

Gopal Krishna Gokhale

**Gokhale Institute
of Politics and
Economics**

(Deemed to be University)
Pune - 411 004

AERC Report



**Agro-Economic
Research Centre
(AERC)**

**Comparative Advantage of Price
Realization to the Farmers on Sale of
their Produce through Competitive
and Innovative Marketing Channel
vis-à-vis Traditional Channel
in the State of Maharashtra**

**Deepak Shah
Jayanti Kajale**



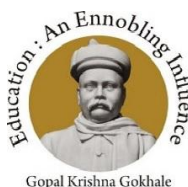
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Agro Economic Research Centre
Gokhale Institute of Politics and Economics
(Deemed University)
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Research Team

Project Head

Prof. Deepak Shah

Prof. Jayanti Kajale

Research Team

Dr. Anil S. Memane

Dr. Ajay D. Kumbhar

Published By

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Gokhale Institute of Politics and Economics,

BMCC Road, Deccan Gymkhana, Pune - 411 004.

Ph. No. 020- 25683300, E-mail: gokhaleinstitute@gipe.ac.in

Preface

In the current context of liberalization and privatization scenario, the present marketing system, which was essentially evolved earlier to cater to the requirement of growing population and planned development of the country, needs to be reviewed. The development of agricultural sector not only requires enhanced production volume of cereals, pulses, oilseeds and a host of other crops but also improvement in the marketing mechanism of various agricultural commodities and efficiency of the system. An efficient system of marketing of agricultural produce is considered to be crucial for guaranteeing remunerative price and a higher share to the farmer producers in the value chain of the agricultural produce. Although the pre-independence period was marked by lower investment and hence lower growth rate of the agricultural sector, the post-independence saw passage of Agricultural Produce Markets Regulation (APMR) Act and establishment of agricultural produce marketing committees (APMCs) in various states. However, it has been observed that the system of APMCs is not been able to provide an efficient marketing platform to the producer farmers. Studies have pointed out collusive nature of licensed commission agents, leading to lower prices being paid to the farmers and their lower share in the consumer price. Therefore, the Model Agricultural Marketing Act (2003) was framed by the Union government and the rules were circulated among the state governments in 2007 for making appropriate changes in the state Acts. Through the provisions of the act, direct marketing of the produce, contract farming, licensing and setting up of private markets outside APMC market yards, establishment of farmer-consumer markets were encouraged.

Although the above reform process has led to establishment of innovative marketing channels across states, it is important to understand the status of their implementation, and also various issues concerning the existing system of marketing of agricultural produce. At present, there are two broad channels of marketing of agricultural produce, which include the traditional marketing channel of APMC *mandi* system and the innovative marketing channel such as the private markets (PM) and direct marketing (DM). The present study attempts to perform a comparative analysis of traditional vis-à-vis innovative marketing channels in the state of Maharashtra based on relevant performance indicators.

The study showed positive impact of innovative marketing channels vis-à-vis traditional channel of marketing since the beneficiaries of innovative channels not only received higher output prices for their maize, onion and soybean crops but also generated much higher net returns from these crops as against beneficiaries of traditional channel of APMC. While availability of better prices of produce and reduction in marketing and other cost turned out to be the major reasons for farmer's preference of innovative channel of PM and DM, the traditional channel of APMC was preferred by farmers mainly due to their day to day functioning, which helped them to avail marketing facilities on daily basis. However, the beneficiaries of innovative and

traditional marketing channels aired a number of suggestions to improve the effectiveness of the marketing system. Measures and initiatives undertaken to address these suggestions will not only improve effectiveness as well as efficiency of marketing system but also improve overall financial condition of farmers through expansion in production and marketing of produce.

The study has been conducted by the AERC, of Gokhale Institute of Politics and Economics, Pune, at the initiative of the Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi. We are thankful to Secretary, Ministry of Agriculture and Farmers Welfare for entrusting this study to AERC Pune. We are also thankful to Dr. Promodita Sathish, Adviser, Directorate of Economics and Statistics, MoA&FW, New Delhi and her team for constant encouragement during the study. We are also extremely thankful to prof. Kalamkar, Director AERC, Vallabh Vidyanagar for reviewing the report and for providing useful comments.

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We thank Director, Department of Marketing of Maharashtra Government and the officials of Maharashtra State Agricultural Marketing Board for sharing relevant information with us. We are grateful to the Offices of Superintendent Agricultural Officer, districts of Ahmednagar, Nasik and Yavatmal. We are grateful to them for all the support and information provided for conducting the study in the sample villages. We also thank the agricultural assistants, taluka officials as well as gram panchayat officials for providing necessary data and cooperating with us during the period of the survey. We are grateful to all respondent farmers as well as traders for patiently and sincerely providing answers to our questions and to members of all sample households for cooperating with us.

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Deepak Shah and Jayanti Kajale
Gokhale Institute of Politics and Economics, Pune.
(Deemed to be University under section 3 of the UGC Act, 1956)
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Executive Summary

Introduction

An efficient system of marketing of agricultural produce is considered to be crucial for guaranteeing remunerative price and a higher share to the farmer producers in the value chain of the agricultural produce. The pre-independence period was marked by lower investment and hence lower growth rate of the agricultural sector. The farmers were exploited due to inadequate knowledge, poor quality marketing infrastructure, lower bargaining strength and hence received lower prices for their produce. In the aftermath of the independence, agricultural produce marketing committees (APMCs) were established. The major objectives were to regulate marketing practices for agricultural produce and protect the farmers who largely were small and marginal land owners / operators from exploitative marketing practices of intermediaries, generate remunerative prices for them and to provide infrastructure for marketing of the agri produce. As a result, market yards and sub market yards with marketing infrastructure were set up for facilitating sale of the agri produce. The farmers were mandated to sell their produce to the nearest APMC through auction method. Market fees were paid by the farmers for availing various marketing services such as weighing, grading and other facilities. Dispute settlement mechanism, reduction in physical losses of produce, payment of cash to farmers without undue deductions were the major benefits of the APMC system to the farmers and was expected to protect the interests of the small and marginal farmers.

Over the years however, the system of APMCs has not been able to provide an efficient marketing platform to the producer farmers. Studies have pointed out collusive nature of licensed commission agents leading to lower prices being paid to the farmers and their lower share in the consumer price. The market committees also were not able to invest adequately in development of adequate infrastructural facilities at the market yards. As a result, need was felt to reform the system and provide alternatives to the existing channels of marketing so that the farmers can sell off their produce at competitive rate. On this backdrop, the idea of reforms was discussed among policymakers and researchers. In order to strengthen the marketing system of the agricultural commodities to the benefit of the farmers, the reforms which were carried out focused on liberalization of the marketing framework. The Model Agricultural Marketing (Development and Regulation) Act (2003) was framed by the union

government and the rules were circulated among the state governments in 2007 for making appropriate changes in the state Acts. Through the provisions of the act, direct marketing of the produce, contract farming, licensing and setting up of private markets outside APMC market yards, establishment of farmer-consumer markets were encouraged. Thus, it primarily aimed at deregulation of agricultural marketing and provision of alternative channel of marketing to the APMC system and enhanced role of private players in the market for agri commodities.

There are two channels of marketing agri produce- firstly, the traditional marketing channel or the APMC mandi system and secondly, private markets (PM) and direct marketing (DM) or innovative marketing channel. However, it is felt that authentic information on the comparative advantage of both the marketing channels in terms of marketing cost, facilities / infrastructure for marketing and other support facilities / infrastructure, payment mechanism, incentives to farmers and buyers and also price discovery is not adequately available.

Maharashtra has been one of the leading states as far as reforms in agri marketing system are concerned. As per the information provided by the Ministry of Agriculture and Farmers Welfare, more than 120 private markets licenses and more than 4000 direct marketing licenses have been issued across the country by various state governments in 2023. Out of these, Maharashtra contributes around 70 percent to the total private market licenses issued and 32 percent to the direct marketing licenses issued. The score of the index ‘Agricultural Marketing and Farmer Friendly Reforms Index (AMFFRI)’ launched by NITI Ayog was highest 81.7 out of 100 for Maharashtra.

In order to compare benefits of and problems associated with traditional as well as innovative marketing channels, it is important to make comparative analysis of empirical data for a state like Maharashtra which indicates strong presence of APMC market yards as well as direct marketing and private markets. Such analysis will set an example for replicating marketing reforms in other states especially those which indicate lower level of marketing reforms and lower level of agricultural growth also.

Objectives of the Study

1. To study the emergence, evolution and regional spread of various innovative marketing channels in Maharashtra.
2. To compare and contrast working of the innovative marketing channels (direct marketing and private markets) and the traditional marketing channels with

respect to costs, infrastructure, prices received etc. as far as the farmers are concerned in Maharashtra.

3. To analyse the responses of the farmers with respect to various dimensions of the marketing channels used and identify benefits as well as problems relating to innovative marketing channels.
4. To suggest policy measures for improving working of marketing channels for the benefit of the farmers.

Sampling Design and Methodology

The study is based on secondary as well as primary data collected from the field. Secondary data was collected from various government sources. The field level data was collected from farmers using traditional and DM and PM or innovative channels. In the first stage, based on the list provided by the state marketing department, DM license holder (DMLH) traders and PM license holder (PMLH) traders were mapped. Nasik, Ahmednagar and Yavatmal are the districts which are top districts as far as number of DM as well as PM licenses were issued. Hence these districts were selected for conducting field survey. Further, in the next stage, based on the secondary data on cropping pattern as well as information provided by the state marketing department on commodities to be traded by license holders, onion for Nasik, Maize for Ahmednagar and Soybean for Yavatmal district were selected. In the next stage, lists of farmers attached to the traders actively using DM and PM channels were procured. Based on the lists, farmers were randomly selected. From each district which represented a particular crop, 40 farmers using DM channel and 10 farmers using PM and 30 farmers using traditional APMC channel were selected.

Data on production and marketing costs incurred, prices received and income earned from sale of the commodity for two years (2023-24 and 2022-23) was analysed and compared for farmers under different channels for each of the concerned crop selected. The average price received by farmers through different marketing channels for the concerned crops was examined. Similarly, marketing costs, returns and price analysis was performed for different marketing channels. Analysis of costs and returns was carried out through calculation of cost of cultivation, cost of marketing and gross returns. Subsequently, return over variable cost, return over marketing cost and return over variable and marketing cost was calculated. Moreover, feedback of the farmers relating to their experience of the marketing channel, e-NAM, reasons for selection of a particular channel, benefits and the problems faced was analysed. Feedback of DM and PM traders was also analysed.

