- **Distress Situation:** Being one of the major distressed regions of the state, the district of Latur has some industrialization with the presence of manufacturing, agro processing, engineering and small scale cottage industries. As of 2012, total micro category industries stood at 1,560, with small scale industries at 491 and large scale at 19. These

provided a cumulative employment respectively to 14,320, 7,589 and 5,727 personnel respectively. Of these, manufacturing of food products and beverages provided maximum employment (7,933).[5]

- **Agri Marketing Infrastructure:** The presence of 11 main market yards and 12 sub market yards provides regulated channel for marketing of commodities like cotton, soyabean, pulses etc. As per primary survey, around 10 cold storage facilities were found to exist in and around Latur city.

- **Food Processing:** A major hub for pulses and soybean processing, the district has 1012 agro processing units, out of which 19 are large units. There are 10 sugar factories in the district.

- **Diversification:** Due to Soyabean based monocropping, area under sugarcane has been reducing drastically due to drought like conditions since the last few years. 2015-16 onwards, owing to high dependence on borewell water the district administration itself has tried to bring down acreage under sugarcane to around 7,000 ha from 45,000 ha. A noticeable reduction has also been seen in Jowar where cultivable area and production has declined in recent years due to which scarcity of fodder source for dairying has become a major issue impacting animal husbandry activities in the region. Farmers have been cultivating horticulture crops like tomato, custard apple, mango and undertaking sericulture activities on a minor scale.

- **Key non-farm generating activities:** The most important small scale industries in the district are dal mills, oil pressures, confectionery, saw mills and engineering etc. In case of the cottage and small scale industries sector, manufacture of fabricated metal products, wearing apparel; dressing and dyeing of fur, publishing, printing are some of the important industries located in Latur.

[5] *Brief Industrial Profile of Latur District*

3.2.2. *Survey Observations*

3.2.2.1. Socio Economic Profile of the Farmers

Gender

The survey was conducted across the district as per the predefined sampling plan so as to cover all kinds of farmers considering their cropping patterns, land holdings, location etc. It was ensured to cover female agriculture farmers as well as a result of which the survey yielded 9% female farmers while the balance 91% farmers were male.

Exhibit 27: Gender Profile of the Respondents – Latur District

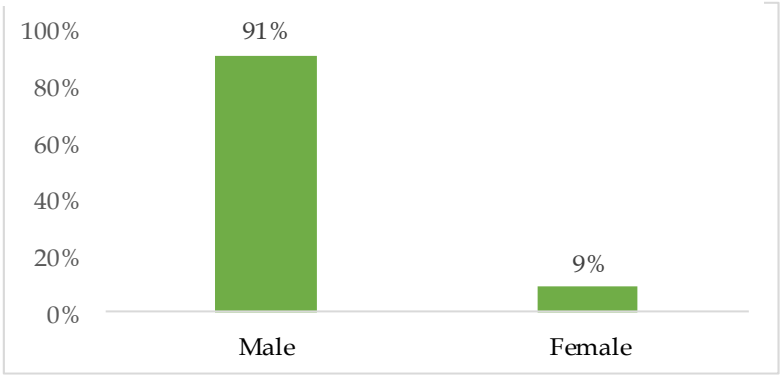
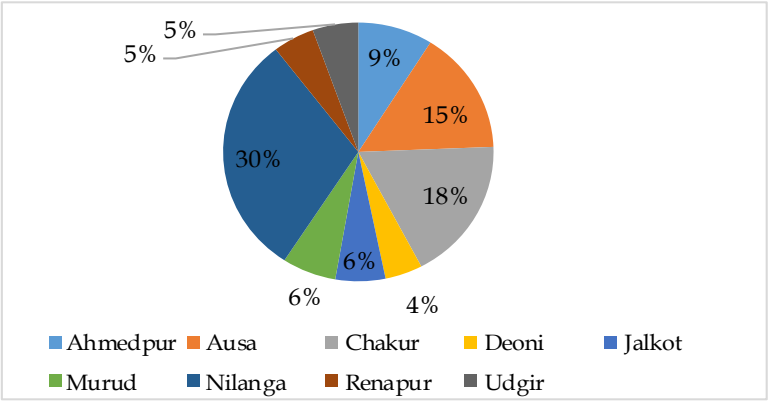


Exhibit 28: Tehsil wise sample distribution of respondents – Latur District

Tehsil wise Distribution

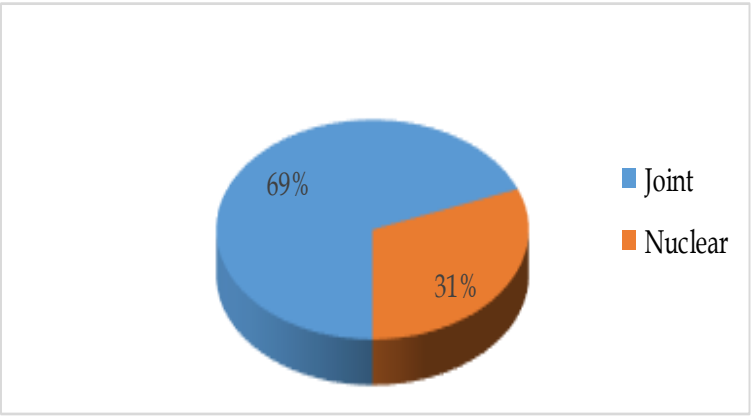
Chakur, Ausa and Nilanga being the major soya and pulses producing region in the district saw a sample contribution of 15%, 18% and 30% respectively which contributed around over 60% of the total samples covered in the district.



Family Structure:

69 % of the respondents belonged to the joint family dynamic while the balance belonged to joint family. Around 73 % of the total target population were adults. 64% of the adult family members were involved in farm activities while 11% were involved in non-farm activities. Close to 26% of the adults were found to be unemployed. Most of the household members resided in and around the vicinity of the village.

Exhibit 29: Family Structure of respondents surveyed – Latur District



3.2.2.2. Assessment of Farm Incomes and Factors Impacting the Farm Incomes

1) Details of Land Holding

The distribution of land holding in the study area are provided in the table below:

Table 17: Distribution of the Land Holdings – Latur District

Classification of Holding	Holding		Area	
	No.	% to Total	Ha.	% to Total
< = 1 Ha	74	37	17.4	6.0
>1 to <=2 Ha	81	40	134	43
>2 Ha	46	23	157.58	51
Total	**201**	**100**	**308.98**	**100**

The cultivated land was owned by all the 201 respondents with an average land holding of 1.73 hectares. Out of the total cultivable area of ~309 hectares, around 49 % land is irrigated and the balance 51% land is non-irrigated area.

2) Cropping Pattern and Cost of Cultivation

The cropping pattern followed by the farmers in the study area was assessed on the parameters of area under cultivation, production, markets and average selling price. The area is highly dominated by Soyabean cultivation (52%), followed by Tur with 22%, Sugarcane, Cotton, Udid, Moong (4% each). It is noticeable that sugarcane cultivation contributes only 2% of the total samples surveyed in the region. This is primarily due to the drought situation which has been plaguing the area since the last 3-4 years.

Table 18: Average Area under Cultivation, Production and Cost of Cultivation – Latur District

Name of the Crop	Average area under cultivation (Hectares)	Average Production (Quintals per hectare)	Average Cost of Cultivation (INR per hectare)
Soybean	1.70	18.60	30,319
Sugarcane	1.46	564	47,731
Tur	0.70	6.80	9,476
Urad	0.60	5.73	12,800
Cotton	1.07	8.23	28,500

**Cost of cultivation includes cost of seeds, irrigation, fertilizers, insecticides, labour and manure.*

It was also observed that whereas entire cotton produced is sold in the market, 92% of the production of soybean, 75 % of the red gram, 94% of the green gram and 53% of the production of vegetables is sold in the market and the remaining is retained for household consumption and next sowing.

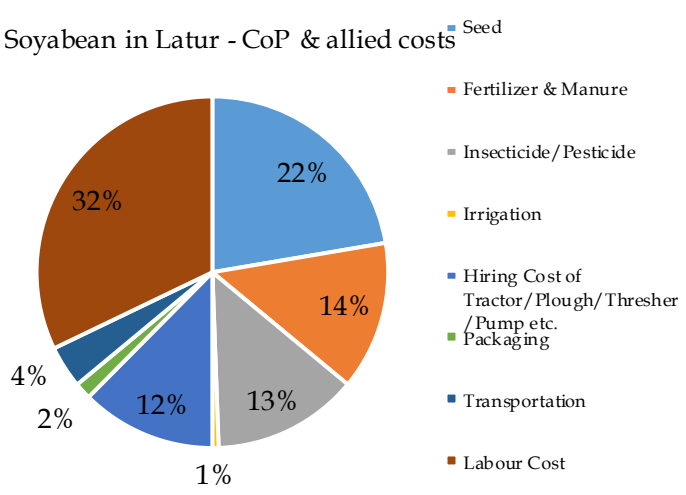
A breakup of the cost of production & post-harvest costs of major commodities in Latur district as per primary survey is depicted in the table below. (Only primary crop grown has been considered)

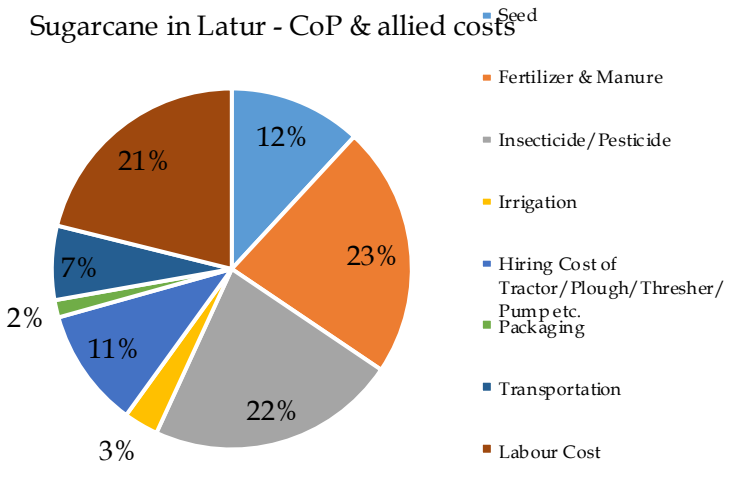
Table 19: Latur District: Cost of Production & allied costs of major commodities (INR/Ha.)

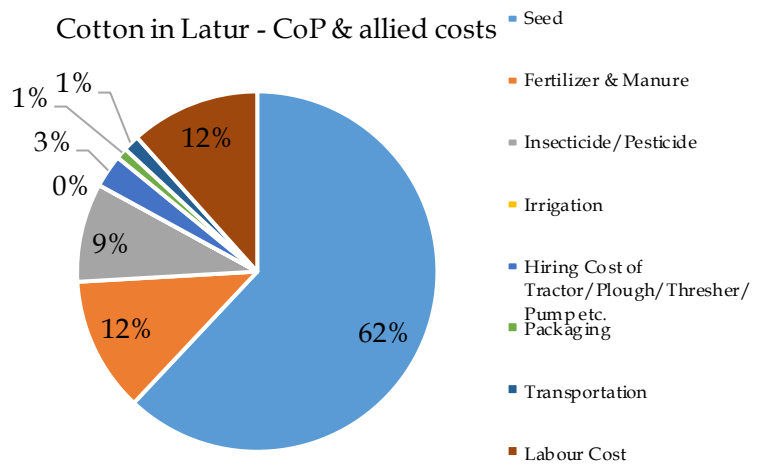
Cost Head (INR/ha)	Soyabean	Sugarcane	Cotton
Seed	8,242	7,004	25,396
Fertilizer & Manure	5,052	13,255	4,889
Insecticide/Pesticide	4,953	13,207	3,584
Irrigation	210	1,830	-
Labour Cost	11,861	12,435	4,701
Hiring Cost of Tractor/Plough/Thresher/Pump etc.	4,588	6,289	1,188
Packaging	569	915	73
Transportation	1,438	3,907	593
TOTAL	**36,913**	**58,842**	**40,424**

Labour employed in cultivation of crops - The labour intensity was captured across crop value chains undertaken by the farmers though measurement of the labour man-days and average labour cost per man-day. The labour involvement has been highest across intercultural operations followed by harvesting, sowing, land preparation loading/unloading and input application. Labour component forms a major component in cultivation cost contributing ~ 30-40 % of the cultivation costs. Timely availability of the labour and the cost is not predictable during the time of sowing as well as harvesting. This is one of the critical reasons for higher cost of cultivation thereby impacting farmer incomes adversely. The graphs below depict the cost of cultivation to farmer with added cost heads post production viz. equipment cost, packaging and transportation.

Exhibit 30: Distribution of CoP & allied costs for major commodities in Latur district

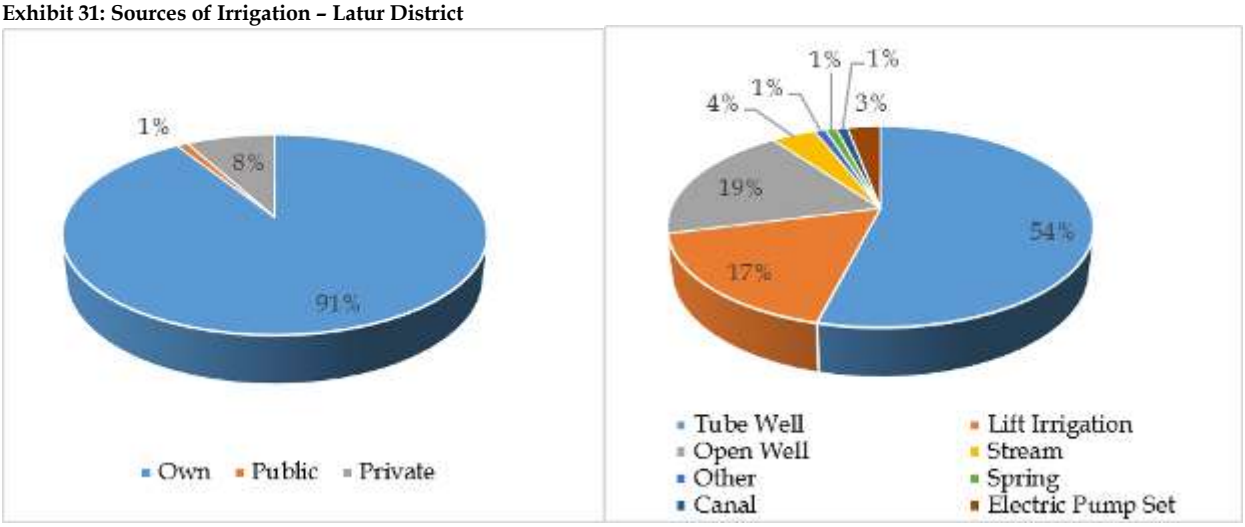






Sources of Irrigation: Around 62% of the land area of the surveyed respondents was found to be non-irrigated. Of those with irrigation facility, 90% of the respondents had their own irrigation facility and balance relying on public irrigation facilities. Key sources of irrigation include Tube Well (54%) followed by Lift Irrigation (17%). The district is predominantly rain fed – averaging around 666 mm a year. Almost all the tehsils employ tube well, open well, electric pump sets and lift irrigation facilities. The Ausa block was found to have marginally better irrigation when compared to others. Around 36% of the respondents were able to avail the irrigation water ranging from 1 to 6 months, 31% from 7-9 months & 32% from 10 to 12 months

Exhibit 31: Sources of Irrigation – Latur District



The ground water quality is good, suitable for drinking and irrigation. However, the water table has gone down in the last 3-4 years due to severe drought conditions having plagued the district. Discussions with the State Agriculture College brought to the fore that adoption of various water conservation methods at village level to improve the ground water level for adequate water supply is the need of the hour.

Agri Marketing Support and Infrastructure - The average selling price and Minimum Support Price (MSP) for various crops has been captured in the table below:

Table 20: Average Selling Price and MSP (in INR per quintal) – Latur District

Name of the Crop	Average Selling Price (INR per quintal)	MSP (INR per quintal)	% Difference in Price Realization
Soyabean	2,450	2,775	-13%
Tur	3,500	5,050	-44%
Cotton	4,285	3,860	11%

Most of the regulated markets/wholesale markets where farmers used to sell their produce was equipped with the following facilities except drying platform and cold storage facilities. In few markets, godowns infrastructure was absent.

1) Office building
2) Auction Platform
3) Weighing bridge/electronic weighing machines
4) Godowns
5) Water supply/sanitary arrangements
6) Grading and weighing arrangements
7) Internal roads and waste disposal arrangements

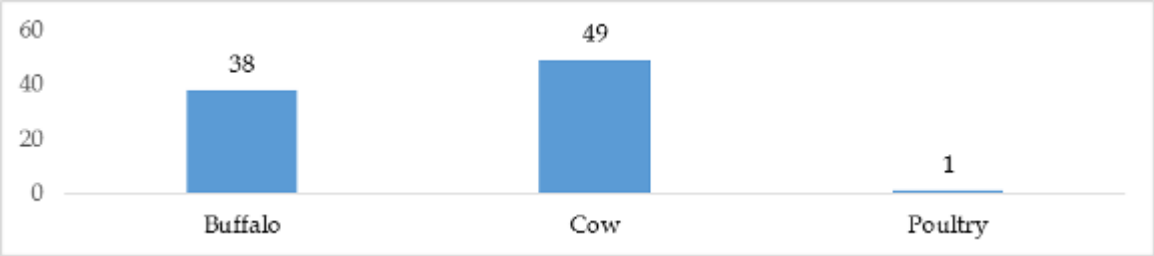
Delay in sale of produce (39%) and delay in payment/levy of unauthorized charges (61%) are key reasons cited by the farmers in not receiving a fair dealing through marketing channels available. Majority of the farmers (53%) experienced the gap of 7-15 days in the realization of the price against the produce sold followed by the gap up to 2-7 days (47%).

In few markets, godowns infrastructure was absent. As per discussions with APMC officials, e-NAM has been in process of initiation in Latur APMC with facilities of e-auction hall, assaying facilities, weighing facilities being in process of construction. Soybean is the parent commodity at LATUR APMC

3.2.2.3. Farm Incomes from Allied Activities - Animal Husbandry

On assessment of livestock production in the study area, most of the respondents (38 farmers) had buffaloes whereas around 49 farmers were rearing indigenous cows. Few other farmers reported possession of sheep and goat as in-house livestock. The renowned 'Deoni' variety of cow was reported to be found with few of the sample farmers in the study region. It has been observed that the average holding size of buffaloes and cows is 1 to 3 respectively mainly for subsistence activities with almost half of the herd size in milking stage to ensure the cyclicity of the herd size and availability of the milk. The average milk yield per day is ~4 kg and 2.8 kg for buffaloes and cows respectively. This is below par as a result of unregulated fodder, feed and disease management.

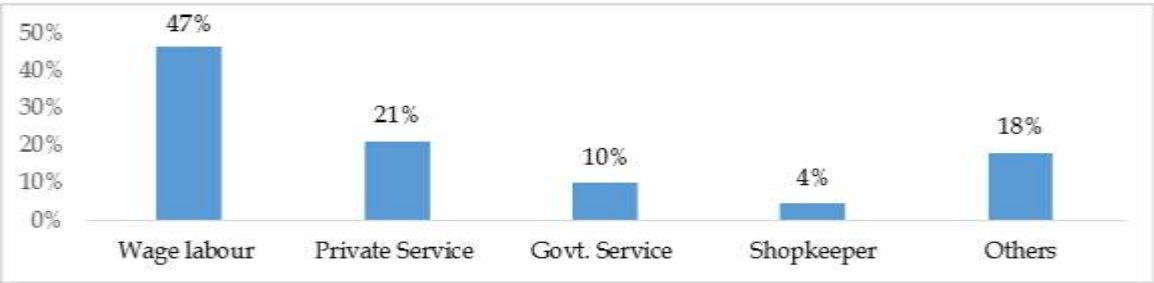
Exhibit 32: Livestock Possession – Latur District (nos.)



3.2.2.4. Assessment of Non-Farm Incomes and Factors Impacting the Non-Farm Incomes

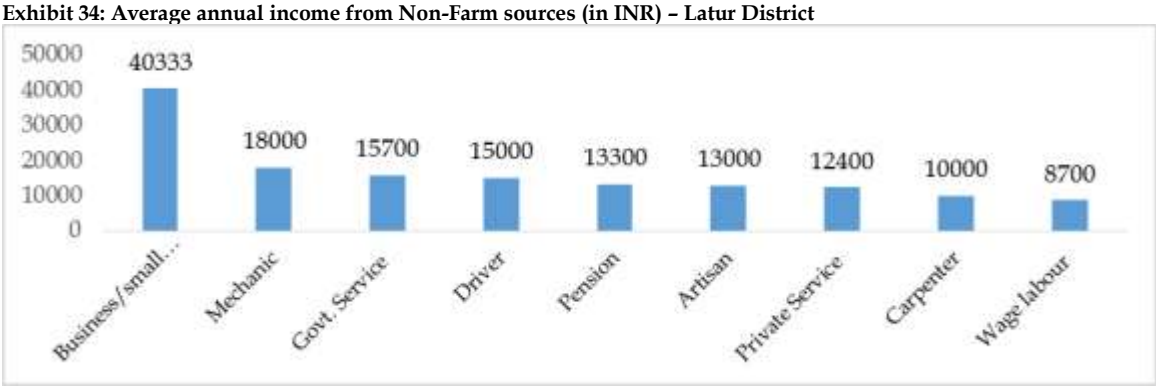
The key non-farm sources of income include wage labour (47%) owing to high distress and fluctuating cropping seasons in the region, private service (21%), government service (10%) while other occupations such as in driving, artisanship, carpentry, electrician etc rounding of the balance 22%.

Exhibit 33: Sources of Non-Farm Income - Latur District



The average income has been found to be highest in Private Business/Enterprise followed by mechanic shop service and government service. Labour availability has been the key issue in Latur district and hence, there is always the demand of wage labour. Inconsistent income has been the key issue in wage labour whereas in other services, farmers are not able to concentrate on farm level operations.

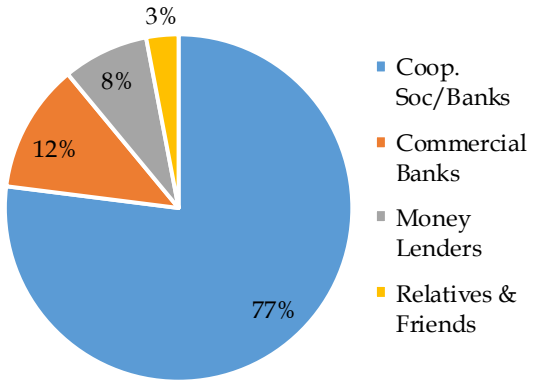
Exhibit 34: Average annual income from Non-Farm sources (in INR) – Latur District



3.2.2.5. Access to Credit

The key source of availing the finance by target respondents included Coop Societies/Banks, Commercial Banks Landlord/Money lenders and Relatives and Friends. 76% of the farmers have taken credit from cooperative societies/banks followed by 12% from commercial banks, while 8% from landlords/money lenders. Crop Output & Livestock contributed to 89% of the total loan availment. Loan for house and farm assets accounted for 2% of the loan availed. Relatives and Friends are also considered the important source of availing the credit primarily for agriculture purposes.

Exhibit 35: Sources of formal & informal credit in Latur District



Land has been the primary collateral offered to cooperative societies/banks. However, jewellery was key collateral provided to the money lenders providing loans at as high as 10-15 % per month as compared to formal sources of credit offering interest rates in the range of 4-6%.The period of loan ranged from 12-13 months for loan availed from cooperatives, 18 months when sourced from commercial banks and around 15 months when sourced from money lenders. Farmers usually resort to taking loans to cope up with the constraints in these months. The loan amount averaged at INR 50,000 when sourced from Cooperatives, INR 1,30,000 when sourced from Commercial Banks & the highest at INR 1, 60,000 when sourced from money lenders/landlords.

3.2.2.6. Policy Support and Private Sector Participation

The Government support and Private sector support was analyzed across agri value chains viz Inputs, Labour, Animal Husbandry/Vet Services, Logistics, Infrastructure, Extension, Finance and Marketing. Government has been supporting the farmers in almost all the above areas whereas private sector intervention is only limited to Agri Inputs, Animal Husbandry/Vet Services and Finance. It has been observed that supply of agri inputs by the agri input companies dealer is the most prevalent mode of access to agri inputs like fertilizers and pesticides who along with selling them also provide field demonstrations and consulting. Seeds are provided by MAHABEEJ. Government provides animal husbandry and veterinary services through existing veterinary infrastructure present in the district including polyclinics and veterinary clinics.

KVK Latur is working in collaboration with VNMKV Parbhani to develop extension programmes and inputs usage training to the farmer. Liquid Biofertiliser in 0.5-1 litre packaging to farmers, training in vermicomposting is also provided. Capacity building provided in collaboration with ATMA: Entrepreneurship Development, Management of FPOs, Exposure

visits and need based farmer training. APMC and its sub-market yards provide the platform by Government to enable the farmers market their produce. These market yards provide place for free and fair trading, grading and weighing facilities and also help farmers to market their commodities.

Table 21: Support by Government and Private Sector across Agriculture Value Chain - Latur District

Sr No	Parameter	Support
1	Inputs	Field demonstrations and consulting
2	Animal Husbandry/Vet Services	Veterinary Services
3	Infrastructure	APMC for marketing
4	Extension	Consultancy, Field demonstrations
5	Finance	Loans and Insurance
6	Marketing	APMC for marketing

ATMA and KVK are spearheading the extension framework in the district by means of tie ups with corporates under CSR programs and also conducting regular training programs with individual farmers or groups. ATMA Latur chapter has taken up organic farming in around 1200 acres in Latur district and has also initiated Adarsh Clinic pilot projects, wherein, farmers brings in their produce directly for sale at 3rd party operated standalone selling joints with adequate infrastructure, transport services and utilities.

Table 22: Awareness and Adoption of Government Schemes in the District - Latur District

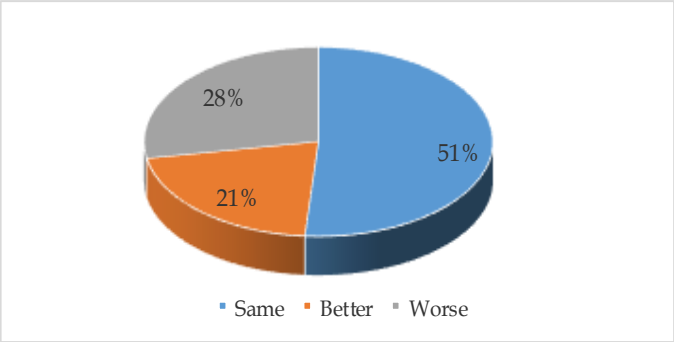
S. No.	Government Schemes/Support	% Heard about the scheme	% benefited
1	Rashtriya Krishi Vikas Yojana (RKVY)	94%	9%
2	Gramin Bhandaran Yojana	89%	0.0%
3	National Food Security Mission (NFSM)	100%	0.0%
4	National Agriculture Insurance Scheme (NAIS)	75%	73%
5	ATMA	100%	0.0%
6	Krishi Vigyan Kendra (KVK)	100%	0.0%
7	Grameen Beej Yojana	0%	0.0%

On assessment of awareness about the Government schemes and support provided by various institutions and their effective utilization, it has been observed that farmers were aware about various Government schemes like RKVY, MGNREGA, KVK and NAIS. However, the utilization of the benefits and support provided by the above schemes and support bodies was found to be poor except RKVY. It was also found that majority of the farmers have not heard about the schemes like Gramin Beej Yojana. Also, when it comes to RKVY, only around 9% of the respondents agreed to having availed the scheme.

3.1.1.1. Income Trends

The qualitative trend on income in last five years was captured as shown in exhibit below. It has been observed that 28% of the respondents felt that their income has worsened over last five years with 21% respondents feeling that their income has remained same. Almost 51 % of the farmers have felt that their income has improved over the last 5 years.

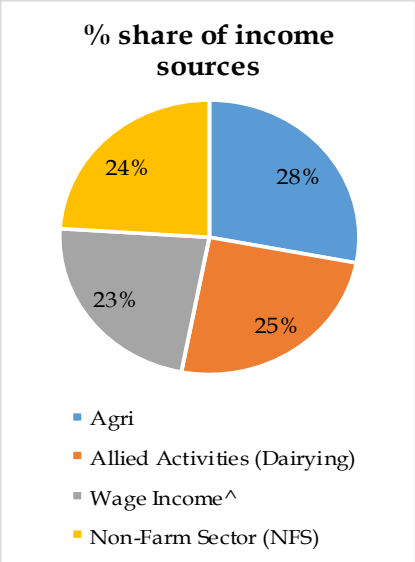
Exhibit 36: Income Trends of the farmers in Latur District

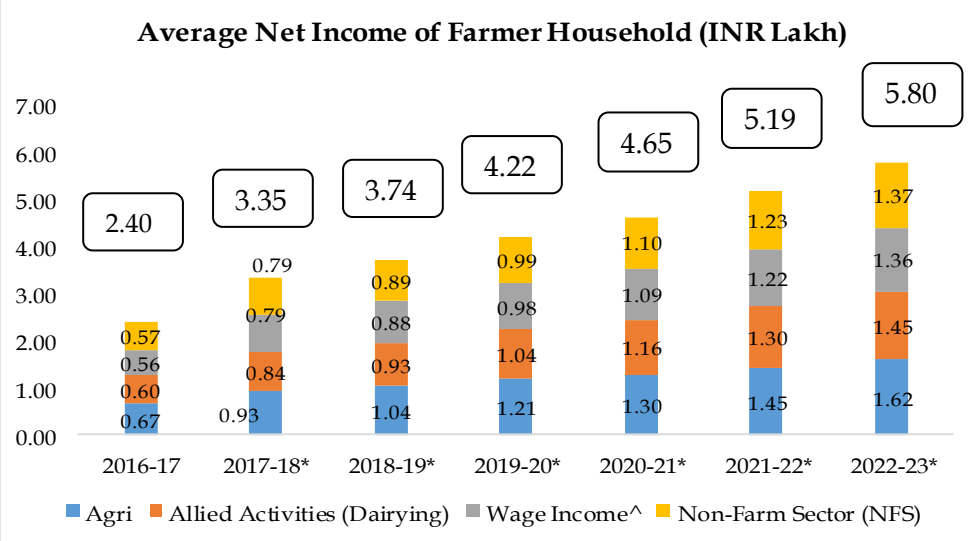


3.1.1.2. Income Projections

An attempt to also calculate the net income (net of cultivation costs and net income from livestock farming) along with projections till 2022-23 has been made based on the assumptions given below. The income from the agri predominantly comprised of incomes from cropping of Soyabean in the district. The non-farm sector enterprises comprised of private service, shop keeper, driver, business/small enterprises, Government service, Pension). It was found that the average net income of the farmer household in Latur district was found to be INR 2.40 lakh with 28% contribution from agri activities followed by Allied activities (25%) Non-Farm sector initiatives (24%) and wage income (23%). Considering the nominal growth rate of 11.61%, it is projected to almost double the net income levels to INR 5.80 lakh by 2022-23 with appropriate recommendations and strategies. Since, the data pertaining to composition of farmers' income in the State is not available for 2002-03 and 2012-13 to arrive at change in composition of farmers' incomes, the estimations for incomes till 2022-23 is done basis the current composition available as per the survey results.

Exhibit 37: Average Net Income of Farmer Household from various sources in Latur district





Key Assumptions#

- *CAGR Nominal Growth in Income from 2002-03 to 2012-13 for Maharashtra - 11.61%*
- *CAGR Real Growth in Income from 2002-03 to 2012-13 for Maharashtra - 5.66%*
- *Doubling time in years @ nominal CAGR - 6.31*
- *Doubling time in years @ real CAGR - 12.58*

#Source: Level of Income of farm holdings (Rs) and doubling time (Years) – Maharashtra Vs All India, Computed from NSSO (2005 & 2014). Situation Assessment Survey, Report No. 497(59/33/5) & 69(70/33/1)

*Projected Net Incomes

^ Gross Incomes wrt Wage Incomes and NFS (Private Service, Shopkeeper, Driver, Business/Small Enterprises, Government Service, Pension)

3.1.2. *Key Challenges*

a. Technology and Cultivation Practices

- Mono-cropping pattern with Soyabean cornering the bulk of the land space due to prevailing soil and agro climatic conditions (52%). Area under sugarcane has reduced drastically due to unavailability of water for irrigation. Also, area under Jowar has reduced considerably (negligible samples during the survey), thereby creating a problem for availability of animal fodder.
- Though adoption of F&V crops post drought period (e.g. Tomato in Chakur Block and custard apple in Ausa & Amberjogai) has been initiated, the overall acreage under high value crops is still considerably low on account of lack of awareness, resources and know how.

b. Agri Infrastructure Development

- Only around 10 cold storage facilities were found to exist in and around Latur city. Facilities such as market intelligence systems, warehouses and WRS were almost nonexistent.
- As a result of limited processing facilities in the region, a large chunk of the produce (especially soybean and sometimes tur) is sent to neighboring Solapur District and states of Madhya Pradesh & Andhra Pradesh for processing.
- Though upcoming facilities which have adequate storage infrastructure for F&V products (tomato, custard apple, pomegranate, Mango) are being implemented (Latur Cold Storage & Kisan Mitra Cold Storage), these facilities are not enough in terms of services and proximity to production clusters.

c. Marketing, Prices and Trade

- Though e-NAM is proposed to be implemented in Latur APMC in the near future, it is still not in place. Delay in payment, delay in sale of produce, transparency issues, levy of unauthorized charges are the key reasons for not receiving the fair dealing by the farmers. Still 60% of the transactions take place in cash.
- Lack of initiatives to encourage contract farming to take up cultivation of high value horticultural crops such as medicinal &aromatic plants, fruits, vegetables, spices and ornamental flowers.

d. Crop Diversification and Post Production Management

- Owing to drought & reduction in sugarcane on account of the resultant decrease in productivity, current trends are seen shifting from pulses in Kharif & Jowar in Rabi to Soybean, Tur & Urad in Kharif & Wheat/Gram in Rabi
- As a result of this, farmer groups & few progressive farmers along with departmental help have initiated restricted F&V cultivation, specifically for tomato (Chakur block), custard apple (Sangola in Latur), pomegranate (Killari in Latur) & grapes/guava (Nilanga in Latur). However, owing to negligible CA/cold storage facilities or processing facilities, the produce is disposed off to other districts within the state or to

other centres in neighboring states at subpar price. These crops seldom find their way to APMCs.

e. Credit and Insurance

- The small and marginal farmers depend more on the informal sources like money lenders for credit for asset creation as compared to the medium and large-size landholders which charge exorbitant rates of interest compared to formal sources of income.
- Despite awareness about the insurance schemes and benefits, there is reluctance by the farmers to adopt crop insurance policies on account of lack of funds for payment of insurance premium, lack of trust on insurance companies and unfavorable policies
- Though lower volume higher value crops such as custard apple, Aonla, Mango, pomegranate, mulberry cultivation, others have a good scope of premium and higher income realization to farmers, banks are less willing to lend because of less scale at present & fluctuations in the market.

f. Animal Husbandry Management and Integration Farming Systems

- A major challenge is the availability of dry fodder as feed for the livestock. Prevalence of mono-cropping pattern with Soyabean and grams has resulted in stark decline in jowar and maize cultivation in the district leading to fodder scarcity. Awareness regarding chafing of fodder (Jowar, Bajra, Maize, and Sugarcane) is minimal in farmers who feed it to cattle as it is. Lack of slope/hilly terrain in the region also affects availability of feed for the livestock.
- Though sericulture has picked up marginally in Latur post drought period, lack of market linkages, hand holding and marketing intelligence due to which sub-par income realization to the farmer is seen. (Raw silk @INR 625/kg is the market rate in Latur which fetches a rate of INR 800/kg in Bangalore)

g. Irrigation Management

- Around 62% of the land area of the surveyed respondents was found to be non-irrigated. The area is one of the most climatically distressed districts in the state (as well as India) which has created an alteration in cropping patterns and affected overall farmer wellbeing in recent years.
- The district is predominantly rain fed – averaging around 650 mm a year. Most irrigation is ground water irrigation coming from wells. Presence of micro irrigation or protective irrigation is negligible.
- Private water suppliers are indulging in sky high prices during peak distress period.

h. Extension Services

- Awareness and adoption of benefit from government schemes and initiatives was found to be negligible amongst the farmers. Only trainings and programs provided by KVKs had some visibility in the farming community owing to word of mouth and

communication with market intermediaries. Though all respondents had heard of KVKs, a negligible section of them were able to derive benefit from the same.

i. Non-farm incomes

- Since labour has been the key problem in the district, wage labour is in demand & is the key non-farm source of income. However, it provides inconsistent returns.
- Migration during off season results in fluctuating manpower supply and affects avenues for non-farm income.