Major findings – Secondary data

- The state of Maharashtra can be considered as a pioneer as far as the system of agri marketing is considered as the *first ever APMC in India* was established in Maharashtra in the year 1886 at Karanja Lad, in district Akola of the vidarbha region for marketing of cotton.
- In the post-independence period Maharashtra has acquired top position as the state with highest number of total APMC market yards However, it can also be noted that Maharashtra is also a state with highest number of non-functional market yards and the share of these to the total market yards is almost 20 percent.
- The state adopted model APMC Act of the central government in 2006 and also became a pioneer as far as market reforms are concerned. Thereby it permitted sale of agri commodities through different channels apart from the traditional channel of APMCs. It is the state which has issued highest number of licenses for direct marketing and private markets.
- Further, 133 APMC mandis in the state are connected with the electronic marketing platform under e NAM which was initiated by the central government in the year 2016.
- The data relating to selected crops maize during the last two decades showed that its production has increased due to significant expansion in yield in all the major maize growing districts of Maharashtra.
- The production of soybean crop in Maharashtra has grown by about four folds during the last two decades, mainly due to area expansion as rather than any discernible improvement in yield of soybean during the last two decades.
- There has been six folds rise in area and about eight folds rise in production of onion in Maharashtra over the last two decades. The increase in production of onion is mainly contributed by area expansion since there has not been much improvement in yield of onion

Major findings – Primary data

Socio Economic Status of the Farmers

- Overall, 97 per cent of respondents were male and only 3 per cent belonged to female category. The age profile showed that more than 80 per cent of selected maize, onion and soybean farmers using innovative as well as traditional marketing channels were less than 60 years of age with majority of them falling in the 36-59 years of age category.
- The education status showed that the sampled respondents using innovative and traditional marketing channels were relatively well educated since very high proportion of them attained education beyond secondary level. The estimates also showed that illiteracy was relatively higher among respondents using traditional marketing channel as compared to respondents using innovative marketing channels.
- The caste profile of sampled respondents turned out to be invariably in favour of general and OBC category since about 85 per cent of total sampled respondents belonged to these two social groups.
- 95 percent of the sampled respondents reported crop cultivation as the major occupational activity.
- the average per acre marketing cost of maize turned out to be relatively higher for farmers using traditional marketing channel of APMC since they incurred higher expenses towards packing, transportation, loading and unloading activities as against farmers using innovative marketing channels

Costs and Profitability

- In case of onion, the farmers using traditional marketing channel of APMC showed 29 per cent higher marketing cost as against farmers using DML marketing channel and 24 per cent higher marketing cost as against farmers using PML marketing channel. The farmers using traditional channel incurred much higher expenses towards transportation, drying, sorting, grading and packing activities as against farmers using innovative channel of PML and DML.
- For onion, the farmers using APMC marketing channel showed 9-12 per cent higher per acre total cost of soybean as against farmers using PML marketing channel and 8-11 per cent higher cost as against farmers using DML marketing channel.

- The cost estimates for onion showed that the farmers using traditional marketing channel of APMC incurred 24 per cent higher cost of onion as against farmers using PML marketing channel and 8 per cent higher cost as against farmers using DML marketing channel. The farmers using traditional marketing channel of APMC showed 29 per cent higher marketing cost as against farmers using DML marketing channel and 24 per cent higher marketing cost as against farmers using PML marketing channel.
- The farmers using traditional channel incurred much higher expenses towards transportation, drying, sorting, grading and packing activities as against farmers using innovative channel of PML and DML.
- Farmers using DML and PML channels not only received higher output prices for their maize, onion and soybean crops but also generated higher net returns from these crops as against those using traditional channel of APMC.
- The DML farmers were found to receive 5-8 per cent higher prices for maize, 11-16 per cent for onion and 2-4 per cent for soybean as against beneficiaries of APMC. The PML farmers also showed 2-3 per cent higher prices for these crops as against the APMC farmers.
- The net return estimates revealed 10-13 per cent higher returns from maize, 40-73 per cent from onion and 48-54 per cent higher returns from soybean for DML farmers as against the APMC farmers.

Thus, farmers using innovative marketing channels generated substantially higher returns from maize, onion and soybean crops not only due to higher prices received by them for these crops but also on account of lower cost incurred by them for these crops, which turned out to be 8-20 per cent lower for farmers using innovative channels as against those using traditional channel.

Availability of Infrastructure

- Although wide range of facilities are expected to be available at APMC, the responses of maize, onion and soybean farmers in terms of availability of market infrastructure related facilities at APMC were not very encouraging.
- While majority of farmers aired their view in favour availability of certain specific facilities at APMC like porter services for loading and unloading of produce, facility of weighing machines, technology to measure moisture content in produce, electricity backup for computers in the market and facility of

transparent bidding, the respondents also showed their discontent for poor or non-availability certain facilities at APMC, especially with respect to lack of electronic display for dissemination of price information and ticket board display facility, poor grievances redressal facility, non-availability of cold storage, health clinic and ambulance facility, lack of soil testing and foodgrain assaying facility, etc.

- The farmers diverting their maize, onion and soybean crop produce through PML favoured private markets mainly due to availability of many facilities in these markets such as availability of auction hall, godown, internal road within market, drinking water facility, toilet facility, firefighting facility, residence facility for porters and farmers. The infrastructure facilities available at PML also played a crucial role in encouraging farmers to divert their produce through these markets.
- While availability of better prices of produce and reduction in marketing cost turned out to be the major reasons for farmer's preference of innovative channel of PML and DML, the traditional channel of APMC was preferred by these farmers mainly due to their day to day functioning, which helped them to avail marketing facilities on daily basis.

Major Issues and Suggestions by Farmers

- The major issue faced by the farmers in marketing of their maize, onion and soybean produce through innovative channel of DML was the lower than expected price of the crop, which also held true in case of beneficiaries of traditional channel of APMC. The beneficiaries of PML showed lower profit as their major cause of concern. However, it deserves mention that about 25 per cent of these farmers did not comment on any problem faced by them while marketing their crop through innovative or traditional channel of marketing.
- The major suggestion of beneficiaries of innovative and traditional marketing channel mainly revolved around more remunerative prices on offer for their maize, onion and soybean crop, reduction in prices of fuel to reduce expenses towards transportation cost, an increase in MSP of maize and soybean and some price support for onion crop having higher shelf life, provision of facility of Custom Hiring Center with a view to access machinery and equipment on rental basis, provision of marketing insurance facilities by the govt. in order to reduce expenses towards post-harvest losses, and provision of financing facility for purchasing automated machinery for drying, sorting and grading of produce.

Appropriate measures undertaken to address these suggestions extended by beneficiaries of innovative and traditional marketing channel will not only improve effectiveness but also efficiency of these channels of marketing.

Feedback from Traders

- Based on the data provided by the marketing department of the state government relating to total DM licenses issued in the three sample districts of Ahmednagar, Nasik and Yavatmal, only around 52 percent (or 168) of the traders could be contacted due to availability of full contact details.
- Out of these 168 DMLH traders, 27 percent did not respond to phone calls. 40 percent reported that they were actively engaged as DMLH traders. Out of these, only the selected crop specific traders were contacted. The rest, i.e. 33 percent informed that they were not active during reference years as DMLH due to DM channel specific problems as well as other financial issues.
- In case of PMLH traders, out of a total of 27 traders in the 3 selected districts, contact details of 3 traders were incomplete. Hence, they could not be contacted. Out of the remaining 24 traders, it was found that 18 were actively engaged as private market traders and 6 were not active.
- It is thus noted that though the number of DM and PM licenses issued is very high in Maharashtra, all of the license holders may not be active either on temporary / permanent basis.
- As far as the process of getting license is concerned, almost all i.e. 17 out of 18 traders reported that the application process for getting DM and PM license was easy.
- Whereas majority i.e. 12 traders out of 18 reported that they came to know about the same from the MSAMB/ marketing department officials, 6 traders informed that the source of information was fellow traders.
- For 13 or 72 percent of the traders interviewed across the districts, the major objective for operating through innovative channel was to have better business. Others reported reducing costs of trading as well as increasing profits as major reason for adopting innovative channel.
- Prices paid by the DMLH and PMLH traders to the farmers were compared. These were also compared with respective MSP of maize and soybean.

- It was revealed that *average price paid by DML traders was higher than that paid by the PML traders in the year 2022-23 as well as 2023-24 for maize as well as onion.*
- The average price paid by the DML traders was more than the MSP for the concerned years in case of *maize*. The PML maize prices however were less than the MSP in both the years.
- In case of *soybean*, the price paid by DML was higher than the MSP for the year 2022-23. However, the DML as well as PML price was less than the MSP in 2023-24.
- As far as awareness of the traders is concerned, it was found that *none of them was aware about the e NAM initiative.*
- The major concerns reported by the DMLH and PMLH traders were regarding need to compete with APMC traders for connecting with more and more farmers by paying them a remunerative price.
- Also, need for adequate warehouse spaces was also reported as one of the concerns.
- Hence, their suggestions focused on subsidy for construction of storage facilities, transport and export of produce, announcement of higher MSP and higher import duty on edible oils for the benefit of farmers as well as traders.

Policy Suggestions

As is observed from the examination of the data, Maharashtra has highest number of APMC mandis and is also considered to be a pioneer state in carrying out marketing reforms in case of agricultural commodities. However, APMCs of the state still remain the main destination for sale and purchase of agri commodities in the state. The analysis also indicates that DML and PML farmers not only received higher output prices for their maize, onion and soybean crops but also generated much higher net returns from these crops as against farmers using traditional channel of APMC. However, it is revealed that there is a need to strengthen marketing of agri produce through both the marketing channels. Based on the analysis of the data, following are the policy suggestions with the ultimate objective of strengthening and improvement in the existing market infrastructure facilities, remunerative prices on offer for the produce and various other support to farmers with a view to reduce their production as well as marketing cost.

1. Reports reveal that 65 new APMCs will be established in talukas which do not have any APMC mandis. It is also observed from the Draft National Policy on Agriculture that 243 or around 21 percent of the total number of APMC mandis are nonfunctional in Maharashtra. *Hence, apart from establishment of new APMC mandis, efforts should be made to use these nonfunctional facilities.*
2. The analysis of secondary data shows that increase in production of soybean and onion in case of Maharashtra has been mainly on account of area expansion. In fact, Maharashtra, though an important state as far as production of these crops is concerned, it lags behind other states as far as yield at the state level is concerned. *Hence there is need to increase yield of these crops.*
3. The study showed that the farmers using innovative channels of DML and PML not only received higher output prices for their maize, onion and soybean crops but also generated much higher net returns from these crops as against farmers using traditional channel of APMC. However, *all the farmers were concerned about lower than expected prices received by them.* They suggested increase in MSP of maize and soybean and price support for onion having higher shelf life. Therefore, suggestion to increase MSP may be considered so that farmers receive remunerative price and adequate profits/ net returns over and above their costs.
4. Farmers using different marketing channels were concerned about high cost of production and especially, cost of marketing. Hence based on their suggestions, efforts should be made to reduce fuel and transportation cost, to provide facility of custom hiring centre for post-harvest equipment, to provide marketing insurance facilities and financing facility for purchasing of automated machinery for drying, sorting and grading of produce needs to be considered.
5. The farmers using APMC mandis for sale of their produce were concerned about poor or lack of facilities such as electronic display for dissemination of price information, cold storage, health clinic and soil testing facility, food grain assaying facility, ticket board display facility, etc. *Hence there is a need to improve facilities extended by APMC mandis.*
6. As far as the traders are concerned, the analysis revealed that all of the DM license holders in the three selected districts may not be active either on temporary / permanent basis mainly due to their smaller scale of operations and the need to compete with other channels for giving remunerative prices to farmers. Their major suggestion was about necessity of having good quality subsidized storage facilities

which would reduce their cost of storage and profitability. *Hence, efforts should be made to expand subsidized storage facilities for the DM License holder traders.*

7. None of the farmers as well as DMLH and PMLH traders who interviewed were aware about the e NAM platform and its functioning. *Therefore, there is need to increase awareness of the farmers and the traders about the e NAM platform for transaction of agri commodities.*

It is revealed that each marketing channel has benefits to offer to the farmers. There are also concerns or problems in case of each of the channels. The farmers depending upon various factors, take decision to sell the produce through a particular channel every year. Similarly, traders especially DMLH traders take decision to be active or not active and about the crop to be traded depending upon several factors. The coexistence of various channels of marketing thus provides alternatives to farmers so that they can take decision to sell the produce based on marketing cost and price received associated with each channel so as to increase profitability of the crop.