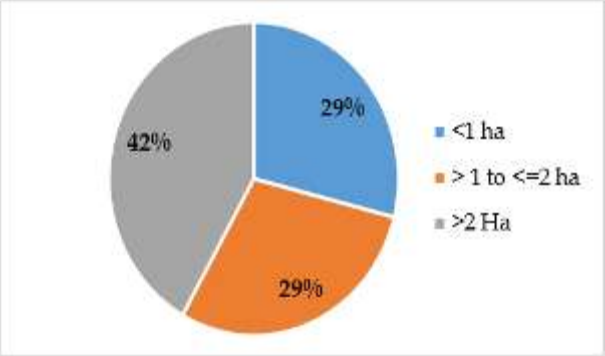
Figure 2: Farmers survey underway in Latur

3.2. Nashik

3.2.1. Overview of Nashik District

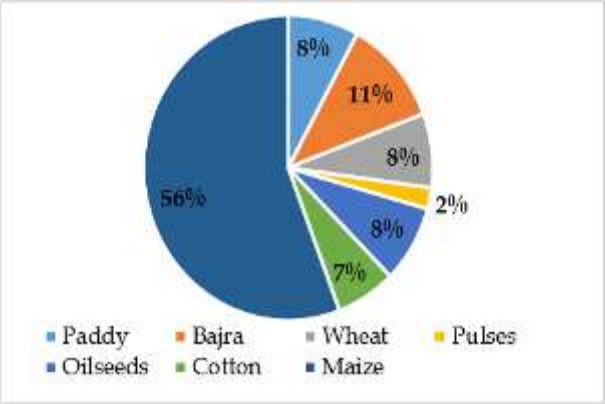
Agro Climatic Zones: The district of Nashik mainly consists of four different agro-climatic zones. The Ghat zone or the tribal belt receives a rainfall of 3,000 to 5,000 mm with laterite soil and undulated topography. Out of 15 blocks in the district, as many as 8 blocks including Surgana, Peth, Igatpuri, Kalwan, Baglan, Dindori, Trimbakeshwar and Nashik are tribal blocks. Rice is mainly grown in the zone during the rains and farmers migrate to Nashik city and other places during off season and work as wage labours. The other two zones consist of transition zone I (annual rainfall of 1,250 mm to 3,000 mm with reddish brown soil) and transition zone II (annual rain fall of 700 mm to 1240 mm and black soil). The framers grow different varieties of agriculture and horticulture crops in the belt with multiple cropping. The fourth zone is the water scarcity zone with annual rainfall from 500-700 mm and coarse shallow soils. Du to water scarcity, the major crops grown in the belt includes bajra, cotton, maize and pomegranate.

Exhibit 38: Landholding Pattern in Nasik District



Agriculture as key occupation: Nasik is a predominantly agriculture dominated district with more than 58% rural households and 4.87 lakh cultivators. The cropping intensity in the district is 107% and is amongst one of the most prosperous districts in terms of agriculture. The distribution of land holding is as depicted in the exhibit

Exhibit 39: Cropping Pattern - Nasik District



Cropping Pattern: Area under irrigation is about 2, 47,000 ha i.e. 29% of net sown area which is higher than other districts of Maharashtra. The percentage of area sown more than once to net sown area is 12.5%. Major Kharif crops includes Maize, Bajra, Onion, Paddy, millets and other horticulture crops. Major F&V include Grapes, Pomegranate, Banana, Strawberry, Tomato, Onion etc. Major Rabi crops include wheat, groundnut, gram, oilseeds etc.

Horticulture Development: Nashik accounts for 18% of total area and 16.8% of total production of horticultural crops in Maharashtra. Major fruit crops being grapes, pomegranate, guava, mango, strawberry, papaya, aonla etc. and major vegetables being tomato, chili, brinjal, cucumber, cauliflower, cabbage and capsicum. Although the area

under cereals, oilseeds and pulses has witnessed a decreasing trend; area under horticulture crops has been increasing.

Irrigation: The net irrigated area in Nashik is 2, 47,000 ha (29% of net sown area). Out of the total area more than 75% is irrigated through tube wells and balance 25% through surface irrigation. The net available groundwater in the area has been decreasing regularly.

Animal Husbandry and Allied Sectors: At present, there are 10 chilling plants in Nashik with a capacity of 1.75 Lakh liters. Average collection of the district is at 52,817 Liters per day. Only 80 primary producer's cooperative societies are operating. There is no major private dairy cooperative in the area and therefore dairying is not much commercialized and practiced as a subsistence activity. Poultry production in the region is mainly undertaken by private players including Godrej Agrovet, Suguna hatcheries. Sheep and goat rearing are the other income generating activities practiced in the region but practiced on a very limited scale. Dairy development in Nashik is underdeveloped on account of lack of organized marketing channels, lower productivity and limited availability of fodder. Buffaloes constituted almost 50 % of the total milk production of 908.05 lakh liters which is 0.95% of total state milk production during the year 2014-15[6].

Farm Mechanization: Compared to other districts, penetration of farm mechanization in Nasik is much higher (18 tractors per 1000 ha) but far less than desired levels. Requirement of farm equipment is particularly higher due to grapes cultivation.

Agriculture Marketing Infrastructure: There are 16 APMC's and 31 sub-market yards in Nashik district. In addition there are 91 rural haats in the districts which are unregulated.

Food Processing & Storage Infrastructure: There are estimated around 623 warehouses in Nashik with a combined storage capacity of 1, 70, 230 MT. An additional storage capacity of 2, 21,219 MT is required in the district. In addition, Nashik has 70 cold storages with 5,600 MT capacity. In terms of food processing units, there are 21 rice mills, 18 dal mils and 45 oil mills. In addition tomato processing, raisin making units, mango and other fruit processing units are also present. There are 37 wineries, the major ones being Sula & Charosa wineries.[7]

Non-Farm Activities: As of 2012, there are 754 units registered in Nashik with employment generation potential of 23,443. The key non-farm income activities includes textile, tobacco, apparel, leather based, wood and pulp products, bottling, media, chemicals, rubber and other service oriented activities. Other key activities include raisin making, textile clusters, wine clusters etc. Rural artisans and village industries in the district suffer from lack of organized approach towards linking of the artisans to the market.

[6] *Source: Potential Linked Credit Plan- Nashik (2017-18), NABARD*
[7] *Source: Potential Linked Credit Plan- Nashik (2017-18), NABARD*

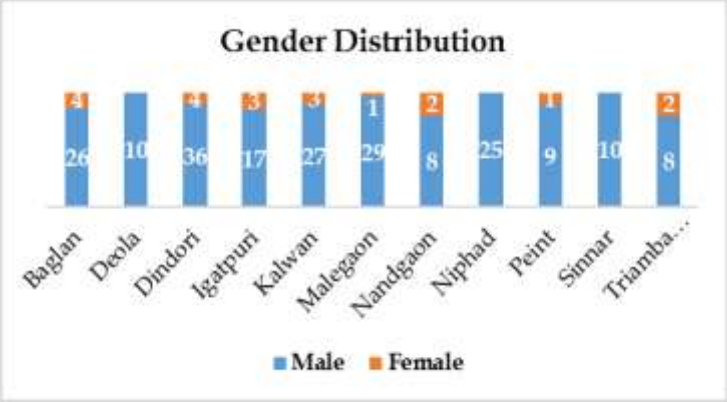
3.2.2. *Survey Observations*

3.2.2.1. Socio Economic Profile of the Farmers

The key parameters analyzed under this section included demographic information, social category of the household, family structure, occupational structure and house ownership. The key findings have been explained below:

Gender Distribution: The exhibit shows distribution of samples between various tehsils in Nashik. As per the survey, decisions related to agriculture and allied activities decisions are taken and driven by males and females in the family has very limited role in the decision making process. Agriculture was the primary occupation of all the respondents. Out of total samples surveyed, approximately 10% of the respondents were female decision makers of the households.

Exhibit 40: Gender Distribution of surveyed farmers - Nashik District (nos.)



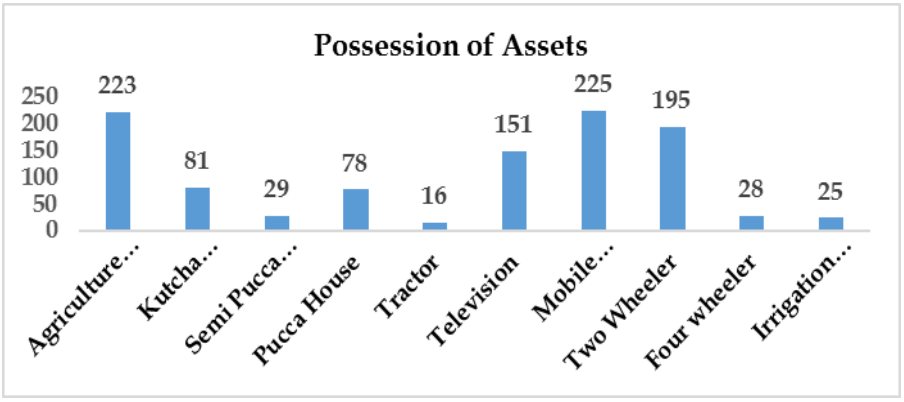
Family Structure- 45 % of the respondents belonged to the nuclear family, 13% were of extended family and the balance belonged to joint family. Joint family has an average of 7 members in it with 4 members engaged in the farming and allied activities and the level of unemployment in this families is 3 members per family. One key observation is that in joint families job diversification is minimum.

Table 23: House Hold Size of Surveyed Farmers - Nashik District (nos.)

Type	Average Household Size (Adult)	Farm	Non-Farm	Unemployed
Joint	4.8	4.2	0.4	1.6
Nuclear	3.2	3	0.2	0.5
Extended	4.8	4.7	0.1	0.7

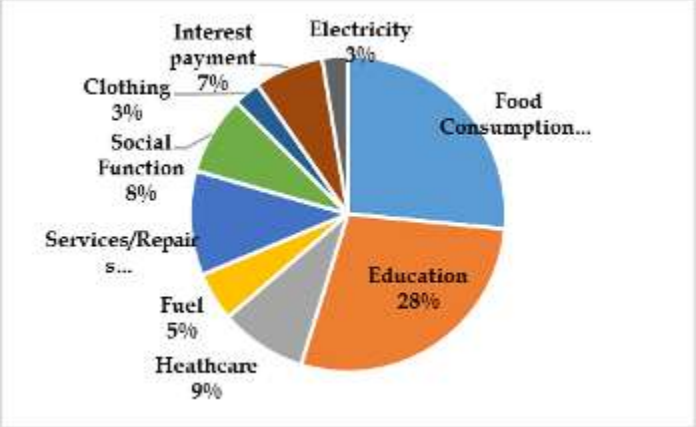
Possession of Assets: The possession of assets by the farmers as given in the exhibit below which indicates that 99% of the farmers have agricultural land as well as mobile phones. The highest percentage of the farmers possessing the assets are included two-wheelers (87%), television (67%) four wheelers (13%) and irrigation pumps (11%). Due to lower penetration of farm mechanization primarily on account of majority of mechanization used in grapes farming, merely 7% of the farmers had tractors for their farm management operations. It was also observed that farmers never sold these assets to cope up during the financial distress situations but only to satisfy their personal aspirations like availing exchange scheme benefits, second hand phones or television sets.

Exhibit 41: Possession of Assets by Farm Households



Annual Household Expenditure - The annual household expenditure pattern of the target respondents were analyzed. It was found that the maximum monthly expenses were incurred on Food Consumption (26%) followed by education (28%), healthcare (9%), servicing/ repairs (11%) and others.

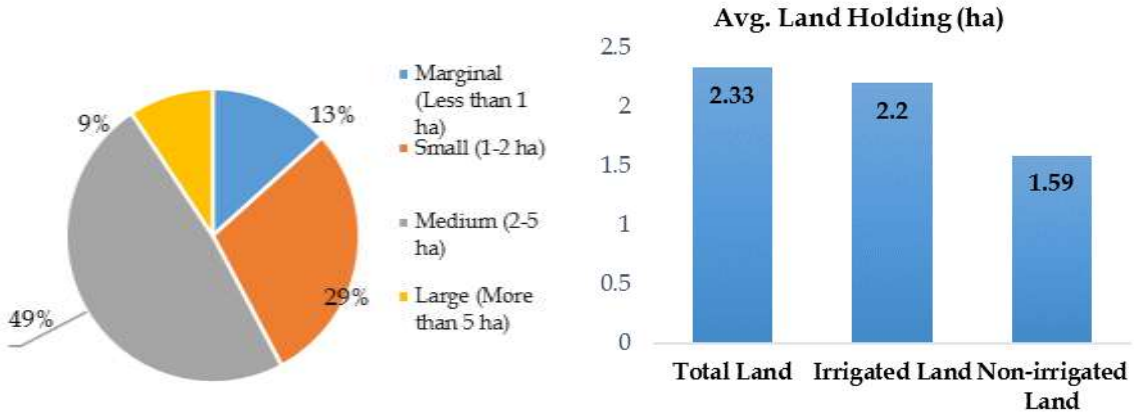
Exhibit 42: Annual Average Household Expenditure Details - Nashik



3.2.2.2. Assessment of Farm Incomes and Factors Impacting the Farm Incomes

Land Holding and Cropping Pattern:

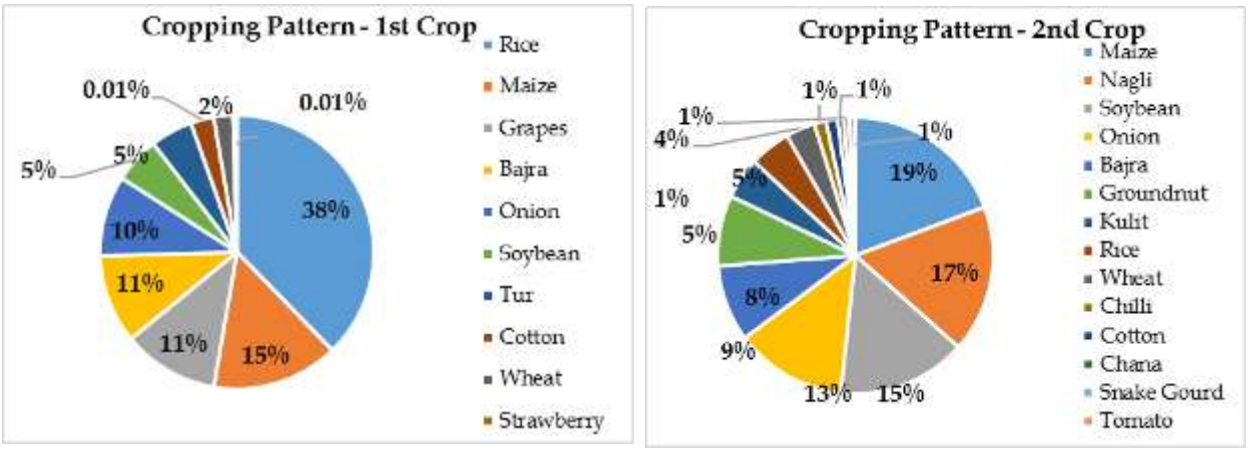
Exhibit 43: Average Land Holdings - Nashik District (in ha)



The cultivated land was owned by all the 225 respondents with an average land holding of 2.33 hectares. Average irrigated land is 2.2 ha. The farmers' categorization is as mentioned in the Exhibit with 13% marginal farmers, 29% small, 49% medium and 9% large farmers.

Cropping Pattern and Cost of Cultivation: The cropping pattern followed by the farmers in the study area was assessed on the parameters of area under cultivation, production, markets and average selling price. Majority of the area surveyed followed multiple cropping with minimum 2 crops in a year. The majority share of primary crop was of rice (38%), followed by maize (15%), grapes (11%), bajra (11%) and onion (10%). Other crops include soybean (5%), tur (5%) and wheat. As a second crop, area under maize ragi (17%) was highest followed by onion (13%), maize (9%) bajra (9%) and groundnut (8%). The exhibit below depicts the distribution of different crops within the cropping pattern of surveyed farm households.

Exhibit 44: Cropping Pattern of primary and secondary crops - Nashik District



Cost of Cultivation

The major crops grown by the surveyed households in Nashik include rice, bajra, maize & soybean among foodgrains & oilseeds; grapes in fruits, tur in pulses and onion in vegetables

Table 24: Average Cost of Cultivation of key crops - Nashik District

Crops	Average area under cultivation (Ha)	Average Production (Quintals)	Average Total Cost INR/Ha
Rice	1.6	31.2	12,476
Maize	1	23.7	18,375
Grapes	5.16	192	1,26,230
Bajra	1.2	5.5	12,599
Onion	1.2	151	25,634
Soybean	0.9	16.3	24,098
Tur	1.4	19.3	34,259
Cotton	1.4	13.9	17,434
Wheat	0.7	31.4	15,957
Strawberry	1	470	1,50,000

**Cost of cultivation includes cost of seeds, irrigation, fertilizers, insecticides, labour and manure.*

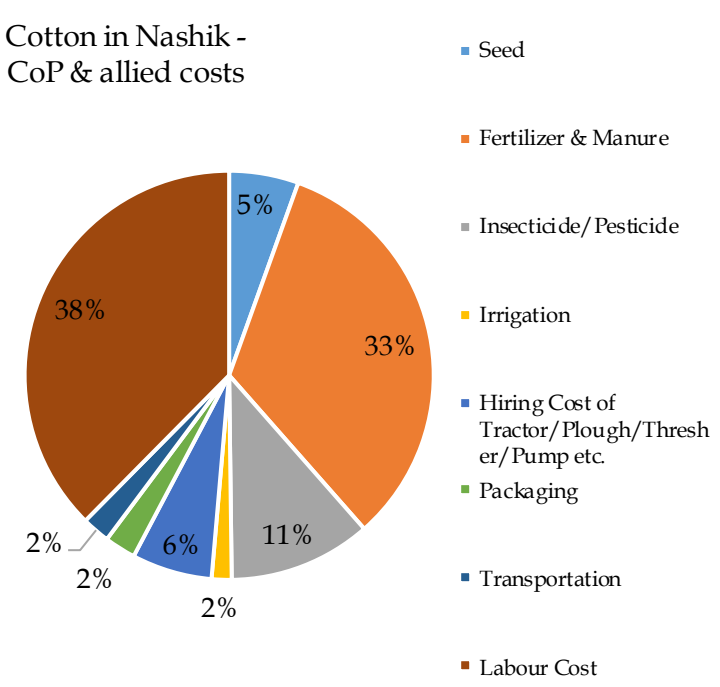
While it is clearly visible from the above table that average cost of cultivation is lowest in rice followed by bajra, wheat and maize among food grains. The highest cost of cultivation is in strawberry followed by grapes, tur and onion. It can be inferred from the above data that crop diversity is abundant in Nasik district. Whereas in the Igatpuri belt, cultivation of rice is abundant, the plain belt has a higher crop diversity with food grains grown along with fruits and vegetables. As we move towards water scarcity belt, cultivation of bajra, maize and pulses is higher.

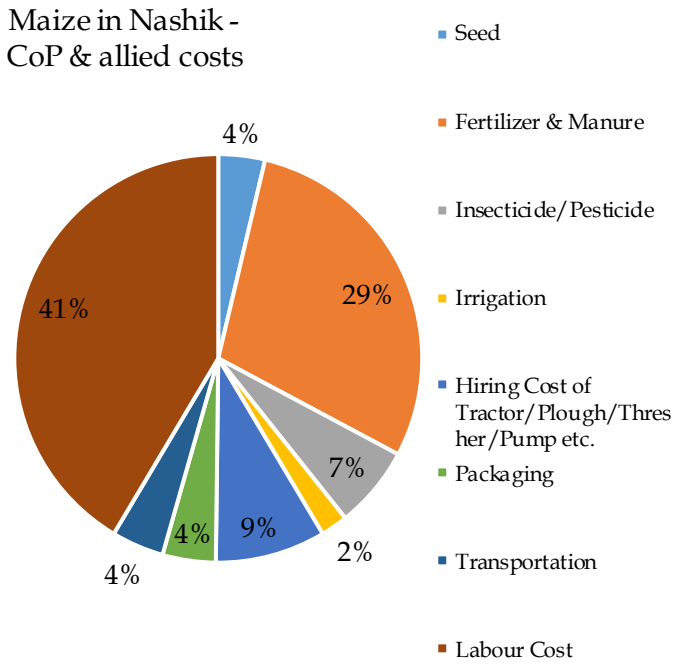
A breakup of the cost of production & post-harvest costs of major commodities in Nashik district as per primary survey is depicted in the table below. (Only primary crop grown has been considered):

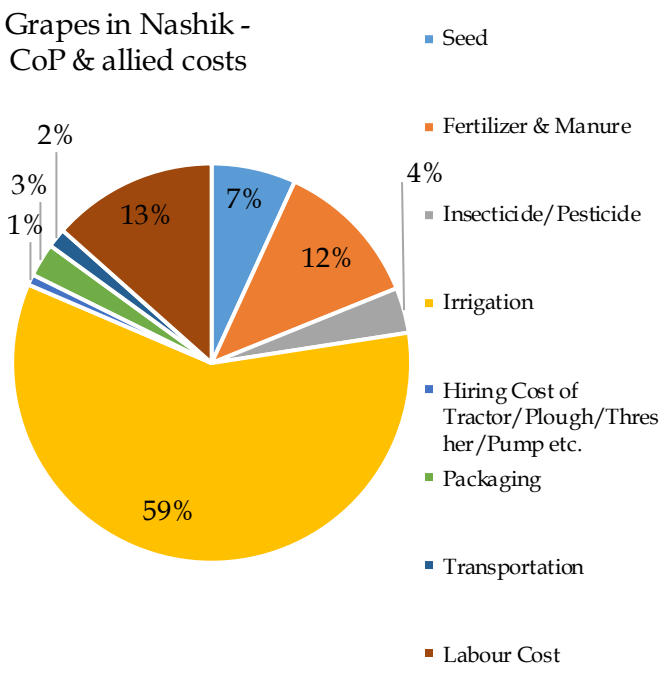
Table 25: Nashik District: Cost of Production & allied costs of major commodities (INR/Ha.)

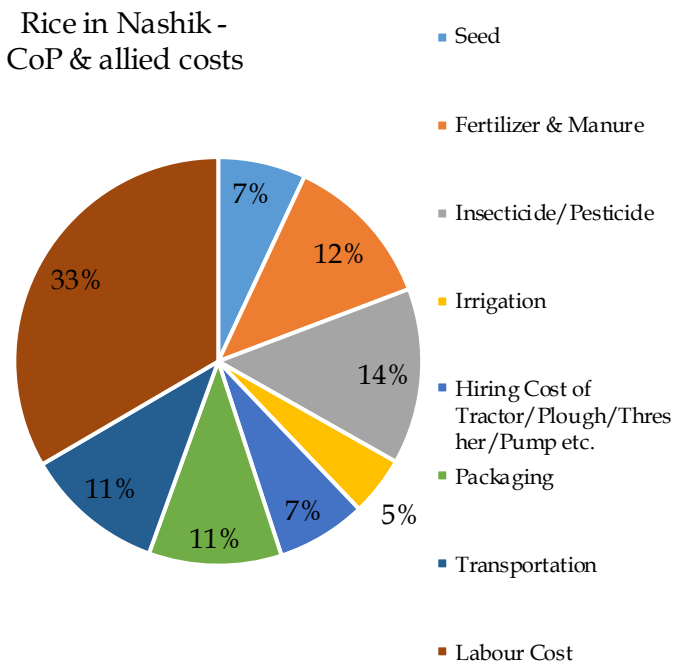
Cost Head (INR/ha)	Grapes	Rice	Onion	Bajra	Cotton	Maize	Soyabean	Tur
Seed	8,635	868	2,569	717	958	680	3,164	2,127
Fertilizer & Manure	15,209	1,532	10,371	1,535	5,756	5,345	6,750	19,919
Insecticide/Pesticide	4,635	1,739	2,247	604	1,968	1,195	959	2,286
Irrigation	74,319	585	1,032	539	275	394	568	1,976
Labour Cost	16,952	4,169	5,545	4,506	6,553	7,614	8,651	4,388
Hiring Cost of Tractor/Plough/Thresher/Pump etc.	1,092	887	1,601	714	1,108	1,608	3,324	1,587
Packaging	3,422	1,315	1,011	2,068	431	776	247	972
Transportation	1,966	1,381	1,258	1,916	385	763	435	1,004
TOTAL	**1,26,230**	**12,476**	**25,634**	**12,599**	**17,434**	**18,375**	**24,098**	**34,259**

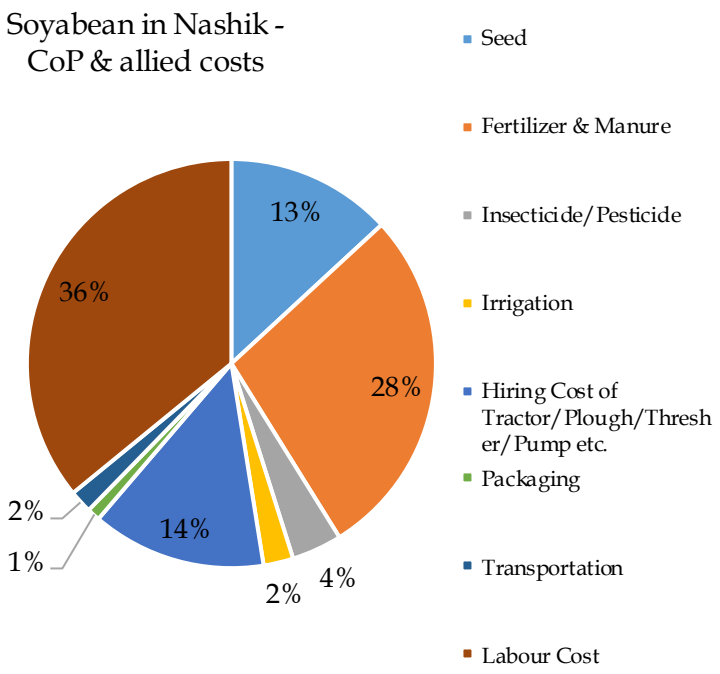
Exhibit 45: Distribution of CoP & allied costs for major commodities in Nashik district

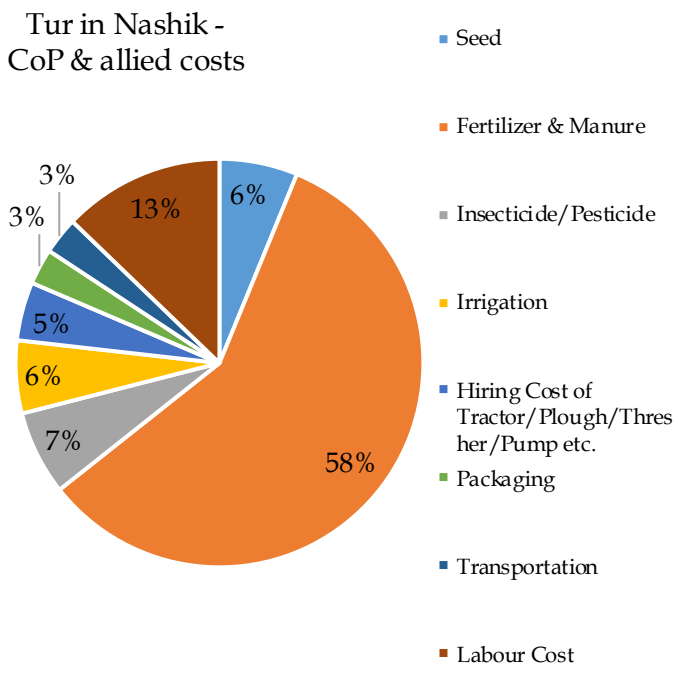


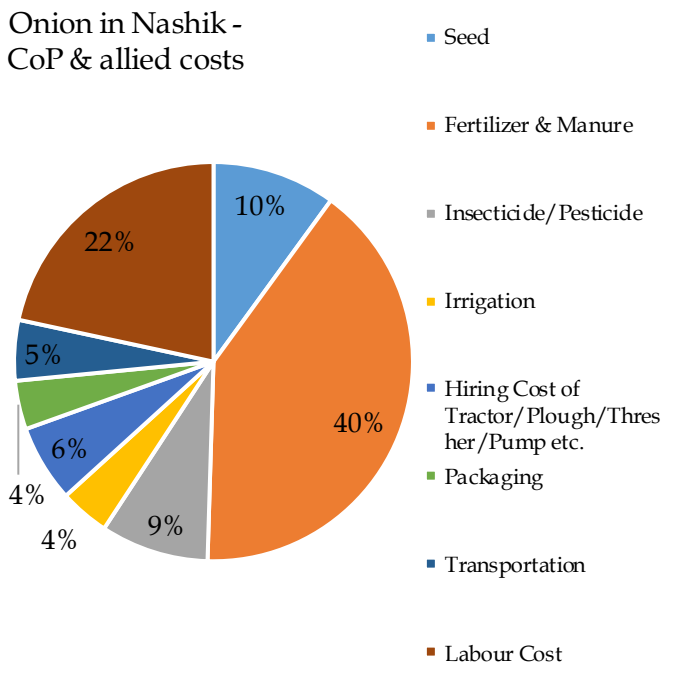


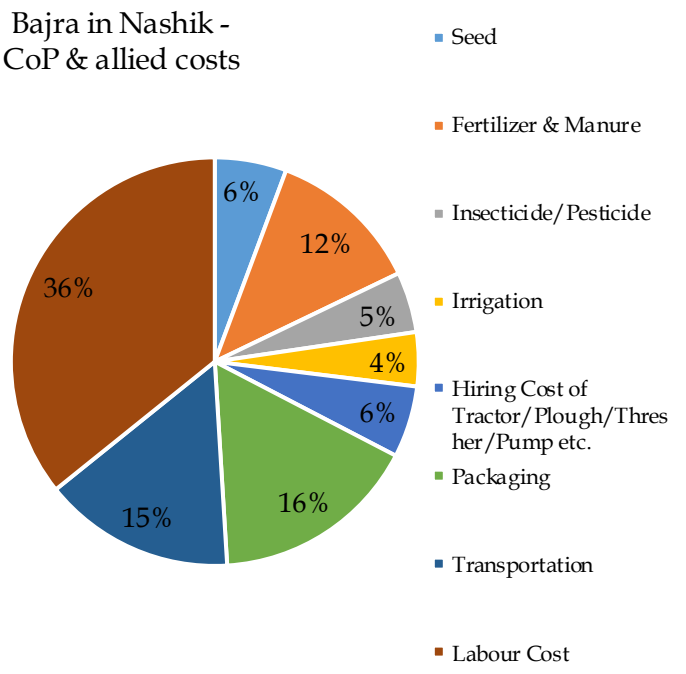





Soyabean in Nashik - CoP & allied costs
13%
28%
4%
2%
14%
1%
2%
36%
Seed
Fertilizer & Manure
Insecticide/Pesticide
Irrigation
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Packaging
Transportation
Labour Cost

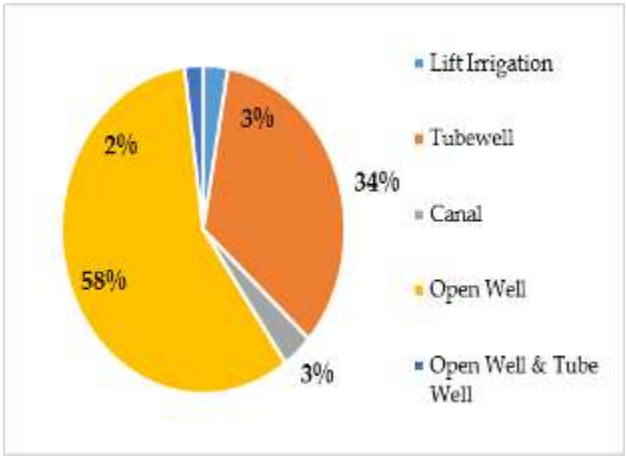

Tur in Nashik - CoP & allied costs
6%
58%
7%
6%
5%
3%
3%
13%
Seed
Fertilizer & Manure
Insecticide/Pesticide
Irrigation
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Packaging
Transportation
Labour Cost


Onion in Nashik - CoP & allied costs
10%
40%
9%
4%
4%
6%
5%
22%
Seed
Fertilizer & Manure
Insecticide/Pesticide
Irrigation
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Packaging
Transportation
Labour Cost


Bajra in Nashik - CoP & allied costs
6%
12%
5%
4%
6%
16%
15%
36%
Seed
Fertilizer & Manure
Insecticide/Pesticide
Irrigation
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Packaging
Transportation
Labour Cost

Source of Irrigation: It has been observed that 42% of the land is non-irrigated which is major concern. The area receives adequate rainfall and the water table level is also good, but the lack of irrigation lifting machinery has resulted in the increased non-irrigated land. Majority of the owned irrigation facilities has open wells and tube wells. Micro irrigation facilities such as drip and sprinkler irrigation are comparatively limited. Of the farmers surveyed open well contributed maximum share of irrigation (58%) followed by bore well/ tube well (34%).

Exhibit 46: Source of Irrigation: Nashik District



Labour employed in cultivation of crops: The labour intensity was captured across crop value chains undertaken by the farmers though measurement of the labour man-days and average labour cost per man-day as shown in Exhibit. Labour intensity was highest in rice followed by grapes followed by bajra, maize, grapes and cotton and lowest in onion, tur and soybean.

Exhibit 48: Avg. Labour man-days deployed in farming activities - Nashik District (%)

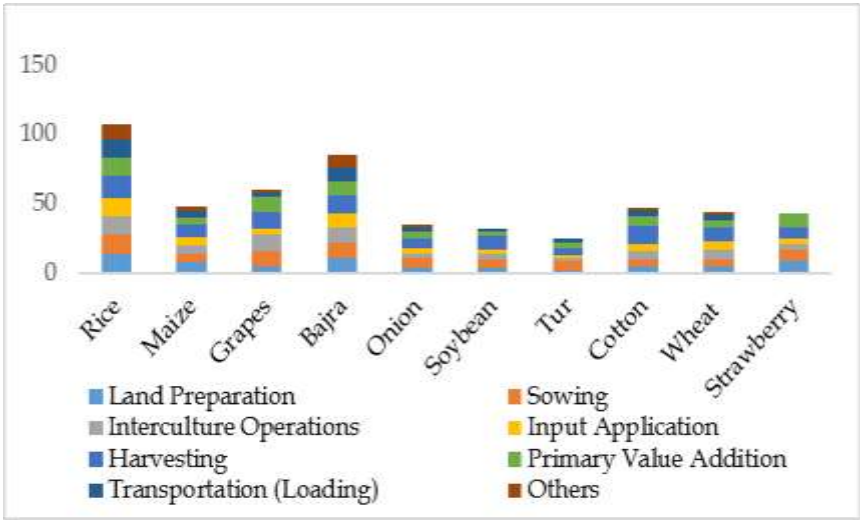
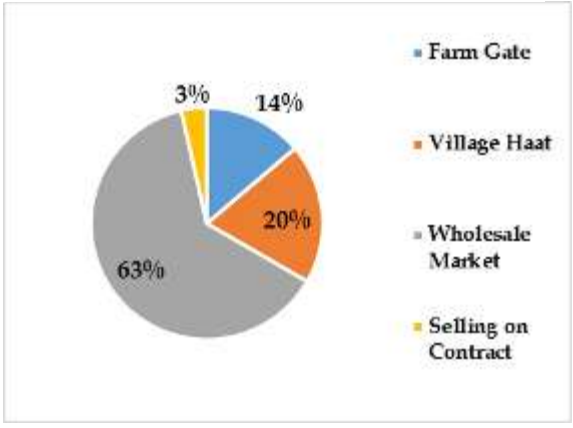


Exhibit 47: Point of Sale of key crops in Nashik District

Mode of Transportation & Market for Sale of Produce: Majority of the respondents interviewed sell their produce in the nearest wholesale market and APMC's. 20% of the respondents sell their produce in the village haats and balance 14% sell it to the traders/middleman at farm gate level. Contract farming is very limited with only 3% of the respondents selling on contract (majority grapes farmers). In terms of mode of transportation, majority (95%) use mini trucks as the mode of



transportation in Nasik. The average distance travelled for sale of produce is approximately 13 Km.