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CHAPTER - I

INTRODUCTION

1.1 Introduction

An efficient system of marketing of agricultural produce is considered to be crucial for guaranteeing remunerative price and a higher share to the farmer producers in the value chain of the agricultural produce. The pre-independence period was marked by lower investment and hence lower growth rate of the agricultural sector. The farmers were exploited due to inadequate knowledge, poor quality marketing infrastructure, lower bargaining strength and hence received lower prices for their produce. In the aftermath of the independence, Agricultural Produce Markets Regulation (APMR) Act was passed in various states and agricultural produce marketing committees (APMCs) were established. The major objectives were to regulate marketing practices for agricultural produce and protect the farmers who largely were small and marginal land owners / operators from exploitative marketing practices of intermediaries, generate remunerative prices for them and to provide infrastructure for marketing of the agri produce. As a result, market yards and sub market yards with marketing infrastructure were set up for facilitating sale of the agri produce. The farmers were mandated to sell their produce to the nearest APMC through auction method. Market fees were paid by the farmers for availing various marketing services such as weighing, grading and other facilities. Dispute settlement mechanism, reduction in physical losses of produce, payment of cash to farmers without undue deductions were the major benefits of the APMC system to the farmers and was expected to protect the interests of the small and marginal farmers.

Over the years however, the system of APMCs has not been able to provide an efficient marketing platform to the producer farmers. Studies have pointed out collusive nature of licensed commission agents leading to lower prices being paid to the farmers and their lower share in the consumer price. The market committees also were not able to invest adequately in development of adequate infrastructural facilities at the market yards. As a result, need was felt to reform the system and provide alternatives to the existing channels of marketing so that the farmers can sell off their produce at competitive rate. On this backdrop, the idea of reforms was discussed among policymakers and researchers. In order to strengthen the marketing system of the agricultural commodities to the benefit of the farmers, the reforms which were carried out

focused on liberalization of the marketing framework. As part of the reforms, the inter-ministerial committee constituted under the chairmanship of Shri R.C.A. Jain recommended formulation of model APMC Act. The Model Agricultural Marketing (Development and Regulation) Act (2003) was framed by the union government and the rules were circulated among the state governments in 2007 for making appropriate changes in the state Acts. Through the provisions of the act, direct marketing of the produce, contract farming, licensing and setting up of private markets outside APMC market yards, establishment of farmer-consumer markets were encouraged. Thus, it primarily aimed at deregulation of agricultural marketing and provision of alternative channel of marketing to the APMC system and enhanced role of private players in the market for agri commodities. However, there still exists variation between the states as far as the level of adoption of various provisions of the Act are concerned. Further, in 2016, in order to create a unified national agri market and to introduce competition, the government introduced e-National Agriculture Market (e-NAM), which provides an electronic trading portal and connects APMC mandis across the country. After the model Act of 2003, the government also formulated Model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act and shared it with the state governments in 2017. On the backdrop of these initiatives, it is important to understand the status of their implementation and also various issues concerning the existing system of marketing of agri produce. Section 1.2 provides a brief review of literature regarding the same.

1.2 Brief Review of Literature

One of the basic functions of the agricultural sector in the context of development of any economy is to supply food. As the economy develops and the agricultural sector increasingly loses its subsistence nature, the markets and the system of marketing also start developing. The system not only supplies agri commodities to the consumers, but also leads to discovery of prices for the sellers. The performance of the Indian agri marketing system has remained under continuous scrutiny and the government took several initiatives to influence the structure and conduct of agricultural produce markets (Acharya, 1998). In the post-independence period, the basic issue confronted by the existing system was imperfections in the agri output markets leading to realization of prices which were not remunerative for the producer farmers. Hence government intervention was required. As mentioned in the brief history of agricultural marketing regulation by the department of marketing of the union government, majority of the states therefore enacted Agricultural Produce Marketing Act so as to regulate marketing

activities for protecting interests especially of the agri producers (<https://dmi.gov.in/Documents/Brief%20History%20of%20Marketing%20Regulation.pdf>).

Initially, though the focus was on wheat and paddy, later on, several other crops were included in its ambit and organized agricultural marketing came into existence through regulated markets (Bisen and Kumar, 2018). By the end of 1950, there were 286 regulated markets in the country, and during 1992-93 agricultural commodities worth Rs. 62,000 crores were traded in these wholesale markets (Acharya, 1998). It was also pointed out by this study that the process of price discovery in these markets was open, weighing was more accurate and reliable, the marketing charges were rationalized and standardized and payments to farmers were ensured within the stipulated time in regulated markets. The number of regulated markets gradually went on increasing and there were 2599 principal market yards, 4486 sub-market yards taking the total number to 7085 as on 31.03.2023 (GoI, 2024).

Despite the increasing number of APMCs in various states, it was observed that over a period of time, the regulation and intervention by the institution of APMCs could not remove market imperfections. The report of the Committee for Doubling of Farmers' Incomes noted that the established system of markets could no longer efficiently cater to the changed demand patterns from across the nation (GoI, 2017). It also observed that the existing system gave rise to multiple intermediaries and positioned the farmer at a disadvantage by relegating control over the primary pricing to the intermediary procurement level. The regulated marketing system was plagued with inefficiencies, bureaucratic control and politicisation (Chand, 2012). It was also observed that growth in market infrastructure did not keep pace with volume of market arrivals as the facilities provided in markets remained not only inadequate, but also deteriorated in many cases (Chand, 2016). It was clear that the excessive intermediation was working to the disadvantage of producers and consumers. The average area served by one regulated market could not be reduced and is still very high i.e. 406 sq.km (GoI, 2024) and it varies between 70 sq km in Puducherry to 11215sq.km. in Meghalaya. It was also pointed out that in several states, elections of APMCs have not been held and that they have lost the characteristic of farmer dominated bodies. Moreover, congestion at the market yards leading to delays in disposal of the produce, gaps in the market infrastructure and malpractices in payments to farmers were also experienced. Further, it was observed that the inadequate infrastructure also lead to considerable post-harvest losses. For setting up of the marketing system, each state is divided into a number of market areas, which are

under the administration of respective marketing committees. It was observed that this division of market acted as hindrance to free flow of commodities (Patnaik, Gokul 2011).

In view of the problems associated with the agri marketing system in various states, and for introducing reforms in the existing system, the central government enacted model APMC act, 2003. As mentioned by Reddy(2016), the Model APMC Act is based on seven pillars - (a) allowing direct sale of farm produce to contract farming; (b) setting up of special markets; (c) allowing private persons, farmers and consumers to establish new markets outside the established APMCs; (d) single levy of market fee on sale of any produce within the notified area; (e) to replace license with registrations; (f) facilitate direct sale of farm produce; and (g) creation of market infrastructure from revenue earned by the APMC. States are free to adopt/ change the act according to local situation and implement it. It can be seen that one of the important dimensions of the Model Act is the provision of alternative marketing channel to the producer farmers. Thus, it promotes direct marketing of the produce by farmers and also establishment of private markets so as to introduce competitiveness in the working of various marketing channels leading to efficient outcomes for the producer farmers.

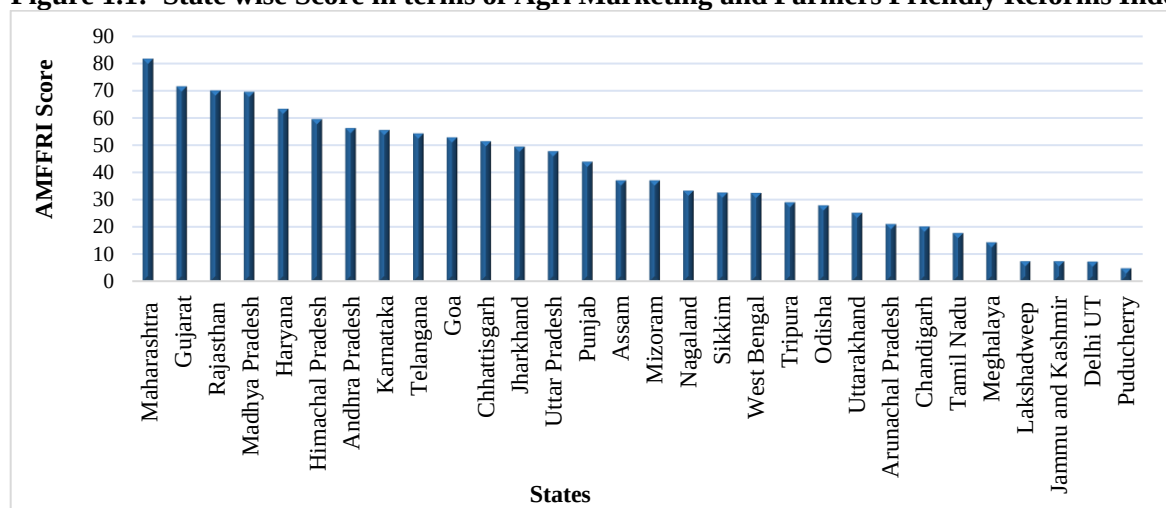
The document on Draft National Policy on Agriculture observes that the response by the states to the model APMC act has been lukewarm. For example, the provisions relating to setting up of private markets has been adopted by 26 states. However, only 15 states have notified the rules. Similarly, in case of direct marketing, only 14 states adopted the provision in the Act and further, only 4 states notified the rules (GoI, 2024). As a result, evidence on the working of these alternative marketing channels is inadequate.

e-NAM was initiated so as to integrate APMC mandis and create a marketing platform where farmers can sell their produce in the national market. This was intended to promote direct sale of produce between sellers and buyers and free the farmers from collusive practices of the traders. It is observed that so far, 1466 mandis in 23 states and 4 UTs have been integrated. Further, 1.78 crore farmers, 2.62 lakhs traders and more than 4250 Farmer Producer Organizations (FPOs) are registered on e-NAM. Mandis are integrated into the platform upon fulfilling the necessary infrastructure and technical requirements as per the e-NAM operational guidelines (GoI, 2024). The studies conducted provide evidence of market integration (Bhattacharya and Choudhury, 2023) and of higher prices for the farmers (Sekhar and Bhat, 2020). However, the latter study underlines lack of trained manpower to help the farmers with e NAM, and also lack of

adequate infrastructure facilities relating to grading sorting, refrigeration before the sale takes place.

An index based on the initiatives taken by each state and UT named ‘Agricultural Marketing and Farmer Friendly Reforms Index (AMFFRI)’ was launched by NITI Ayog in 2016 (GoI , 2016). The three indicators used for ranking of the States and UTs in AMFFRI are: i) Agricultural market reforms ii) Land lease reforms iii) Reforms related to forestry on private land-felling and transit of trees. It can be seen that the state of Maharashtra achieved first rank in implementation of various reforms with a highest score of 81.7 out of 100. Gujarat ranks second with a score of 71.5. It is followed by Rajasthan and Madhya Pradesh. Variables relating to the marketing reforms in the index include institutional reforms such as setting licenses for direct marketing, private markets, contract farming etc, joining e NAM initiative and special treatment to fruits and vegetables for marketing and level of taxes in mandis.

Figure 1.1: State wise Score in terms of Agri Marketing and Farmers Friendly Reforms Index



Source: Based on data provided by pib.nic.in, 31October,2016

<https://www.pib.gov.in/newsite/PrintRelease.aspx?relid=153145#:~:text=The%20Index%20is%20named%20as,the%20score%20of%20the%20index.>

The study by Purohit (2016) constructed multidimensional index that measured the institution of APMC Act and rules for select 14 states for the period 1970-2008. Rankings of states in terms of the index showed that Maharashtra and Punjab witnessed a stable and high ranking historically. Thus, Maharashtra consistently appears to be the state with higher levels of marketing reforms.

1.3 Need for the Study

As is clear, there are two channels of marketing agri produce- firstly, the traditional marketing channel or the APMC mandi system and secondly, private markets (PM) and direct marketing (DM) or innovative marketing channel. However, it is felt that

authentic information on the comparative advantage of both the marketing channels in terms of marketing cost, facilities / infrastructure for marketing and other support facilities / infrastructure, payment mechanism, incentives to farmers and buyers and also price discovery is not adequately available.

As mentioned above, Maharashtra has been one of the leading states as far as reforms in agri marketing system are concerned. As per the information provided by the Ministry of Agriculture and Farmers Welfare, more than 120 private markets licenses and more than 4000 direct marketing licenses have been issued across the country by various state governments in 2023. Out of these, Maharashtra contributes around 70 percent to the total private market licenses issued and 32 percent to the direct marketing licenses issued.

In order to compare benefits of and problems associated with traditional as well as innovative marketing channels, it is important to make comparative analysis of empirical data for a state like Maharashtra which indicates strong presence of APMC market yards as well as direct marketing and private markets. Such analysis will set an example for replicating marketing reforms in other states especially those which indicate lower level of marketing reforms and lower level of agricultural growth also.

1.4 Objectives of the Study

1. To study the emergence, evolution and regional spread of various innovative marketing channels in Maharashtra.
2. To compare and contrast working of the innovative marketing channels (direct marketing and private markets) and the traditional marketing channels with respect to costs, infrastructure, prices received etc. as far as the farmers are concerned in Maharashtra.
3. To analyse the responses of the farmers with respect to various dimensions of the marketing channels used and identify benefits as well as problems relating to innovative marketing channels.
4. To suggest policy measures for improving working of marketing channels for the benefit of the farmers.

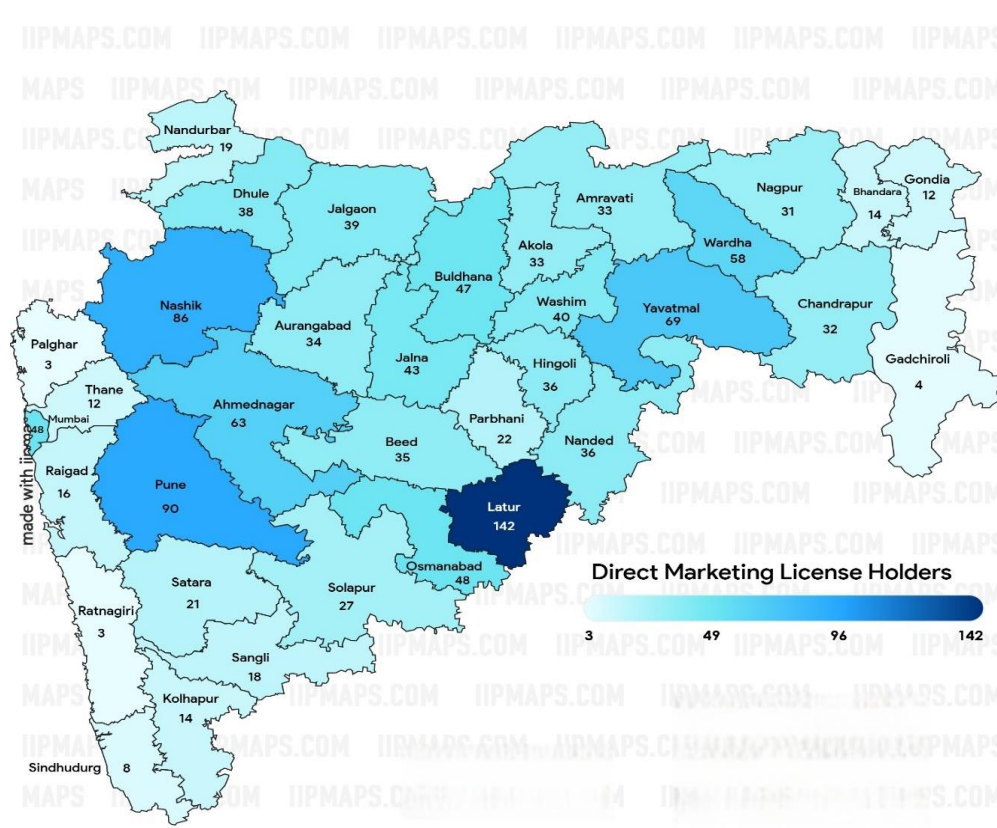
1.5 Sampling Design and Methodology

The study is based on secondary as well as primary data collected from the field. Secondary data was collected from various government sources. This data was used for understanding mainly state level trend in cropping pattern, district wise trends in area, production and productivity of the selected commodities. Data relating to DM and PM licenses issued was also collected.

Sampling Design

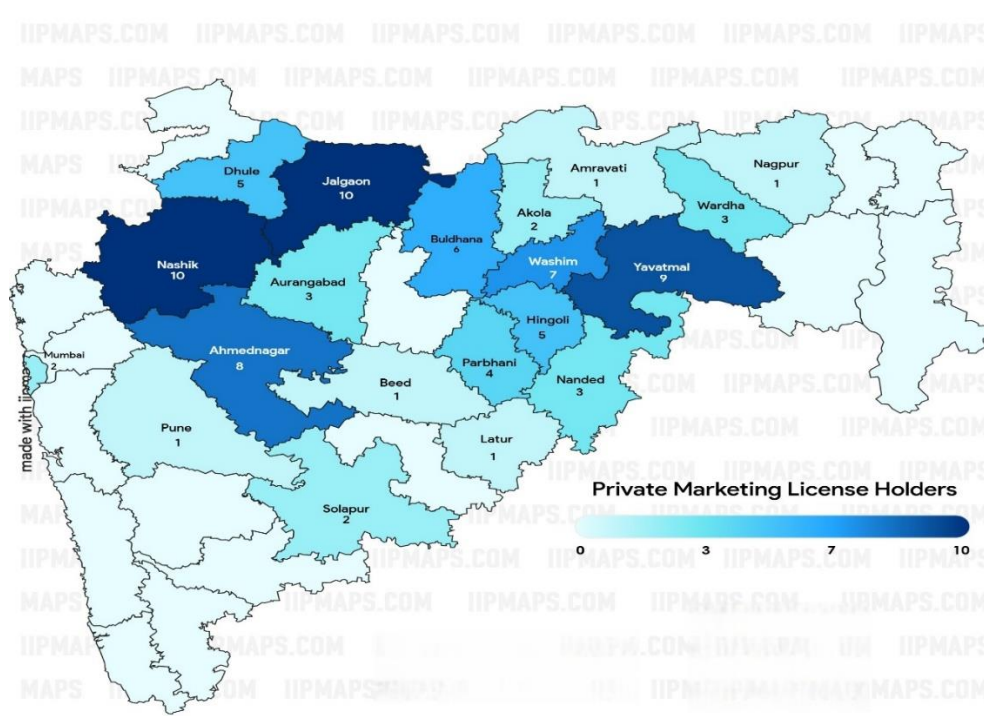
- Field level data was collected from farmers using traditional and DM and PM or innovative channels.
- In the first stage, based on the list provided by the state marketing department, DM license holder (DMLH) traders and PM license holder (PMLH) traders were mapped.
- Three districts with considerable number of licenses issued under DM as well as PM channels were to be selected. Figures 1.2a and 1.2b present district wise number of DM and PM licenses issued based on the data received the department of marketing at the time of commencement of the study and before the field work started.
- It can be seen that Nasik, Ahmednagar and Yavatmal are the districts which are top districts as far as number of DM as well as PM licenses were issued. Hence these districts were selected for conducting field survey.
- Further, in the next stage, based on the secondary data on cropping pattern as well as information provided by the state marketing department on commodities to be traded by license holders one commodity in each of the districts was selected.
- Accordingly, the commodities selected were onion for Nasik, Maize for Ahmednagar and Soybean for Yavatmal.
- In the next stage, lists of farmers attached to the traders actively using DM and PM channels were procured. Based on the lists, farmers were randomly selected.
- From each district which represented a particular crop, 40 farmers using DM channel and 10 farmers using PM channel were selected.
- Moreover, for the sake of comparison, 30 farmers using traditional APMC channel were selected.
- Thus, the total number of selected sample farmers was 80 in each district and 240 at the state level (table 1.1).
- Farmers using DM and PM channels were scattered across the selected district. Therefore, the data was collected from 91 villages of 16 blocks and 3 districts. This can be observed from table 1.2

Figure: 1.2a: District wise Number of Direct Marketing License Holders



Source: Based on information provided by the office of Directorate of Marketing, GoM, Pune

Figure: 1.2b District wise Number of Private Market License Holders



Source: Based on information provided by the office of Directorate of Marketing, GoM, Pune

Table 1.1: Number of Farmers and DMLH – PMLH Traders Selected

Districts selected	Selected crops	No of sample farmers using innovative channels		No of sample farmers using traditional channel APMC	Total number of sample farmers	Traders		
		DML	PML			DML	PML	Total
Nasik	Onion	40	10	30	80	5	1	6
Ahmednagar	Maize	40	10	30	80	5	1	6
Yavatmal	Soybean	40	10	30	80	5	1	6
Total		120	30	90	240	15	3	18

Table 1.2: Village wise Distribution of Sample Farmers

Districts	Marketing Channel	Blocks covered (no of villages)	Number of farmers covered			
			PML	DML	APMC	Total
Ahmednagar	PML	Shrigonda (6)	10	-	-	
	DML	Rahuri (2)	-	17	-	
		Newasa (3)	-	4	-	
		Rahata (2)	-	18	-	
		Shrirampur (1)	-	1	-	
	APMC	Newasa (4)	-	-	7	
		Rahata (2)	-	-	5	
		Rahuri (5)	-	-	11	
		Shrigonda (3)	-	-	5	
		Shrirampur (2)	-	-	2	
Total		5 (30)	10	40	30	80
Nashik	PML	Nashik (1)	9	-	-	
		Sinnar (1)	1	-	-	
	DML	Igatpuri (1)	-	1	-	
		Sinnar (8)	-	39	-	
	APMC	Nashik (1)	-	-	1	
		Niphad (2)	-	-	3	
		Sinnar (8)	-	-	26	
Total		4 (22)	10	40	30	80
Yavatmal	PML	Darwah (3)	4	-	-	
		Arni (1)	1	-	-	
		Yavatmal (1)	1	-	-	
		Ghatanji (2)	3	-	-	
		Ner (1)	1	-	-	
	DML	Babhulgaon (3)	-	24	-	
		Ner (8)	-	9	-	
		Darwah (6)	-	7	-	
	APMC	Babhugaon (12)	-	-	28	
		Pandhrakawda (1)	-	-	1	
		Arni (1)	-	-	1	
Total		7 (39)	10	40	30	80
Grand total		16 (91)	30	120	90	240

Methodology

- The major objective of the study is to compare and contrast the working of the innovative and traditional marketing channels with respect to costs incurred, prices received by the farmers and infrastructure available.
- Data on production and marketing costs incurred, prices received and income earned from sale of the commodity for two years (2023-24 and 2022-23) was analysed and compared for farmers under different channels for each of the concerned crop selected.
- Price prevailing in different marketing channels was analysed through weighted average price calculation for each channel
- The average price received by farmers through different marketing channels for the concerned crops was examined. Similarly, marketing costs, returns and price analysis was performed for different marketing channels.
- Analysis of costs and returns was carried out through calculation of cost of cultivation, cost of marketing and gross returns. Subsequently, return over variable cost, return over marketing cost and return over variable and marketing cost was calculated.
- Moreover, feedback of the farmers relating to their experience of the marketing channel, e-NAM, reasons for selection of a particular channel, benefits and the problems faced was analysed.
- Feedback of DM and PM traders was also analysed.