Major markets for sale of produce

The major APMCs are Lasalgaon, Pimpalgaon, Sinnar, Nashik, Nandgaon, Madgaon, Deola etc. Basis the survey, the major markets for sale of commodities by the respondents are being listed below:

Table 26: Major Markets for sale of commodities - Nashik District

Commodity	Major Market
Onion	Jalgaon (Nimbait), Malegaon, Nandgaon, Satana, Lasalgaon, Sinner, Nashik, Dindori
Grapes	Pimpalgaon
Bajra	Jalgaon (Nimbait), Vanpat, Nandgaon, Dindori, Nashik
Cotton	Malegaon
Maize	Jalgaon (Nimbait), Nandgaon, Kanashi, Malegaon, Dindori, Baglan, Nashik
Rice	Dalpatpur, Umbarpad, Adwan, Rayambe
Soybean	Borgaon, Dindori, Nashik
Tur	Satana APMC, Nashik
Wheat	Vanpat, Kanashi, Dindori, Nashik, Sinner
Groundnut	Dalpatpur, Vanpat, Nashik, Trimbakeshwar
Ragi (Nagli)	Dalpatpur, Umbarpad, Adwan, Satana, Dindori

Average Selling Price of Key Commodities

Comparing the average selling price of major food grains, pulses and oilseeds (except for Soybean, cotton); prices of majority of crops have higher price in comparison to the MSP.

Table 27: Average Selling Price of key commodities - Nashik District

Crop	Average Selling Price (INR per quintal)	MSP (INR per quintal)*	% Difference in Realization
Rice	1,690	1,510	+11%
Maize	1,533	1,365	+11%
Grapes	3,312	NA	-
Bajra	1,708	1,330	+22%
Onion	689	NA	-
Soybean	2,316	2,775	-20%
Tur	7,636	5,050	+33%
Cotton	3,766	3,860	-3%
Wheat	1,940	1,625	+16%
Strawberry	2,500	NA	-

Crop	Average Selling Price (INR per quintal)	MSP (INR per quintal)*	% Difference in Realization
Ragi	1,591	NA	-
Horse Gram	2,166	NA	-
Groundnut	3,675	4,220	-15%
Chili	4,000	NA	-
Tomato	1,400	NA	-

**2016-17 MSP Prices*

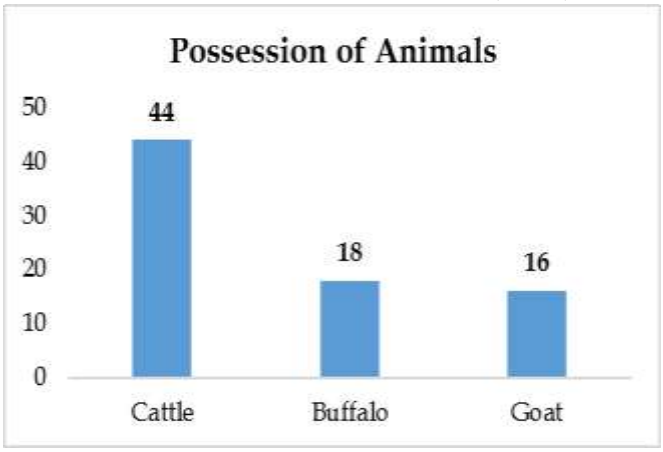
In case of crops (mainly oilseeds) including cotton, soybean and groundnut, farmers' net price realization is much lower than the MSP. In case of food-grains and pulses the price realization is higher.

In terms of infrastructure available for eNAM, of the APMCs surveyed in **Nashik, Pet** and **Trambhakeshwar**, although all the APMCs were connected to internet, none of the APMCs have assaying labs, electronic displays and e-auction halls. As most of arrivals consist of F&V, no transaction was undertaken through eNAM.

3.2.2.3. Farm Incomes from Allied Activities – Animal Husbandry

Among the allied activities, animal husbandry was one of the key allied activities which the farm households are currently engaged in Nashik is cattle rearing (20% penetration) followed by buffalo (7%). Goatery is also practiced by the farmers. Majority of the livestock rearing activities are undertaken by the farmers for subsistence and not for profitability. Poultry farming is undertaken to a very limited extent. Poultry farming is more commercial and is directly linked with the poultry players.

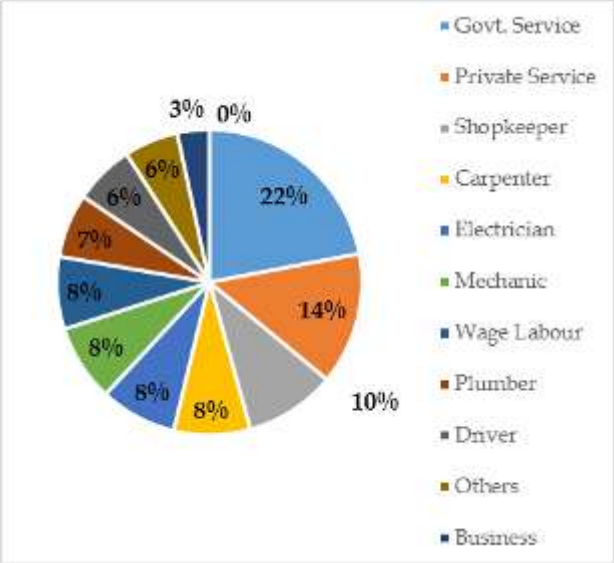
Exhibit 49: Possession of Animals - Nashik District (in nos.)

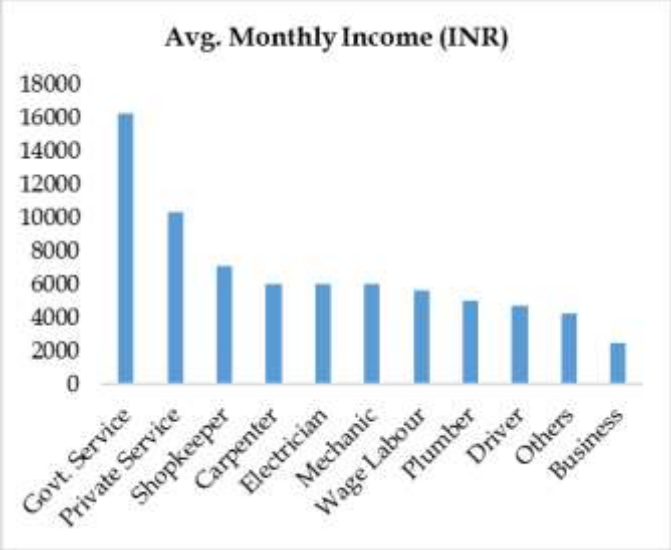


3.2.2.4. Assessment of Non-Farm Incomes and Factors Impacting the Non-Farm Incomes

Among the non-farm income sources, government services has the highest share (22%) followed by private service (14%), shopkeeper (10%), carpenter (10%) and electricians (8%). Wage labour contributes a relatively less share in non-farm incomes (8%). Other key non-farm income sources includes plumber, driving and own business. Average monthly income is highest in case of Govt. service and lowest in other businesses.

Exhibit 50: Sources of Non-Farm Income: Nashik District

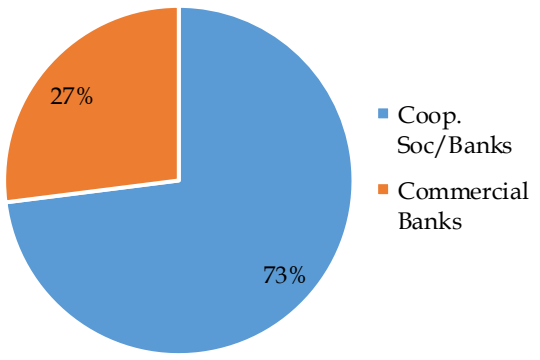




3.2.2.5. Access to Credit

The key source of availing the finance by the target respondents included Cooperative Societies/Banks, Commercial Banks, Landlord/Money lenders and Relatives and Friends. During primary survey, of the respondents who had availed credit, 73% said that they had availed loan facility from Cooperative Banks mainly for working capital requirement and duration of 12 months. The interest rate charged by Bank varied from 4-6% per annum. 27% of the respondents availed credit facility from commercial banks. Other farmers were not keen to respond and majority were availing credit facility from money lenders. Penetration of commercial banks have been relatively lesser in the surveyed areas. Majority of the farmers have availed credit for their working capital requirement for crop output and livestock with a tenure of 12 months.

Exhibit 51: Sources of formal and informal credit in Nashik District



3.2.2.6. Policy Support & Private Sector Participation

Govt. support has been found mainly across four segments in Nashik i.e. Animal husbandry, agri inputs, finance and in marketing. Although KVK and ATMA are actively involved in assisting farmers in terms of extension activities, there is limited awareness among farmers in this regard. In addition, there is no support from Govt. in terms of agri-infrastructure, logistics and extension activities.

Table 28: Support by Government & Private Sector across Agriculture Value Chain – Nashik District

Sr. No	Parameter	Support
1	Inputs	Field demonstrations and consulting
2	Animal Husbandry/Vet Services	Veterinary support & medicines
3	Marketing	APMC for marketing
4	Agriculture Finance	Credit Availability

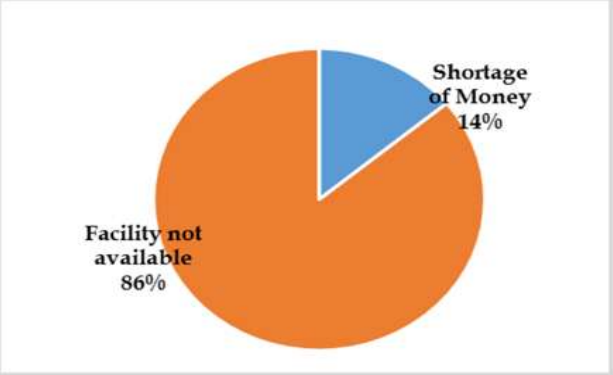
Table 29: Awareness and Adoption of Government Schemes in the District – Nashik District (nos.)

Government Schemes/Support	Awareness about the scheme among farmers	Benefited
Rashtriya Krishi Vikas Yojana (RKVY)	88 (39%)	8
MGNREGA	141(62%)	0
National Food Security Mission (NFSM)	90 (40%)	0
National Agriculture Insurance Scheme (NAIS)	53 (24%)	3
Krishi Vigyan Kendra (KVK)	88 (39%)	13
Grameen Beej Yojana	1 (1 %)	0

Distress Situation

On assessment of distress situation faced by the target respondents, it was revealed that the close to 60% of the farmers had suffered crop destruction in last few years due to different reasons. The major reason for distress was primarily water scarcity (86%), pest attack (6%) followed by major variation in price (4%) and temperature fluctuations (4%). Majority of the responses on water scarcity was witnessed in the water scarcity belt in Nasik. There was no assistance which the farmers had received from the Govt. Considering the awareness with regard to crop insurance, out of the target respondents 24% of farmers are aware of crop insurance while only 11% of farmers have their crops insured. The major reasons identified for not availing crop insurance as informed by the farmers are not being lack of the facility in the region followed by shortage of money.

Exhibit 52: Awareness of crop insurance - Nashik District



3.2.2.7. Income Trends

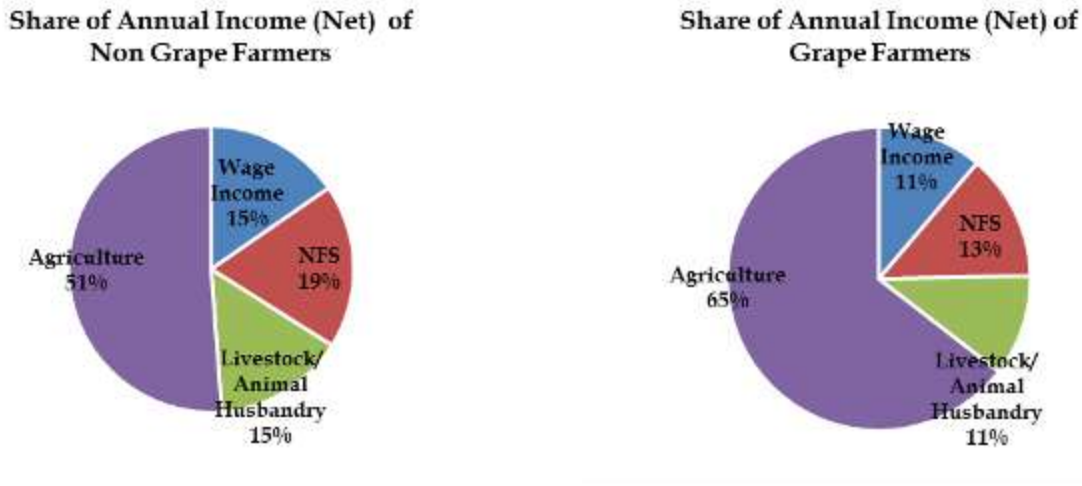
Basis the analysis from the survey, it was found that annual gross income from farming activities constituted 83% of the total income followed by non -farm (15%). Only 2% is contributed by livestock (allied income activities). This indicates that currently there is limited non-farm income sources in the region in comparison to farming and farming as an income generating activity is preferred by the farmers. A lot of awareness needs to be generated in terms of engaging in allied activities (animal husbandry) in the region.

The qualitative trend on income and expenditure on agriculture in last five years was captured in the questionnaire and was prompted by the interviewers. Basis the assessment, more than 70% of the respondents have witnessed increase in income levels whereas for 25% of respondents there has been a negative trend in income levels. On an average the farmer's income have increased by 5% in the last five years (range in between -5 -12%). In many cases farmers have witnessed a negative trend in income levels. In terms of expenditure, on an average farmers expenditure has increased almost 12% in the last five years (range from -5 to 12%). The main reason identified by the farmers have been increase in cost of inputs thus resulting in increased expenditure.

3.2.2.8. Income Projections

The current level of average income of farmer household (in net value terms) in Nashik district is provided in table below. The level of incomes are purely based on the assessment of sample surveyed in Nashik. In order to provide better representation of the scenario in Nashik, the current levels of income has been divided into two groups – income of grapes farmers (mainly medium and large farmers) and income of non-grapes farmers (mainly small and marginal farmers). For non-grape farmers, the data indicates that farm income from agriculture activities contributed to around 51% of the total average gross income followed by non-farm income (19%).The incomes from livestock and wage income contributed to around 15% each respectively of the total incomes. The net income from the agri predominantly comprised of incomes from cropping of Rice, Maize, Bajra, Soybean, Groundnut vegetables including onion and Pulses. The farmers do multiple cropping with 2-3 crops in a year. The non-farm sector enterprises comprised of private service, carpenter, plumbing, electrician, mechanic, shopkeeper, driver, business/small enterprises, Government service, and pension. The average annual net income in 2016-17 for the sample households (non-grape farmers) in Nashik district was found to be INR 4, 41, 416.

Exhibit 53: Share of Annual Income of farm households in Nashik District

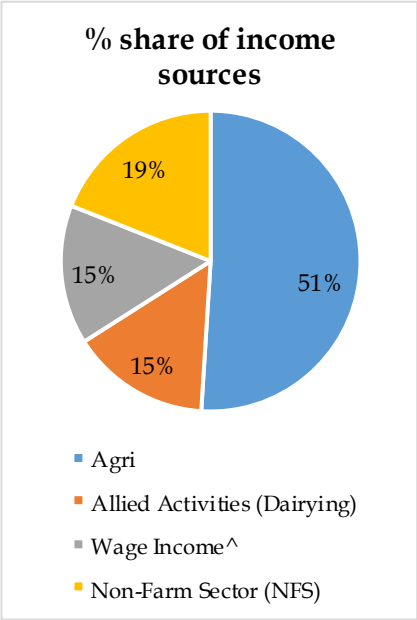


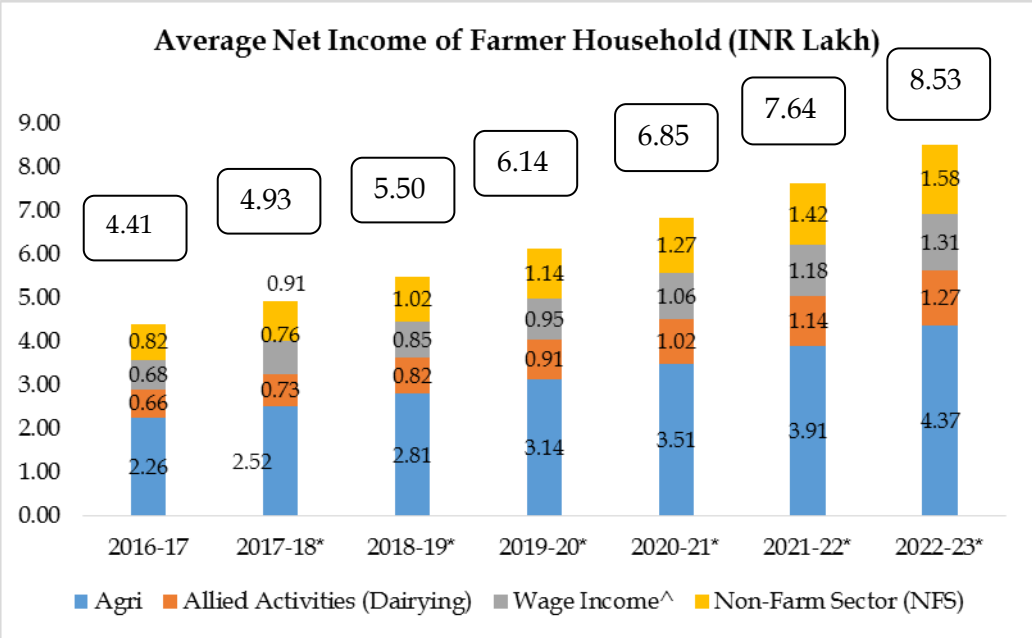
Source: Primary Survey, YES Bank Analysis

In contrast, for grape farmers the data indicates that farm income from agriculture activities contributed to around 65% of the total average net income followed by non-farm sector (13%). The incomes from livestock and wage income contributed to around 11% each of the total incomes. The average annual net income as on 2016-17 for the sample households in Nashik districts was found to be INR 6, 07, 037.

An attempt has been made to also calculate the net income (net of cultivation costs and net income from livestock farming) along with projections till 2022-23 based on the assumptions given below. The income from the agri predominantly comprised of incomes from cropping of Soyabean, Cotton and Pulses in the district. The non-farm sector enterprises comprised of private service, shop keeper, driver, business/small enterprises, Government service, Pension). It was found that the average net income of the farmer household in Nashik district was found to be INR 4.41 lakh with 51% contribution from agri activities followed by Non-Farm sector initiatives (19%), wage income (15 %) and Allied activities (15%). Considering the nominal growth rate of 11.61%, it is projected to almost double the net income levels to INR 8.53 lakh by 2022-23 with appropriate recommendations and strategies. Since, the data pertaining to composition of farmers' income in the State is not available for 2002-03 and 2012-13 to arrive at change in composition of farmers' incomes, the estimations for incomes till 2022-23 is done basis the current composition available as per the survey results.

Exhibit 54: Average Net Income of Farmer Household from various sources in Nashik district





Key Assumptions#

- *CAGR Nominal Growth in Income from 2002-03 to 2012-13 for Maharashtra - 11.61%*
- *CAGR Real Growth in Income from 2002-03 to 2012-13 for Maharashtra - 5.66%*
- *Doubling time in years @ nominal CAGR - 6.31*
- *Doubling time in years @ real CAGR - 12.58*

#Source: Level of Income of farm holdings (Rs) and doubling time (Years) – Maharashtra Vs All India, Computed from NSSO (2005 & 2014). Situation Assessment Survey, Report No. 497(59/33/5) & 69(70/33/1)

*Projected Net Incomes

^ Gross Incomes wrt Wage Incomes and NFS (Private Service, Shopkeeper, Driver, Business/Small Enterprises, Government Service, Pension)

3.2.3. Key Challenges

a. Technology and Cultivation Practices

- Although there is an increased usage of greenhouse cultivation and cultivation of vegetables and high value crops among the medium and large farmers, the transfer of technology is limited.
- Mainstreaming of innovations in the progressive regions of Nashik (Plain belt) and replication in the other regions (tribal and scarcity belt)
- Lack of adoption of suitable cropping pattern basis agro climatic conditions. For example short duration crops in scarcity belt.
- Due to lower penetration of farm mechanization primarily on account of majority of mechanization used in grapes farming, merely 7% of the farmers had tractors for their farm management operations.
- Availability of labour mainly due to migration of labour and sale of land (mainly in the tribal and scarcity belt). Labour as a percentage of cost of production is ~35-40%.

b. Agri Infrastructure Development

- Transportation facility for carrying produce from farm to the APMCs/rural hats/wholesale markets. Majority of farmers are using their own vehicles (motorcycles etc.) for transportation of produce.
- Lack of availability of adequate pack houses and cold storages near to farm for onion, grapes and pomegranate.
- Lack of availability of cooperative dairy structure including presence of private dairies in the region thus limiting growth of dairying in the region. Most of the organized cooperatives including Sangamner dairy are in the adjacent Ahmednagar belt.

c. Marketing, Prices and Trade

- Farmers are currently paid 10-15% lower than MSP in the open market for foodgrains. There is very limited MSP procurement in the surveyed villages
- None of the farmers are selling to Government purchase centers on account of issues pertaining to proximity of those centers to the farms, cumbersome procedures in selling to centers and banking facilities.
- For Fruits & Vegetables, there are limited marketing channels. 34% of the farmers surveyed sell their produce at farm level and village haats.
- Market disruptions in terms of price interventions for onion, tomatoes and grapes impacts the farmers in Nashik.
- Absence of brick & mortar infrastructure at the APMCs in Nashik for e-NAM integration - assaying labs, e-auction halls, scientific sorting/grading facilities or quality testing machines.

d. Crop Diversification and Post Production Management

- More than 80% of farm families had agriculture as a primary source of income. Allied agriculture activities including dairying and poultry farming is very limited and thus impacting return from farms and increasing risk of crop loss.
- Vegetables farming on a commercial scale is still not currently being undertaken and mainly large and medium farmers are undertaking the same.
- Limited crop diversification in the tribal belt and limited use of relay cropping/off season production.

e. Credit and Insurance

- Limited penetration of cooperative and commercial banks among the small and marginal farmers & poor crop insurance awareness.
- Majority of the FPOs/FPCs in the region have complained about lack of availability of credit facility to the FPCs required for scaling up of the companies both in terms of working capital and term loan.

f. Animal Husbandry Management and Integration Farming Systems

- Limited development of entire animal husbandry sector within the region. Dairy and poultry farming is not commercialized (except few FPCs and large farmers)
- No organized channel for marketing of milk present in the district. There is limited infrastructure in terms of chilling centers, milk collection centers and BMCs. No organized cooperative is operating on a large scale in the district
- Labour scarcity is another critical challenge in the district required for dairy farm management operations.

g. Irrigation Management

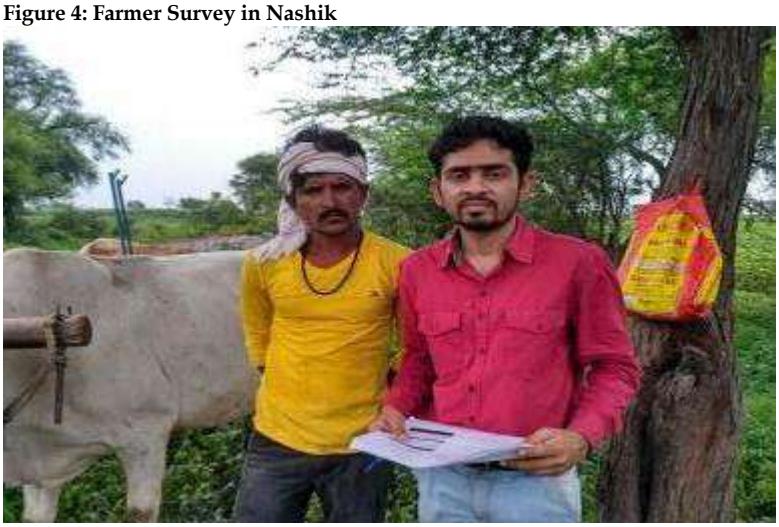
- The area receives adequate rainfall and the water table level is also good, but the lack of irrigation lifting machinery has resulted in the increased non-irrigated land. Majority of the owned irrigation facilities has open wells and tube wells.

h. Non-farm incomes

- Limited non-farm share in the overall income of the farm household. Carpentry, shop keeping, plumbing, electrician, driving, mechanics and wage labour are the non-farm income generating activities.
- Most of the employed work-force (surveyed farmers) either unskilled or semi-skilled.
- Lack of entrepreneurial approach and interest towards taking non-farm sector activities among the small and medium farmers.
- Lack of organized approach towards linking the rural artisans and village industries to the market. Although rural artisanal clusters exists in Nashik (Umerti & Kingaon for pottery & dry flowers), there is no on ground initiative in non-farm sector.

Figure 3: Visit to Fruits and Vegetables APMC in Dindori - Nashik

Figure 4: Farmer Survey in Nashik



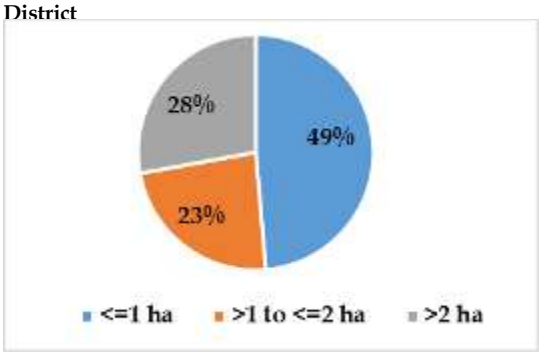
3.3. Sangli

3.3.1. Overview of Sangli District

Agro Climatic Zones: The district has three distinct climatic zones. The western zone, which receives very heavy rainfall, has lateritic soils on up-ghats and reddish brown soils on hill slopes, the latter being developed on parent material of trap rock. This consists of Shirala and Walwa blocks receiving maximum rainfall. The transition zone of Krishna valley has deep black soils of alluvial origin (consisting of Miraj, Tasgaon and Palus blocks). The third is the eastern drier zone, which consists largely of granular black soils and poor shallow soils. Saline-alkaline soils are met with in the low lying patches in the areas of low rainfall. The zone is also referred to as rain shadow zone consisting of Kawathemahakal and Jat blocks.

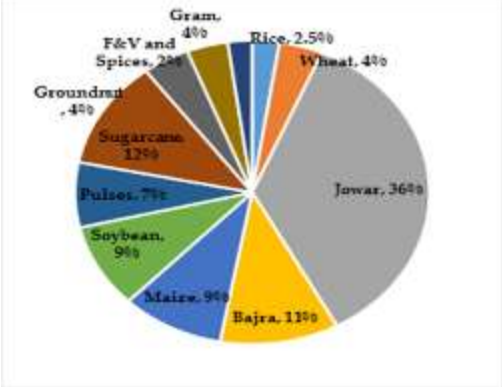
Agriculture as key occupation: Total land area in the district is 8.61 lakh hectares out of which total cropped area is 7.13 lakh hectares. The district predominantly is an agriculture based district. Out of the total number of 11.20 lakh rural workforce, 5.60 lakh are cultivators and 2.87 lakh are agricultural labourers. More than 49% farmers are marginal (< 1 ha.), followed by small and medium farmers (1-2ha) & large farmers (>2 ha).

Exhibit 55: Existing Landholding Pattern - Sangli District



Cropping Pattern: Major crops grown in the region includes grains like Jowar, Bajra, soybean, sugarcane, pulses, wheat and other fruits and vegetables including grapes, pomegranate etc.

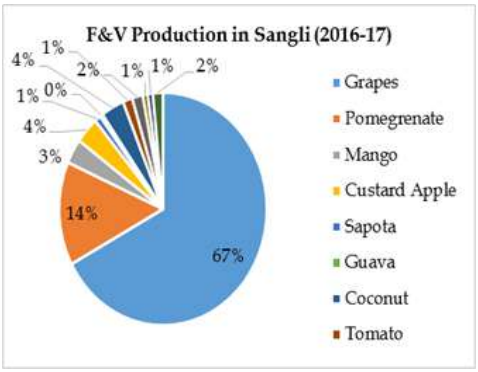
Exhibit 56: Cropping Pattern - Sangli District



Looking at the overall cropping pattern in the region, area under food grains is 55.55% followed by pulses, oilseeds and sugarcane. Fruits, vegetables & spices comprises only about 2-3% of total cropped area in Sangli. Because of the high intensity of irrigation, the crops like sugarcane and spice concentrate in the central part of the district. While the tehsils of Shirala, Walwa, Miraj, Khanapur, Tasgaon and Kavathemahankal are mono-cropped while the tehsils of Atpadi and Jat have two crop combinations. Mostly the crop rice is cultivated in the high rainfall areas of the district and on the other hand the pulses and oilseeds in association jowar and bajra are crops of the drought prone area.

Horticulture Development: The major fruits grown in the region are grapes, pomegranate and banana. This region grows tropical and subtropical fruits like grapes, mango, sapota, guava, jackfruit, banana, pineapple and grapes. Grape cultivation is concentrated in central and eastern central part of the district where irrigation facilities are available Average production is much higher at 28-30 MT/ha. Approximately 50% of the total grape production is processed as raisin and the remaining 50% is consumed domestically. Other major crops grown in the area are Pomegranate, vegetables and major flower crops including greenhouse cultivation.

Exhibit 57: Fruits & Vegetables Production in Sangli



Animal Husbandry and Allied Sectors: As per 2012 annual livestock census, Sangli has 1,322,591 livestock population. The population comprises of 492,633 buffalo (37%), 341547 cow (26%) and 482,022 sheep/goat (36%) respectively. Annual milk production in the district as of 2014-15 was 5,072 Lakh LPD accounting for almost about 5.3% of Maharashtra production. Basis the census of 2012, the poultry population Sangli is around 30,27,382 of which population of commercial birds in poultry farm is around 21,39,572 (71%). The layer production is about 8296 lakh eggs (2012-13). Sangli is one of the largest egg producing districts in Maharashtra accounting for almost 16.3% of total egg production of the state.

Agriculture Marketing Infrastructure: There are 7 APMC's in Sangli district with 15 sub-yards with majority of the arrivals at mainly 2 APMC's. Among all the APMC's in the district, Sangli APMC has the highest arrivals followed by Tasgaon APMC. The table below lists the major mandis in Sangli with major commodities handled:

Exhibit 58: Major APMCs in Sangli District

Sr. No.	Name of APMC	Major commodities traded
1.	Atpadi	Pomegranate, Maize, Jowar, Cotton, Banana
2.	Islampur	Soybean
3.	Palus	Cattle
4.	Sangli	Jaggery, Maize, Rice, Soybean, Raisins, Turmeric, Jowar, Wheat, Sapota, Onion, Potato, Watermelon
5.	Tasgaon	Tamarind, Raisins, Maize
6.	Vita	Green chili, Cotton

In addition to the APMCs, there are 194 rural haats in Sangli. In terms of storage infrastructure, as per the Potential Linked Credit Plan report of NABARD for Sangli (2017-18), the required storage capacity in the district is about 4.32 Lakh MT for a production of 13

Lakh MT annually. The current available storage capacity is about 2.4 Lakh MT thus implying a gap of 44% of total storage capacity (mainly for dry commodities). In terms of number of units, there are 81 warehouses and 35 cold storage units in Sangli.

Food Processing & Storage Infrastructure: Major agro-processing units in Sangli includes raisin processing units, oil/dal mills, turmeric processing units, wine units and sugarcane processing units. Currently, there are 50 turmeric processing units, 295 food processing units (259 in raisin manufacturing), 13 wine making units, 30 dal & oil mills & ~16 sugar mills in Sangli.

Table 30: Existing Food processing infrastructure - Sangli District

Type of Processing Activity	No. of units
Food (Dal/Oil Mills)	30
Sugar Mills	16
Fruit Processing unit	2
Spice Processing unit	91
Dry Fruits (Raisin units)	259
Cotton Ginning units	116
Milk Processing units	42

Non-Farm Activities: As of march 2016, there are 10366 micro, small, medium and large scale industries in Sangli district as detailed in table below. In terms of total workforce, out of 11,20,000 workforce, more than 77% are engaged in agriculture and allied activities, whereas 23% is engaged in other activities including industry, service and business sector, government/semi government services, education, healthcare and other social sectors.

Table 31: Major Industries in Sangli District

Sl. No.	Category	No. of enterprises	Employment Generation (No.)
1	**Micro**	8,097	54,554
2	**Small**	2,122	26,715
3	**Medium**	35	1,008
4	**Large**	112	23,785
Total		**10,366**	**1,06,062**

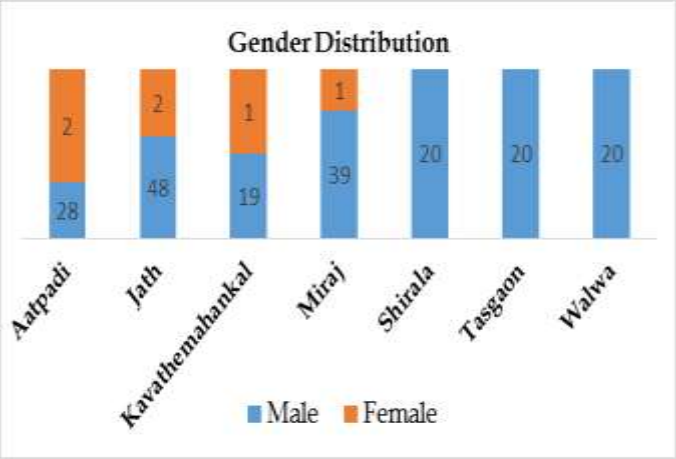
Source: Potential Linked Credit Plan- Sangli (2017-18), NABARD

3.3.2. *Survey Observations*

3.3.2.1. Socio Economic Profile of the Farmers

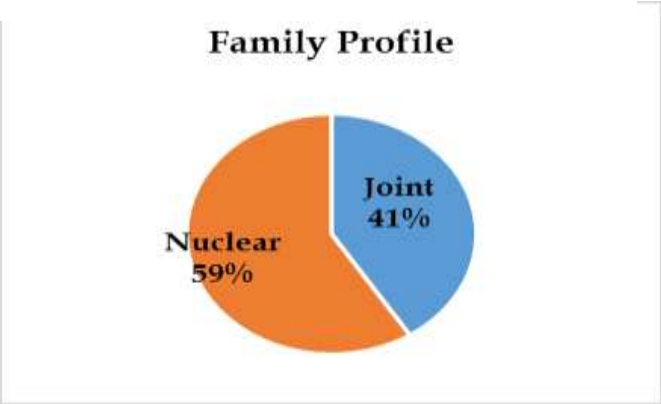
Gender Distribution: It was found out that Agriculture decisions are mostly male dominated and females in the family has very less role in the decision making process. In the survey of female farmers (where the female is the decision maker of the household) it has been found that either the women is widow or her husband is out from the village for other job. Mostly if there is elder man in the family, he normally takes all of the decisions pertaining to farm and related activities.

Exhibit 59: Gender Distribution of surveyed farmers – Sangli (nos.)



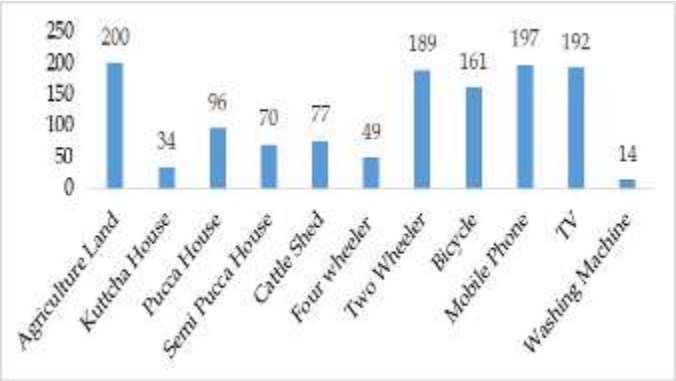
Family Structure: Of the 200 farm households surveyed in Sangli, 60% were part of Joint family and balance 40% with nuclear families. Joint family has an average of 6 members in it with 3 members engaged in the farming and allied activities and the level of unemployment in this families is 2 members per family. This joint family has maximum count of 120 and hence the level of unemployment is high among this families. Major reasons for such condition are lack of job diversification (In such families almost every member is depended on agriculture), No agriculture allied sector income source, lack of education, lack of skills and training.

Exhibit 60: Family Structure of Farmers Surveyed - Sangli District



Possession of Assets: All the farmer households surveyed have their own agricultural land. Majority (almost 97-98%) have mobile phones and television. 2-wheelers are higher in number as compared to bicycle as a mode of transport for the family members. Limited households have access to 4-wheelers, washing machines etc. 77

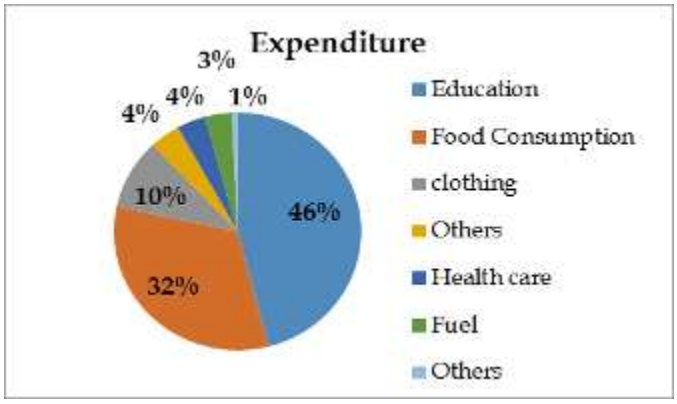
Exhibit 61: Possession of Assets by Farm Households in Sangli



farmers/farm households have cattle sheds. In terms of ownership of house, 48% farmers have pucca house, 35% have semi-pucca house whereas the balance 17% have Kutcha house. In most of the cases, farmers have pucca house due to Pradhan Mantri Awas Yojana.