1.6 Organisation of the Study

The first chapter on introduction is followed by chapter 2 which provides an overview and status of marketing of agri produce through the traditional channel i.e. APMCs and the modern channels i.e. direct marketing and private markets in Maharashtra. It also examines the status of Maharashtra as far as transactions through e NAM are concerned. The third chapter discusses cropping pattern of Maharashtra and area, production and productivity of the three crops selected for primary data collection. This is followed by chapter four on characteristic features of the selected farmers. The analysis in chapter 5 not only focusses on comparative costs, prices, net returns of the farmers adopting various channels for marketing of concerned crops but also their feedback relating to benefits and problems relating to the marketing channel selected. Chapter 6 presents feedback of the traders. This chapter is followed by the chapter on summary and conclusions. Policy suggestions are presented in chapter 8.

CHAPTER - II

AGRICULTURAL MARKETING CHANNELS IN MAHARASHTRA: AN OVERVIEW

2.1 Introduction

The state of Maharashtra is considered as a pioneer state as far as marketing of agri produce is concerned. This chapter takes an overview of existing traditional channel of marketing i.e. the regulated mandis and briefly discusses profile of the APMCs in Maharashtra. The adoption of model APMC Act in the state enabled the government to promote modern channels of marketing i.e. direct marketing of the agri produce as well as setting up of private markets. Further, 133 APMC mandis in the state are connected with the electronic marketing platform under e NAM which was initiated by the central government in the year 2016. The chapter therefore also examines the year wise and district wise extent of licenses issued in case of direct marketing and the private markets and takes an overview of the progress relating to e NAM mandis of Maharashtra.

2.2 Directorate of Agricultural Marketing in Maharashtra

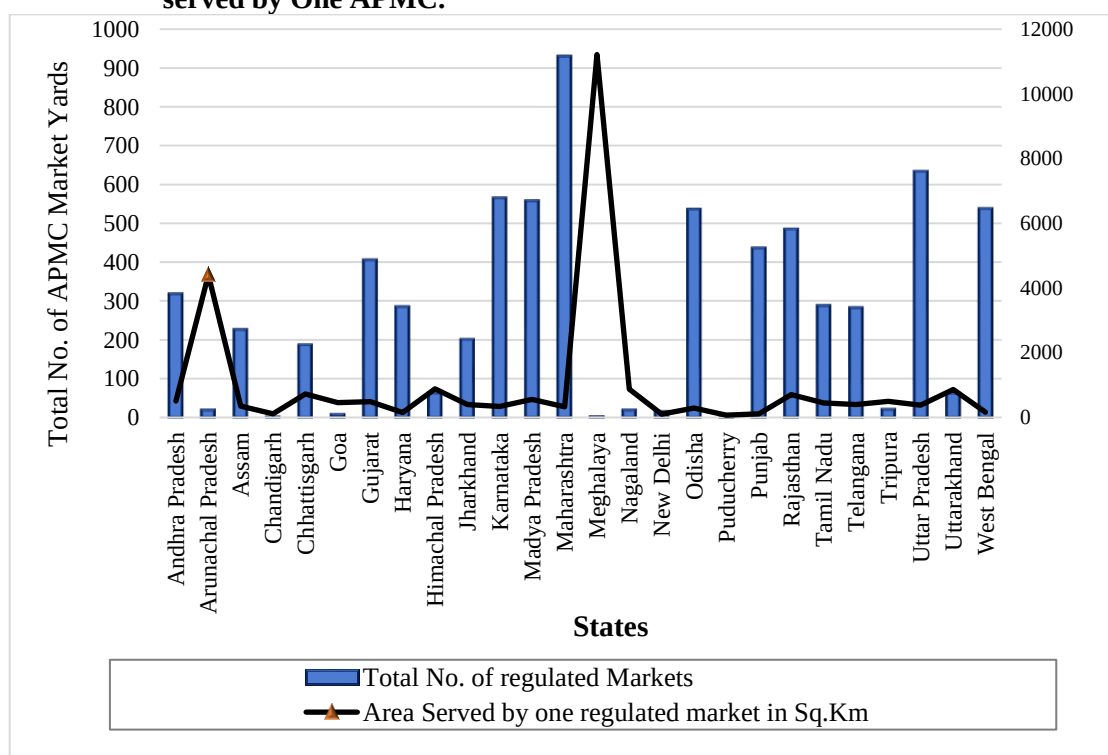
The Directorate of Agricultural Marketing was established in Maharashtra in November 1971(<https://mahapanan.maharashtra.gov.in/1004/1002/History>). It controls the marketing activities of agricultural products produced by farmers of Maharashtra State. It also supervises and controls activities of APMCs in the state. The vision of the Directorate is ‘to endeavour for development of a globally competitive and organized marketing network with well-equipped infrastructural facilities so as to facilitate the farmers to get remunerative prices to their agricultural produce and quality agricultural goods to consumers’ (<https://mahapanan.maharashtra.gov.in/1004/Overview>). An associated organisation is the Maharashtra State Agricultural Marketing Board (MSAMB) which was established in the year 1984 (https://www.msamb.com/Documents/AR_2023_24_English.pdf). The Board coordinates functions of market committees, undertakes state level planning for development of agri produce markets, advise market committees on various aspects relating to their development etc (<https://www.msamb.com/Aboutus/MSAMBOjective>).

2.3 APMCs in Maharashtra

The ***first APMC in India*** was established before independence ***in the state of Maharashtra*** in **1886**. It was established at Karanja Lad, in district Akola of the vidarbha

region for marketing of cotton. In the post-independence period, the state of Maharashtra implemented the Maharashtra Agricultural Produce Marketing (Development and Regulation) Act, 1963, and the Maharashtra Agricultural Produce Marketing (Development and Regulation) Rules, 1967 which are applicable to the Agricultural Produce Market Committees in the State of Maharashtra. (<https://mahapanan.maharashtra.gov.in/1004/1002/History>). The Act provides for establishment of market committees in the state. These market committees are engaged in development of market yards for the benefit of agriculturists and the buyers. Various agricultural produce commodities are regulated under the Act (<https://www.msamb.com/APMC/Regulation>). It can be noted that today, *Maharashtra has highest number of total APMC market yards*. It is also one of the states with less than all India average area served by one regulated market. This is clear from figure 2.1. The absence of Bihar, Kerala, Manipur, Mizoram and Sikkim, as well as Union Territories (UTs) of Andaman and Nicobar Islands, Lakshadweep, Daman and Diu and Dadra and Nagar Haveli in the figure indicates absence of APMC market system in these states/ UTs.

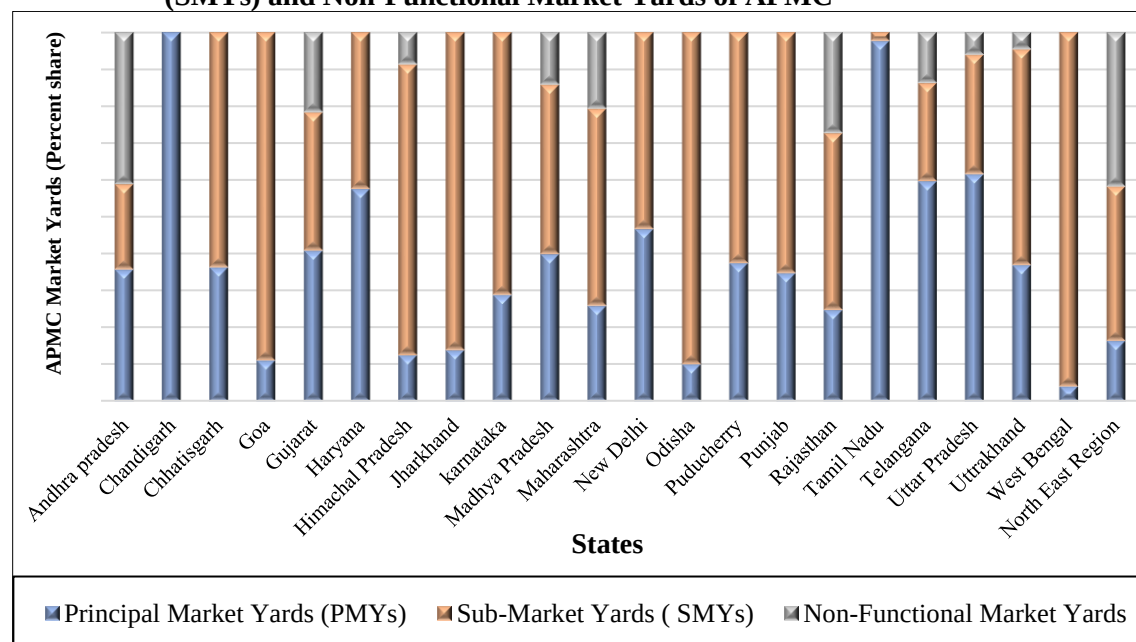
Figure 2.1: State wise Number of APMC Market Yards (Main and sub yards) and Area served by One APMC.



Source: “National Policy Framework on Agricultural Marketing, GoI, [https://agriwelfare.gov.in/Documents/HomeWhatsNew/Draft National Policy framework AgriMarketing 25112024.pdf](https://agriwelfare.gov.in/Documents/HomeWhatsNew/Draft%20National%20Policy%20framework%20AgriMarketing%2025112024.pdf), November 25, 2024

However, it can also be noted from figure 2.2 that Maharashtra is also a state with highest number of non-functional market yards. It has 930 functional and 243 non-functional market yards. Thus, the share of the latter to the total market yards is around 2 percent and is above all India average of 13 percent.

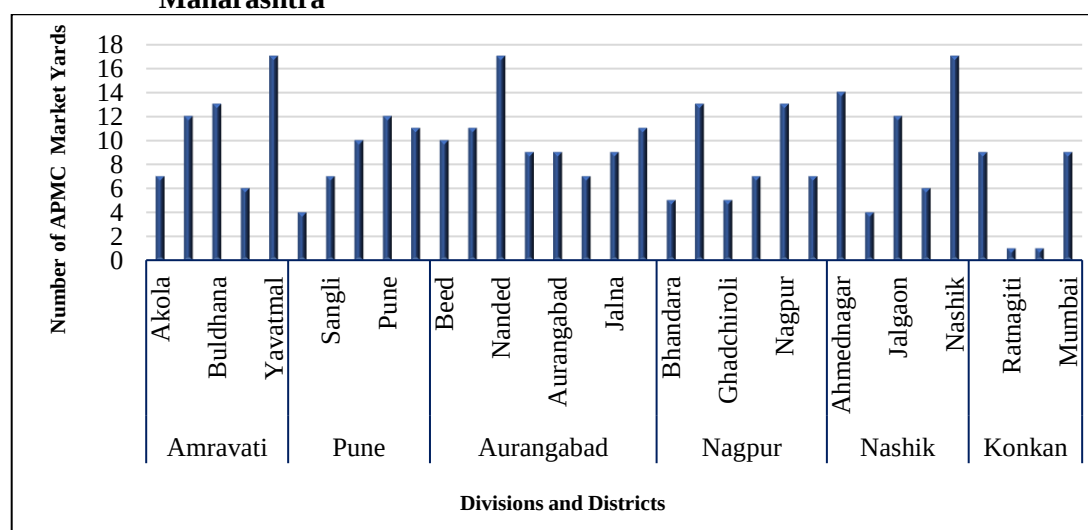
Figure 2.2: State wise Number of Principal Market Yard (PMYs), Sub-Market Yards (SMYs) and Non-Functional Market Yards of APMC



Source: “National Policy Framework on Agricultural Marketing, GoI, https://agriwelfare.gov.in/Documents/HomeWhatsNew/Draft_National_Policy_framework_AgriMarketing_25112024.pdf, November 25, 2024

Figure 2.3 shows division wise and district wise number of APMC main market yards in Maharashtra.

Figure 2.3: Division wise and District wise Number of APMC Main Market Yards in Maharashtra



Source: Based on data obtained from the office of MSAMB, Pune.