Annual Household Expenditure: The graph shows that average family expenditure is highest in the education i.e. 46% and 32% on food, Food and education both added gives 78% of total expenditure. The expenditure on food is comparatively lower as majority of the farm households use their own crop production for subsistence purpose. Expenditure on healthcare, fuel and others have a relatively lower share in annual household expenditure.

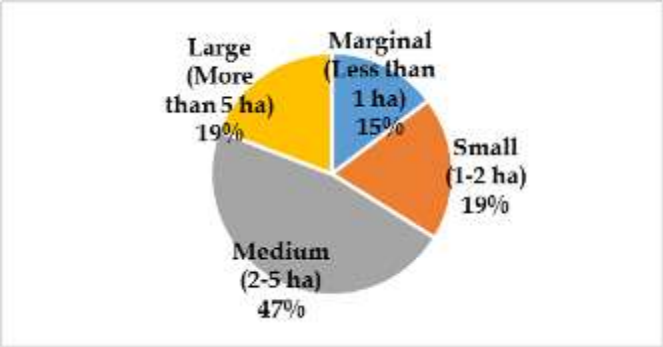
Exhibit 62: Annual Average Household Expenditure Details - Sangli



3.3.2.2. Assessment of Farm Incomes and Factors Impacting the Farm Incomes

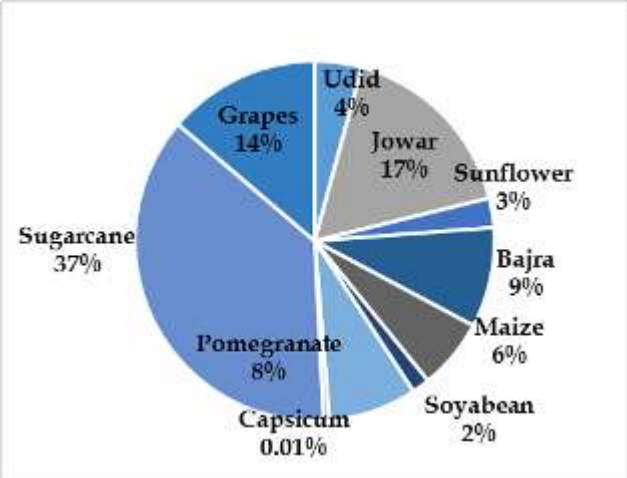
Land Holding and Cropping Pattern:
The average land holding size is found to be 3.6 Ha. It is found that even though average land holding size is the 3.6 Ha but the average irrigated land is 1.2 Ha i.e. only 33% and average non-irrigated land is 1.9 Ha, so we can see that water scarcity is one of the important problem in the Sangli district.

Exhibit 63: Land Holding Profile - Sangli District



Cropping Pattern and Cost of Cultivation: The average area under cultivation is highest for the Urad i.e. 4.9 ha but the number of farmers growing sugarcane is highest followed by Jowar and Grapes. The average area under cultivation in Jowar is 2.7 ha and Bajra is 2.1 ha. In case of rice, the main purpose of rice cultivation is to use it for own consumption rather than selling it commercially. Sugarcane and Grapes is mostly grown as cash crop and it is grown in Walwa, Shirala, Ashta, Palus and Miraj blocks where water availability is good. The farmers from these area has lower land holding size but the high returns as they have cash crops whereas Jat, Kavthemahankal, Tasgaon blocks have high land holding size but lower returns.

Exhibit 64: Major Crops Grown - Sangli District



Cost of Cultivation

Major crops grown by surveyed households in Sangli included bajra, jowar, maize & soybean among foodgrains & oilseeds; sugarcane as a cash crop & grapes and pomegranate in fruits.

Table 32: Cost of Cultivation of Major Crops - Sangli District

Crops	Average area under cultivation (Ha)	Average Production (Quintals)	Average Total Cost INR/Ha
Bajra	2.1	19	20,774
Grapes	0.4	425	1,43,796
Jowar	2.7	15	20,733
Maize	1.7	19.9	28,514
Pomegranate	1.2	420	1,78,478
Sugarcane	0.5	3232	69,044
Udid (Red Gram)	2.78	-	33,093

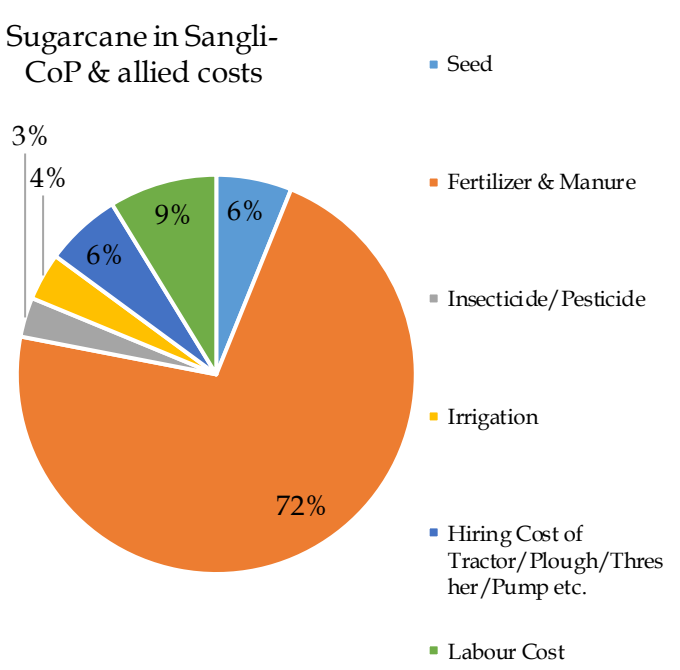
From the table above, it is clearly visible that average cost of cultivation is lowest in Jowar, followed by bajra and Maize. The highest average cost of cultivation is in Pomegranate followed by Grapes and Sugarcane. A breakup of the cost of production & post-harvest costs of major commodities in Sangli as per primary survey is depicted in the table below. (Only primary crop grown has been considered):

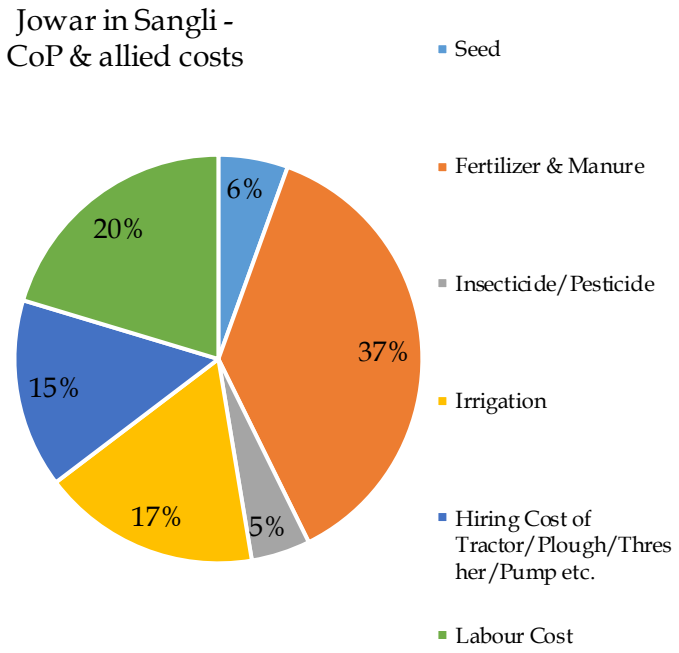
Table 33: Sangli District: Cost of Production & allied costs of major commodities (INR/Ha.)

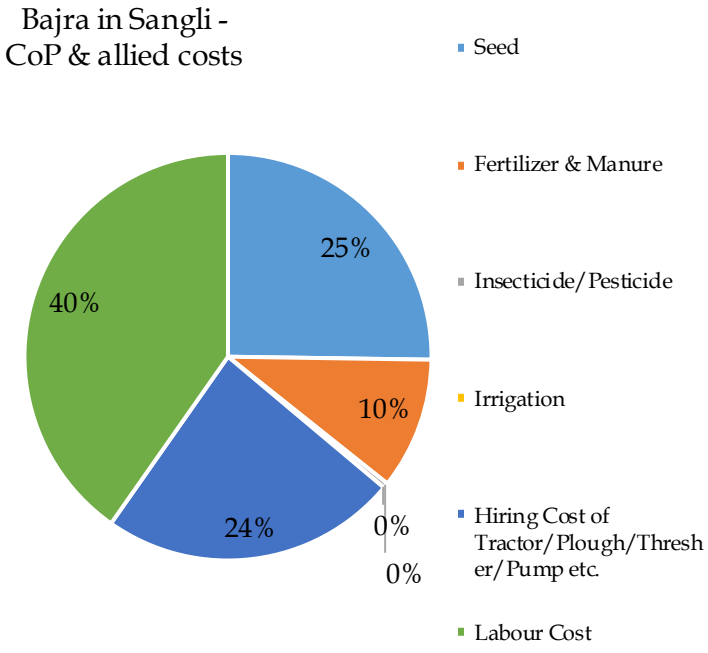
Cost Head (INR/ha)	Sugarcane	Jowar	Pomegranate	Grapes	Bajra	Maize	Udid
Seed	4,226	1,145	43,022	7,243	5,242	281	4,923
Fertilizer & Manure	49,657	7,707	52,054	60,536	2,173	20,593	1,682
Insecticide/Pesticide	2,208	970	36,808	61,596	86	0	0
Irrigation	2,659	3,589	8,056	3,212	0	1,328	0
Labour Cost	6,041	4,220	31,160	8,431	8,362	4,014	19,970
Hiring Cost of Tractor/Plough/Thresher/Pump etc.	4,253	3,102	7,378	2,778	4,911	2,298	6,518
TOTAL	**69,044**	**20,733**	**178,478**	**143,796**	**20,774**	**28,514**	**33,093**

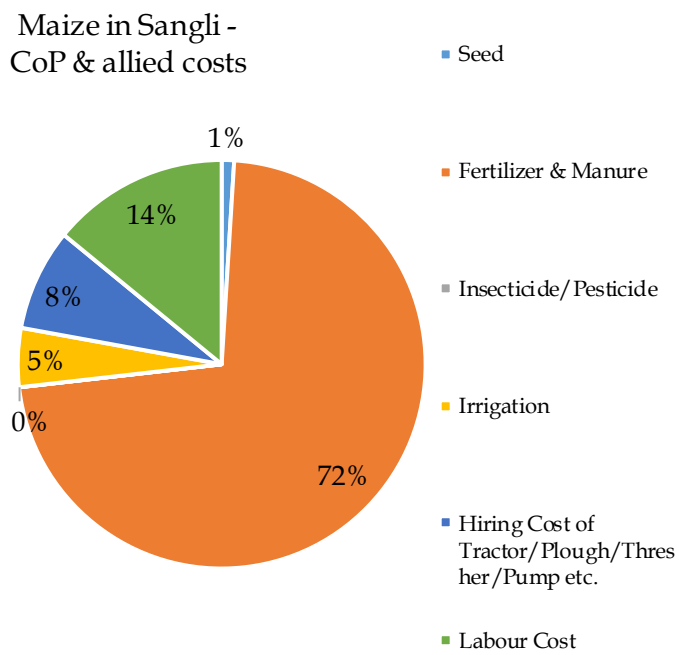
PS: Packaging & transportation costs NA for Sangli district

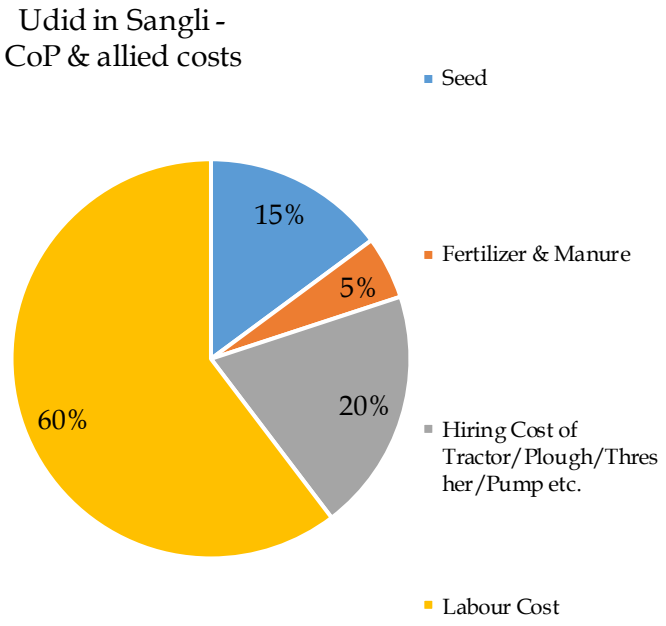
Exhibit 65: Distribution of CoP & allied costs for major commodities in Sangli district

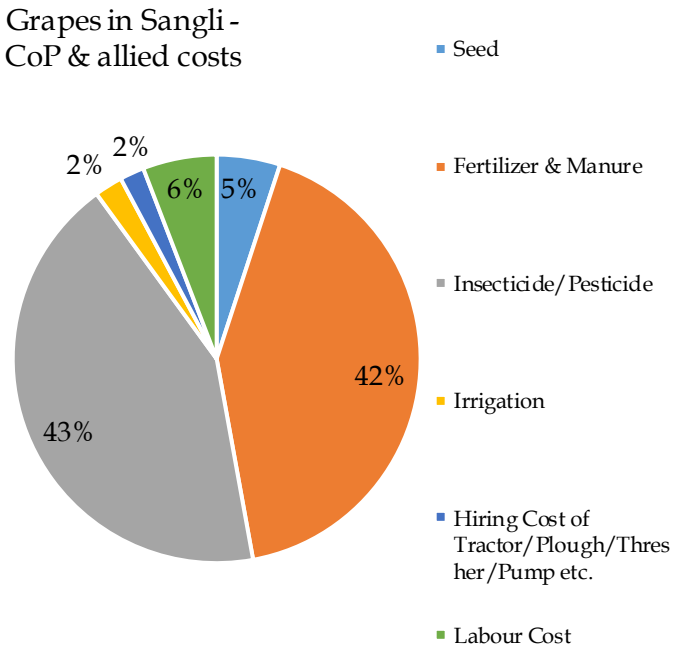


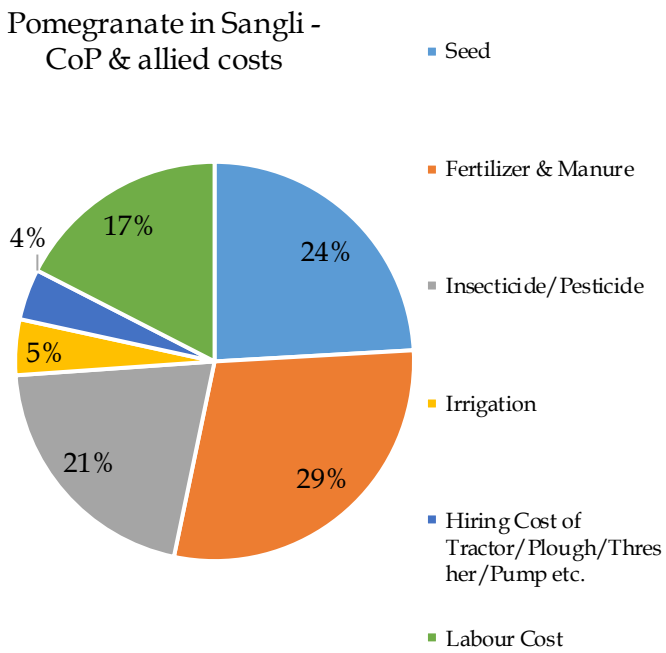






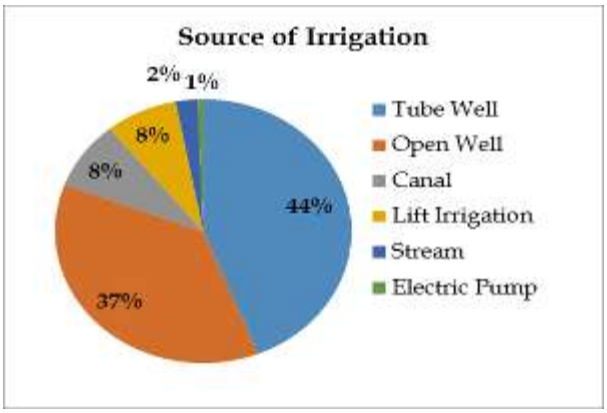

Udid in Sangli - CoP & allied costs
15%
5%
20%
60%
Seed
Fertilizer & Manure
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Labour Cost


Grapes in Sangli - CoP & allied costs
2%
2%
6%
5%
42%
43%
Seed
Fertilizer & Manure
Insecticide/Pesticide
Irrigation
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Labour Cost


Pomegranate in Sangli - CoP & allied costs
4%
17%
24%
5%
21%
29%
Seed
Fertilizer & Manure
Insecticide/Pesticide
Irrigation
Hiring Cost of Tractor/Plough/Thresher/Pump etc.
Labour Cost

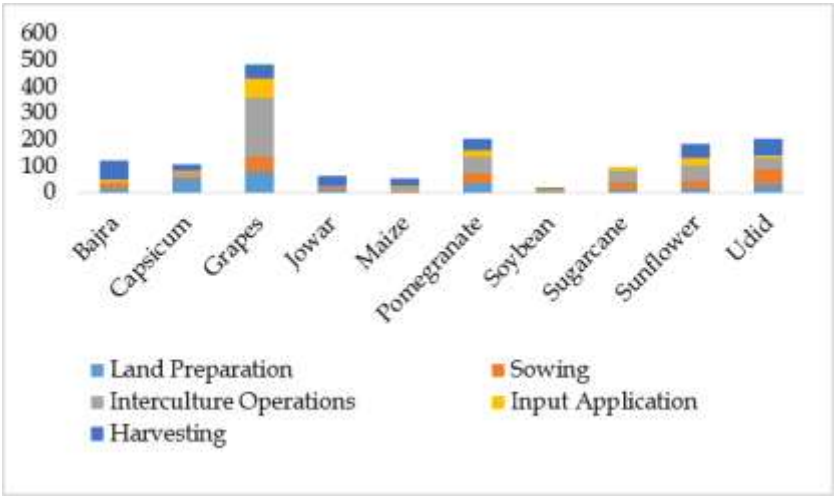
From the table above, it is clearly visible that average cost of cultivation is lowest in Bajra followed by Maize and Jowar. The highest average cost of cultivation is in Grapes followed by Pomegranate and Sugarcane and also if we see the highest average production is highest in grapes followed by Sugarcane and Pomegranate.

Exhibit 66: Source of Irrigation - Sangli District



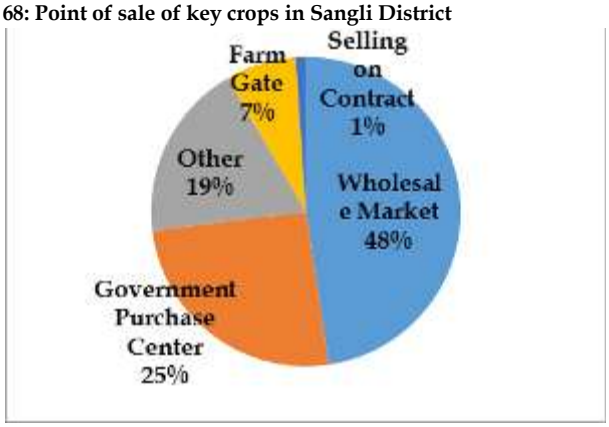
Source of Irrigation: Majority of the owned irrigation facilities has open wells and tube wells. It has been observed that 44% has tube-well as a source of irrigation and followed by 37% as open-well as a source, canal, lift irrigation has 8% share. We can see the people are mostly depend on the wells and the water level is completely dependent on the rainfall. There are canals present in the Jat, Kavthemahankal and Atpadi region but the water is not available there due to draught and other political problems. If these canals started then the large area can be brought under the irrigation.

Exhibit 67: Avg labour mandays deployed in farming activities – Sangli District (%)



Labour employed in cultivation of crops: The labour intensity was captured across crop value chains undertaken by the farmers though measurement of the labour man-days and average labour cost per man-day as shown in Exhibit. Labour intensity was highest in grapes followed by pomegranate, Udid, sunflower and Bajra. Soybean, jowar and maize are the least labour intensive crops in the region.

Exhibit 68: Point of sale of key crops in Sangli District



Mode of Transportation & Market for Sale of Produce:

48% of farmers sell their produce at wholesale market whereas only 25% of farmers are selling their produce in the government purchase centers. As the government purchasing centers are present at only Tehsils/ main city, it is very difficult to famers to go to tehsil place every time to sell the

produce. And also the rate for commodity is same as wholesale market. So farmers prefer to sell their produce in wholesale market. The average cost of transportation is INR 22 per quintal and average distance to be travelled to market is 22 kilometers. As almost of farmers don't have vehicles they use mini trucks and tractors to go to the market. And the average cost is INR 22/quintal for transportation.

Major markets for sale of produce: The major APMCs in Sangli were Sangli, Atpadi and Tasgaon. Whereas Sangli APMC deals with all the major commodities including food grains, pulses, fruits, spices and vegetables; Tasgaon APMC is mainly deals with raisin (grapes) and Atpadi APMC into Pomegranate. Basis the survey, the major markets for sale of commodities by the farmers are being listed below:

Table 34: Major Markets for Sale of Produce - Sangli District

Commodity	Major Market
Bajra	Atpadi, Jat
Jowar	Atpadi, Miraj, Jat, Tasgaon, Kavathemahankal
Udid	Tasgaon, Jat
Maize	Atpadi, Jat, Miraj
Grapes	Miraj, Sangli, Jat
Pomegranate	Sangli, Atpadi, Jat
Vegetables	Sangli

Average Selling Price of Key Commodities

Comparing the average selling price of major food grains and pulses in Sangli, it can be seen that except for Urad and maize, most of the crops are sold by the farmers at below MSP price mainly to the commission agents and the wholesalers.

Table 35: Average Selling Price of Key Commodities - Sangli District

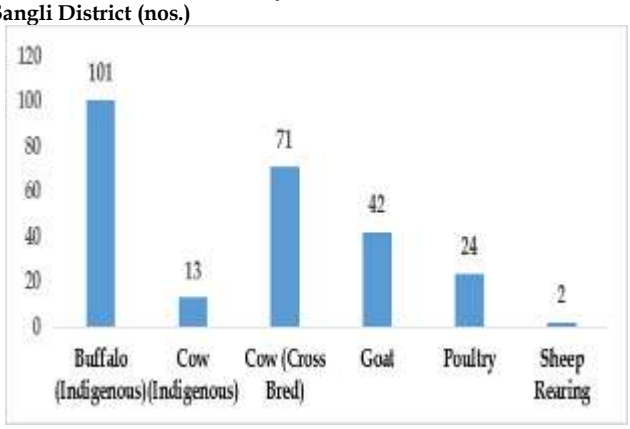
Crop	Average Selling Price (INR per quintal)	MSP (INR per quintal)	% Difference in Price Realization
Bajra	1,092	1,330	-21%
Jowar	1,416	1,650	-17%
Maize	1,460	1,365	+7%
Soybean	2,700	2,775	-3%
Udid	6,375	5,000	+21%

**2016-17 MSP Prices*

In case of Grapes, the major channels of sales is through wholesalers, commission agents and to exporters. While a farmer generates a price between INR 5500- INR 5750/quintal in wholesale; through exporter the price increases to INR 6000/quintal i.e. a jump of INR 2.5 per Kg of grapes. Pomegranate is mainly sold in wholesale at INR 4418/quintal pricing whereas for capsicum the average sale price is INR 1400/quintal.

Bajra, Jowar, Maize are rain fed crops and mostly cultivated for meet family consumption needs. There is a need for shifting the cropping pattern and need to adapt modern farm practices such as use of drip and micro irrigation facilities to overcome the problems of water scarcity in scarcity belts. Sugarcane, grapes and pomegranate are cultivated in Walwa, Shirala, Ashta, Palus and Tasgaon blocks. The farmer's income level is very high due to adoption of modern farm practices as well as cultivation of cash crops.

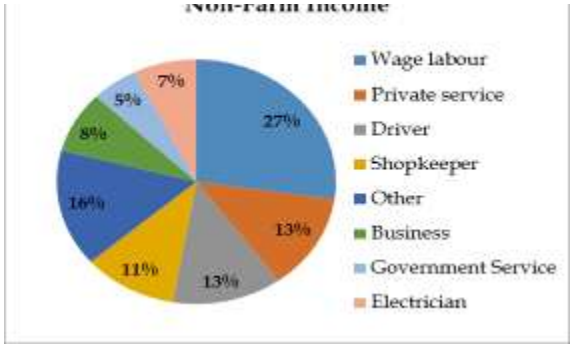
Exhibit 69: Animal Husbandry Practices of Farmer Households - Sangli District (nos.)



3.3.2.3. Farm Incomes from Allied Activities – Animal Husbandry

Among the allied activities, animal husbandry was one of the major activities which the farm households are currently engaged in Sangli. Majority of the households own buffalo, followed by crossbred cow. Goatery and Poultry farming is also predominant in the region. Whereas goatery is mainly practiced as a subsistence activity, poultry farming is more commercial and is directly linked with the poultry players including Suguna, etc.

Exhibit 70: Sources of Non-Farm Income: Sangli District



3.3.2.4. Assessment of Non-Farm Incomes and Factors Impacting the Non-Farm Incomes

Among the non-farm income sources, wage labour has the highest share (27%) followed by private service (13%), driving (13%) and shopkeeper (11%). Own business and Govt. services have a relatively lower share in non-farm income share in Sangli district.

3.3.2.5. Access to Credit

The key source of availing the finance by the target respondents included Cooperative Societies/Banks, Commercial Banks, Landlord/Money lenders and Relatives and Friends. Out of the total respondents 84 farmers have availed loan facility from Cooperative Banks mainly for working capital requirement and duration of 12 months. The interest rate charged by Bank varied from 4-6% per annum. 2-3 farmers availed credit facility from retail outlets, relatives and friends. Other farmers were not keen to respond and majority were availing credit facility from money lenders. Penetration of commercial banks have been relatively lesser in the surveyed areas.

3.3.2.6. Policy Support & Private Sector Participation

Govt. support has been found mainly across two segments in Sangli i.e. Animal husbandry and in Finance. Although KVK and ATMA are actively involved in assisting farmers in terms of extension activities, there is limited awareness among farmers in this regard. In addition, there is no support from Govt. in terms of Agri-Inputs, Marketing & Infrastructure Availability and Extension activities. There is very limited interventions from the private sector in terms of assistance to the farmers in any part of the value chains thus implying limited private sector interventions in the region.

Table 36: Support by Government & Private Sector across Agri Value Chain - Sangli District

Sr. No	Parameter	Support
1	Inputs	Field demonstrations and consulting.
2	Animal Husbandry/Vet Services	Veterinary support & medicines
3	Marketing	APMC for marketing

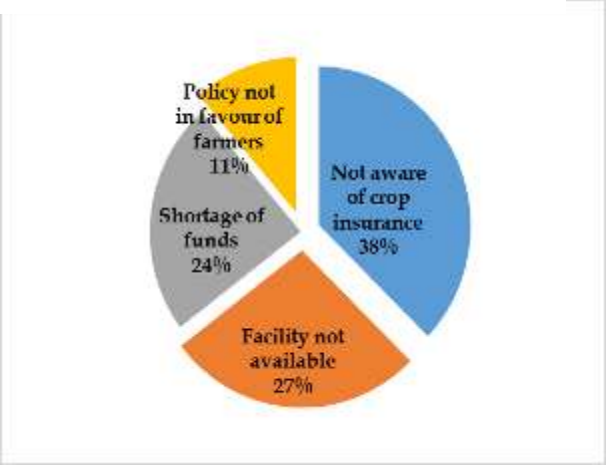
Table 37: Awareness and Adoption of Government Schemes - Sangli District

Government Schemes/Support	Awareness about the scheme among farmers
Rashtriya Krishi Vikas Yojana (RKVY)	72 (36%)
MGNREGA	128 (64%)
Gramin Bhandaran Yojana	0 (0%)
National Food Security Mission (NFSM)	72 (36%)
National Agriculture Insurance Scheme (NAIS)	28 (14%)
ATMA	0 (0%)
Krishi Vigyan Kendra (KVK)	72 (36%)
Grameen Beej Yojana	0 (0 %)

In terms of infrastructure available for eNAM, of the APMCs connected through eNAM of Tasgaon, Atpadi and Sangli, except Sangli, although all the APMCs were connected to internet, none of the APMCs have assaying labs, electronic displays and e-auction halls. APMC of Tasgaon was handling mainly raisins with zero online transaction and Atpadi mainly Pomegranate with no eNAM transaction.

Distress Situation

Exhibit 71: Awareness on Crop Insurance: Sangli District



On assessment of distress situation faced by the target respondents, it was revealed that the close to 12.5 % of the farmers had suffered crop destruction in last few years due to different reasons. The major reason for distress was primarily drought (64%) followed by major variations in price (32%) and temperature fluctuations (4%). There was no assistance which the farmers had received from the government. Considering the awareness with regard to crop insurance, out of the target respondents 84% of farmers are aware of crop insurance while only 25% of farmers have their crops insured. The major reasons identified for not availing crop insurance as informed by the farmers are not being aware of crop insurance and lack of the facility in the region. The pie-chart below depicts the different reasons for not availing crop insurance.

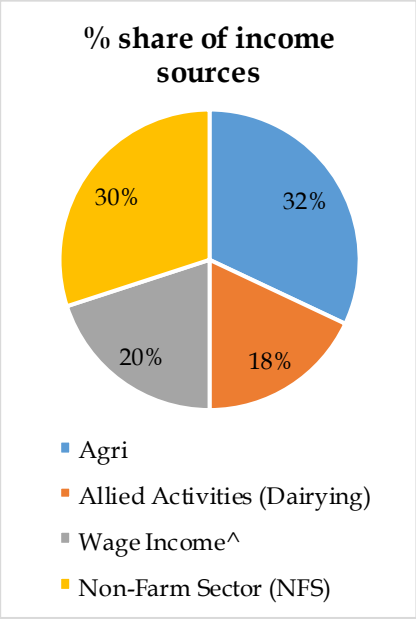
3.3.2.7. Income Trends

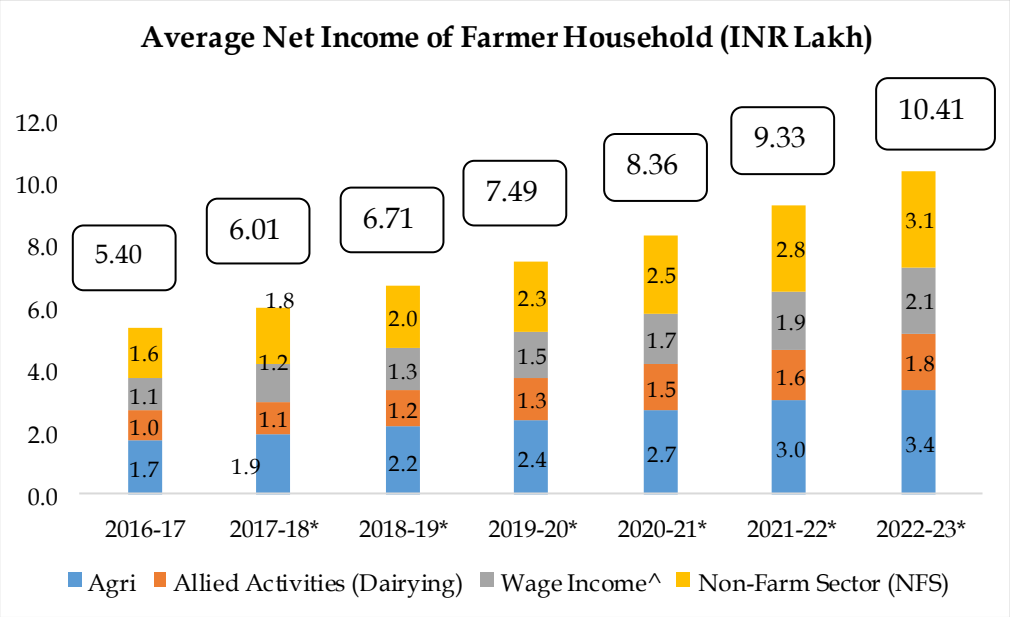
The qualitative trend on income and expenditure on agriculture in last five years was captured in the questionnaire and was prompted by the interviewers. Basis the assessment, on an average the farmer's income have increased by 3% in the last five years (range in between 4 -10%). In many cases farmers have witnessed a negative trend in income levels. In terms of expenditure, on an average farmers expenditure has increased almost 10% in the last five years (range from 5 to 20%). The main reason identified by the farmers have been increase in cost of inputs thus resulting in increased expenditure.

3.3.2.8. Income Projections

An attempt has been made to also calculate the net income (net of cultivation costs and net income from livestock farming) along with projections till 2022-23 based on the assumptions stated below. The income from the agri predominantly comprised of incomes from cropping of Soyabean, Cotton and Pulses in the district. The non-farm sector enterprises comprised of private service, shop keeper, driver, business/small enterprises, Government service, Pension). It was found that the average net income of the farmer household in Akola district was found to be INR 5.40 lakh with 32% contribution from agri activities followed by Non-Farm sector initiatives (30%), wage income (20%) and Allied activities (18%). Considering the nominal growth rate of 11.61%, it is projected to almost double the net income levels to INR 10.41 lakh by 2022-23 with appropriate recommendations and strategies. Since, the data pertaining to composition of farmers' income in the State is not available for 2002-03 and 2012-13 to arrive at change in composition of farmers' incomes, the estimations for incomes till 2022-23 is done basis the current composition available as per the survey results

Exhibit 72: Average Net Income of Farmer Household from various sources in Sangli district





Key Assumptions#

- *CAGR Nominal Growth in Income from 2002-03 to 2012-13 for Maharashtra - 11.61%*
- *CAGR Real Growth in Income from 2002-03 to 2012-13 for Maharashtra - 5.s66%*
- *Doubling time in years @ nominal CAGR - 6.31*
- *Doubling time in years @ real CAGR - 12.58*

#Source: Level of Income of farm holdings (Rs) and doubling time (Years) – Maharashtra Vs All India, Computed from NSSO (2005 & 2014). Situation Assessment Survey, Report No. 497(59/33/5) & 69(70/33/1)

*Projected Net Incomes

^ Gross Incomes wrt Wage Incomes and NFS (Private Service, Shopkeeper, Driver, Business/Small Enterprises, Government Service, Pension)

3.3.3. *Key Challenges*

a. Technology and Cultivation Practices

- Non-adaptation of Package of practices as recommended by KVK/ATMA/ Agriculture universities for improving quality of grains.
- Limited adoption of Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) practices by majority of farm households.
- Lack of appropriate crop mix for cultivation has led to continuing lower yields over the years and rising input costs as farmers started using more and more chemical fertilizers and water to get yields.
- Limited use of farm machinery and equipment thereby resulting in increased cost of cultivation. Only 22% of the farmers have tractors and only 11% of farmers are using modern irrigation practices of drip and sprinkler irrigation.

b. Agri-Infrastructure Development

- Availability of transportation facility for carrying produce from farm to the APMCs/rural hats/wholesale markets and adequate cold storages near to farm. Majority of farmers are using their own vehicles (motorcycles etc.) for transportation of produce.
- Support infrastructure in terms of power supply is inadequate.
- Other than Sangli APMC, there is no major multi commodity APMC in the district trading food grains. Tasgaon APMC and Atpadi APMC is mainly for raisins (grapes) and Pomegranate.

c. Marketing, Prices and Trade

- Farmers end up selling their produce 10-15% below the MSP due to non-availability of procurement centers nearby and short duration of procurement cycle.
- There are 15 registered Farmer Producer Companies (FPCs) in the district mainly for vegetables cultivation, cleaning, grading and sorting of food grains (soybean, wheat, rice) and pulses. The major issues with the FPCs currently are the lack of networking and information transfer between groups of farmers.
- Absence of brick & mortar infrastructure at the APMCs in Sangli for e-NAM integration - assaying labs, e-auction halls, scientific sorting/grading facilities or quality testing machines.

d. Crop Diversification and Post Production Management

- Farmers are shifting to high water guzzling crops in the irrigated belts and for subsistence/sustenance in scarcity belts. Cultivated area has largely been static with no major changes over the last five years.
- Vegetables farming on a commercial scale is still not currently being undertaken and mainly large and medium farmers are undertaking the same.
- Diversification in terms of allied activities (dairy, goatery, poultry etc.) is limited although the region has a good potential for the same.

- Grading and sorting facilities installed at APMCs are limited. Most farmers give importance to cleaning and grading since they associate these post-harvest practices with better price realization.
- Limited emphasis on reduction in cost of cultivation of crops (collective family based model) thus reducing returns. Farmers are incurring higher input cost but are still reluctant in forming farmer groups for purchase of agri-inputs.

e. Credit and Insurance

- Reluctance by the farmers to adopt crop insurance policies on account of lack of availability of information about crop insurance and facility not being available.
- Majority of the FPOs/FPCs in the region have complained about lack of availability of credit facility to the FPCs required for scaling up of the companies both in terms of working capital and term loan.

f. Animal Husbandry Management and Integration Farming Systems

- Dairying and Goatery is always considered to be the activity for sustenance rather than commercial enterprise.
- No organized channel for marketing of milk present in the district.
- Lack of commercialization of poultry farming and goatery/sheep farming in the region.
- Lack of availability of fodder/animal feed at cheaper rates (normal and concentrate feed) is one of the important factors deterring farmers from undertaking dairying/poultry farming on a large scale.

g. Irrigation Management

- Majority of the owned irrigation facilities has open wells and tube wells. It has been observed that 44% has tube-well as a source of irrigation and followed by 37% as open-well as a source, canal, lift irrigation has 8% share.

h. Extension Services

- Capacity building and market linkages for the existing FPOs/FPCs in the district is currently highly limited (except for few NGO's and ATMA).

i. Non-farm incomes

- Limited non-farm income sources in the region in addition to agriculture and allied activities.
- Since labour has been the key problem in the district, wage labour is in demand and is the key non-farm source of income. However, this avenue provides inconsistent returns. Other major source of non-farm income includes shop keeping and driving that are not scalable & self-sustaining.
- Lack of entrepreneurial approach and interest towards taking non-farm sector activities.

Figure 5: Visit to Village Panchayat in Sangli

Figure 6: Interview with Women's Farmers underway in Sangli

Figure 7: FPO Workshop under process in Sangli

In addition to farm, infrastructure, marketing and post-harvest challenges summarized above for all districts, the farmers in general face few other issues as well pertaining to societal, general awareness, as well as skill and capacity building. These are common in nature, applicable to all districts and have been summarized below:

Chapter 4: Cluster Wise Recommendations and Strategies for enhancing the farmers' income in Maharashtra

4.1. Western Maharashtra and Khandesh Cluster

Recommendation 1: Improved Access to Farm Level Storage Infrastructure for Fruits and Vegetables

Premise for the Recommendation:

In Maharashtra, out of 207 Lakh MT production of Fruits and Vegetables (F & V), commodities requiring higher farm storage investments include Onion (65 Lakh MT production), Grapes (20 Lakh MT Production) and Pomegranate (14 Lakh Mt production) particularly in the surveyed districts of Nashik and Sangli.

Sl. No.	Commodity	Storage Requirement
1.	Onion	Upto 4 months storage is technically feasible
2.	Grapes	Upto 6 months storage for raisins
3.	Pomegranate	Upto 1 month storage

In the survey districts of Nashik and Sangli, which are amongst one of the major F & V producing districts of Maharashtra, 15-20% of farmers are selling their produce at village haats due to non-availability of farm level infrastructure including cold storages. There is a requirement of large scale scientific storage infrastructure at tehsil level for Onion, Grapes and Pomegranate in the production belts.

Although under the Mission for Integrated Development of Horticulture (MIDH) – NHM scheme a number of storage structures including pack house, ripening chamber, onion storage structure, cold storage, pre-cooling unit, etc. have been constructed, all of the storage facilities are located at tehsil level or at the APMCs thus requiring farmers to travel on average 20-25 Km (as per the primary survey). In addition, Govt. of India under Union Budget 2018-19 has launched two schemes mainly GRAM (Grameen[8] Agriculture Rural Markets) and Operation Green to facilitate last mile storage infrastructure.

Action Plans:

The following Action Plans have been envisaged in Western Maharashtra and Khandesh Districts to facilitate farm level storage infrastructure for Onion, Grapes and Pomegranate

1. **Action Plan 1: Grant-in-aid facility needs to be provided to create 5 lakh MT farm level storage infrastructure (INR 500 Cr investment) in 70 locations in Western Maharashtra and Khandesh Districts**
    - Farm level storage infrastructure needs to be created at all tehsil headquarters of Nashik (15), Sangli (10), Solapur (11), Pune (15), Ahmednagar (14), Jalgaon (15)

[8] *Assumption: Cost for setting up of Multi Commodity Cold Storage Facility of Avg. 7000 MT storage capacity – INR 7.2 r. (As per Cold Chain norms of MIDH)*

2. **Action Plan 2: Micro-storage infrastructure at village level:**
    - Innovative renewable energy based storage systems at the farm level are to be popularized and promoted by the state Govt. There are numerous technology providers like Ecozen, Promethean, and Tessol which are wanting to scale up their farm storage facilities (typically 1-5 MT).
    - A programme for leasing of storage space to farmers by the above service providers need to be facilitated – Storage service providing agri. entrepreneurs need to be a given a subsidy under existing Sub Mission on Agriculture Mechanization (SMAM) scheme for large scale proliferation of these facilities at village level.
    - Key Stakeholders may include the Dept. of Agriculture - Govt. of Maharashtra; Dept. of Agricultural Marketing – MSAMB; NABARD, SFAC, Private Enterprises – Technology providers, NHRDF

Impact Potential: Adoption of Micro storages at farm level will result in reduction in wastage of perishables (fruits and vegetables) upto 20% at farm level. This is going to further enhance farmer's income levels (increase in gross income levels upto 15-25%). The table below depicts the per hectare estimated increase in gross income through reduction in wastage levels of F & V in Nashik and Sangli districts.

Table 38: Scenario Building – Increase in income due to reduction in Post- Harvest Losses

Sl. No.	Crop	% Post Harvest Wastage	Per Hectare Average Production (Quintals)	Average Price (INR)/Qntl	Gross Incremental Income (INR) /ha	% Increase in Income/ha
Nashik						
1	**Grapes**	10-15%	192	4500	129600	15-20%
2	**Onion**	10%	151	700	10570	3-5%
Sangli						
1	**Grapes**	5-10%	177	5000	88500	15%
2	**Pomegranate**	5-10%	300	4700	141000	25%

Source: Primary Survey

Micro-storage Infrastructure at Village Level: Case Study of Portable Cold Storages using PCM (Phase Change Material) Technology

Phase Change Materials (PCM) which are special thermal energy storage materials used as reliable sources of stored energy. PCM i.e. phase change means a change from one state (solid/ liquid/ gas) to another without a change in composition. There are many companies into this space; predominantly Ecozen, Promethean, Tessol etc. use these technology. Portable mobile solar powered hybrid models of thermal backup cold storage using PCM coated panels/ or plates are typically

20 feet x 8 feet x 8 feet storages (Approximately 21 cubic meters storage) with solar panels mounted on top of these mobile containers. These containers can be moved from one field to another for aggregating farm produce during harvesting and stored as soon as harvested. Temperature in these mobile cold storages is maintained between 4-10 degree Celsius with a relative humidity (RH) of around 85%and can be modulated according to produce. This system has battery-less compressor operation; however a small battery is provided only for control systems and auxiliary use.

The portable cold storages are typically 5-6 MT having approximately 1 MT of precooling and 4-5 MT of staging/ cold storage capacity. This cold storage can act as packaging unit and also storage. Broadly the costs of installation and other auxiliaries is as follows:

Sl. No.	Components	Total Cost
	20 feet x 8 feet x 8 feet storages to store approximately 5 MT produce (approximately 21 cubic meters)	INR 7,50,000.00
2.	Solar System with Thermal Banks back up (solar panels and battery backup)	INR 7,50,000.00
3.	Programmable Logic Controller Equipment (PLC)	INR 1,00,000.00
	Total	INR 16,00,000.00

Note:

1. This is excluding GST

2. Various incentives under MIDH guidelines under Post Harvest Management for "Precooling unit"; "Cold Room (staging)" ; and incentives are available for "Alternate Technologies component" and "PLC" in Appendix II – Technology induction in Cold chain, add on for CA and Modernization ; hence costs will come down after proposal is approved by NHB using MIDH incentives (https://midh.gov.in/PDF/midh(English).pdf)

Recommendation 2: Development of FPCs through commodity based cluster model

Premise for the Recommendation:

The state of Maharashtra has more than 1400 registered FPCs. The districts of Akola, Latur, Nashik and Sangli have almost 150 registered FPCs many of which are supported by NABARD, SFAC and under MACP. Most of these FPCs are still operational on a very small scale (except in Nasik).

Currently both NABARD and SFAC are jointly implementing schemes for development of FPOs in Maharashtra. While SFAC's equity grant and credit guarantee fund for FPOs ensure that finance for producer companies flows smoothly, NABARD has scheme for promotion and development of FPOs along with Producer Organisation Development Fund for credit support, capacity building and market linkage support.

Action Plans:

NABARD and SFAC may take lead and identify commodity specific FPCs in each of the districts and strengthen the FPCs. Region specific anchors (Private players including processors, organized retail and e-commerce chains) to be facilitated for supply chain interventions with the existing as well as new FPCs. Credible corporate anchor can also bring in equity to the FPCs. The anchors would be responsible for:

- Clustering FPCs commodity-wise and undertake infrastructure gap assessment in terms of collection centers, pack houses, mobile vending carts, grading & sorting facilities.
    - **Pomegranate** – Nashik, Dhule, Ahmednagar, Pune, Sangli, Solapur (90% coverage)
    - **Pigeon Pea (Tur)**- Latur, Akola, Buldhana, Amravati, Nanded, Yavatmal, Nagpur, Wardha (70% coverage)
    - **Grapes**- Nasik, Pune, Solapur, Osmanabad and Sangli (98% coverage)
    - **Onion** - Jalgaon, Nashik, Pune, Dhule, Satara, Solapur, Buldhana, Aurangabad (80% coverage)
    - **Banana**- Akola, Jalgaon, Nanded, Pune (90% coverage)
    - **Vegetables**– Nashik, Pune, Kalgan, Satara, Sangli (70% coverage)

  Note: The above 6 commodities have been selected basis potential for processing/improvement in supply chain management
- Existing FPCs can also be dovetailed into the above initiatives.
- ATMA and KVK funds may be utilized by the private anchors as an incentive.
- Credit Guarantee Fund Scheme should extend the coverage from presently INR 1 Cr to INR 2 Cr (on similar lines of CGTMSE cover limit) to address the concerns of the FPCs who are growing in size and require larger funding.
- Channelizing of Govt. schemes and grants viz. NABARD Dairy Fund & Animal Husbandry Fund, to private sector as well (currently available only to cooperatives) will promote strengthened investments by the value chain based private players.

- Develop commodity based processing clusters to promote the culture of cash flow based farmer financing (Case of Tao Bao)
- Key Stakeholders may include the Dept. of Agriculture, Dept. of Agriculture Extension Govt. of Maharashtra; NABARD, SFAC, Private Enterprises, Commercial Bank.

Devnadi Valley Agriculture Producers Company Limited –Nashik

- Date of Incorporation: 03 February 2011
- No of Villages Covered: 17
- Number of Producer Member: 853
- Turnover: 1.75 Cr. (approx.)
- Activities: Vegetable marketing; Agriculture Input Shop (Agri-Mall) and Agriculture Advisory Services to Member farmers

Devnadi Valley Agricultural Producers Co. Ltd. is a perfect example of corporate anchored successful FPC. Initially, the farmers in and around Devnadi river faced multiple problems. These can be summarized into unavailability of agricultural credit, inadequate and untimely supply of agri-inputs, poor quality of agri-inputs, lack of scientific and technological knowhow regarding different agricultural practices and lack of remunerative prices for agricultural produce. This was primarily responsible for the formation of Devnadi Valley Agricultural Producers' Company Ltd.

The key issues faced by the FPC included:

- Lack of clarity regarding functioning of FPCs and its day to day operations
- Issues regarding marketing of produce for member farmers and adherence to quality standards
- Assistance in terms of capital for Devnadi FPC. Banks were not ready to lend to FPC as they had never heard of such kind of Farmer's company.

With assistance from TATA trust company started supplying vegetables to the malls of TATA group. FPC started production planning with its members to stick to the rules of quality, consistency and continuity in the market. There were many challenges regarding quality of produce but support from TATA trust was immense and it helped the FPC to overcome those challenges. FPC started production planning with its members to stick to the rules of quality, consistency and continuity in the market. Members planned to grow different vegetable crops to ensure regular supply of all vegetables in the market.

With the pressing issue regarding availability of quality inputs, the idea of agri mall was initiated. The core idea of starting an Agri Mall was to bring farmers together to make them realize the power of collective bargaining to help them procure better quality of input at lower cost and get better price for their produce. Currently the FPC supplies vegetables to many institutional as well as retail buyers. This includes vegetables to Akshay Patra Foundation, Kisan Network and different markets in Mumbai, Surat and Ahmedabad. This has helped farmers as they are getting 20% higher rate than the existing rates as well as earning income everyday as the supply continues throughout the week. Even the customers are getting 10-20% lesser rates than the market rates.

4.2. Distressed Districts of Vidarbha and Marathwada Cluster

Recommendation 3: Development of end to end Dairy Value Chain in distressed districts of Vidarbha and Marathwada

Premise for the Recommendation:

Dairying is an important secondary source of income for rural households and has assumed a major role in providing employment and income generating opportunities. In Maharashtra, more than three-fourth of the agriculture is rain-fed. Moreover, uneven distribution of rainfall across various regions of the state and also with erratic pattern, dairying is gaining importance as a source of livelihood for the small and marginal farmers of the state.

Region-wise, the Marathawada and Vidarbha regions are characterized by frequent droughts and low yielding livestock hence, dairying is relegated to western parts of the state. The perpendicular strip of land in western part comprising of Ahmednagar, Nashik, Pune, Satara, Sangli, Kolhapur and Solapur districts comprises more than one-third of bovine population of the state, mainly crossbred cows and buffaloes. As per the survey, 34 % of the HHs practiced dairying in the study districts with indigenous cows and buffaloes rearing without any scientific farm management practices. No cross bred cattle farming was undertaken by the farmers. In Akola, the cultivable area of Jowar (main source of fodder) was down by 25% in last five years due to mono-cropping pattern with ~35 % area under cotton and soybean each. Further, Akola and Latur were lacking organized marketing channels for farmers.

Over 27,000 milk producers have benefited from a dairy development programme initiated to provide financial stability to farmers in the Vidarbha and Marathwada regions of Maharashtra. The project, launched by the National Dairy Development Board (NDDB) last year, covers 3,023 villages spread across 11 districts falling under the two backward regions with an outlay of INR 340 crores. The project's objective is to provide financial stability to farmers, generate self-employment in the dairy sector and boost milk production through scientific breeding activities, like increasing the number of milch animals by improving their feeding and health care facilities. The districts of Nagpur, Wardha, Amravati, Chandrapur, Buldhana, Akola and Yavatmal in Vidarbha and Nanded, Osmanabad, Latur and Jalna in Marathwada are covered under the project. In three years, milk producing farmers will be able to store about 2.5 lakh liters of milk per day and earn more than INR 250 crore.

To enable such initiatives to succeed, it is critical to involve Government support in formation of Producer Companies and facilitate the marketing linkages with cooperatives/private players. Developing an ecosystem of backward and forward linkages in dairy chain can only make the dairying viable in these regions.

Action Plans:

Action Plan 1: Develop end-to-end production, procurement, processing and marketing ecosystem for Dairy

- Increase the productivity of the milch animals through scientific breeding, feed management and diagnostic services through technical support of NDDB Dairy Services/BAIF/District Animal Husbandry department.
- Promote formation of Dairy Interest Groups (DIGs) in each village collectively forming a "Milk Producer Company" (MPC).
- Set up Milk Collection Points (MCP) for procurement from adjacent villages and BMCs at strategic locations
- Establish one fodder bank in each block to mitigate the issue of fodder scarcity as well as promote silage systems. Provide the subsidy to the extent of 75 % of the cost of Hydroponics set up to encourage farmers to adopt the technology for providing nutritious animal fodder.
- Facilitate market linkages with established cooperatives/private processors in the region (For example, Ranade Dairy in Yavatmal, Wardha dairy in Wardha) or undertake the capacity building of MPC to start the processing of milk.
- Get Trusts/NGOs/NABARD involved for meeting the capital expenditure & operational expenses for MPC through Grant-in-aid programme. TATA Trusts has initiated a similar program in Yavatmal district of Vidarbha region. (Refer case study below).
- Approximate financial outlay for above initiative ~ INR 650 lacs over 3 year period in 100 villages of the district. Considering the proposed implementation in all 19 districts with 100 villages each, the total outlay can be proposed at INR 124 crores till 2022. Those villages where NDDB's coverage is not present may be targeted to scale up operations.

Impact Potential: The proposed intervention can lead to incremental net income of INR 20,000 per annum for a micro dairy enterprise comprising of 2 buffalo units. These interventions can impact approximately 1.10 lakh and 1.34 lakh small and marginal (S&M) farmers in Vidarbha and Marathwada regions respectively (Targeted 5 % of S&M farmers these regions).

Table 39: Scenario Building for Dairy Rearing (2 buffaloes) – Income and Expenditure Analysis in distressed districts.

Sr No	Particulars	Average Annual Gross Income* (INR)	Average Annual Expenditure* (INR)	Net Income* (INR)
1	2 buffaloes unit	147,840	127,543	20,297

Assumptions*

1. Acquisition cost for buffaloes @ INR 60,000 per animal amortized over 7 years lactation cycle
2. Expenditure includes Feed cost of INR 40,000 per animal including cost of green fodder, dry fodder and concentrates, veterinary cost of INR 3000 per animal, miscellaneous cost of INR 5000 per animal comprising of water, consumables etc
3. Income comprises of sale of milk @ INR 33 per litre for 280 days of lactation cycle with average yield of 8 litres per animal
4. Interest cost has been assumed to be 12 % annualized
5. The cost of family labour was not imputed in cost calculations as farmers traditionally follow farming systems from time immemorial and they become part of natural farming due to complimentary benefits of each enterprise including the contribution of family members.

Case Study: SukhiBaliraja Initiative of TATA Trusts in Yavatmal District

Dairy program of Tata trust initiated in Yavatmal cluster of Vidarbha, projected under "SukhiBaliraja Initiative". The study belongs to the farmer from Wadgaon village of Yavatmal cluster. Mr. Marotrao Thak, aged 56 years is having 3 acres of land and was producing Cotton and Pigeon pea. Uncertainty in rainfall since last 3 years decreased agricultural produce. Higher input cost in agriculture, low yield and distressed market provoke him to have an alternative income source. He purchased one local cattle breed producing 3 liters of milk per day and was selling it to Yavatmal at the rate of INR 20 per liter. As the dairy business works on fat percentage, cow milk was not been procured on regular basis due to less fat content and most of the time his milk remained unsold. Over a period of time he realized that dairying is not at all proving beneficial. Thereafter, he used to milk the animal just to fulfill his homely requirement and rest of milk is left with animal for feeding of calf.

Tata Trusts established dairy plant in Wadgaon with its milk procurement centers in nearby villages; milk market is made available to farmers at the local level. Trust started procuring cow milk at the rate of INR 24 per liter. Procurement center being in the same village, he started pouring 3 liters of milk per day at the center and was earning INR 2000 per month. Due to local availability of milk market he is doing dairy business without hampering day to day agricultural activities. Initiative of Tata Trusts generated a ray of hope to procure more milch animals. Today he is having three milch animals with milk output of 8 liters per day having benefit of INR 7000 per month.

Source: TATA Trusts

Recommendation 4: Promotion of scientific Goat Meat Value Chains in distressed districts of Vidarbha and Marathwada

Premise for the Recommendation:

Development of the goat sector has the potential to impact the livelihoods of 20 million goat rearers (NSSO, 2013) belonging to resource poor and socially backward segments of the society living in ecologically vulnerable areas. Goat rearing is a traditional backyard activity contributing about 10-40% to household income in different regions rearing small herds of 3-5 or 5-10 goats. Doubling Farmers Income Committee has emphasized small ruminants as important contributors to poverty alleviation. Goat sector development is an important component of the National Rural Livelihood Mission. SDGs recognize that goat sector can contribute towards the objective of poverty alleviation, impacting nutrition and women empowerment.

Maharashtra is amongst the top 10 states with the population of 8 million heads as per 19th Livestock Census (2007-2012). Approximately 48 lakh families in the dry climatic districts of Pune, Satara, Solapur, **Sangli,** Kolhapur, Ahmednagar, **Nasik,** Dhule, Jalgaon, Aurangabad, Jalna, Beed, **Latur,** Nanded, Osmanabad, Buldhana, and Chandrapur are engaged in goat and on sheep rearing business for meat production contributing to 8 % of the total livestock meat production in the State. The key challenge in goat farming is the access to the organized marketing channels for goat meat as emerged during the survey. The meat trade is predominantly unorganized in the State. As per the information obtained from Department of Animal Husbandry, Government of Maharashtra, there are at approximately 2250 Sheep & Goat breeders Coop. Societies in the State with the following composition a) Western Maharashtra - 450 b) Marathwada - 380 c) Vidarbha – 170 d) Konkan – 25 e) Khandesh – 1200. Most of the societies are not functioning at all & are defunct or dormant. As per the primary survey, farmers need to travel to livestock markets for selling their produce to brokers who buy on per animal basis rather than per weight basis thereby exploiting the farmers by giving them un-remunerative prices (INR 150-200 trader margin).

Various schemes are being implemented by the State to uplift the rural poor through the livestock rearing, to create entrepreneurship and to generate employment in rural areas. Under State level scheme of stall-fed supply of 10 goats and 1 male goat distribution, 2324 beneficiaries have been benefited with the support of INR 11.19 crores whereas district level scheme for supply of 10+1 goat unit to Scheduled Caste beneficiaries has impacted 2685 beneficiaries with support of INR 14.93 crores as on 2016-17. These schemes have been proven to be beneficial in improvement in productivity of animals, resource use efficiency or saving in cost of production and increase in production intensity. However, an integrated approach towards building Goat Value Chains in the State is required to further enhance the incomes of small and marginal farmers through the procurement, processing into value added products including Goat Meat having domestic and export potential.

Goat rearing is dominated in ecologically vulnerable and drought prone areas. Goat farming is a low input high output livestock activity with limited fodder requirement and assures an additional source of cash flow critical for the distressed districts of Maharashtra.

Action Plans:

The following Action Plans have been envisaged to promote scientific Goat Meat Value Chain for small and marginal farmers in distressed districts of Vidarbha and Marathwada contributing 27 % and 19 % of the Goat population of the State to augment their secondary sources of farm income.

Action Plan 1: Formulate Comprehensive State Policy for Goat Sector

- Develop a Comprehensive State Policy for the Goat Sector covering aspects on breed development, extension policy, disease mapping and reporting along with disease control, marketing regulations, marketing infrastructure, schemes and model to provide incentives system to encourage investments. The comprehensive policy can be prepared on lines of National Action Plan for development of Goat sector prepared by Department of Animal Husbandry, Dairying and Fisheries, Government of India. State breeding policy can be made part of this comprehensive policy.
- Involve the key stakeholders including entrepreneurs, industry players, goat breeders, advanced goat rearers, cooperative federations, NGOs like BAIF, Nimbkar Agricultural Research Institute (NARI) to draft the policy covering the emerging value chain including marketing regulations, food quality and safety and support to modern abattoirs.

Action Plan 2: Revival of Defunct Goat Cooperative Societies

- Revive the defunct cooperative societies to enable them to play a significant role in helping the producers through procurement of their products & supply the produce to users like slaughter houses etc. They can also be made to supply breedable stock to other breeders.
- In order to encourage the dormant societies to take up above programmes, the societies will have to be provided finance in the form of share capital contribution to assist them to create infrastructure like society office, furniture & machinery, Weighing scale, Office stationary etc. The societies can obtain working capital from the banks for running their activities.

Action Plan 3: Develop Goat Meat Value Chain under Public-Private-Producer Partnership

- Develop end-to-end procurement, processing and marketing infrastructure for Goat Meat through:

    - Construct Small Ruminant Market Yards in these regions on similar lines of existing Small Ruminant Market Yards in Sangli, Ahmednagar, Pune and Satara for gathering and selling points for livestock fully equipped with sheds, water and electricity, vet facilities, loading and unloading facilities. These can be developed and locations selected according to small ruminant population i.e. producing area or hub of small ruminant breeding. These markets will be under the local authorities' responsibility and can be either privately or publicly managed. The funds can be allocated from Maharashtra State Agricultural Marketing Board (MSAMB). The indicative budgetary allocation can be INR 7.60 crores (@ INR 40 lacs per location assuming 19 locations).

    - Develop scientific slaughtering facilities for goat and by-products processing in drought prone districts. Typical investment for minimum capacity of scientific abattoir of 20 MT/day is ~ INR 25 crores) under Public-Private Partnership model where private players can develop the slaughtering facilities and Government can provide the land and other fiscal incentives in form of grant-in-aid to promote investments to the tune of 50 % of the technical plant and machinery and civil work subject to the maximum grant of INR 5 crores. The budget allocation of INR 50 crores till 2022 can be envisaged under this initiative for establishing the facilities in 10 districts. Department of Animal Husbandry, Government of Maharashtra can implement this programme.

    - Provide clarity on permissions or notification by the State Government on land in drought prone districts for development of scientific slaughtering facilities by the private entrepreneurs. As per secondary survey of the goat meat processors, land for development can be easily acquired in remote areas, but the clarity on permissions and notification by Govt is absent hampering the private investments.

Impact Potential: The proposed intervention can lead to incremental net income of INR 10,000 per annum for a micro goat enterprise comprising of flock size of 5 animals. These interventions can impact approximately 1.30 lakh marginal farmers in Vidarbha and Marathwada regions. (Targeted 5 % of the marginal farmers in Vidarbha and Marathwada regions).

Table 40: Scenario Building for Goat Rearing (5 animal) – Income and Expenditure Analysis in distressed districts.

Sr No	Particulars	Average Annual Gross Income (INR)*	Average Annual Expenditure (INR)*	Net Income (INR)*
1	Flock Size of 5 animals	25,000	15,000	10,000

***Assumptions:**

1. It has been assumed that small and marginal farmers will take up this activity only for rearing purposes and not for breeding as this is riskier and requires longer gestation period.
2. Minimum size of 5 animals considered for calculation.
3. Animal acquisition cost is considered to be INR 2,500 per animal weighing ~ 10 kgs (5 * 2,500 = INR 12,500)
4. Other average expenditure is assumed to be INR 500 per animal including vaccination. Considering that feeding is taken care by grazing. (INR 500 * 5 animals = INR 2,500). This takes total average investment to be INR 15,000 for 5 animals.
5. The animal grows from 10 kgs to 25 kgs over 8 month holding period.
6. Average Gross Income = 25 kgs/animal @ INR 200 per animal (INR 200*25*5)= INR 25,000)
7. Goat rearing along with cropping can provide the additional source of income of upto INR 2,000 per year per animal to small and marginal farmers in the distressed districts.

Source: YES BANK Analysis

Recommendation 5: Development of Sericulture Clusters in Marathwada & Vidarbha Regions

Premise for the recommendation

Maharashtra is a nontraditional sericulture state producing Mulberry and Tasar silk. The specialty of the state is that, it undertakes 98% of bivoltine sericulture and stood first among nontraditional states and one of the potential States in India for silk production. The bivoltine sericulture development has been one of the priority sectors of Indian silk industry but its production is yet to meet the targets. Women play a dominant role in this sector, as the activities are mostly home-based. Women have been contributing to all the sectors of Sericulture starting from on-farm activities to fabric production, marketing and consumption. The involvement of women in different activities of Sericulture is well above 53%[9]. Mulberry sericulture is practiced in 24 districts of Vidarbha, Marathwada and Western Maharashtra. The main districts are Pune, Solapur, Satara, Sangli, Ahmednagar, Aurangabad, Osmanabad, Beed, Buldhana, Jalna, Nanded, Latur, Akola, Nagpur and Wardha. Besides mulberry, it is a minor but traditional Tasar producing state. The sericulture industry is a labour intensive and has very good potential to provide employment to the rural mass at their local level.

The state government has started various schemes to promote the Sericulture activity for the benefit of farmers. Farmers can take the advantage of these schemes and make oneself Independent Entrepreneur and can start gaining good income by doing sericulture business.
Through the District Annual Scheme (Jilha Varshik Yojana), the Department of Sericulture every year estimates the Tuti plantation in rural area and on the basis of that selects the farmers group who can go into sericulture based farming. Tuti plant seeds and other necessary activities like educational tour, Silk work eggs are provided to these new farmers through the Jilha Varshik Yojana from State Government Scheme. Through the Assured Wages Scheme (Rojgar Hami Yojana), Rs. 20,000/- Grant is sanctioned, which consists of Rs. 12,000/- for labour charges and Rs. 8000/- for equipment purchase which can be given to farmers during the period of 3 years.
In spite of such initiatives, awareness regarding the benefits of silk farming is less. This shows in the overall production figures for silk in Maharashtra which stood at a lowly 252 MT as of 2015-16, while the neighbouring state of Karnataka yielded a very high 9,823 MT, followed by Andhra Pradesh with 5,086 MT and West Bengal with 2,351 MT.

Sericulture can also be a good additional income source during Nov-June in areas traditionally growing cotton and soyabean like Akola and Latur. As per the feedback in study district Latur, around 1,000 hectares is under sericulture in different pockets being practiced by very few farmers. The key challenges affecting sericulture in the district included lack of technical knowhow, lack of good quality seed/cocoon and avenues for marketing and marketing

[9] Scenario of sericulture industry in Maharashtra State, India, Hiware Chandrashekhar Jalba Professor & Former Director of Sericulture (Government of Maharashtra) Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431 004 (M.S.) India.

information. Sericulture Clusters in Marathwada and Vidarbha may be proposed to enable small and marginal farmers to get additional income from this activity.

Action Plan 1: Identification of clusters/districts

- Targeted identification & development of clusters/districts in Marathwada and Vidarbha based on area and farmer coverage
- Identify potential SF/MF & maintain database based on resource mapping, benchmarking survey, diagnostic study and action plan

Action Plan 2: Establish Silkworm Seed Bank/Support through Automation in Reeling

- Development of a Silkworm Seed Bank in identified areas by Sericulture Department/Cluster Dev. Agency (CDA)
- Each seed bank at cluster/district level will cater to all villages within the block including testing equipment, moth rooms and incubation chamber, equipment, transport, quality control and ISO certification etc with capex of INR 1 Crore.
- Automation in Silk Processing through Installation of Reeling Units should be established in each cluster/district with capex of INR 5 Cr per unit

Action Plan 3: Capacity Building, Monitoring and Marketing of Raw Silk

- Capacity Building & Monitoring - Link each such cluster/district to KVK/SAU and with periodic monitoring by CSB to keep farmers abreast with latest technology and know-how and conduct capacity building exercises pertaining to pre and post production processes
- Maintain and publish database (on website) of silk production units/farmers/SHGs/FPOs etc. to help easy identification by potential buyers in Maharashtra & other states
- Explore options of collaborating with Silk Board to work with buyers who could provide buy back guarantee on output for first 3 years

- Approximate investment envisaged (*as per SRDC estimates*) in seed bank and reeling unit development ~ INR 115 crore considering 1 cluster each in 19 districts of Marathwada & Vidarbha. Key stakeholders for implementing the recommendation would include State Sericulture Dept, SRDC, CSB, CSRTI, Farmers/FPOs/NGOs/SHGs.

Impact Potential: Sericulture has the potential to impact the existing 45 lakh small holder farmers in both regions and generate significant non-farm sector employment. Incremental income envisaged – Average INR 12,000 per cycle (for 1 acre farm size & subject to prevailing prices & stability) as indicated in Table below.

Table 41: Scenario Building for Sericulture Farming (1 acre farm size) – Income and Expenditure Analysis in distressed districts.

Sr No	Particulars	Average Annual Gross Income (INR)*	Average Annual Expenditure* (INR)	Net Income (INR)*
1	1 acre farm size	75,000	15,000	60,000

*** Assumptions:**

1. Farm size of 1 acre
2. Cocoon cultivation is being practiced round the year.
3. 5 cycles in a calendar year. Average cocoon cycle is of 3 months. With optimal practices and monitoring, 5 cycles can be achieved in a year.
4. Average expenditure on labour, land preparation and equipment for Year 1 considered to be INR 15,000
5. Average Annual Gross Income = 5 cycles*INR 15,000 per cycle = INR 75,000
6. Small and Marginal farmers can earn an incremental income of INR 75,000 per 1 acre farm size per year
7. Labour, equipment and land preparation costs reduce marginally from Year 2 onwards.
8. Market pricing of raw silk is highly volatile. Primary stakeholder consultations has also yielded that farmers have got upwards of INR 25,000 per cycle as well depending on the market dynamics existing during that period.

Source: YES BANK Analysis

4.3. Dry land Clusters

Maharashtra has 82% area under rainfed conditions and droughts are a frequent phenomenon. The State Government had launched Dryland Agriculture Mission (DAM) in 2013 with an outlay of INR 10,000 crores. The components of DAM include agricultural development through farmers groups, farm ponds, micro irrigation, controlled agriculture, inter-cropping and double cropping, processing, value addition and marketing. This mission has been initiated to bring sustainability in crop production in the dryland area. The grant utilized for this mission during 2016-17 was INR 13.88 crore as against INR 29.62 crore in 2015-16. During 2017-18 upto December, grant released was INR 24.74 crore. The following recommendations have been proposed to further the development of dry land regions in the State including Vidarbha.

Recommendation 6: Promote Crop Diversification

Premise for the Recommendation

Although major part of Nashik and Sangli falls in the irrigated and plain belt with sufficient water availability, there are constraints in terms of crop cultivation in the sugarcane belt in Sangli, tribal and water scarcity belts of Nashik. The farmers, mostly small and marginal practice crop diversification and multiple cropping, thus enhancing income levels.

Sl. No.	Crop	Cropping Pattern	Gross Income/hectare
Sangli District			
1	**Bajra**	Bajra – Jowar-Maize	Bajra (mono-cropping) – INR 7357/ha Bajra – Jowar-Maize – INR 32357/ha
2	**Jowar**	Jowar – Maize Jowar – Groundnut Jowar - Bajra	Jowar (mono-cropping) – INR 13,369/ha Jowar – Maize – INR 45838/ha Jowar - Groundnut – INR 85,619/ha Jowar – Bajra – INR 32,369/ha
3	**Maize**	Maize – Jowar	Maize (mono-cropping) – INR 19,100/ha Maize – Jowar – IN 37020/ha
4	**Soybean**	Soybean – Jowar - Groundnut	Soybean (mono-cropping) – INR 46,933/ha Soybean – Jowar – Groundnut – INR 2,00,897/ha
Nashik District			
1	**Rice**	Rice – Groundnut – Ragi (Nangli) Rice - Ragi – Groundnut Rice – Wheat – Tomato Rice – Ragi – Tur Rice – Tomato - Brinjal	Rice (Mono-cropping) – INR 41,559/ha Rice – Groundnut – Ragi (Nangli) – INR 1,16, 374/ha Rice – Wheat – Tomato – 1,49,959/ha Rice – Ragi – Tur – 1,03,834/ha Rice – Tomato – Brinjal – INR 1,58,459/ha
2	**Bajra**	Bajra – Groundnut –	Bajra(Mono-cropping) - INR 7153/ha

Sl. No.	Crop	Cropping Pattern	Gross Income/hectare
		Onion Bajra – Maize - Onion	Bajra – Groundnut – Onion – INR 1,57,766 Bajra – Maize – Onion – INR 1,12,943/ha
3	**Maize**	Maize – Bajra- Onion Maize – Groundnut – Onion/Tomato Maize – Soybean - Bajra	Maize (mono-cropping) – INR 1,00,617/ha Maize – Bajra- Onion – INR 2,22,069/ha Maize – Groundnut – Onion/Tomato – INR 3,46,499/ha Maize – Soybean – Bajra – INR 1,54,617/ha
4	**Soybean**	Soybean – Maize – Chilly	Soybean (mono-cropped) – INR 30,072/ha Soybean – Maize – Chilly - INR 82,472/ha
5	**Red gram (Tur)**	Tur- Chili – Maize	Tur (Mono-cropped) – INR 1,42,400/ha Tur- Chili – Maize – INR 2,22,000/ha

In the tribal belt of Nashik, intensive cropping of rice with other cereals and vegetables enabled Gross Income levels of up to INR 1, 58,459 /hectare; in the water scarcity belt growing dry land crops including Bajra and Maize with a vegetable crop fetched gross income levels of up to INR 2,22, 069 /hectare. Similarly cropping of Tur along with Maize and Chilly fetched gross income level of up to INR 2, 22,000 /ha.