Yavatmal, Nanded and Nasik are the districts with highest number of APMC main market yards in the state. Division wise, Nasik tops with 19.78 percent share in total market yards. It is followed by divisions Amravati (16.88 percent) and Nagpur (7.42 percent). These are followed by Latur (13.66) Chhatrapati Sambhajanagar (12.15 percent), Pune (9.46 percent), Kolhapur (7.42 percent) and Konkan (6.57 percent) divisions. It can be noted that the districts in division Pune which are the relatively developed districts of the state have relatively less number of APMC main markets as well as sub markets. This was also observed from the ratio of net sown area of the districts (2023-24) to the number of main APMC mandis in the respective districts. The concerned values were lower for relatively underdeveloped districts in divisions of Amravati and Aurangabad as compared to those in Division Pune.

Recently in April 2025, the state government announced that new APMCs will be established in 65 talukas out of 68 talukas which so far did not have any APMC. This was announced under the initiative ‘One Taluka, One Market Committee’ (Sakal, Marathi daily newspaper 19 April 2025,<https://www.esakal.com/uttar-maharashtra/nashik/maharashtra-approves-65-new-agricultural-market-committees-nmk01>)

The APMCs are categorised based on total income generated. Table 2.1 shows that more than 60 percent of the APMCs are in the category A with income above 1 crore.

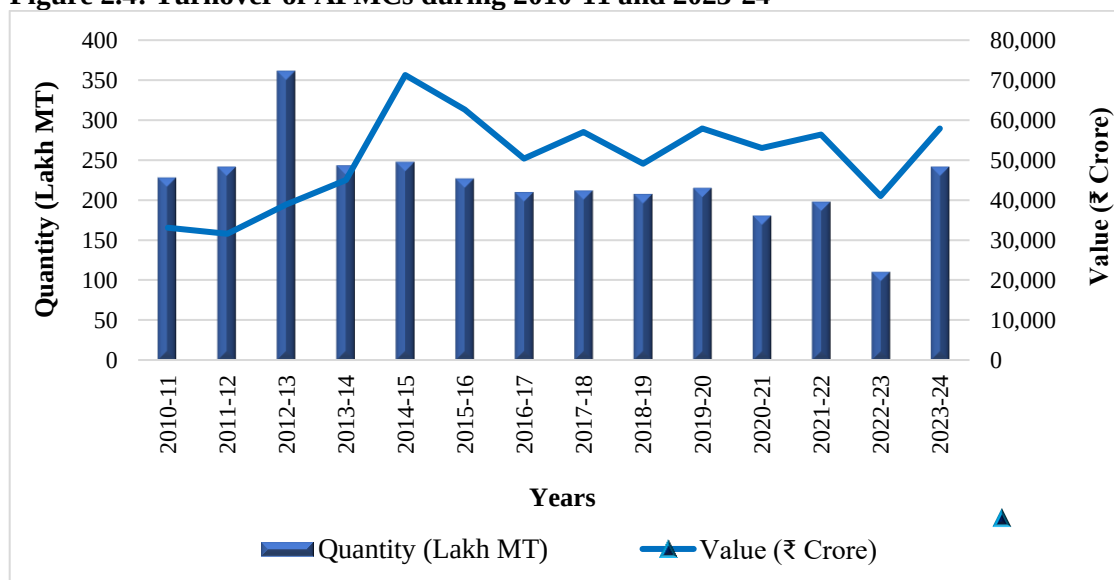
Table 2.1: Classification of APMCs (2023-2024)

No	APMC Class	No. of APMCs	Total Income
1	A	194 (63.61)	Above Rs. 1 Crore
2	B	54 (17.70)	Rs. 50 Lac to Rs. 1Crore
3	C	27 (8.85)	Rs. 25 to Rs. 50Lac
4	D	30 (9.84)	Less than Rs. 25Lac
	Total	305	

Source: Maharashtra state Agricultural Marketing Board

Figure 2.4 shows the turnover of APMCs since 2010-11. It is observed that the quantity traded through APMCs has remained more or less stable barring the year 2012-13 when it significantly increased and in 2022-23 when it declined.

Figure 2.4: Turnover of APMCs during 2010-11 and 2023-24



Source: Economic Surveys of Maharashtra, GoM, various years

2.4 Market Reforms and Innovative Marketing Channels in Maharashtra

The Directorate aims to provide better as well as alternative marketing opportunities to the farmers so that they are not subjected to distress sale and also to ensure market reforms by reducing middleman to an optimistic level by providing alternative market channels of direct market license, farmer- consumer markets, private markets and contract farming (<https://mahapanan.maharashtra.gov.in/1004/Overview>). Thus, reforming the marketing system by creating and promoting alternative marketing channels is one of the important objectives of the Directorate. The state government adopted the model APMC Act of the union government 2006. Accordingly, the market reform desk of the department of marketing is constituted to issue under the provision of Maharashtra APMC act 1963, following type of licenses (<https://mahapanan.maharashtra.gov.in/1061/1028/Market-Reforms>)

- (1) Direct Marketing License, - As per Maharashtra Agriculture Produce Marketing (Development and Regulation Rules 1967, Rule 4B) Direct Marketing license is given to any person desiring to purchase agricultural produce directly from agriculturists in one or more than one market area.
- (2) Private Market License - As per Maharashtra Agriculture Produce Marketing (Development and Regulation Rules 1967, Rule 4C) Private Marketing license is given to any person desiring to establish a private market in one or more than one market area.

- (3) Farmer Consumer Market License Farmer-Consumer Market license is given to any person desiring to establish a Farmer- Consumer Market in one or more than one market area
- (4) Single Trade License. As per Maharashtra Agriculture Produce Marketing (Development and Regulation Rules 1967, Rule 6(3A)) Single Traders license is given to any trader desiring to operate in more than one market area
- (5) Also, the Act allows contract farming producer and the contract farming sponsor to mutually decide the terms and conditions of the contract farming agreement which shall not be contrary to the provisions of the act and rules made there under.

In 2016, the state also deregulated fruits and vegetables from the purview of APMCs.

The focus of this study is on working of direct marketing and private market channels. Hence the next section examines the profile of direct marketing and private market licenses issued in Maharashtra over a period of time.

2.5: Profile of Direct Marketing Licenses and Private Market Licenses issued

These licenses are issued upon submission of required documents, payment of bank guarantee and license fee (table 2.2)

Table 2.2: License Fee and Bank Guarantee for obtaining Direct Marketing License and Private Market License.

Marketing Channels	License Fee		Bank Guarantee	
	Jurisdiction	Amount (Rs)	Jurisdiction	Amount (Lakh Rs)
DML	Whole state	1000/-	Whole State	5
	One Division	500/-	Konkan, Pune, Nashik Division	5
			Nagpur Division	3
			Aurangabad, Amravati Division	2
PML	District place with Municipal corporation	50,000	District place with Municipal corporation	20
	Other places	25000	Other places	5

Source: <https://mahapanan.maharashtra.gov.in/1106/FAQ>

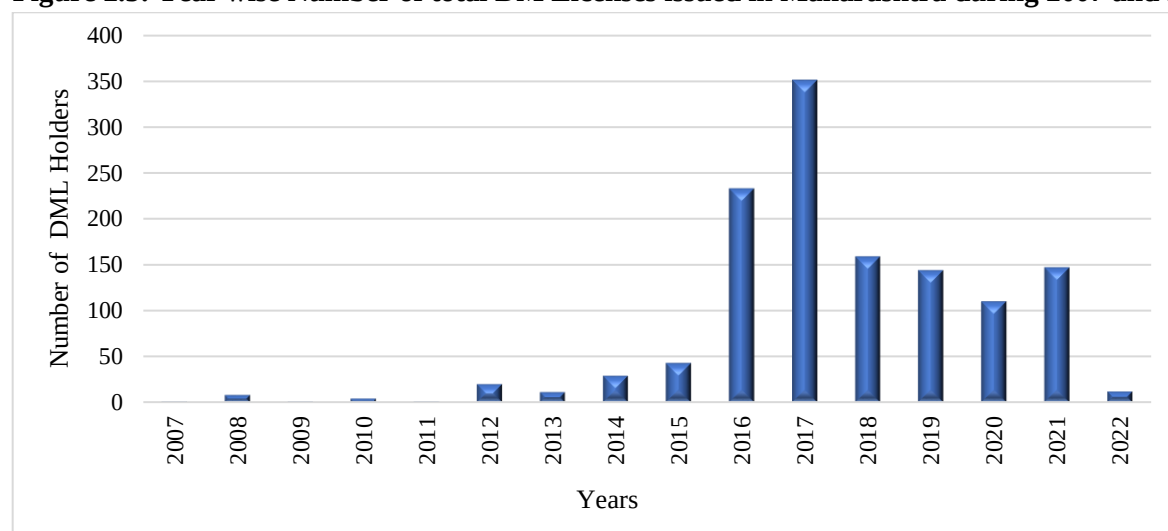
Direct Marketing Licenses

Figure 2.5 shows year wise number of DM licenses issued during 2007 and 2022. This information was provided by the marketing department of the state. The available data shows that the license holders were individuals, processing companies, farmer processing organisations companies, self-help groups etc.

It can be seen that over the time period, number of licenses issued have been increasing. Out of a total of 1274 licenses issued till 2022, maximum number of licenses were issued in the year 2017 and almost all the districts were covered under the same. The 5 districts with maximum number of licenses issued during the period are Latur (142)

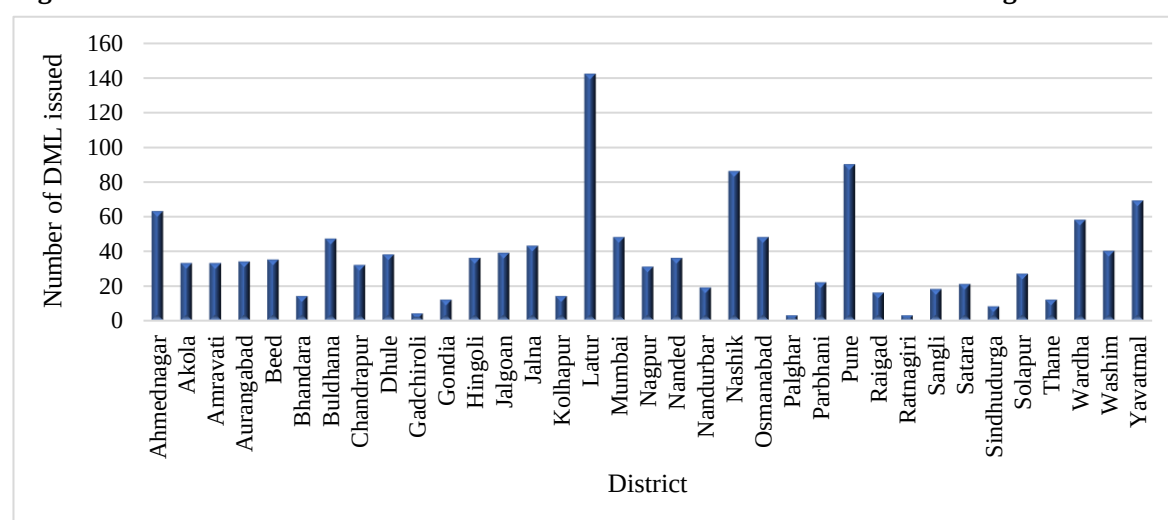
which is a drought prone district followed by Pune (90) and Nasik (86) and other districts. This is observed from figure 2.6

Figure 2.5: Year wise Number of total DM Licenses issued in Maharashtra during 2007 and 2022



Source: Office of MSAMB, Department of Marketing, GoM, Pune

Figure 2.6: District wise and Year wise Total Number of DM Licenses Issued during 2007 and 2022



Source: Office of MSAMB, Department of Marketing, GoM, Pune

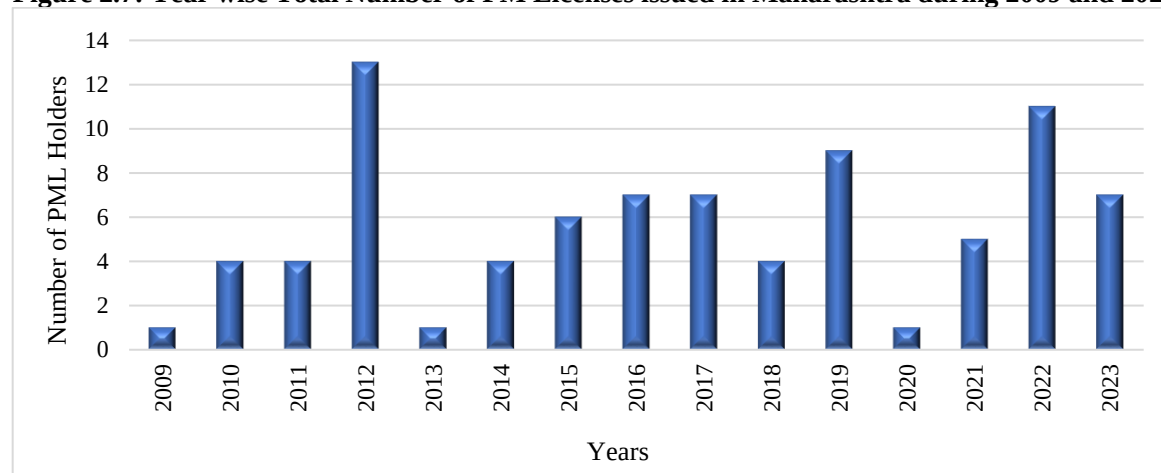
It can be noted that as per the recent information given by the Economic Survey of Maharashtra, 2024-25, till December 2024, 1719 DML were issued (GoM, 2024-25). Thus, the number of licenses issued have been increasing.

Private Market License holders

Figure 2.7 presents year wise number of private market licenses which were issued during 2009 and 2023. In all, as per the data received, 84 licenses have been issued during this period. . Maximum number of licenses were issued in the year 2012. Figure 2.8 shows the district wise number of licenses issued. Jalgaon and Nasik are the districts wherein

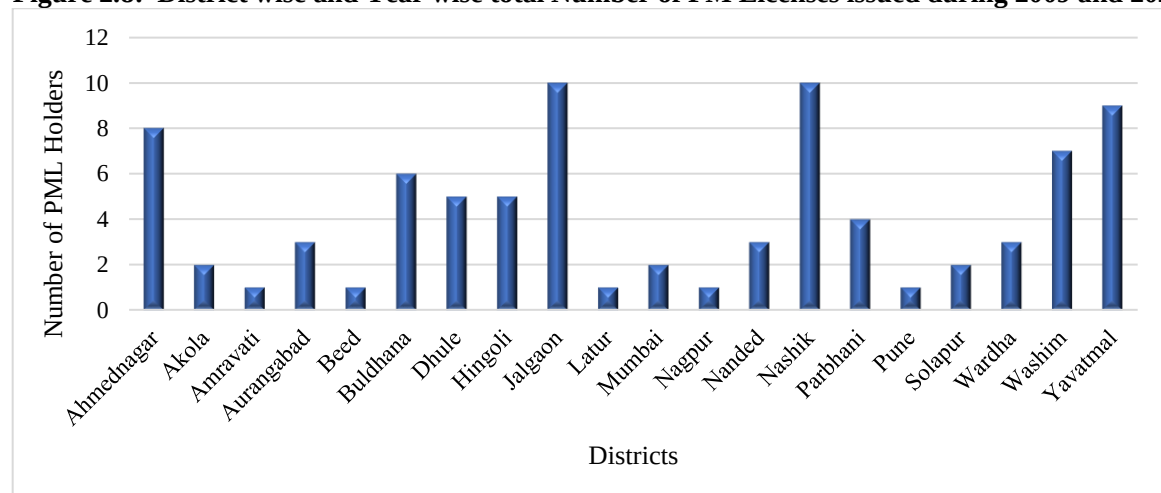
highest number (10) of licenses were issued. These are followed by districts Yavatmal and Ahmednagar.

Figure 2.7: Year wise Total Number of PM Licenses issued in Maharashtra during 2009 and 2023



Source: Office of MSAMB, Department of Marketing, GoM, Pune

Figure 2.8: District wise and Year wise total Number of PM Licenses issued during 2009 and 2023



Source: Office of MSAMB, Department of Marketing, GoM, Pune

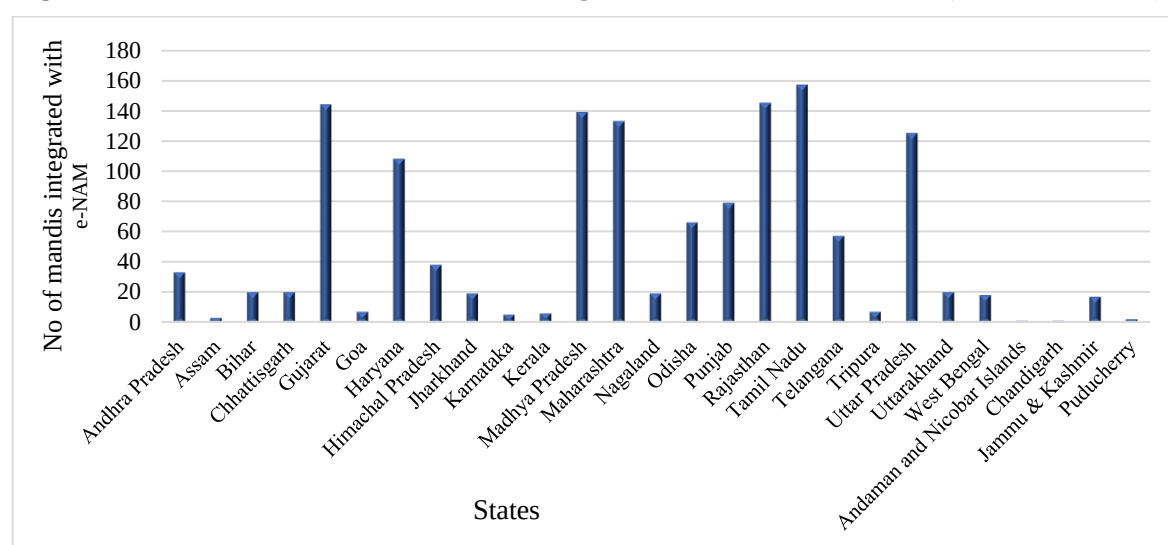
The recent data reveals an increase in the number of PM licenses issued. As per the Economic Survey of Maharashtra 2024-25, till December 2024, 97 PM licenses were issued (GoM, 2025).

A comparison of turnover of the APMCs on one hand and that of DML-PML license holders on the other provides important insights. As per the reports, in 2019-20, the turnover of the private markets and direct marketing license holders was Rs 8,360 crores (ToI, 2020). As compared to this, the turnover of APMCs in that year was around Rs. 57000 crores (figure 2.3) i.e. approximately 7 times higher than the former. However, the data relating to the turnover of DMLH and PMLH is not available with the department of marketing or MSAMB further comparison could not be made.

2.6 e-Nam in Maharashtra

Figure 2.9 shows state wise number of APMC mandis integrated with e-NAM Platform. As per the economic survey of Maharashtra 2024-25, in all 133 APMCs of the State are operating under e-NAM. These constitute around 43 percent of the main market yards in Maharashtra. Online gate entry, e-auction have been started in 118 APMCs and e-payment has been started in 78 APMCs. Up to October 2024, about 481 lakh qtl of agricultural produce worth Rs 18,073 crore was e-auctioned and e-payments of 449 crore were made. Quality assaying laboratories have been established in 118 APMCs for quality inspection & certification of agricultural commodities (GoM, 2025).

Figure 2.9: State-wise Number of Mandis integrated with e-NAM Platform (as on 31.10.2024)



Source: PIB, 2024

(<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2086484#:~:text=As%20on%2031.10.,integrated%20with%20e%2DNAM%20platform.>)

2.7 Summary

The overview of the agri marketing system shows that Maharashtra is considered as a pioneer state as far as the system of agri marketing is considered. The first ever APMC in India was established in Maharashtra in the year 1886. In the post-independence period Maharashtra has acquired top position as the state with highest number of total APMC market yards. The state adopted model APMC Act of the central government in 2006 and became pioneer as far as market reforms are concerned. It is the state which has issued highest number of licenses for direct marketing (1719 in number) and private markets (97 in number). However, it is also the state where around 20 percent of the total APMC mandis in the state are non-functional. As per the recent decision, the state government will be establishing 65 APMCs in talukas with non-existent APMCs under the initiative 'One

Taluka, One Market Committee'. It is also observed that 133 APMC mandis or 43 percent of the main APMC mandis have been integrated with e NAM. Thus, the state has permitted sale of agri commodities through different channels apart from the traditional channel of APMCs and has been a pioneer state in that context. However, the available data shows that the turnover of APMCs in year 2019-20 was approximately 7 times higher than that under DM and PM channels. Thus, APMCs of the state still remain the main destination for sale and purchase of agri commodities in the state.

CHAPTER – III

AREA, PRODUCTION, PRODUCTIVITY OF MAIZE, SOYBEAN AND ONION IN MAHARASHTRA

3.1 Introduction

This chapter provides an insight into the estimates relating to area, production and productivity of selected maize, soybean and onion crop cultivated in the state of Maharashtra encompassing the period between 2000-01 and 2022-23. The primary focus is on evaluating structural changes in area, production and productivity of these selected crops cultivated across all the districts and regions/divisions of the state during the period from 2000-01 to 2022-23, aside from evaluating changes in share of different districts in maize, soybean and onion crop acreage and production in the state during the given period of time. This chapter also attempts to evaluate cropping pattern changes during the last four decades in Maharashtra with a view to assess crop diversification drive in favour of cereal, pulses, oilseeds and various horticultural crops cultivated in the state over time. The major thrust of this chapter is, therefore, on providing information relating to trend estimates for selected crops cultivated in the state of Maharashtra, especially with respect to their area, production, and productivity.

3.2 Cropping Pattern Changes in Maharashtra

Although the green revolution initiated during the mid-sixties led to significant rise in wheat and rice production in India, the technology revolution introduced through application of HYVs of seeds, chemical fertilizer and expansion of irrigation infrastructure also resulted in significant production expansion of various other cereal, pulses, oilseeds and horticultural crops. Even the area and production of cash and fiber crops increased substantially over time. The increase in crop production over time has been not only due to technology revolution but also on account of rise in human population and consequent consumer demand. Further, there has been significant shift in cropping pattern over time on account of factors like rise in human population, growing urbanization, rise in income levels, changes in consumption pattern and growing demand for specific food and non-food crops, etc. ((Bhalla and Singh, 1997; Ghosh, 2011). This has led to significant changes in cropping pattern over time across all the states of India.

Among various states, Maharashtra has witness not only perceptible increase in gross cropped area (GCA) but also a paradigm shift in cropping pattern in favour of pulses, oilseeds and cotton crops. The state has shown nearly 27 per cent rise in GCA

during the last four decades. The change in cropping pattern in Maharashtra can be witnessed from steadily rising shares of maize, pulses, oilseeds, sugarcane and cotton in GCA during the past four decades in the face of declining share of main cereals and other course cereals. While area under all cereal crops put together as proportion of GCA steadily declined from 56 per cent in 1980-81 to 28 per cent in 2020-21, the area under maize within/among cereals increased from less than 1 per cent to nearly 5 per cent of GCA during the same period. The pulses have shown an increase in their area as proportion of GCA from 14 per cent to 18 per cent during the last four decades. The rise in share of pulses in GCA is mainly due to significant increase in area under gram (Bengal gram) and tur (red gram) crops over time (Table 3.1).