Similarly, in Sangli district, double crop and multiple cropping were observed during the primary survey. While in the water surplus belts crops like Sugarcane, Pomegranate and Grapes was grown along with cereals, in the water scarce districts cropping of cereals/millets along with pulses and oilseeds enabled increased Gross Income levels of up to INR 2,00,000/hectare.

Note: *The Gross Income levels are excluding dairying which is being practiced by most of the farmers in the region (except tribal belt) as crops like Jowar, Bajra, Millets and Maize also serve as excellent sources of fodder for the livestock.*

Action Plans:

Action Plan 1: Promote Diversified Cropping Systems

- Promote diversification of cropping pattern to include hardy crops and adoption of integrated farming system approach (millets, pulse crops) and provision of seeds for short duration, drought tolerance and improved varieties of minor millets. One of the key observations includes that crops like Ragi (Nagli), Jowar and Bajra can be easily be grown in dry land areas as a second/third crop with an income generation potential of upto INR 22,000/hectare with minimum agri input application. Unlike Sangli and Nashik districts, the findings from Akola & Latur districts indicate that farmers

practiced the following cropping patterns. None of the farmers practiced millet crops or Jowar and Bajra which can greatly enhance income generation.

Akola:

- Soyabean –Redgram
- Cotton – Soyabean
- Redgram – Greengram
- Cotton – Redgram-Soyabean
- Cotton-Redgram-Greengram

Latur

- Soyabean-Tur-Moong
- Soyabean-Gram-Urad

- In Akola, for obtaining high monetary returns and soil and moisture conservation, it is recommended to take Soybean-chickpea double cropping on 30% area of lower topo-sequence in place of sole cotton under cotton based cropping system in dryland condition. It is also observed that, the strip of soybean – chickpea reduced the runoff and soil loss to some extent.

- For obtaining higher monetary returns and meeting the need of food, fodder and fuel from one piece of land, it is recommended to adopt three tier cotton based intercropping system in which cotton, sorghum, pigeon pea and sorghum be grown in 6:1:2:1 row proportion under rainfed situation. This system has the highest capacity to bear risk of the season due to erratic behavior of monsoon and also being adopted on reasonably sizeable area.

- As per discussions with KVK, Akola, under dryland condition, ber agro-horticulture system (Ber + Greengram) was found be more remunerative than anola and custard apple horticulture system which is practiced in certain regions of the district by the farmers.

- Provide start-up funds for community-managed grain banks to supply good drought-resistant seeds

Recommendation 7: Promote Micro Irrigation Management

Premise for the Recommendation

As per the secondary research, the existing area under irrigation is only 5%, 14%, 21% and 29% of the net irrigated area in Akola, Latur, Sangli and Nashik respectively. Considering the agrarian distress prevailing in Akola and Latur, these districts need to at least double this area in the next five years. Scarcity of water in these regions have led to reluctance to shift to other High Value Crops by the farmers resulting in lower income realizations. State Government has been running various irrigation programmes and projects including Jalyukta Shivar Abhiyan, Pradhan Mantri Krishi Sinchai Yojana (PMKSY) and Maharashtra Micro Irrigation Project to undertake various irrigation projects including MI projects.

PMKSY scheme is being implemented to enhance the area under cultivable land by promoting most efficient irrigation system like sprinkler & drip. Under PMKSY 'Per Drop More Crop', INR 620.67 crore is sanctioned for the year 2017-18. As per the operational guidelines received from GoI for 2017-18, subsidy norm for small and marginal farmers are 55 per cent and other farmers are 45 per cent. For accepting applications from farmers, e-thibak software is open for accepting the applications. Micro-irrigation area brought under this scheme from 1986 to 2017 is about 21 lakh ha in the State. However, 50 % of the surveyed farmers complained about late disbursal of MI subsidy (~ 1 year) under the scheme. In wake of above, it is critical to revamp the existing MI schemes for faster adoption and quick disbursal of MI subsidies being provided by the State Government and promoting Participatory Approach for widespread adoption of MI.

Action Plans:

Action Plan 1: Revamp *e-Thibak* scheme on MI by GoM

- Revamp the existing e-Thibak MI scheme to ensure quick disbursal of MI to the farmers along with bundling of the following provisions: 1) Any area 2) Any crop 3) Any type
- of MIS 4) Choice of MIS Supplier 5) Electricity connection on overriding priority and 6) No subsidy ceiling with uniform norms

The following subsidy norms can be proposed for various categories of farmers as given below:

Sr No	Category of Farmers	Rest of Maharashtra	Vidarbha and Marathwada Regions
1	General Farmer: (Land holders of more than 2 hectares)	Up to 50% of MIS Unit Cost or Rs. 60,000/- per hectares, whichever is less	Up to 60% of MIS Unit Cost or Rs. 60,000/- per hectares, whichever is less
2	General Farmer: Small and Marginal farmer (Landholders of less than 2	Up to 60% of MIS Unit Cost or Rs. 70,000/- per	Up to 70% of MIS Unit Cost or Rs. 70,000/- per hectares,

Sr No	Category of Farmers	Rest of Maharashtra	Vidarbha and Marathwada Regions
	hectares)	hectares, whichever is less	whichever is less
3	SC/ST Farmers	Up to 75% of MIS Unit Cost or Rs. 90,000/- per hectares, whichever is less	Up to 85% of MIS Unit Cost or Rs. 90,000/- per hectares, whichever is less

- Create awareness through various forums on MI adoption
- Make MIS supplier to render agronomic and technical support after implementation
- Involve other partners in MIS - NGOs, Credit Cooperative Societies, Milk Cooperative Societies can act as MIS Partner and provide additional financial assistance to the beneficiary farmers

Action Plan 2: Devise Crop Specific Plans for Wide Spread use of MI

- Maharashtra and Karnataka, which together have 27 percent of the area under sugarcane in India, have enforced rules making drip method of irrigation mandatory for the cultivation of sugarcane in the states with the potential of saving up to 60 percent of water used in agriculture. Taking a crop-specific focus would yield quicker results with large areas brought under micro irrigation in shorter periods of time. Next crop focus could be on cotton, fruits and vegetables which are other major water guzzling crops with provision of MI sets to farmers at subsidized interest rates to make the adoption viable. The potential fruit crops that can be targeted in the State include Banana, Mango, Citrus crops, Grapes. Tomato, Chilli and Brinjal are the potential vegetable crops that can be brought under MI.

Action Plan 3: Credit Guarantee Funds for MI

- In case of Micro, Small and Medium Enterprises (MSMEs), which can get collateral free loans up to INR 1 crore through banks due to support provided by CGTMSE (Credit Guarantee fund trust for MSEs). A similar fund is also currently run by the Small Farmer Agribusiness Consortium (SFAC) for collateral free loans to Farmer Producer Organization (FPOs). A similar arrangement can be set up for micro irrigation, with the initial investment coming from the government and each farmer taking a loan could contribute a small percentage as guarantee to the fund.

Action Plan 2: Promote Participatory Approach in MI management

- Facilitate FPOs specifically for the purpose of MI management initiatives through grant, loan or capacity building/skilling initiatives in areas which are affected by water logging, salinity affected and water scarce regions *(Refer Case Study on Gujarat's Bhomaikrupa Bhungroo Juth (FPO) renowned success model)*
    - Collection and storage of rainwater harvesting structures by FPOs

- Pooling of land by the members and involvement of women members
- NABARD along with State Agri Department can facilitate FPOs for such initiatives.

- **Impact Potential:** Maharashtra government is planning to pump more money into micro-irrigation projects to double agricultural income by 2022. Considering that Maharashtra's total area under agriculture is more than 20 million hectares and only 20 per cent of it is covered under the formal irrigation system, at present rate it would take decades before micro-irrigation systems can be installed in every farmer's field. The government needs to ramp up coverage of the micro-irrigation systems by channelizing more investments to bridge the gap. According to one of the Impact Evaluation Study conducted on National Mission on Micro Irrigation conducted by Ministry of Agriculture, Government of India, it was observed that the economic impact was upto 31% decrease in irrigation cost, upto 34 % decrease in electricity cost, upto 23% savings in fertilizer. Upto 46 % increase in farmers' income can (Net incremental income of ~ INR 13,000 per acre) can be observed with the adoption of above interventions in the State of Maharashtra.

Case Study: Farmer Producer Organization (FPO) Bhomaikrupa Bhungroo Juth, Gujarat model MI management

Farmer Producer Organization (FPO) Bhomaikrupa Bhungroo Juth in Patan district of Gujarat has undertaken innovation in the micro management in irrigation through rainwater harvesting. By collecting rainwater for just about 10 days in a year, Bhungroo enables as much as 40 million litres of irrigation-suitable water to be stored in the underground aquifer reservoir. This water reserve enables the farmers to conveniently have two cropping cycles, that is, monsoon and winter farming over seven to eight months in a year. Participation of women is central to the Bhungroo initiative, in which people are hired to construct drainage systems while drilling is undertaken by five participating families. Each group consists of five women, one of whom gives a part of her land for construction of the Bhungroo, while the other members extend their labour and bring an added sense of teamwork.

Small and marginal women farmers have been able to ensure food security and enhance their income through the use of this innovative irrigation technology. Moreover, Bhungroos have helped improve their perennially water logged, salinity-affected lands and enabled the women farmers to earn higher income within the first two seasons. The solution, which initially covered 14 villages in the Sami and Harij blocks of the Patan district, in Gujarat, has been replicated in other parts of the state by the Gujarat Ecology Commission and Gujarat State Planning Board.

Constructed Drainage System

Salinity affected area

Source: "Krishi Sutra 2" - Success stories of FARMER PRODUCER ORGANISATIONS published by SFAC

4.4. General Recommendations (Applicable To All Clusters)

Recommendation 8: Strengthening of MSP Procurement Support in Maharashtra

Premises for the Recommendation:

Currently less than 5% of overall production of food-grains; 6% in case of oilseeds and 2% for cotton is procured through MSP support in Maharashtra. During the farmer's survey in the districts of Nashik, Sangli, Akola and Latur it was found that farmers are currently paid 10-15% lower than the MSP in the open market for food-grains. 10% of the surveyed farmers in Akola and 53% of the surveyed farmers in Latur faced issues pertaining to short duration of pulses procurement and payment delays (more than 15 days delay in 90 % cases). The table below list the commodity-wise difference in MSP and market prices as per the survey districts.

Table 42: MSP of key commodities in the study region (per quintal)

Crop	Average Selling Price (INR per quintal)	MSP (INR per quintal)*	% Difference in Price Realization
Akola			
Red Gram (Tur)	3750	5050	-35%
Soybean	2534	2775	-10%
Green Gram	4766	4850	-2%
Latur			
Soybean	2450	2775	-13%
Red Gram (Tur)	3500	5050	-44%
Nashik			
Soybean	2316	2775	-20%
Groundnut	3675	4220	-15%
Sangli			
Bajra	1,092	1,330	-21%
Jowar	1,416	1,650	-17%
Soybean	2,700	2,775	-3%

In addition, the farmers complained about the Government procurement centers only in the Tehsils and main cities because of which farmers are unable to sell their produce through MSP procurement. Tur which has more than 90% of share of total procurement has only 189 procurement centers.

Union Budget 2018-19 proposed new scheme - Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA) for implementing crop MSPs. Under the PM-AASHA, states will be allowed to choose from three schemes — existing Price Support Scheme (PSS), newly designed Price Deficiency Payment Scheme (PDPS) and the pilot Private Procurement Stockist Scheme (PPSS). State Govt. can rope in private players in the procurement of crops at MSP. Although, there has been many initiatives from the demand side for strengthening the MSP, the need of

the hour is to address the issue from the supply side for strengthening the MSP procurement support.

Action Plans:

It is recommended to strengthen the existing MSP Procurement support in Maharashtra through the following measures:

- Improvement in facilities at procurement centers including temporary storages, drying yards and electronic weighment - including enhanced focus on coarse cereals.
- Adoption of mobile based procurement token system for farmers to be implemented.
- Broadening the role of Cotton Corporation, NAFED and other Central/State Govt. agencies into procurement of food-grains including paddy, wheat and coarse cereals (Jowar and Bajra)
- CWC and SWC warehouses in the State should be designated/notified as procurement centers & provide multi-pronged services like price discovery mechanism, assaying, sorting and grading of the produce, weather advisory.
- Key Stakeholders will include the Department of Agriculture, Government of Maharashtra, Food Corporation of India (FCI), CWC, SWC, CCI and NAFED.

Impact Potential: Increased net price realization of upto 15-20% per quintal for farmers growing soybean, green gram, bajra and jowar. For red gram, net price realization can improve upto 30% per quintal.

Paddy Procurement Model in Chhattisgarh

Government of Chhattisgarh has initiated Paddy and Maize procurement at MSP. There are 1992 purchasing centers of the 1333 Primary Agriculture Credit Co-Operative Societies Procurement centers. The target is for procurement of 70 lakh metric tonnes of paddy and 10,000 metric tonnes of maize in 2017-18 Kharif season.

The key achievements of the scheme was:

- Immediate Payment of MSP Online - The day farmers sell their paddy the payments was done online the same day. Notably, Chhattisgarh stood second in the country in Kharif season 2015-16 among a list of 18 states with targeted procurement of 36 lakh metric tonnes of paddy crop during 2015-16 as per Central Govt. data.
- Setting up of Online Procurement Monitoring System (OPMS) for daily monitoring of district-wise procurement and 'Project Monitoring Unit' for successful implementation of Paddy Procurement, Storage and Disposal system in the State.
- There are 1992 purchasing centers of the 1333 Primary Agriculture Credit Co-Operative Societies Procurement centers. The target was 70 lakh metric tonnes of paddy in 2017-18 Kharif season (85-90% of total paddy production in Chhattisgarh). The paddy was purchased on 42 mandi premises of the 69 Agriculture Produce Markets and 73 Up-Mandis. The paddy was being procured through the MARKFED in all the 27 districts of the State. Paddy purchase centers had been opened in every five Gram Panchayats.

Source: Chhattisgarh State Cooperative Marketing Federation (MARKFED) http://www.markfed.cg.nic.in/)

Recommendation 9: Connect Farmers to Electronic Markets for Better Price Discovery and Access to Large No. of Buyers

Premises for the Recommendation:

Ministry of Agriculture, Govt. of India has launched National Agriculture Market scheme in the year 2016. The scheme envisages implementation of the NAM by setting up of an appropriate common e-market platform that would be deployable in selected 585 regulated wholesale markets in States / UTs desirous of joining the e-platform.

Currently only 60 of the 306 Mandis (APMCs) in Maharashtra are integrated to e-NAM with less than 1% commodity transaction coverage as of 2016-17). Integration of 10 APMCs in the four districts of Akola, Latur, Nashik and Sangli and all the remaining APMCs needs to be implemented by Govt. of Maharashtra.

As per the survey, none of the 844 farmers surveyed has utilized e-NAM for sale of his agri-commodities. Of the APMCs visited in Nashik, Sangli, Akola and Latur, most of the APMCs were connected online with-e-NAM with negligible transactions in the 10 APMCs. The connected APMCs do not have the infrastructure necessary for e-NAM including modern assaying labs, e-auction hall, and electronic displays. There is also a lack of technical expertise at the state agriculture marketing departments to assess the kind of equipment needed for the crops as per interaction with the APMCs of Nashik & Sangli.

Action Plans:

The key recommendations include

- Harmonization of quality standards of agricultural produce and provision for assaying (quality testing) infrastructure in every market to enable informed bidding by buyers in each of the district.
- Trading of non-perishable commodities to be made compulsory through the electronic platform in all APMCs in Maharashtra
- Brick and Mortar infrastructure in all 306APMCs needs to be spruced up - assaying labs, e-auction halls, scientific sorting/grading facilities or quality testing machines. Each APMC will require a budget of INR 20-25 Lakh for up-gradation (tentative).
- Farmers can avail commodity finance (Warehouse Receipt Finance) against the pledge of commodities traded in e-NAM portal and repay the loan after selling the stocks when they price becomes favorable.
- Key Stakeholders may include the Dept. of Agri, Govt. of India; Dept. of Agri – Govt. of Maharashtra; MSAMB; SFAC, Private Enterprises – NCDEX

Table 43: Crops and APMCs proposed to be upgraded

Sl. No.	Commodities	% share of arrivals in Maharashtra	APMCs to be upgraded
1.	Red gram (Arhar)	16%	Akot, Murtizapur, Udgir
2.	Bengal gram (Gram)	29%	Akot, Murtizapur, Telhara
3.	Black gram	31%	Akot
4	Green gram	38%	Akot
5	Soybean	24%	Murtizapur, Udgir
6	Maize	33%	Kalvan, Lasalgaon, Manmad, Nandgaon, Satana

Source: agmarket.gov.in

Impact Potential: Upto 13% increase in farmers' price realization from e-auctioning as compared to manual auction prices as compared**.**

Case Study: The Karnataka E-Mandi

The electronic Tender System is a unique project involving the adoption of ICT at the primary wholesale markets level aimed at ensuring competitive price for the farmers' produce and encouraging fair marketing practices within the State. The e-tender system was first introduced in 2006-07 on pilot basis for paddy in the Mysore market. It was further extended to 11 commodities in 2010. It is now operational in 55 markets in the state. Initially the project was implemented with the help of a software developed by the Karnataka State Electronics Development Corporation Limited (KEONICS) although now it is being gradually shifted to a software developed by the National Commodity & Derivatives Exchange Ltd (NCDEX), both are private companies. E-Mandi has made a commercial partnership with ICICI Bank as the nodal financial institution for disbursement of payments in the accounts of farmers, traders and commission agents.

By the end of 2014 Karnataka had 82 mandis already operating on the electronic platform with full support from APMCs and local traders. It aims at eventually covering all the 155 remaining mandis in the State. From the day of its launch, February 2014, 0.75 million lots of trading have been carried out on the platform, with 4.5 million bids being made. Transactions on the platform are worth INR 150 billion since it began – or about US$2 billion. It has serviced over 400 thousand farmers, 31 473 traders and 17 149 commission agents for all the 92 regulated commodities. The introduction of organised electronic exchanges can bring about a great change in the physical market of commodities. The average cost of intermediation in farm commodities is 50 to 60 percent, which could be reduced to just 10% as shown by the experience in Karnataka. The other key benefits included:

- In the case of Karnataka, farmers' realization for 10 commodities under ReMS platform has been 13% higher than manual auctions (in real terms).
- More than 4 lakh farmers spread across 92 regulated commodities have got benefitted from the e-auction systems in Karnataka.

Source: Innovative risk management strategies in rural and agriculture finance - The Asian experience (FAO, 2015)

Recommendation 10: Improve the Penetration and Administration of Crop Insurance

Premise for the Recommendation:

In a recent survey done in eight states (Uttar Pradesh, Gujarat, Odisha, Andhra Pradesh, Chhattisgarh, Nagaland, Bihar and Maharashtra) by BASIX, it was found that only 28.7% of the sampled farmers are aware about the PMFBY. In study districts, it was found that only 16% of these farmers knew that their crops were insured (Kisan Credit Card bundling). Farmers are not even aware that premium is being deducted for insurance from their crop loan amount disbursals. The banks currently manage the process of enrolment of farmers on behalf of insurance companies. Farmers taking loans take insurance by default, but a majority of those who haven't taken loan from banks are not even aware of crop insurance scheme.

In addition, unseasonal rains and hailstorms in north Maharashtra, Marathwada and Vidarbha are frequent occurrences for last few years. For eligibility under the crop insurance scheme, a crop has to be notified in a revenue circle. In the case of fruit crops, a minimum of 20 hectares is required to be cultivated in the revenue circle for the crop to be notified. Farmers in tehsils which do not have adequate cultivation of the fruit crop cannot access the scheme. Similarly only limited fruits are covered under the scheme in Maharashtra like grapes, oranges, mosambi, bananas, mango, pomegranate, cashew, lemon and guava.

Action Plans:

There is an urgent need to launch campaigns to educate farmers and create awareness about the scheme amongst them. The following operational recommendations have been proposed to improve the penetration and administration of Crop Insurance in the State.

Action Plan 1: Create Awareness Platforms for the Farmers

- Create simple platforms to help farmers apply for the scheme and, at the same time, get details on the risks covered in the scheme and how they can inform about their localised losses. There is a need for a transparent platform wherein applications, survey requests and payout status can be checked timely and grievances of farmers and insurance companies can be redressed via a grievance redressal mechanism. Farmers should receive an SMS as soon as they purchase the insurance product so that they are well informed about compulsory deduction of premium, the amount of sum insured and procedure of claim.
- Involve Panchayati Raj Institutions (PRIs) in the implementation of the scheme at various stages of implementation of the scheme, especially in identification of crops and beneficiaries as well as awareness campaigns.

Action Plan 2: Deploy Technologies for Increasing Efficiency

- Deploy latest technologies for more efficient Crop Cutting Experiments (CCEs) as well as for complementing CCEs with remote monitoring & satellite imagery based applications (humanly impossible to conduct manual CCEs in limited time frame). This will also enable in ascertaining authenticity of cropping. This should be supervised and monitored by independent experts from state agricultural universities and Krishi Vigyan Kendras. Satellite images could be used to determine broad location of CCEs, determination of area sown to validate area insured and it may be possible to conduct CCE in areas which are prone to higher losses. Use of handheld devices and mobile phones to capture multiple images in case of heterogeneity of field conditions in a village could be beneficial in assessment of damage. Karnataka has gone ahead as they have made Samarakshane Crop Insurance portal. Not only does this portal provide information related to CCE but other information such as claim statements, farmer wise including farmer's Aadhar number and account number. Mobile phones have been made mandatory for CCE. Maharashtra should design similar portal like Karnataka and provide complete information of CCE, use of technology, updating of pictures from CCE and provide timely information to insurance companies and also involve them in CCE.

- Expedite the collection of digital land records by the farmers. The land record of the farmers should be digitized and linked to their bank account. The claim amounts could be transferred to farmers' bank accounts linked with Aadhaar along with their mobile numbers. This system can enable faster settlement of claims within two weeks of crop damage due to certain reasons like hail where assessment is possible without CCEs.

Action Plan 3: Extend the scope of Crop Insurance

- Relax ceiling of 20 hectares in revenue circle under national Weather Based Crop Insurance Scheme (WBCIS) for horticulture crops.
- Include more fruit crops like papaya which are not being presently covered under the scheme
- Extend the scope of insurance to fisheries sector on the lines of PMFBY. Extend the coverage to cover the risks such as the large-scale decline in the stock of fish species, damage of sea cages, loss of fish crops and damage to farm structures.

Case Study: Crop Insurance in Karnataka

Karnataka Government has made Samarakshane portal which has been operational for about 20 months. It handles all facets of PMFBY right from issue of notification till the payment of the compensation, including updation of such compensation details. Number of crop cutting experiment required for CCE is 4 for major crop and notified at Gram Panchayat level and 10 for minor crop notified at Hobli (sub taluka) level. The number of experiments under NAIS during Kharif 2015 was 74,242 and this has increased to 85,166 in Kharif 2016 and further to 88,434 in Kharif 2017. For crop cutting experiments, mobile phones have been made mandatory. Mobile phones were introduced under Kharif 2016 and as induction of mobile phones was delayed, 32,447 experiments out of 85,166 experiments were conducted by mobile phones. In Rabi & Summer 2016-17 all 52,208 experiments were conducted using mobile phones. They are used to capture images of CCE increasing transparency and accuracy of the data. It is not just the Crop Cutting Experiment data that is given to the insurance company. It includes other information such as claim statements, farmer-wise including farmer's Aadhaar number and account number. The insurance company can make the payment soon after the sheet is given.. However, compensation is delayed by some insurance companies as they raise objection on the CCE data provided by the government. To address this issue, since Kharif 2017, insurance companies are made to participate in CCE and can raise objections on the mobile phone platform itself. Thereafter, they would not be allowed to raise any objections at a later point of time. This will enhance transparency in the data received for CCE so that claims could be disbursed to farmers on time.

Source: Working Paper No. 352 - Crop Insurance in India: Key Issues and Way Forward published by ICRIER, February 2018

Recommendation 11: Promote Warehouse Receipt Financing (WRF)

Premise for the Recommendation:

The current size of WRF in Maharashtra is ~ INR 4,000 crores (INR 40,000 crores is the annual grains/oilseeds production). None of the farmers in the surveyed districts availed WRF despite 55 % of the HHs surveyed being under the ambit of formal banking system.

Action Plans:

To promote Warehouse Receipt Financing (WRF) in Maharashtra, following actionables have been proposed:

- Designate warehouses where MSP procurement happens for focused WRF initiatives. Unique off-season pricing mechanisms can be structured for enabling farmers to benefit from upside in off-season.
- Designate CWC and SWC warehouses in the State as procurement centers & provide multi-pronged services like price discovery mechanism, assaying, sorting and grading of the produce and weather advisory services.
- Subsidize storage rentals and interest subvention specifically for small and marginal farmers storing their produce in these procurement centers. These benefits would be transferred to Aadhar linked accounts.
- Make e-NWRs compulsory for any kind of commodity based funding to give enhanced comfort to Banks.
- Synergize electronic Warehouse Receipts with e-NAM portals
- Scale up corporate anchored closed loop structures involving farmers, corporates & Banks wherein procurement will be done during the season by the Corporate and the pricing will be done at the time of choice of the farmer.

Recommendation 12: Enhancement of Institutional Credit

Premise for the Recommendation:

For 2018-19, NABARD has estimated the crop loan potential at INR 62,763 crore which is 6.4% more than the projections of 2016-17 and 15.7% more than that the Annual Credit Plan (ACP) target of 2017-18. The total agriculture including investment credit has been assessed at INR 93, 618 crore which is 7.8% over and above the last year's projections and 20% more than the ACP target 2017-18. As far as projections in respect of agriculture is concerned, the share of Western Maharashtra with 6 districts is 36% of the total projections followed by Vidarbha (11 districts) and Marathwada (8 districts) with 22% and 21% respectively. In respect of Crop loan, Western Maharashtra is having highest share of 34% (INR 21,290 crore) in the total projections, followed by Marathwada and Vidarbha equally at 24%, Northern Maharashtra at 14% and Konkan at 3%. The reasons could be attributed to higher scale of finance crops and higher Gross Cropped Area (GCA) (28% of the total GCA covered, next to Vidarbha at 29%).

Farmers' dependence on private money lenders to tide over financial crisis has shown a steep rise at 40% in the last one year in Maharashtra. The total amount of loans disbursed by private money lenders at higher interest rates was INR 1.25 lakh crores. 65 % of the State's farmers in the distressed regions of Vidarbha and Marathwada have only 42 % credit allocation. ~ 48 % of the surveyed farmers' availed loan from informal banking sources whereas 54% of the farmers availed loan for formal banking institutions.

It is critical to build a mechanism to provide small and marginal farmers easy access to crop loan credit. Keeping them out of institutional credit bracket defeats the very objective for which crop loan credit has been created. There is a need to improve the regional infrastructure to make crop loans easily accessible to farmers through financial institutions. The following enablers would attempt to increase the coverage and penetration of Institutional Credit in the State.

Action Plans:

- Design appropriate centralized database for enabling Financial Institutions to access farm, farmer, crop & market related updated information so as to better assess farmer wise credit risk
- Phase out farm loan waivers and instill a healthy credit culture amongst farmers complemented with relevant efficient safety net enablers like insurance, warehouse receipt financing, MSP support, efficient marketing infrastructure & Electronic markets
- Digitize Land Records through establishment of Nodal State Level agency to maintain Cadastral maps and registered deeds, complete digitization of maps to enable online mortgage creation
- Promote innovative technologies including geo-tagged tablets equipped with biometric fingerprint recognition, for more efficient and lower-cost deposit-taking, loan disbursal and repayment.

Recommendation 13: Capacity Building, Skill Development & Extension Services

Premise for the recommendation

Farming awareness and adherence to package of practices, as well as reducing unwanted expenses and being aware of the same as well goes a long way in cutting costs and dependency on external and unorganized finances. This may be enabled through efficient communication and sensitization of farmers through proper and timely information, as well as market exposure and capacity building. As per primary survey, around only 3% of the farmers in Akola acknowledged receiving government support for skilling or extension services. Latur, Nashik and Sangli reported negligible exposure to government services in skill development or extension. (Though other support in inputs availability, infrastructure support and finance was acknowledged).

"For Akola, it is estimated that even after continuous efforts of extension organisations, 60% of the farmers do not have access to any source of information resulting in a huge adoption gap.[1] The study of Adhiguru et al., (2009) on agricultural information flow has revealed that only 40% farm household's access information from one or the other source.

Another aspect which emerged as per primary survey is that an average farming household spent a considerable amount of its monthly expenditure on social customs, functions and religious/festival activities. In distressed districts, especially like the ones of Akola & Latur, the figures stood at an average of 12% & 8%. As the society lays unwanted stress on social upkeep and status, households facing distress or less cash flow are compelled to spend more than what is required on such activities, many times through loans and unorganized lending sources. Similarly, when it came to awareness and practical application of government schemes such as RKVY, though the farming household was awareness of these schemes, seldom do they have availed the same.

"As per the NSSO 70th Round report on 'Key Indicators of Situation of Agricultural Households in India', it has been highlighted that at the national level, only 6.2% and 2.7% of every 1000 agri households accessed technical advice from extension agents and District KVK respectively"

- During primary survey, for district Akola, 90% of the farmer respondents have heard of RKVY but none have availed benefit from it. In the case of ATMA, the awareness was again, found to be negligible. For KVK's the awareness was comparatively better with ~80% of the respondents having availed benefit from KVK activities. For district Latur, the awareness levels and benefits anticipated from RKVY and ATMA was negligible.
- Similarly for Nashik, the awareness levels for RKVY stood at ~40% only. ATMA found negligible visibility amongst the surveyed farmer households. KVKs fared better with around ~32% being aware of them, but only a select few had availed its benefits (<5%). For Sangli, 36% of farmer households knew about RKVY but only 4% had availed benefit from them. Again, KVKs found better visibility (though quite

low) with 36% farmers having heard about it, however, only 3% of them having availed benefit.

- Also, a fact noticeable from the primary survey (and explained in earlier sections) is that the cost of production of key agri/horti commodities in the study region was on the higher side when compared to the recommended package of practices (PoP). This shows lack of awareness and pragmatism on the part of the farmer in terms of reducing the cost of production by means of good farming practices (less usage of inputs, efficient irrigation, usage of better quality seed etc. and other related factors). Large scale migration to other states during off season, or to other districts for non-farm jobs (manufacturing labour based) leads to higher expenses. There have been multiple state and central level schemes and programs being run in the state of Maharashtra for farmer capacity building and training. An indicative list of the same includes:
    - 21,000 functionaries dedicated for agricultural extension are being provided at the Block level and below under the Extension Reforms scheme being implemented through ATMA.[10]
    - A total of 45 Krishi Vigyan Kendra imparting on field training, Field Line Demo and capacity building to farmers in areas of inputs, machinery usage, pest management amongst others.
    - 7 Regional Agricultural Extension Management Training Institutes (RAMETI) functioning across Maharashtra having divisional coverage.
- Some of the limitations plaguing agricultural extension include poor status of resources, infrastructure, mobility, linkages with research and marketing system, focus on production oriented technologies and neglect of post-production services, provision of generic information, target orientation, repetition rather innovation, poor PPP and ICT applications and hence ineffective manpower. A holistic and inclusive training approach needs to be developed and implemented so as to provide farmers end to end resources in terms of information and knowledge thereby helping him/her to reduce cost of production & marketing and as a consequence, impacting the income positively. A multi-pronged approach for the same should include the following:

[10] http://www.kisansuvidha.com/training-extension-farmers/

Action Plan 1: Enhance role of ATMA through Private Sector Participation linkages MOUs in order to improve dissemination of disseminate Good Farming Practices, success stories & overall farmer sensitization

Lack of good PPP models and a lack of clarity of the concept and sharing mechanism at implementers' level, fear of legal implications & non-approval at district level, etc. have impeded Private sector participation in extension. 10% allocation for PPP activities in ATMA has also not borne desired results.

- Hence, it is recommended to bring in major private sector agri business players at district level with ATMA who, together can use their respective strengths (ATMA with extension personnel, grassroots level connect & infrastructure, geographical coverage and Private sector with its technology and financial strength) to improve extension delivery.
- A SPV can be explored for promoting CSR activities in extension. It is recommended to follow a decentralized model for this intervention, ensure district level monitoring, more autonomy to ATMA and hence improving accountability and maintaining transparent communication channels. An independent agency/call center should be enrolled to follow up with farmers, maintain database periodically.

Action Plan 2: Improve farmer awareness and capability through ICT applications and crop advisory

- Technology has to be used to facilitate information at various levels of value chains. It is imperative to promote PPP (Public Private Partnership) for investment in farm extension and backward linkages. This would entail information at all stages including cultivation practices, seed quality, inputs usage, weather information/forecast, market intelligence, crop prices, and use of financial services over mobile through calls or text messages. This should primarily be include:
  - Farm Level inputs: Crop Advisory, weather updates, irrigation advisory, GAPs
  - Market Level inputs: Pricing trends, price on arrival, registered market intermediaries and service providers, processors, allied sector market players coordinates etc.

Action Plan 3: Awareness & Training campaign for marketing of High Value Crops in collaboration with private industries.

HVC consumption domestically and in exports entails a different marketing channel and set of guidelines to which it should adhere to. Quality control, sanitary and Phytosanitary measures and waste management is critical for optimal quality and premium. The state has several indigenous varieties viz. Ratnagiri Alphonso, Nashik Grapes, Nagpur Orange etc. which has high market value and visibility.

- It is therefore recommended that the government invest heavily in a training, communication and awareness program across focus commodities with assistance from the private industry. Tie ups with FBOs for off take of produce can ensure steady income

flow for the farmer irrespective of the market prices and fluctuations. Also, in areas with high monocropping patterns, HVC crops can bear higher returns for the farmer if he/she is aware of the same and includes it in their cropping patterns.

Action Plan 4: Orientation for women cultivators to Organic Farming

- The state of Maharashtra owing to its high gross crop area and variable climatic conditions has potential for organic farming. A study done by the Committee on DFI in August 2017 shows that shifting of area in favour of horticulture at 2% per annum for the first 3 years and thereafter at 4% per annum for the next 4 years (2018-19 to 2022-23) can lead to an increase in farmer income to the tune of 14.8% for the state of Maharashtra.
- It is recommended that the MOFF, State NRCs and SAUs should link with the private industry to launch an SPV focusing on small and marginal women farmers to promote organic farming. Women SHGs should be consolidated and given access to Organic Cultivation Practices under Private sector expertise. The MOFF is currently involved in formation of FPCs across various districts to push farmers towards organic cultivation. Owing to depleting water table and climate change, avenues such as hydroponics and aeroponics with private sector should be explored. Linking these SHGs by direct procurement to an established private sector processor will eliminate middlemen, reduce losses and result in high income realization.
- Commodities such as Orange, Mango, Tomato, Custard Apple, Papaya, and Pomegranate may be considered in the preliminary stages for this initiative. This, should be coupled with a robust marketing and branding campaign to create visibility and attract further private sector investment.

Action Plan 5: Promote Agri Entrepreneurship Programme under Public Private Partnership Model

- Agri/ Rural entrepreneurship Model can be adopted by the Govt. of Maharashtra in association with the private sector companies in agriculture sector. Under this model Govt. will form an SPV with private player (Agri input company/ Food Processing Company/ Commercial Bank). The agri-entrepreneurs will anchor large market led extension projects in different crops. A typical value chain approach can be followed. In this approach, the SPV will support the entrepreneurs for kick-starting the business and thereafter, the rural youth manages independently on commercial basis with farmers. These agri-entrepreneurs will be jointly identified by the private enterprise and the Extension Dept. of state Govt. and will undergo 3-6 months training on different aspects.
- The AE can act as an extension service provider, an input suppler, market aggregator and marketer, as a business correspondent and as a farm equipment supplier for farmers/ farm groups. The different sources of revenue that the AE will generate would enable self-sustain the model. The SPV will provide the seed money to the agri-entrepreneur in setting up the facility (in terms of soft loan). While Govt. will provide

the seed money, private enterprise will provide training and handholding services for the rural youths. The SPV in order to strengthen and capacity building might tie up with the NGOs in the region. For the private player scaling up of the programme will act as a channel for sale and promotion of his produce/ credit.

eKutir (Agro Advisory)

eKutir is an Indian social agro-business launched in 2009. It developed a network of entrepreneurs who run franchised local e-kiosks supporting local farmers. As of 2013, eKutir's "Krishi vikas" (a farmer development program designed with Grameen Intel) provided individualized advice and trade information services to 50,000 small farmers through 106 eKutir e-kiosks.

Connectivity and broadband is at the very heart of the eKutir business model. It allows entrepreneurs – equipped with a tablet or mobile phone and an Internet data card ensuring wireless medium-speed connection (~140 Kbps) – to directly link small-holding farmers (with 2-3 acres of land) with the market (direct orders from buyers, aggregate purchase of inputs) and with agro experts who can advise them. On average, eKutir users have seen their incomes increase by 50 % and their costs (e.g., of inputs) decrease by 17 %.

Entrepreneurs provide farmers with eight main services developed by eKutir and based on ICT tools (both in-house software and regular Internet tools) using broadband or other speed connections available on *Seed selection ("Ankur"), Nutrient management ("Mrittika"), Crop planning ("Krishi Yojana"), Harvest and marketing ("Bozar"), Pest and disease management ("Pratikar"), Farmer portfolio management, Supply chain risk assessment, Farmer risk assessment.* Broadband infrastructure such as the fiber network that is currently being expanded by the Indian government in rural areas is key for the project to deliver a sufficient number of services quickly enough to be attractive to farmers.

• "eKutir's approach goes beyond approaches where single economic actors are "doing well by doing good" (Porter and Kramer 2011). Here, each stakeholder created value for themselves, while at the same time increasing the pool of technological, human, economic, and material resources that were organized into a single collective agenda devoted to addressing poverty and setting communities on a course of sustainable prosperity, referred to as "convergent innovation" (Dubé et al. 2014; Dubé et al. 2012; Jha et al. 2014)" – ***MIS QUARTERLY***

Recommendation 14: Promote Common Service Centre Model

Premise for the Recommendation

As per the secondary research, there are varying sources of funds available with farmers across the surveyed districts of Akola, Latur, Sangli and Nashik. Considering the agrarian distress prevailing in Akola and Latur, farmers are not left with enough money for farm operations after investing cash in buying agri inputs viz. seeds, fertilisers in cash during onset of Kharif; thus they are not able to undertake the entire package of practices including on field farm operations resulting in lower income realizations.

Action Plan: Development of Common Service Centres Model across the four surveyed districts and subsequently across all the districts in Maharashtra.

A. The Common Service Centres will be outlets that will stock high quality agri inputs and be manned by a local entrepreneur or by B.Sc. Agriculture graduates passing out from training centres of ATMA. The Common Service Centres will also build a set of Farm Machinery Banks for which leading farm equipment companies can be approached for stocking equipment relevant to the districts. For example in Nashik which is a leading grapes and other horticulture produce area; the Common Service Centres can have grapes orchard sprayers (fertilisers, pesticides etc) while in Akola the Common Service Centres can have seed coating equipment which can be of use for coating the soybean seed with seed treatment chemicals. The business model in Common Service Centres will be a mix of high quality inputs which can be purchased on cash by farmers ; and other high CAPEX + seasonal use items like farm mechanization equipment which can be hired ; hence no burden on farmers to buy equipment at high costs.

B. Option can also be looked at Farming-As-A- Service (FaaS) model whereby the entrepreneur of Common Service Centres can also undertake farm operations as a service by actually undertaking farm operations across the various land parcels of farmers on a payment basis per acre or per farm operation. This FaaS option will be of great use in areas using latest agri-inputs; the use of which the local farmers may not have developed. In such cases, to promote SAFE USE of agri-inputs; the FaaS option can also help in stewardship so that farmers develop an understanding on how to use agri-inputs judiciously and safely. Thus Common Service Centres will serve as outlet for buying agri inputs or even hiring services for farm hiring (FaaS). Moreover, the same outlet can have retired agri officials who can converse with farmers and help them. Suitable financial institutions can also have a "No frills" banking operations for credit needs of farmers.

C. In the last budget, the Central government has pushed for 22,000 rural haats and their conversion into Grameen Agricultural Markets (GRAMs). So, Common Service Centres can also be dovetailed into such GRAMs as these are modern agri infrastructure where large

groups of farmers will be linked to. Thought can also be put on enhancing the utility of such centres by designating them as "agri mandis" so that they double up as procurement centres for farmers produce. In such cases, they can be linked to eNAM or State electronic portal. For example, MACP has linked about 25 mandis with electronic platform (licensed from a company called "Virtual Galaxy "of Nagpur) and the same software can be broadened to cover Akola, Latur, Sangli and Nashik.

As Common Service Centres are highly customized opportunity; they also have potential to help farmers in ancillary activities also eg.

1. In locations with beekeeping; these outlets can provide "beehive boxes" on seasonal rental and the box can be recovered from farmers who have hired. A suitable fee can be recovered by farmers ; thus this will help farmers to look at rental rather than buying the boxes which have only seasonal relevance
2. Suggestion here is also on providing bulk milk chillers (BMC) in districts like Akola, Latur where dairying is a major activity. Farmers can have BMC on rent from Common Service Centres as long term hiring contracts and they can sell chilled milk to dairy processors thereby earning more money rather than selling raw milk at lower procurement prices
    a. Some other equipment like milking machines may also be thought of as a part of Farm machinery banks
3. A new concept of farm level portable solar powered cold storages are in vogue now. These are of the size of 20 feet containers and can store upto 8 MT of fresh produce (refer Recommendation 1). Farmers typically harvest and immediately move across to nearest mandi to sell; and they are mostly short charged by intermediaries. These portable mobile cold storages (mCS) are a messiah for farmers as they allow storage for longer time; and since farmer is able to harvest and immediately shift produce to cold storage at farm level itself; the quality and freshness of produce is retained besides allowing farmer to sell after prices have reached a higher level to increase his profits in offseason.
    a. However, these portable cold storages have CAPEX of upto INR 12 to INR 15 lakhs and unaffordable to most farmers in Maharashtra. It is suggested that Common Service Centres also buy these portable storages from manufacturers and put them on seasonal hire through Farm Machinery Banks; thereby farmers will be relieved of investing in such high CAPEX items.

Budgetary Allocation (Indicative):

Based on the interventions proposed, market information available and analytical assumptions, an indicative budget for four key recommendations is tabulated as per the table below:

Table 44: Budgetary Allocation for provided recommendations (Indicative)

Sl. No.	Recommendation	Government Initiative	Budgetary Allocation	Source of Funds
1.	Promotion of scientific Goat Meat Value Chains in distressed districts of Vidarbha and Marathwada	Development of scientific abattoirs	INR 50 Cr	
		Construction of Small Ruminant Market Yards	INR 8 Cr	MSAMB funds for APMC infrastructure up-gradation.
		Construction of semen stations and cost of bucks under National Action Plan for Goats for Maharashtra	INR 44 Cr	National Livestock Mission
		TOTAL	**102 Crores**	
2	Development of Sericulture Clusters in Marathwada & Vidarbha Regions	Establish Silkworm Seed Bank/Support through Automation in Reeling	INR 115 Cr	Considering 19 districts of Vidarbha & Marathwada, 1 cluster per district (*SRDC Estimates)*
3	Development of end to end Dairy Value Chain in distressed districts of Vidarbha and Marathwada	Develop end-to-end production, procurement, processing & marketing ecosystem for Dairy	INR 124 Cr	Dairy Development Package for Vidarbha and Marathwada
4	Improved Access to Farm Level Storage Infrastructure for Fruits and Vegetables	Farm level cold storage infrastructure needs to be created at all tehsil headquarters of Nashik (15), Sangli (10), Solapur (11), Pune (15), Ahmednagar (14), Jalgaon (15)	INR 500 Cr	Initial funds to be allocated through MIDH Scheme. Additional funds through Operations Green Scheme of MoA and Grameen Rural Agriculture Market Scheme
		Renewable energy based storage systems at the farm level are to be popularized and promoted by state Govt.	No additional fund allocation.	50% subsidy under existing Sub Mission on Agriculture Mechanization (SMAM)
5	Connect Farmers to Electronic Markets for Better Price Discovery & Access to more buyers	Brick and Mortar infrastructure in all 306 APMCs to be implemented.	INR 92 Cr	National Agriculture Market Scheme (eNAM)
	GRAND TOTAL		INR 933 Cr	

4.5. Recommendations for Improving Non-Farm Income

Recommendation 15: Promote Agri/Rural based Tourism in Potential Regions

Premise for the Recommendation:

Agro tourism is complimentary to traditional agricultural activities. It is an opportunity for farmers to use the available resources in a diversified and innovative way. It creates a win –win situation to farmers as well as tourists. Farmers earn better from innovative use of available resources and the tourist can enjoy village life and nature in affordable prices. The villages are also benefited due to the development of agro tourism. The fundamental concept lies in attracting tourists through developing farms into vacation ventures and hosting farming based activities tasks. This convergence of tourism and agriculture will not only support the farms with additional revenue and better sustainability, but also create multiplier effect on employment generation further support the ancillary line of business. Maharashtra is a pioneer State in promoting agricultural tourism with its 328 agri tourism centres in 33 districts. These agricultural tourism activities have generated more than INR 50 crore in incomes for the farming community who have hosted over 21 lakh tourists in the last three years.

Action Plans:

Maharashtra tourism department is encouraging farmers to develop their lands for tourists looking for farm-stays, in keeping with its 'Mahabhraman Scheme'. To further promote agri tourism in the State of Maharashtra to provide alternate sources of income to the farmers, the following action plans have been proposed.

Action Plan 1: Allocate special budgetary allocation for promoting agri tourism ventures in the State

- NABARD may allocate special budgetary allocation under "Agritourism Development Fund" under Cluster Development Programme spearheaded by Off-Farm Development Department, NABARD for promoting & branding agri tourism potential in the State along with providing soft loans and special tax incentives to promote agri tourism centers.
- NABARD will act as potential partner in association with Maharashtra State Agri and Rural Tourism Co-Operative Federation Ltd (MART)/Agri Tourism Development Corporation (ATDC) to promote such ventures
- Provide technical assistance and expertise to small farmers/off-farm producer organizations to undertake such ventures
- Identify the Organic clusters which can be further promoted for development of agri tourism centers. This can be done in association with Maharashtra Organic Farming Federation which has jurisdiction in 34 districts, 140 talukas and 15,000 villages.

- Facilitate linkages of these ventures with online travel and hospitality service providers like Airbnb, Oyo Rooms and travel websites for training in hospitality and responsible hosting practices whereby these ventures will get a platform to promote agri-tourism and market various farm and non-farm products

Impact Potential: As per "Maharashtra Tourism Policy 2016" which is under Department of Tourism & Culture Affairs (DOT) Maharashtra; tourism and agro/ rural tourism has potential to create 1 lakh jobs besides achieving a sectoral growth of 10% p.a. and share of 15% in GSDP since Maharashtra offers a unique tourism proposition through its rural landscape (approx. 55% of the state area).

Case Study: Advancing Sustainable Tourism through Home Sharing – Partnership of SEWA and Airbnb

In November 2016, Airbnb signed a Memorandum of Understanding with SEWA to promote rural livelihood opportunities for SEWA women in India through its community-centered digital platform. As part of the partnership, Airbnb has trained SEWA members on home sharing, hospitality and quality standards, and responsible hosting practices. This partnership with SEWA follows a commitment between Airbnb and the Government of Gujarat announced in September 2016 to increase tourism and create positive travel experiences for both domestic and international visitors in Gujarat. To date, Airbnb and SEWA have listed 18 SEWA homes on the Airbnb platform, with additional homes scheduled to come online this year.

Rural SEWA hosts hope that Airbnb can help drive demand to make their homestays a popular choice for international volunteers implementing development projects in Gujarat. SEWA members will be able to promote their craftwork directly from their own homes through the Airbnb platform, effectively representing a new opportunity to market their products.

While the partnership is still in its early stages, SEWA and Airbnb hope it will strengthen livelihoods for women in rural areas and simultaneously promote tourism in parts of India that have not traditionally benefited from tourism and hospitality. Airbnb and SEWA aim for this "peer to peer" learning model to increase the number of SEWA women choosing to list their homes on Airbnb's platform, and ultimately spread to all 14 Indian states where SEWA has members. According to the Indian Ministry of Tourism, "the development of a strong platform around the concept of rural tourism is definitely useful for a country like India, where almost 74% of the population resides in its seven million villages. Throwing open rural homes could play a large part in boosting an economy."

Source: Airbnb

Recommendation 16: Setting of Rural Transformation Centers (Taobao Model)

Premises for the Recommendation

Of the surveyed districts of Nashik, Sangli, Akola and Latur; the major non-farm income generating activities included government services, private services, shop-keeping, carpentry, mechanic, electrician, and plumbing (ancillary activities). There was no diversification in terms of non-farm income generating activities. There are very limited activities in the craft clusters in Miraj (Sangli), Umarti & Kingaon (Nashik).

Action Plans:

In order to facilitate non-farm income generation in the state of Maharashtra and promote rural artisans/handicrafts, it is recommended that:

- Govt. of Maharashtra to pilot setting up Rural Transformation Centers (in similar lines with Taobao villages) initially in Western & Khandesh Maharashtra (10 districts, 14,211 villages) followed by Vidarbha, Marathwada and Konkan Maharashtra.
    - The Govt. needs to initially pilot the model (which is in similar lines with Taobao village and Rural Taobao prevalent in China) in few villages.
- Govt. to invite competitive bids for facilitation of online e-commerce platform for both agri-inputs and output from e-commerce players. One e-commerce player can bid for more than one district.
- Formulate a Comprehensive **One Village One Product (OVOP)** policy by the state Govt. of Maharashtra. The concept involves development of one dedicated product by one village depending on the natural resources available in that particular village. This will provide additional non-farm employment to rural people and thus enhancing their annual income.
- Each of the Village Level Panchayats will identify 1-2 products (both farm and non-farm) for facilitating direct online sales at village level through Block Level Centers. These block level centers will be located at the Indian Post Premises (considering the higher penetration levels of Indian Post at village level).
    - Once output (both farm and non-farm) is produced; post-harvest activities can be undertaken on farm and semi-processing activities can be done at GRAM/sub-market yards after which packing will be done and delivery thereafter
        - At village level haats – Mobile cold storages can be installed for storage
    - Agri Inputs network (e-commerce platform) can be outsourced to entities like Agrostar; Storeking thus facilitating bulk purchase of agri-inputs
        - KCC for buying agri-inputs and a general current account for regular transactions can be pursued
- Other services to be provided at the centers will include – financial services, recharging services, medicine pick-up, and ticket bookings.

- Microfinance arm of NABARD to facilitate micro-loans to the farmers/Farmer Groups and also map the existing SHGs in the region to the platform.

Key Stakeholders – Department of Rural Development Maharashtra, Village Panchayats, District Agriculture Officers, Indian Post, E-commerce Players – Amazon, Flipkart, Big basket; NABARD, Other Banks and Private sector Enterprises

Case Study on Taobao Village – Rural E-Commerce Based Model In China

A **"Taobao village"** is a cluster of rural e-tailers within an administrative village where:

- ✓ Residents started into e-commerce primarily with the use of **Taobao** Marketplace
- ✓ Total annual e-commerce transaction volume at least RMB10 million (USD 1.6 million)
- ✓ At least 10% of village households actively engage in e-commerce or at least 100 active online shops have been opened by villagers.

In 2009, clusters of rural online entrepreneurs who have opened shops on Taobao Marketplace, which are referred to as **"Taobao Villages,"** began to emerge in China. The first farming village to take up e-commerce on a large scale was Dongfeng Village in Shaji Town, Jiangsu Province, where more than 1,000 households had joined the digital economy by getting involved in furniture production and selling their finished goods online. Two other Taobao Villages also emerged in Hebei Province and Zhejiang Province, respectively, in the same year. These villages now cover 70,000 rural producers.

As per AliResearch, Alibaba's in-house research arm, there were 2,118 Taobao villages and 242 Taobao townships in China in 2017, with combined sales of 120 billion yuan. The reasons behind this development include:

- ✓ Villagers have naturally spread e-commerce to neighboring villages through their connections. More impoverished regions have joined the wave of e-commerce. In some cases, the neighboring villages are involved in similar industries and they are naturally attracted by the success of the Taobao Villages to join the wave of e-commerce.
    - o Many of the villages specialize in unique products such as honey, musical instruments, ceramics, handicrafts, purple clay teapots and silverware.
- ✓ The government policy in some regions is conducive to the development and expansion of e-commerce. An increasing number of Taobao Villages participate in cross-border trade. As some Taobao Villages mature and their products become more high-end and Alibaba Group's retail platforms have become more globalized.

"Rural Taobao" is Alibaba Group's core business in respect to rural e-commerce development. It aims to promote two- way trade between China's rural and urban regions by removing bottlenecks in logistics and information flow. Alibaba Group does so by building rural e-commerce infrastructure at the county and village levels, and cultivating rural e- commerce talent and ecosystem players.

The **"Rural Taobao"** initiative serves various purposes including access to broader range of consumer products and services at lower prices, efficient channel for procurement of agri-inputs and sales of specialty products.

Alibaba Group has set up a county level center to oversee all the village-level centers in the region. The county-level center, which is operated by Alibaba employees, provides regular training to managers of the village-level centers and also serves as a sorting facility for inbound packages generated from the local villagers' e- commerce orders. Alibaba Group works closely with local governments to establish and operate these centers, providing the necessary hardware, e-commerce training, technical support, and information about promotional offers on its online marketplaces. As of February 2016, more than 14,000 village-level service centers were open in some 300 counties across more than 20 provinces.

The Taobao rural service centers are not only intended to facilitate buying and selling of physical products, but also to be conduits for rural villagers to conduct a range of everyday activities, such as paying utility bills, topping up mobile phones, making travel bookings, and more.

Each village-level service center is operated by a manager recruited from the local community, who are referred to as the "Rural Taobao partners" or simply "partners". They are not Alibaba Group employees but work closely with the Alibaba staff responsible for their respective counties. They generate income primarily by charging service fees for facilitating e-commerce orders, helping villagers sell online, and providing related services.

Impact:

- More than 90% of the farmers in the surveyed Taobao villages in China have witnessed an increase in income levels
- Ant Financial has facilitated more than 2 million rural-e-businesses and provided loans to more than 180,000 small and micro corporations
- As of August 2016, the number of active online Taobao Village stores amounted to more than 300,000.
- It is estimated that active online stores of Taobao Villages created more than 840,000 direct job opportunities by August,2016

Source: Aliresearch - http://www.aliresearch.com; YBL Analysis

Annexure A: Government Initiatives & Trends in Investment in Agri & Allied Sectors

State & Central Level Initiatives to Benefit Agriculture and Allied Activities

Sr. No.	Name of Scheme	Particulars
1	Nanaji Deshmukh Krishi Sanjivani Yojna	Maharashtra Government has approved Nanaji Deshmukh Krishi Sanjivani Yojna, a Rs. 4,000 crore project aimed at promoting climate-resilient agriculture. It will be rolled out in 2018-19 and continue until 2023-24. The scheme will be implemented in 5,142 villages across 15 districts. Its objectives are to improve soil quality, develop foodgrains varieties which can sustain climate variations and effect necessary changes in the crop pattern as per water availability in the region. The scheme will cover small- and medium- scale farmers, who are more vulnerable to the impact of climate change. The total cost of project is Rs 4,000 crore, 70% of which will be borne by the World Bank while the state will contribute 30% over 6 years. The entire project will focus on promoting climate resilient method of agriculture and cultivation that will be monitored within various districts and villages in the state. The state government will also strive to take new measures to change pattern of cultivation of crop depending on water availability, thereby competing with the threat of droughts.
2	Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)	PMKSY is a flagship irrigation scheme consisting of the following components: **A. Accelerated Irrigation Benefit Programme (AIBP)** - To focus on faster completion of ongoing Major and Medium Irrigation including National Projects. **B. PMKSY (*Har Khet ko Pani*)** - Creation of new water sources through Minor Irrigation (both surface and ground water) - Repair, restoration and renovation of water bodies; strengthening carrying capacity of traditional water sources, construction rain water harvesting structures (Jal Sanchay); - Command area development, strengthening and creation of distribution network from source to the farm; - Ground water development in the areas where it is abundant, so that sink is created to store runoff/ flood water during peak rainy season. - Improvement in water management and distribution system for water bodies to take advantage of the available source which is not tapped to its fullest capacity (deriving benefits from low hanging

Sr. No.	Name of Scheme	Particulars
		fruits). At least 10% of the command area to be covered under micro/precision irrigation. - Diversion of water from source of different location where it is plenty to nearby water scarce areas, lift irrigation from water bodies/rivers at lower elevation to supplement requirements beyond IWMP and MGNREGS irrespective of irrigation command. - Creating and rejuvenating traditional water storage systems like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc. at feasible locations. **C. (Per Drop More Crop)** - Programme management, preparation of State/District Irrigation Plan, approval of annual action plan, Monitoring etc. - Promoting efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain - guns in the farm (Jal Sinchan); - Topping up of input cost particularly under civil construction beyond permissible limit (40%), under MGNREGS for activities like lining inlet, outlet, silt traps, distribution system etc. - Construction of micro irrigation structures to supplement source creation activities including tube wells and dug wells (in areas where ground water is available and not under semi critical /critical /over exploited category of development) which are not supported under AIBP, PMKSY (Har Khet ko Pani), PMKSY (Watershed) and MGNREGS a s per block/district irrigation plan. - Secondary storage structures at tail end of canal system to store water when available in abundance (rainy season) or from perennial sources like streams for use during dry periods through effective on - farm water management; - Water lifting devices like diesel/ electric/ solar pump sets including water carriage pipes, underground piping system. - Extension activities for promotion of scientific moisture conservation and agronomic measures including cropping alignment to maximize use of available water including rainfall and minimize irrigation requirement (Jal sarankchan); - Capacity building, training and awareness campaign including low cost publications, use of pico

Sr. No.	Name of Scheme	Particulars
		projectors and low cost films for encouraging potential use water source through technological, agronomic and management practices - The extension workers are empowered to disseminate relevant technologies under PMKSY only after requisite training is provided to them especially in the area of promotion of scientific moisture conservation and agronomic measures, improved/ innovative distribution system like pipe and box outlet system, etc. - Information Communication Technology (ICT) interventions through NeGP - A to be made use in the field of water use efficiency, precision irrigation technologies, on farm water management, crop alignment etc. and also to do intensive monitoring of the Scheme. **D. PMKSY (Watershed Development)** - Effective management of runoff water and improved soil & moisture conservation activities such as ridge area treatment, drainage line 5 treatment, rain water harvesting, in - situ moisture conservation and other allied activities on watershed basis. - Converging with MGNREGS for creation of water source to full potential in identified backward rainfed blocks including renovation of traditional water bodies
3	Jalyukt Shivar Abhiyan Program(JSA)	In Maharashtra state, water scarcity was declared in 23,811 villages in the year 2014-15 and15, 747 water scarcity Villages in 2015-16. There was a need to recharge ground water and create decentralized water bodies to overcome the water scarcity problem in rain-fed area of the State. The project focuses on making 5,000 villages water scarcity free each year. a) Increase in Ground Water level: The Water harvesting structures play a key role by storing water and allow sufficient time for water to percolate into ground. Therefore, Increase in ground water table in Drought Prone area in measurable indicator of success of JSA b) Soil Erosion Reduction: The soil erosion was reduced more than 50% in the JSA implanted Area Because of compartment bunding, CCT and Deep CCT and Graded Band. c) Run Off Reduction: With Regards to Run-off reduction it was observed that the Programme is successful in achieving this goal. According to the JSA Beneficiaries this has been possible because of the contour bunding or Field bunding which has also in checking the run-off of rain-

Sr. No.	Name of Scheme	Particulars
		water resulting in Soil Moisture Retention. d) Land-use Pattern: Better Land-use Pattern is one of the important objectives of Watershed management with increase in surface Water conservation and increase in Availability of water in the Watershed regions. e) Cropping Pattern and Agriculture Productivity: Since water is essential for agricultural production, with Available water harvesting Structure Farmers are inclined to new cropping pattern and Agricultural Diversification. f) Cropping Intensity: The Change in Cropping intensity is one of the major indicator to assess impact of the JSA. Increase in residual moisture content due to contour bunding helping in crop growth and yield. Decrease in Soil Erosion and hence protection of Fertile top Soil due to contour bunding. g) Increase in Agriculture Productivity: Result of JSA increase in Agricultural Productivity also Fodder production increased due to this milk Production also increased.
4	Rainfed Area Development Programme (RADP)	- To ensure agriculture growth in the rainfed areas, this Department launched a new scheme "Rainfed Area Development Programme (RADP)" in the year 2011-12 as a sub-scheme under Rashtriya Krishi Vikas Yojana (RKVY). It aims at improving quality of life of farmers' especially, small and marginal farmers by offering a complete package of activities to maximize farm returns. RADP focuses on Integrated Farming System (IFS) for enhancing productivity and minimizing risks associated with climatic variations. For the Year 2016-17, budget provision of Rs. 225.0 crore has been made for implementation of the programme. The state of Maharashtra had one of the highest share of release of funds amongst all states and its utilization stood at a ~80% (INR 2126 lakh of 2663 lakh as of 2016-17)
5	Fisheries and aquaculture infrastructure development fund (FAIDF) under Union	- In the recently released Union budget 2018-19, by continuing the reforms made in the last 2 budgetary years, a provision of Rs. 10,000 crore has been made in this budget for Fisheries and Aquacultures Infrastructure Development Fund and Animal Husbandry Infrastructure Development Fund. Through this, State Governments, Cooperatives and individual investors will get loans at cheap rates for fisheries and animal husbandry infrastructure. This will help to speed up

Sr. No.	Name of Scheme	Particulars
	Budget 2018-19	the pace of construction of fish landing centres, cold storages, ice plants, transport facilities, processing units and hatcheries etc.
6	Dairy Processing & Infrastructure Development Fund (DIDF)	- In the 2017-18 Budget, the government had announced a dedicated fund of Rs. 80.04 billion in NABARD for the dairy sector called the DIDF. The fund will be used for setting up an efficient milk procurement system by creating chilling infrastructure, installing electronic milk adulteration testing equipment, and creating, modernizing, or expanding the milk processing infrastructure, and manufacturing facilities for value-added products like ghee and butter in milk unions and milk producer firms
7	Farmer Producer Organisation Scheme – SFAC	- Collection of producers, especially small and marginal farmers, into producer organisations has emerged as one of the most effective pathways to address the many challenges of agriculture but most importantly, improved access to investments, technology and inputs and markets. Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India has identified farmer producer organisation registered under the special provisions of the Companies Act, 1956 as the most appropriate institutional form around which to mobilize farmers and build their capacity to collectively leverage their production and market strength. SFAC functions across the country in promotion, regulation, capacity building, assisting and enabling FPOs. As of 31/12/2017, the number of registered FPOs in the state of Maharashtra stood at 85, mobilizing a total of around 88,000 farmers.
8	National Initiative on Climate Resilient Agriculture (NICRA)	- The project focused on critical assessment of different crops/zones in the country for vulnerability to climatic stresses and extreme events, in particular, intra seasonal variability of rainfall. Installation of the state-of-the-art equipment like flux towers for measurement of greenhouse gases in large field areas to understand the impact of management practices and contribute data on emissions as national responsibility. Rapid and large scale screening of crop germplasm. Comprehensive field evaluation of new and emerging approaches of paddy cultivation like aerobic rice and SRI for their contribution to reduce the GHG emissions and water saving. Special attention was given to livestock and fishery sectors including aquaculture which have not received enough attention in climate change research in the past. Promote thorough understanding of crop-

Sr. No.	Name of Scheme	Particulars
		pest/pathogen relationship and emergence of new biotypes due to climate change. Simultaneous up-scaling of the outputs both through KVKs and the National Mission on Sustainable Agriculture for wider adoption by the farmers - Success story: Implemented in Pangri village, Taluka Jintur, Parbhani district since kharif 2010-11. There was a deficit rainfall of 29% during kharif 2011 i.e. 636 mm of rainfall against the annual average of 870 mm due to which the annual crops under moisture stress at various stages. To mitigate the dry spell, the farmers were advised to adopt in situ moisture conservation practices like conservation furrow and broad bed furrow in sorghum + pigeonpea intercropping system, sole soybean and sole pigeonpea. The in situ moisture conservation techniques were adopted 30 days after sowing of the crops. Thus, the rainwater particularly in the month of August was conserved and utilized efficiently by all the crops which otherwise experienced moisture stress. Due to adoption of opening of furrow and conservation furrow as in situ rain water conservation techniques, the crop yield was increased up to 28.5%.
9	National Action Plan on Climate Change (NAPCC)	- In order to achieve a sustainable development path that simultaneously advances economic and environmental objectives, the National Action Plan for Climate Change will be guided by the following principles: - Protecting vulnerable sections of the society, achieving national growth through a qualitative changes that enhance ecological sustainability, devising efficient and cost effective strategies for end use Demand Side Management, appropriate technologies for both adaptation and mitigation of greenhouse gases, engineering new and innovative forms of market, regulatory and voluntary mechanisms to promote sustainable development, efficient implementation of programmes through unique linkages and collaborating with international agencies for research and development. The National Plan has Eight National Missions forming the core with a multi-pronged, long term and integrated strategies for achieving key goals in context of climate change. ❖ National Solar Mission ❖ National Mission for Enhanced Energy Efficiency ❖ National Mission on Sustainable Habitat

Sr. No.	Name of Scheme	Particulars
		❖ National Water Mission ❖ National Mission for Sustaining the Himalayan Ecosystem ❖ National Mission for a Green India ✓ ***National Mission for Sustainable Agriculture*** - ***National Mission on Strategic Knowledge for Climate Change***
10	Convergence of Agriculture Interventions in Maharashtra (CAIM)	- The CAIM initiative, launched in Maharashtra included 6 distressed districts in the Vidharbha region, namely Akola, Amravati, Buldhana, Wardha, Washim and Yavatmal with a population of 11.2 million persons, of which nearly 45% are below the poverty line. Rural households account for about 75% of all households. There are about 1.4 million farmers operating with an average farm size of 2.6 ha each. More than half of landholdings are in the smallholders' size group of less than 2 ha. Overall SC, ST and other Backward Class communities constitute two-thirds of the rural poor. - The project had the following components: a) Institutional Capacity Building and Partnerships) Market Linkages and Sustainable Agriculture c) Programme Management Incomes of 286,800 households improved through resilient organic and low-input farming rendered on 403,200 ha, involvement of target group farmers in primary processing, quality enhancement and marketing, empowering women households through micro-finance and micro-enterprises and in addition counselling 158,400 distressed households on social and financial matters.
11	PPP-Integrated Agri Development in Maharashtra (PPPIAD)	Department of Agriculture and Cooperation, Govt. of India has published "Framework for Supporting Public Private Partnership for Integrated Agricultural Development (PPP-IAD) under Rashtriya Krishi Vikas Yojana (RKVY)". As per this document, PPPAID is "a Scheme for facilitating large scale Integrated projects, led by private sector players in the agriculture and allied sectors, with a view to aggregating farmers, and integrating the agricultural supply chain, with financial assistance through RKVY, under the direct supervision of State Governments, supported by National Level Agencies."

Overview of Trends in Investments in Agriculture & Farm Sector in Maharashtra

Indian Context

As per Economic Survey 2017-18, the GDP (at constant market prices), during 2017-18, is estimated at INR 12, 985, 363 Crore whereas Gross Value Added (GVA) at constant prices stood at INR 11, 871, 321 Cr. The gross capital formation (GCF) as a percentage of GDP was 33.3% in 2015-16. The GVA in agriculture is expected to grow at 2.1% in 2017-18.

The growth rates of agriculture & allied sectors have been fluctuating at 1.5% in 2012-13, 5.6% in 2013-14, (-) 0.2% in 2014-15, 0.7% in 2015-16 and 4.9% in 2016-17. As per Economic Survey data 2017-18, the share of agriculture and allied sectors in Gross Value Added (GVA) declined from 18.2% in 2012-13 to 16.4% in 2017-18(AE). There has been a gradual structural change in the agriculture sector with a rise in share of livestock sector since 2011-12 and a drop in share of crop sector from 65% in 2011-12 to 60% in 2015-16.

Table 45: Agriculture Sector - Key Indicators

Item	2012-13	2013-14	2014-15	2015-16	2016-17 PE
Growth in GVA in Agriculture and Allied Sectors at 2011-12 prices (in %)	1.5	5.6	-0.2	0.7	4.9
Share of Agriculture and Allied Sectors in total GVA (in %) at current prices	18.2	18.6	18.0	17.5	17.4
Share of Agriculture and allied sectors GCF in total Gross Capital Formation at current prices (in %)	7.7	9.0	8.3	7.8	NA
Share of Crops	6.5	7.7	6.9	6.5	NA
Share of Livestock	0.8	0.9	0.8	0.8	NA
Share of Forestry & Logging	0.1	0.1	0.1	0.1	NA
Share of Fishing	0.4	0.5	0.5	0.5	NA

Source: Govt. of India, CSO, Economic Survey 2017-18

Gross Capital Formation in Agriculture and Allied Sector

The Gross Capital Formation (GCF) in Agriculture and Allied Sectors relative to GVA in this sector has been showing a fluctuating trend from 18.2% in 2011-12 to 16.4% in 2015-16. The Gross Capital Formation in agriculture and allied sectors as a proportion to the total GCF showed a decline from 8.3% in 2014-2015 to 7.8% in 2015-16. The same is due to the reduction in private sector investments in agriculture sector. Private GCF in Agriculture has reduced from 15.9% in 2011-12 to 13.6% in 2015-16. On the other hand, public sector investments have increased minimally from 2.4 % in 2011-12 to 2.8 % in 2015-16.

Table 46: Gross Capital Formation (GCF) in Agriculture & Allied sector relative to Gross Value Added (GVA) at 2011-12 basic prices

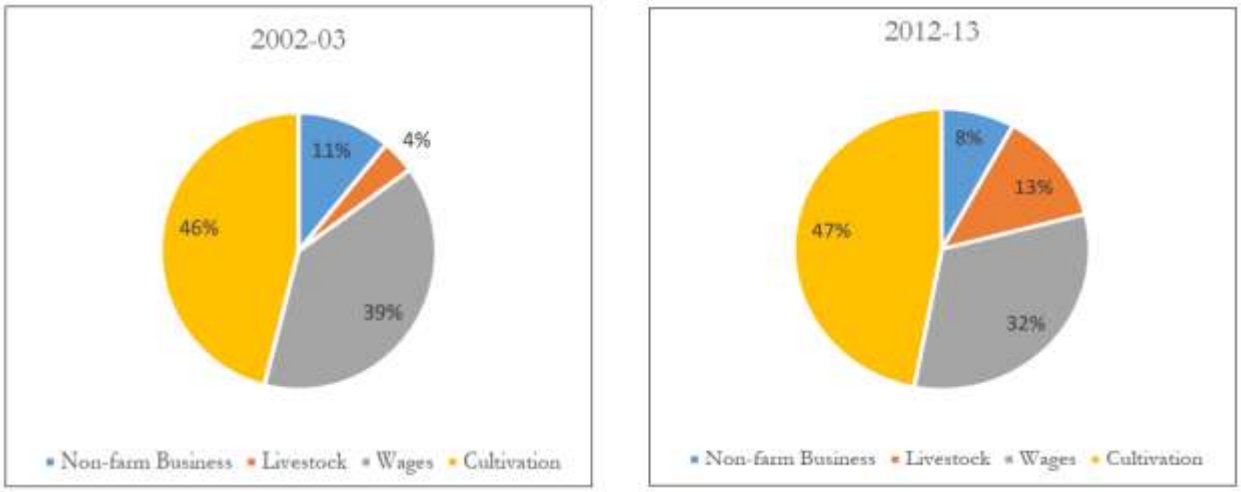
Period	GCF in Agriculture & Allied Sector (in Rs. Crore) at 2011-12 prices			GVA in agriculture & Allied sector (in Rs. Crore)	GCF in Agriculture & Allied Sectors as percentage of GVA of Agriculture & Allied Sector		
	Public	Private	Total	Total	Public	Private	Total
2011-12	35,696	2,38,175	2,73,870	15,01,947	2.4	15.9	18.2
2012-13	36,019	2,15,075	2,51,094	15,24,288	2.4	14.1	16.5
2013-14	33,925	2,50,499	2,84,424	16,09,198	2.1	15.6	17.7
2014-15	36,714	2,40,701	2,77,415	16,06,140	2.3	15	17.3
2015-16	44,957	2,20,081	2,65,038	16,17,208	2.8	13.6	16.4

Source: Govt. of India, CSO, Economic Survey 2017-18

Agriculture Growth Trend in India

The agricultural growth in India has been fluctuating since more than 50% of agriculture in India is rainfall dependent as noted in the overview. However, the sector has been witnessing a gradual structural change in recent years. The structural transformation is also manifested in the farm incomes of the households. The decrease in share of crop sector in the total gross value added of the agriculture and allied sector has impacted the sources of incomes of the farm households. As can be seen from Exhibit in 2002-03 the share of livestock in total farm incomes was just 4% which increased to 13% by 2012-13.

Exhibit 73: Share in Income of Farm Households



Source: Economic Survey 2017-18

The structural changes that are being witnessed by the agriculture sector in India necessitates re-orientation in policies towards this sector in terms of strengthening the agricultural value chain by focusing on allied activities like dairying and livestock development along with gender-specific interventions.

Maharashtra Context

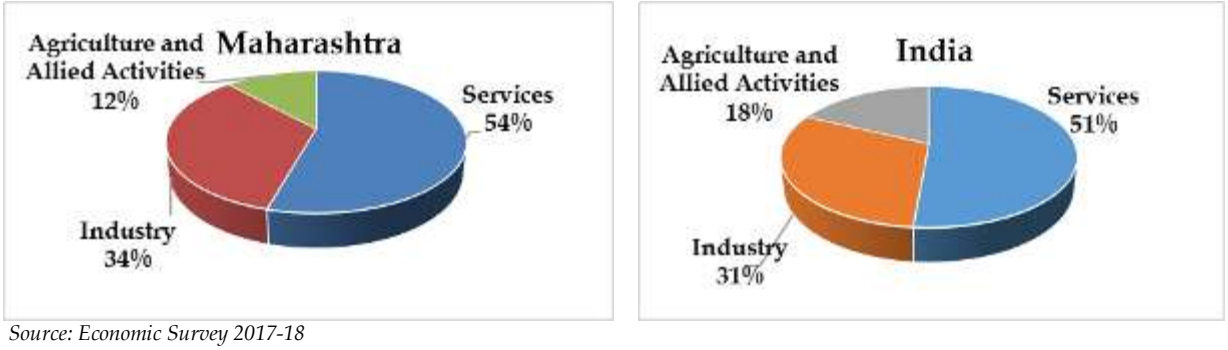
As per Maharashtra Economic Survey 2016-17, Gross State Domestic Product (GSDP) for 2016-17, the State economy is expected to grow by 9.4% over the previous year. The 'Agriculture & Allied Activities' sector is expected to grow by 12.5% while, 'Industry' and 'Services' sectors are expected to grow at 6.7% and 10.8% respectively over the previous year. As per advance estimates real GSDP for 2016-17 is expected to be INR 18,15,498 Crore. The Indian economy is expected to grow by 7.1% during 2016-17.

As per the first revised estimates, real GSDP is INR 16,59, 776 Crore for 2015-16 as against INR 15,30, 211 Crore for 2014-15 showing an increase of 8.5 per cent. Nominal GSDP (at current prices) for 2015-16 is INR 20,01,223 Crore as against INR 17, 73,744 Crore for the previous year. Per Capita State Income is INR 1, 47, 399 for 2015-16 as against INR 1, 32,341 for the previous year. The growth rate of the real Gross State Value Added (GSVA) of 'Crops' to 19.3 per cent. However, growth of about 2% in the remaining sub-sectors of 'Agriculture & Allied Activities' sector have restricted the growth of this sector to 12.5% over the previous year.

Overall, growth in the real GSVA of 'Agriculture & Allied Activities' sector is expected to be (-) 4.6 per cent. GSVA of 'Livestock' and 'Forestry & Logging' is expected to grow by 9.0% and 3.2% respectively. However, growth in 'Fishing & Aquaculture' is expected to decline by 4.2 per cent.

As per Maharashtra Economic Survey 2016-17, from 2011-12 to 2016-17, the GSVA of Agriculture & Allied Activities' sector has average share of 11.8% in the total GSVA (as compared to all India average share of 18 percent) and is growing at an average annual rate of 1.7% (Base year 2011-12). The average share of GSVA of 'Industry' sector is 33.8% and its average annual growth rate is 5.8 per cent. GSVA of 'Services' sector continues to grow annually on an average at 9.4% with an average share of 54.4% in the total GSVA.

Exhibit 74: Share of GSDP in Maharashtra vs. share of GDP of India



Source: Economic Survey 2017-18

Trends in investments in Agriculture and Allied Activities in Maharashtra for Doubling Farmers Income by 2022-23

If we look at the per hectare expenditure on agriculture and irrigation, while in 1984, private investment in agriculture was INR 399/ha compared to all India average of INR 471/ha. Compared to a GSDPA of INR 11,129/ha in 1984, in 2014 the GSDPA stood at INR 38,100/ha. This is comparatively lower than all India average of INR 54,827/ha in 2014.

Table 47: Expenditure on Agriculture and Irrigation and GSDPA per ha (Rs. At 2004-05 prices)

State	Agriculture R & D		Irrigation		Private Investment in Agriculture		GSDPA/ha	
	1984	**2014**	**1984**	**2014**	**1984**	**2014**	**1984**	**2014**
Maharashtra	211	1,560	1,093	3,790	399	1,843	11,129	38,100
Total States	222	1,532	1,012	3,206	471	1,645	20,956	54,827

Source: Public Investment in Agriculture and Growth: An Analysis of Relationship in the Indian Context (Seema Bathla)

As per the table below, there has been a change in the composition of spending on agriculture in Maharashtra and all India. The main subheads relate to agricultural and allied services include crop husbandry, forestry, livestock development and medium irrigation within the irrigation and flood control. Expenditure for 2014 shows the share of crop husbandry is the maximum at 34% followed by forestry (13.14%), animal husbandry (11%), and food storage (9.5%). Expenditure on dairy development has decelerated since the 1990s while large amount of resources seems to have been diverted to activities such as food storage and warehousing and research. The growth rate in fisheries was highest followed by crop husbandry, cooperation and animal husbandry. The table clearly explains the importance of emphasis to be given to dairy and animal husbandry sector in Maharashtra. Also an important sector which grew at a lower rate was irrigation sector growing at 4.8% compared to all India average of 6.91%

Table 48: Composition of Spending in Agriculture & Allied Sectors

Sectors	2014		Annual % growth rate (2000-2013)	
	High Income States	All	High Income States	All
Agriculture (Rs. billion)	174.5	454.15	7.82	8.93
% share of:	100	100		
Crop Husbandry	33.6	35.4	10.66	12.77
Soil & Water Conservation	6.15	4.35	8.67	5.03
Animal Husbandry	11.11	10.6	8.46	7.78
Dairy Development	3.2	2.44	-7.13	-2.02
Fisheries	3.73	2.65	11.94	9.56
Forestry & Wildlife	13.14	15.36	4.67	5.31
Food, Storage & Warehousing	9.15	11.98	(-)	14.14
Agriculture Research & Education	9.23	6.92	6.99	7.31

Sectors	2014		Annual % growth rate (2000-2013)	
Cooperation	9.53	9.63	9.72	12.58
Others	1.18	0.94	7.2	9.9
Irrigation	157.7	477.79	4.76	6.91

Source: Public Investment in Agriculture and Growth: An Analysis of Relationship in the Indian Context (Seema Bathla)

Investment Requirements for Doubling Farm Income

There are ample studies undertaken globally that establish that rural infrastructural investments have contributed immensely to increased agriculture productivity across many developing countries, thus enabling the mitigation of poverty and farm distress in long term perspective. The investment needs may differ across states/ regions given their diverse agro-climatic conditions, the level of agricultural development, the crop and allied activities being undertaken in the regions.

Basis empirical studies, it has been identified that there is a positive impact of private and public sector capital formation on agriculture productivity and incomes although in varying proportions[11]. The section provides a detailed understanding on the relationship between investments (both public and private sector) and farm income levels and also an analysis of the investments trends in Maharashtra.

The table below provides estimates on average ICORs[12] from 2007-12 to 2012-14 across Maharashtra and the select 20 states together with the targeted rate of growth for DFI, and the farm income to be realized by 2022-23 at 2015-16 prices. Clearly, ICOR is much higher in public investment as compared to that in private investment.

Table 49: Estimated ICOR (averaged 2007-12 & 2012-14) on public and private accounts and targeted farm income (INR '00 Cr. at 2015-16 base)

State	Private Investment		Public Investment			Public & Private Investment	Target Farm Income Growth/ year (%)	Targeted Farm Income in 2022-23
	Agri	Irrigation	Agri	Irrigation	Total Agri			
Maharashtra	1.2	0.44	0.41	2.57	3.56	4.76	10.06	864
Average of 20 states	0.72	0.18	0.22	1.08	2.11	2.83	10.36	10502 (Total)

Source: Report of the Committee on Doubling Farmers' Income - Volume II "Status of Farmers' Income: Strategies for Accelerated Growth"

The targeted rate of growth in Maharashtra is 10.06% against and all India rate of 10.36% to achieve a targeted farm income of INR 1,050,200 Crores.

[11] Report of the Committee on Doubling Farmers' Income - *Volume II* "Status of Farmers' Income: Strategies for Accelerated Growth"

[12] The ICOR (Incremental Capital Output Ratio) estimates the additional unit of capital or investment needed to produce an additional unit of output for a particular period, estimated as: I/G where I = investment (GFCF) rate and G is incremental GSDPA.

In terms of additional public capital requirements to achieve double income targets are found to be higher at INR 30,900 Cr. The investment required is higher in case of irrigation for public sector, whereas for private sector higher investments in agriculture is required.

Table 50: Additional investment required over 7 yrs. by 2022-23 for DFI @2015-16 prices (Rs.'00 Cr.

State	Private Investment		Public Investment			Public & Private Investment
	Agriculture	Irrigation	Agriculture	Irrigation	Total Agri	
Maharashtra	104.3	38.1	35.2	223	309	414
Average of 20 states	780.4	168	239	1179	2300	3080

Source: Report of the Committee on Doubling Farmers' Income –Vol. II"Status of Farmers' Income: Strategies for Accelerated Growth"

The table below depicts the annual growth rate in public (Govt. investments) and private investments in agriculture and irrigation sectors required to achieve the objective of doubling farmer's income in Maharashtra. Public investments in agriculture needs to grow at more than 16% in Maharashtra compared to an all India average of 20%. In irrigation, the investments required are 18% compared to all India average of 16%.

Table 51: Required annual rate of growth in investment (%) for DFI from 2015-2022 @2015-16 prices

State	Private Investment		Public Investment		
	Agriculture	Irrigation	Agriculture	Irrigation	Total Agri
Maharashtra	12.41	14.43	16.23	17.94	17.03
Average of 20 states	12.5	13.12	20.7	16.09	16.79

Source: Report of the Committee on Doubling Farmers' Income - Volume II"Status of Farmers' Income: Strategies for Accelerated Growth"

As depicted in the tables below, whereas the total annual private investment needs to grow to INR 18,660 Cr. in Maharashtra by 2022-23, the annual public investment needs to grow to INR 5,411 Cr. by 2022-23 in Maharashtra in agri and allied sectors. This requires increase in efficiency and rationalization of investments through promotion of private sector investments in the space (PPP Models).

Table 52: Total Annual Private Investment Requirement at 2015-16 prices (Rs. '00 crore)

State	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Maharashtra	92.5	104	116.9	131.4	147.7	166	186.6
Average of 20 states	685.8	771.5	868	976.4	1098.4	1236	1390

Source: Report of the Committee on Doubling Farmers' Income –Vol. II"Status of Farmers' Income: Strategies for Accelerated Growth"

Table 53: Total Annual Public Investment Requirement in Agriculture and Allied Activities at 2015-16 prices (Rs. '00 crore)

State	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Maharashtra	21.94	25.51	29.65	34.46	40.05	46.55	54.11
Average of 20 states	105.72	127.61	154.03	185.92	224.41	270.88	326.96

Source: Report of the Committee on Doubling Farmers' Income –Vol. II"Status of Farmers' Income: Strategies for Accelerated Growth"

The resources needs to be mobilized through both public expenditure and private expenditure. The probable sources of funding would be the capital expenditure to be incurred by Maharashtra on Agri and allied activities including irrigation including schemes like Jalyukt Shivar Yojana. Other key Govt. schemes including RKVY, AIBP and DIDF, PMKSY and RAD schemes to name a few. Private investments are mainly going to be enhanced through improved access to institutional credit to the small and marginal farmers in particular. Govt. of Maharashtra should re-launch PPP – Integrated Agriculture Development Scheme to further enhance private sector investments in Agriculture infrastructure in Maharashtra. Considering the trend in budgetary allocations for agriculture sector in Maharashtra (INR 18,112 Crores), a quantum of 15-20% of the overall budgetary allocation to agri and allied activities would be sufficient for sourcing the funds.

It may therefore be interpreted from the analysis that there is an imminent need for a substantial increase in resource allocation to the agricultural sector along with institutional credit to cover as many farmers as possible. In addition promotion of private sector initiatives is need of the hour. This can be only achieved through re-allocation of the existing resources for optimal productive use of resources. The chapter on recommendations has tried to capture the same in a structured manner.

There is a need for a shift in Centre and states from a price-based support policy to an income support policy in Agriculture sector. Increased investments are required in agriculture and the issue of "co-ordination failure between the private and public sectors" needs to be addressed through suitable policy interventions.

Annexure B: District Wise List of Stakeholders Consulted

Table 54: List of Other Stakeholders Contacted for the Study – Akola District

Sr No	Name of the person met/contacted	Designation	Organisation
1	Mr. Sharad Walke	District Development Manager (DDM), Akola	NABARD
2	Mr. Rajesh Nikam	District Superintendent Agri Officer, Akola	Government of Maharashtra
3	Dr. D. M. Mankar	Director of Research	Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola
4	Mr. Qurban Tadvi	Deputy Project Director	ATMA, Akola
5	Dr Umesh G Thakre	In-charge Programme Coordinator Subject Matter Specialist (Extension)	KVK, Akola
6	Mr. Sunil Sudhakarrao Malokar	Secretary	APMC, Akola
7	Mr. Kishore Kudke	Director	Warad Grains (FPO)
8	Mr. Satish Gadre	District Programme Manager	Convergence of Agricultural Interventions in Maharashtra (CAIM)
9	Mr. Chandrakant Kshirsagar	District Manager, Akola	Maharashtra State Seeds Corporation Ltd (MSSCL)
10	Dr. P. S. Bankar	Assistant Professor	Post Graduate Institute of Veterinary and Animal Sciences
11	Mr. Anant Liladhar Vaidya	CEO	The Akola District Central Coop Bank Ltd
12	Mr. Vijay Kolekar	Agronomist	Project on Climate Resilient Agriculture (PoCRA), Mumbai
13	Mr. CA Ashish Heda	Chartered Accountant	Balaji Tirupati Pulses
14	Mr. Mukul Gupte	Regional Manager	TATA Trusts, Yavatmal
15	Dr Sanjay Pardi	District Deputy Commissioner of Animal Husbandry	Commissioner Office of Animal Husbandry, Akola
16	Mr. Shashikant Bhartia	Chairman	Basant Agro Tech (India) Limited

Table 55: List of Other Stakeholders Contacted for the Study – Latur District

Sr No	Name of the person met/contacted	Designation	Organisation
1	Mr. SB Pachpinde	District Development Manager	NABARD Latur
2	Mr. Digrase	Programme Coordinator	Kisan Vigyan Kendra – Latur
3	Mr. Madhukar Gunjkar	Secretary	APMC Latur
4	Mr. Shankar Burde	Lead Bank Manager	State Bank of India Regional Office: Latur
5	Mr. Balaji Biradar/ Prashant Govindrao Markar/ Bharat Nagoraoji Chame	Secretary	APMC – Ahmedpur/Chakur/Deoni
6	Mr. Varun Yadav	Operations Head	Tina Oil Mill
7	Mr. C.D. Patil	Director	Agricultural Technology Management Agency (ATMA) – Latur
8	-	-	Deputy Director – Agriculture, Latur
9	Mr. Naresh Ugile	Proprietor	Naresh & Sons Cold Storage, MIDC Latur
10	Mr. Rajesh Gilda	Proprietor	Latur Cold Storage
11	Mr. Hemant Vaidya	Proprietor	Kisan Mitra Cold Storage Private Limited

Table 56: List of Other Stakeholders Contacted for the Study – Sangli District

Sr. No	Name of the person met/contacted	Designation	Organisation
1.	L.P. Dhanorkar	AGM	NABARD, Sangli
2.	Suresh Makdum	Project Director	ATMA, Sangli
3.	Rakesh G. Zagade	Agri Marketing Expert	ATMA Sangli
4.	Prakash Singhrao Patil	Secretary	APMC Sangli
5.	Ravikant Chavan	ADP Miraj	World Vision India
6.	Pravin P. Khure	Project Coordinator	Dilasa Janvikas Pratisthan
7.	Hanumant Patil	Secretary	Yashwanti Agro Producer Company, Walwa
8.	Ramrao Sampad Patil	Secretary	Varanamayi Agro Producer Company, Walwa
9.	A. A. Shaikh	Programme Coordinator	Krushi Vigyan Kendra, Sangli

10.	Y.S. Patil	Officer	APMC Tasgaon
11.	Vinayak Kulkarni	Secretary	Gram Vikas Bahuuddeshiya Sanstha
12.	Shrikant Patole	Secretary	Shivar Farmer Producers Company
13.	Ganesh Chitale	Director	Chitale Dairy
14.	Rajarambapu Patil	Promoter	Patil Dairy

Table 57: List of Other Stakeholders Contacted for the Study – Nashik District

Sr. No	Name of the person met/contacted	Designation	Organisation
1.	A B Vedpathak	AGM	NABARD, Nashik
2.	A.D. Chavan	Chief Manager and Lead District Manager	Bank of Maharashtra, Nashik
3.	Mr. Raosaheb Patil	Director	Krushi Vigyan Kendra, Nashik
4.	Prof. V.S. Dange	Director	KK Wagh College of Agriculture Technology, Nashik
5.	Mr. Sunil Pote	President & Managing Trustee	Yuva Mitra
6.	Sanjay Balkrushna Shinde	Member	Deonadi Valley Farmer Producer's Company
7.	Shailesh Gupta	Managing Director	Fortune Foods, Nashik
8.	Sunil Jaiswal	Chairman	Paradise Juice Private Ltd., Nashik
9.	Rupesh Khiste	Director	Sahyadri Farms, Nashik

Annexure C: Sample Questionnaire – Farmer Survey

State: MAHARASHTRA								
District		**Name of Researcher**						
Block/Taluka		**Supervisor Name**						
Village		**Date of Survey**	*DD/MM/YYYY*					
		Pin code						

Section 1: Respondent Information

Name of Respondent							**Code**
Address							
Contact Number/mobile number							
Gender							**(Code:** 1= Female 2= Male)
Religion							**(** Code: 1=Hindu, 2=Muslim, 3=Christian, 4=Buddhist, 5=Sikh, 6=Other (Specify))
Caste							**(Code:** 1= SC, 2=ST, 3=OBC, 4=General)
Marital Status of Respondent							**(Code 3:** 1=Unmarried, 2=Married, 3=Divorcee, 4=Widow, 5=Widower)
Social category of Household							**(Code: 1=APL-Saffron Card, 2=BPL-Yellow Card, 3= BPL-Antyodaya Card, 4=White Card, 5=Annapurna Card**
How Much Quantity of Food Stuff Household gets monthly on PDS card	Rice	Wheat	Coarse	Cereals	Sugar	Others	(Unit: Kg)
Name of Head of the Household							
Relation with Respondent							**(Code 2:** 1=Self, 2=Mother, 3=Father, 4=Brother, 5=Sister, 6=Daughter, 7=Son, 8=Granddaughter, 9=Grandson, 10=Grandfather, 11=Grandmother, 12=Aunt, 13=Uncle, 14=Son in Law, 15=Daughter in law, 16=Other (Specify)
Marital Status of Head of the Household							**(Code 3:** 1=Unmarried, 2=Married, 3=Divorcee, 4=Widow, 5=Widower)
Family Structure							(Code: 1= Joint, 2= Nuclear, 3= Extended)
Number of Family Members	Adult (>16Years)		Children (< 16 Years)		Total		
Number of Family Members Involved in	Farm Activities		Non-Farm Activities		Unemployed		

House Ownership				(Code: 1= Own, 2= Rented)

Section 2: Household Profile

Sl. No.	Name of Household Members	Relation to Respondent (Code 2: 1=Self, 2=Mother, 3=Father, 4=Brother, 5=Sister, 6=Daughter, 7=Son, 8=Granddaughter, 9=Grandson, 10=Grandfather, 11=Grandmother, 12=Aunt, 13=Uncle, 14=Son in Law, 15=Daughter in law, 16=Other (Specify)	Age (Years)	Education (Code: 1=Illiterate, 2=Up to Class 5, 3=Class 6th to 10th, 4=Class 10th to 12th, 5=Graduate, 6=Masters and above, 7=Technical)	Occupation (Code: 1=Cultivator/Farmer, 2=Dairying, 3=Govt. Service, 4=Private Service, 5=Farmer, 6=Agriculture labour, 7=Artisans, 8=Carpenter, 9=Electrician, 10= Plumber, 11=Mechanic, 12=Pensioner, 13=Masonry, 14=Blacksmith, 15=Weaver, 16=Driver, 17=Shopkeeper, 18=Student, 19=Unemployed, 20=Other(specify)		Residence (Code:1= Live in village, 2=Outside)
					Primary	Subsidiary	
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

Do you like farming	**YES/NO**
If YES, main reason for liking farming	**1=Proud to be a farmer; 2=Traditional occupation; 3=Good social status 4=Good income; 5=Good future, 6=Others**
If NO, Main reason for not liking	**1= Income not good; 2=Low social status; 3=No future; 4=Highly stressful/risky; 5= Others**

Section 3: Details of Land Holding (Reference period 2016-17)

Particulars	Total Land (Area in Hectares)	Own Land (Area in Hectares)	Land Leased in (Area in Hectares)	Leased out (Area in Hectares)	Shared Land (Area in Hectares)
Cultivated					
Orchard					
Grassland					
Barren					
Other, Specify					
Total Land					
Irrigated					
Non-Irrigated /Rain fed					

Section 4: Sources of Irrigation (Reference period 2016-17)

Irrigated Land (Area in Hectares)	Ownership of Irrigation Facility (Code: 1=Own, 2=Public, 3=Private)	Sources of Irrigation (Code: 1=Lift Irrigation, 2=Tube Well 3=Electric Pump Set, 4=Canal, 5=Spring 6=Open Well, 7=Stream 9=other Specify...)	No. of Months Irrigation water available

Section 5: Cropping Pattern (Cereals/Pulses/Oilseeds/Fodder/Fruits/Vegetables) (Reference period 2016-17)

Crop Name	Area under Cultivation (Hectares)	Total Production (Qtls)	Total Quantity Retained for Household Consumption and next sowing (Qtls)	Total Quantity Sold in the Market (Qtls)	Market (Code 7: 1=on farm, 2=Within Village, 3=In another village, 4=Local Market, 5=Main Market outside village)	Selling Price of Produce (Rs/Qtls)		
						2016-17	2015-16	2014-15
1								
2.								
3.								
4.								
5.								

Section 5.1: Cost of cultivation for Crops, Provide details of expenditure incurred in last 1 year (Reference period 2016-17)

Crop	Seeds		Fertilizer		Manure		Insecticides/Pesticides		Irrigation	Hiring Cost of Tractor/Plough/Thresher/Pump etc.	Packaging	Transportation	Other (Specify)	Total Cost
	Quantity (Kg)	Price (Per Kg)	Quantity (bags)	Price (Per bag)	Quantity (MT)	Price (Per MT)	Quantity (Ltrs)	Price (Per Ltr)	Total Cost	Total Cost	Total Cost	Total Cost		
1														
2														
3														
4														
5														

Section 5.2 Types of seeds used

Crop	Seeds			If traditional- Reasons	If Hybrid- Reasons
	Traditional	Hybrid	GM	1=Low consumption of fertilizers, water etc. 2= Long Life, 3=Low cost, 4= safety from pests and diseases, 5= Lack of availability of hybrid seeds, 6=Others	1= More yield, 2- quick production, 3= low consumption of fertilizers, 4= Low cost, 5= safety from pests and diseases
1					
2					
3					

4					
5					

Section 5.3: Whom do you take Suggestions for agriculture?

S. No.		Self	Relative/friends	Other farmers	Input Dealer	Agri experts	Kisan call center	Others
1	Drip							
2	Sprinkler							
3	Plastic Mulching							
4	Low Cost tunnels							
5	Low cost green house							
6	High Tech Green Houses							
7	Shade Nets							
8	Integrated Nutrient Management (INM)							
9	Integrated Pest Management (IPM)							
10	Soil Testing							
11	Others							

Section 5.4: Labour employed in cultivation of crops (Reference period 2016-17)

Crop Name	MANDAYS								Total Labour Mandays	Labour Cost (per man-day)
	Land Preparation	Sowing	Interculture Operations	Input Application	Harvesting	Primary Value Addition (Cleaning/Sorting/Grading/Packing	Transportation (Loading)	Others		

											)									
1	family	outside	family	outside	family	outside	family	outside	family	outside	family	outside	family	outside	family	outside	family	outside	family	outside
2																				
3																				
4																				
5																				
6																				
7																				

Section 5.5: Adoption of on Farm Management Practices (Reference period 2016-17)

S. No.	Technology adopted	1=Yes, 2= No	Area Covered Ha./sq.mt	Whether found beneficial (1=Yes, 2= No	Source of procurement (1=Govt, 2=Private)	Subsidy received (Y/N)
1	Drip					
2	Sprinkler					
3	Plastic Mulching					
4	Low Cost tunnels					
5	Low cost green house					
6	High Tech Green Houses					
7	Shade Nets					
8	Integrated Nutrient Management (INM)					
9	Integrated Pest Management (IPM)					
10	Soil Testing					
11	Others					

If soil testing is done, who bears the cost?

Where is the soil testing lab located?
Results in how many days
Do they provide recommendations as well on the input usage based on soil testing?

Section 5.6: Field level PHM activities and losses (Reference period 2016-17)

S. No.	Crops	Storage at farm level (Yes / No)	Type of washing/sorting / grading / cleaning activities at field	Cost of Incurred in washing/sorting / grading / cleaning activities at field (Rs/Qtl)	% of crop lost	Type of packaging (Code:1=Loose, 2=Gunny bag, 3=Jute Bag, 4=Wooden Box, 5=Crates, 6=Others)	Average Quantity packed per unit	Cost of Packaging Material (Rs/Gunny bag, Jute bag, Wooden box, Crates, others)
1								
2								
3								
4								
5								

Section 5.7: Transportation to market (Reference period 2016-17)

S. No.	Crops	Time of selling – days after harvest (Code 1- same day, code 2- within2- 15 days, Code 3- within 15 days-1 month , code 4- within 1 month-6 months, code 5- after 6 months	Market type (Code: 1= farm gate, 2= village haat, 3= Wholesale Market, 4= Selling on contract 5= government purchase center 6= Other (specify)…….. ..)	If not selling to government purchase center reason- 1= low profit, 2= bad behavior of officials, 3- corruption, 4= delay in payment, 5= no purchase center in vicinity, 6=others	Name of market	Distance from field to market (in Kms)	Mode of transport Code: 1=Head load, 2= Mini Truck, 3=Jeep, 4=Bus, 5=Tractor, 6= Bullock Cart, 7=Others)	Cost of Transportation (per Qtl)	% of crop lost
1									
2									
3									

4									
5									

Section 5.8: Market and Marketing (Reference period 2016-17)

S. No.	Crops	Who is the buyer (Code: 1-Village trader/aggregator, 2= Commission agent, 3=Wholesaler, 4=Retailer, 5= exporter, 6= other (specify)……-)	Average Selling Price (Rs per Qtl)			Any market expenses- Market Fee/ Commission Charges (Rs/Kg)	What was MSP (Rs per Qtl)
			2016-17	201-16	2014-15		
1							
2							
3							
4							

i. Have you heard about Minimum Support Price? (Code: Yes-1, No-2) ☐

ii. If heard, Are you satisfied with the MSP

iii. Are you getting remunerative price for your produce?*(Code: Yes-1, No-2)*

(a) Whether there is any time gap in the realization of the price against the produce sold [Code Yes-1, No-2] ☐

(b) If yes, the duration of such a gap [Code: Up to 1 day-1, 2-7 days-2, 7-15 days-3, Above 15 days-4, Above 15 days- 5] ☐

iv. In case the selling point is regulated market/wholesale market, whether it is equipped with the following facilities:

S. No.	Whether the market is /has	(Code: Yes-1, No-2)
1.	Regulated	
2.	Office Building	
3.	Auction Platform	
4.	Weighing bridge / Electronic weighing machines	
5.	Drying platform	
6.	Cold storage	
7.	Godowns	
8.	Water supply /sanitary arrangements	
9.	Grading and weighing arrangements	
10.	Internal roads Garbage disposal arrangements	
11.	Farmers' guest house	

☐

v. Do you receive a fair dealing? *[Yes-1, No-2]*

If no, reasons therefore– [Code: Delay in the sale of the produce-1, Levy of unauthorized charges-2, Delay in payment-3, Market is situated at a faraway place-4, Market Infrastructure is not adequate-5, no transparency-6] ☐☐

vi. How is the selling decision made?

Section 5.9: Distress Situation

S. No.	Distress situation	
1	In the last years, did any of your crop area get destroyed	YES/NO
2	How many time	YES/NO
3	Reason for destruction	1=flood, 2= drought, 3= prices reduced drastically 4= pest attack 5= animal attack, 6= temperature fluctuation 7= others
4	Support received during the distress situation	

S. No.	Crop insurance	
1	Heard of crop insurance	YES/NO
2	Is your crop insured	YES/NO
3	Reason for not getting crop insured	1=Shortage of money, 2=Facility not available, 3= Not heard of crop insurance, 4=Insurance policies not in favor of farmers, 5=Do not trust insurance companies

Section 6: Animal Husbandry Possession (Reference period 2016-17)

Type of Animal	Numbers owned		Number of Milking Cattles		Average Productivity (per Animal per day)		Total Average Milking Days (in year)	
	Indigenous	Hybrid	Indigenous	Hybrid	Indigenous	Hybrid	Indigenous	Hybrid
i. Buffaloes								
ii. Cows								
iii. Goats								
iv. Chickens								
v. Sheep								
vi. Other,								
vii.								

Section 6.1: Animal Production (Reference period 2016-17)

Type of Animal	Total Average Production (Per Day)		Total Quantity kept for Home Consumption (Per Day)		Total Quantity sold in the market (Per Day)		Total Average Selling Price of (Rs/Ltrs or kg)		
	Lean season	Peak season	Lean season	Peak season	Lean season	Peak season	2016-17	2015-16	2014-15
i. Buffaloes (Milk)									
ii. Cows (Milk)									
iii. Goats (Milk and meat)									
iv. Chickens (M eat)									
v. Eggs									

vi. Sheep (Meat)									
vii. Fish									
viii. Other, Specify									

Section 6.2: Animal Disposal (Reference period 2016-17)

Type of Animal	Disposal of animal- How	Sold to Whom	Average selling price (per animal)		
i.			2016-17	2015-16	2014-15
ii. Buffaloes					
iii. Cows					
iv. Goats					
v. Chickens					
vi. Mules					
vii. Sheep					
viii. Other, Specify					

Is the pricing fair? If no, reasons for the same

Section 6.3: Expense Incurred on Animal Rearing (Reference period 2016-17)

Type of Animal	Market Price of Animal Purchased in last 1 year (2016-17)		Average Expense on Feed Per Day				Average Annual Veterinary Expenses	Labour Employed			Other Expenses
	Indigenous	Hybrid	Green Fodder	Dry Fodder	Concentrates	Others			Numbers	Manday Charges	
i. Buffaloes								family	outside		

ii. Cows											
iii. Goats											
iv. Chicken											
v. Mules											
vi. Sheep											
vii. Other, Specify											

Section 7: Details of Non-Farm Income Sources of Farmer and Household (Reference period 2016-17)

Sources of Income	Average Monthly Income(Rs.)	No. of months of employment	Challenges faced
Govt. Service			
Private Service			
Wage labour			
Artisan			
Carpenter			
Electrician			
Plumber			
Mechanic			
Pension			
Masonry			
Driver			
Shopkeeper			
Migration/remittance			
Business/small enterprises			
Rent Received from Property			
Others			
Total			

Section 8: Details of Monthly Household Expenditure Details (Reference period 2016-17)

Main Expenditure Heads	Expenditure per annum (Rs.)

Food Consumption	
Clothing	
Cosmetics & Toiletries	
Mobile	
Fuel	
Transport	
Rent Paid for Property	
Health Care	
Education	
Electricity	
Entertainment	
Festivals/religious activities	
Social Function	
Interest Payments	
Services/Repairs/Maintenance	
Social Customs (Marriage, Festival, Ceremonies, Ritual etc.)	
Others	
Total	

Section 9: Credit, Has your family borrowed any money in the last 1 year (Reference period 2016-17)? 1=Yes 2=No_____. If Yes, Provide details

Source of Credit	**Purpose of Loan**	**Amount**	**Period of Loan**	**Collateral**	**Interest rate per month**	**Loan Amount Outstanding**
	Code 1	Rupees	Month	Code 2	%	
Cooperative societies/Bank						
Commercial Banks						
Other institutional agencies						
Landlord/Money lenders						
Traders/Shopkeepers						
Relatives & friends						
SHG						
Others						

Code 1: 1=Consumption, 2=Education, 3=Health care, 4=Agriculture, 5=Household Business, 6=House construction, 7=litigation, 8=Religious Festival, 9=Migration, 10=Livestock purchase, 11=Land purchase, 12=Repayment of old loan, 13=Other (Specify)
Code 2: 1=none, 2=Land, 3=Crop Output, 4=Livestock, 5=House, 6=Farm Assets, 7=Household durables, 8=Jewellery, 9=Labour, 10=other (specify)

Section 10: Possession of Assets

Asset	**Ownership** (Code:1=Yes 2=No)	**Purchased in 2016-17** (1=Yes 2=No)	**Amount Spent (Rs)**	**Borrowed in (Code: 1=Cash, 2=Credit)**

i.	Agricultural Land				
ii.	Kutcha House				
iii.	Pucca House				
iv.	Semi Pucca House				
v.	Cattle Shed				
vi.	Kitchen Garden				
vii.	4 Wheeler Vehicle				
viii.	Scooter/Motorcycle/Moped				
ix.	Bicycle				
x.	Mobile Telephone				
xi.	Television				
xii.	Washing Machine				
xiii.	Tractor/Power tiller				
xiv.	Thresher				
xv.	Pump(Irrigation)				
xvi.	Sprinkler				
xvii.	Others (specify…..)				

Section 10: Selling of Assets

Asset	Selling price	Reason for selling
Agricultural Land		
Kutcha House		
Pucca House		
Semi Pucca House		
Cattle Shed		
Kitchen Garden		
4 Wheeler Vehicle		
Scooter/Motorcycle/Moped		
Bicycle		
Mobile Telephone		
Television		
Washing Machine		
Tractor/Power tiller		

Thresher		
Pump(Irrigation)		
Sprinkler		
Others (specify…..)		

Section 11: ***Major Challenges Faced in Agriculture***

Sl. No.		Details of Challenges
1)	Inputs	
2)	Labour	
3)	Logistics	
4) Infrastructure		
5) Skilling		
6)	Marketing	
7)	Animal husbandry	
8)	Veterinary	
9)	Feed/fodder	
10)	Others	

Section 12: Government support

Sl. No.		Government support received yes/no	Private sector support received yes/no	Support received in what form
1)	Inputs			
2)	Labour			
3)	Animal husbandry/ vet services			
4)	Logistics			
5) Infrastructure				
6) Skilling				
7) Extension				
8) Finance				

9)	Marketing			
10)	Others			

Section 12.1 Have you benefitted from any of the following schemes

Sl. No.		Heard about the scheme YES/NO	Benefitted- YES/NO	If benefitted, any challenges
1)	Rashtriya Krishi Vikas Yojana			
2)	MGNREGA			
3)	Gramin Bhandaran Yojana			
4)	National food security mission			
5)	National agriculture insurance scheme			
6)	ATMA			
7)	Krishi Vigyan Kendra			
8)	Grameen Beej Yojana			
9)	Others			

A. What is the relevance of diversification to your household?

B. Do you think that diversification would enhance the household's agricultural income? 1=Yes 2=No_____
If yes, how would you utilize the enhanced income through crop diversification? If No, why do you think there would be no increase in income?

C. **What are the critical/financially constrained months for your household?** _____

D. **How does your household cope up with the constraints in these months?** _____

Section 13: Income trend

Compared to 5 years ago how has your income changed (if farmers can quantify then capture in numbers, otherwise %, if unable to answer as % also capture in qualitative reply like- much better, better, same, worse etc.

	Current	5 years ago	% increase/decrease	qualitative
Income	INR/Annum	INR/Annum		
Expenditure on agri	INR/Annum	INR/Annum		
Other expenses	INR/Annum	INR/Annum		

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