Table 3.1 Cropping Pattern Changes in Maharashtra: 1980/81 – 2020/21

Area/Crop	(Percent Share in GCA)						
	1980-81	1990-91	2000-01	2005-06	2009-10	2014-15	2020-21
Rice	7.43	7.31	6.99	6.71	6.51	6.66	6.26
Wheat	5.41	3.97	3.49	4.14	4.78	4.59	4.52
Jowar	32.93	28.82	23.56	21.01	18.47	14.13	9.31
Bajra	7.81	8.88	8.33	6.36	4.57	3.72	2.76
Maize	0.32	0.48	1.52	2.08	3.51	4.62	4.83
Other Cereals	1.98	1.48	1.55	0.94	0.79	0.91	0.73
All Cereals	55.88	50.94	45.44	41.24	38.63	34.63	28.41
Tur	3.28	4.59	5.07	4.88	4.83	5.20	5.38
Gram	2.09	3.06	3.13	4.56	5.71	6.13	8.95
Moong	-	-	3.30	2.37	1.89	1.35	1.61
Udid	-	-	2.66	2.07	1.57	1.19	1.43
Other Pulses	8.46	7.25	2.30	1.37	0.92	0.80	1.07
All Pulses	13.82	14.90	16.45	15.21	14.93	14.67	18.44
Total Foodgrains	69.70	65.84	61.90	56.46	53.55	49.29	46.85
Groundnut	2.30	4.48	2.17	1.95	1.61	1.40	1.24
Soybean	-	0.92	5.28	10.41	13.35	15.64	17.22
Safflower	2.44	2.90	1.37	1.17	0.83	0.32	0.10
Other Oilseeds	3.08	5.16	2.92	2.66	1.47	0.74	0.40
All Oilseeds	9.06	12.93	11.84	16.23	17.17	18.10	18.96
Sugarcane	1.31	2.02	2.75	2.22	3.34	4.42	4.59
Cotton	12.98	12.45	14.23	12.75	15.00	18.00	18.24
Total Fruits & Vegetables	1.41	2.32	3.05	NA	NA	6.21	7.20
Fruits	0.67	1.11	1.79	NA	NA	3.15	3.33
Vegetables	0.74	1.21	1.26	NA	NA	3.06	3.87
Onion	0.31	0.40	0.48	0.79	0.66	1.90	2.83
GCA (in '000' Hectares)	19642 (100.00)	21859 (100.00)	21619 (100.00)	22556 (100.00)	22612 (100.00)	23273.1 (100.00)	24917 (100.00)

Source: Computations are based on figures obtained from 'Economic Survey of Maharashtra, 2011-12, 2014-15 and 2020-21'

Although the major crops cultivated in Maharashtra are jowar, bajra, pulses, oilseeds and cotton, other cereal crops also find place in the cropping pattern of the state. The farmers in Maharashtra over time have become increasingly price conscious and commercial oriented. This has resulted in significant change in the cropping pattern in Maharashtra in favour of oilseed and horticulture crops. The estimates show that there

has been about two folds rise in share of oilseeds in GCA of Maharashtra, which increased from 9 per cent to 19 per cent during the last four decades (Table 3.1). Even area under cotton as proportion of GCA in Maharashtra has grown from 13 per cent in 1980-81 to 18 per cent in 2020-21. The area under sugarcane as proportion of GCA in Maharashtra has increased from 1.31 per cent in 1980-81 to 5 per cent in 2020-21. These estimates clearly show significant change in cropping pattern of Maharashtra.

In fact, the cropping pattern in Maharashtra underwent significant changes during the nineties period and thereafter when significant area was allocated to oilseeds crops and, in particular, to soybean. During the early eighties period, soybean crop did not find place in the cropping pattern of farmers in Maharashtra and it was only during the mid-eighties that farmers started cultivating this high value oilseed crop mainly due to high element of profit involved in its cultivation (Shah, 2014). The cultivation of soybean was initially confined to Vidarbha region of Maharashtra. However, in due course of time, the farmers belonging to all the regions of Maharashtra started cultivating soybean crop with the sole exception of Konkan region where land is grossly unsuitable for soybean crop.

The estimates presented in Table 3.1 also show a steadily rising share of area under fruits and vegetables as proportion of GCA, which increased from 1.41 per cent in 1980-81 to 7.2 per cent in 2020-21. Further, among various vegetable crops, the area under onion as proportion of GCA increased significantly only during the last one decade or so. This is despite the fact that bulk of the onion produced in India comes from Maharashtra and the state is considered as the onion basket of the country.

Thus, the foregoing estimates clearly show a significant shift in cropping pattern in Maharashtra in favour of those crops which have high consumer demand. The higher disposable consumer income and changes in preference for high value crops are some of the major factors responsible for a shift in cropping pattern from cereals to oilseeds and horticultural crops.

3.3 Trend in Area, Production and Yield of Maize Crop

Maize, a member of the grass family and also known as corn, is an important course cereal cultivated in India. Among cereals, it is the third most important crop after rice and wheat and its cultivation suits to wide range of environments ranging from extreme semi-arid to humid and sub-humid climate (Gadakh et al. 2023) . The maize crop accounts for about 10 per cent of total foodgrain production of India. It is being used for numerous purposes such as a staple food for human consumption, feed for cattle and poultry, raw material for industrial production of starch, oil, alcoholic beverages, food

sweeteners, pharmaceutical package, paper industries, *etc.* (Kumar et al. 2022). Maize is being chiefly used as poultry and cattle feed, followed by its use as industrial non-food products, and human consumption. The area under maize cultivation in India has increased from 3.16 million hectares in 1950-51 to as much as 10.04 million hectares in 2021-22. On the other hand, the production of maize in India has grown from 1.73 million tonnes to 33.62 million tonnes during the same. The rapid increase in production is due to significant yield expansion of maize. Although maize is cultivated across all the states of India, about 80 per cent of total production of maize in the country comes from the states of Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, West Bengal, Bihar, Telangana, Andhra Pradesh and Rajasthan. Among the states, Maharashtra accounts for about 12 per cent share in area and 11 per cent share in production of maize in India.

The state of Maharashtra is beset with diverse agro-climatic regions, which allows cultivation of maize throughout the year. Maize thrives on vast fertile lands of Maharashtra, and significant sowing of maize crop is witnessed during both kharif and rabi seasons with assured yield. The state has been putting concerted efforts to promote high-yielding hybrid varieties of seeds, organic techniques of production, drip irrigation systems and strong market linkages with view to enhance farmer's income from maize production. The agricultural universities and institutes are also involved in developing location specific agronomic practices, which have not only led to significant yield expansion but also area allocation under maize crop in Maharashtra.

The estimates relating to structural changes in area, production and yield of maize crop cultivated across different districts of Maharashtra during the period between TE 2002-03 and TE 2022-23 are shown in Table 3.2.

The maize cropped area in Maharashtra has grown significantly from 3.42 lakh hectares in TE 2002-03 to 8.63 lakh hectares in TE 2012-13 and further to 12.75 lakh hectares in TE 2022-23, showing more than three and a half folds rise in the same during the last two decades (Table 3.2). The districts belonging to Nashik, Aurangabad, Pune and Kolhapur divisions put together are seen to account for more than 85 per cent share in total maize cropped area of Maharashtra (Table 3.3). Incidentally, while Nashik division shows a steadily rising share in maize cropped area of Maharashtra from 18 per cent in TE 2002-03 to 45 per cent in TE 2022-23, this share for Aurangabad division has declined from 39 per cent to 15 per cent during the same period. Thus, a decline in share of Aurangabad division is offset by a sharp increase in share of Nashik division in maize cropped area of Maharashtra during the last two decades. However, the districts

belonging to Pune division have shown about 15-20 per cent share in maize cropped area of Maharashtra during the last two decades. Similarly, there has not been much change in share of districts belonging to Kolhapur division, and these districts put to gather have shown about 10 per cent share in maize cropped area of Maharashtra during the last two decades. The districts of Nagpur division show minuscule area allocation under maize crop in Maharashtra. The other districts belonging to Latur and Amravati division have shown hardly any significant change in their share in maize cropped area of Maharashtra during the last two decades. At present, the major area allocation under maize crop in Maharashtra is noticed in the division of Nashik, followed by Pune, Aurangabad and Kolhapur, and they show about 88 per cent share in maize cropped area of the state.

Table 3.2: Structural Changes in Area, Production and Yield of Maize Crop in Maharashtra: 2000-01 to 2022-23
(Area in '00' Hectares; Production in '00' Metric Tonnes; Yield in Kg/Ha)

District/Division	Area			Production			Yield		
	TE 2002-03	TE 2012-13	TE 2022-23	TE 2002-03	TE 2012-13	TE 2022-23	TE 2002-03	TE 2012-13	TE 2022-23
Nashik	283.33	1714.87	2127.09	557.33	5346.55	9022.65	1967.07	3117.76	4241.78
Dhule	65.33	570.70	692.44	103.33	1570.57	1609.94	1581.66	2752.01	2325.02
Nandurbar	166.33	320.00	586.47	185.33	863.63	1366.04	1114.23	2698.84	2329.26
Jalgaon	113.00	833.00	2304.90	215.67	2597.81	6859.28	1908.58	3118.62	2975.96
Nashik Div.	628.00	3438.57	5710.90	1061.67	10378.56	18857.91	1690.56	3018.28	3302.09
Ahmednagar	203.33	587.20	971.39	261.00	1447.07	2528.34	1283.63	2464.36	2602.81
Pune	154.67	264.60	507.52	231.33	760.91	1580.56	1495.64	2875.70	3114.28
Solapur	264.33	437.33	1042.00	337.33	871.67	2194.87	1276.17	1993.16	2106.40
Pune Div.	622.33	1289.13	2520.91	829.67	3079.65	6303.78	1333.17	2388.94	2500.60
Satara	125.67	207.06	410.30	214.00	388.24	1204.43	1702.87	1875.01	2935.49
Sangli	171.67	437.37	689.99	250.67	1022.67	1980.42	1460.19	2338.23	2870.22
Kolhapur	67.33	95.67	50.30	118.33	231.73	138.81	1757.46	2422.18	2759.64
Kolhapur Div.	364.67	740.10	1150.59	583.00	1642.64	3323.66	1598.71	2219.48	2888.66
Aurangabad	788.00	1470.81	1033.16	1442.33	4323.93	2550.01	1830.37	2939.83	2468.17
Jalna	482.00	631.33	674.11	763.33	1520.87	2470.27	1583.67	2408.99	3664.49
Beed	58.67	95.53	158.74	63.00	104.81	248.89	1073.80	1097.14	1567.91
Aurangabad Div.	1328.67	2197.67	1866.01	2268.67	5949.61	5269.17	1707.47	2707.24	2823.76
Latur	54.33	89.77	113.21	66.00	147.21	139.26	1214.80	1639.86	1230.10
Osmanabad	108.00	195.90	315.53	81.33	182.90	339.84	753.06	933.64	1077.04
Nanded	9.33	10.12	87.75	12.33	14.78	180.44	1321.54	1460.47	2056.30
Parbhani	21.67	33.00	37.01	26.67	39.34	49.59	1230.73	1192.12	1339.91
Hingoli	5.00	12.10	25.89	7.33	15.58	30.83	1466.00	1287.60	1190.81
Latur Div.	198.33	340.89	579.38	193.67	399.81	739.95	976.50	1172.84	1277.14
Buldhana	228.00	542.00	653.23	417.67	1339.14	1738.10	1831.89	2470.74	2660.78
Akola	3.67	11.67	11.19	7.33	27.91	21.87	1997.28	2391.60	1954.42
Washim	1.00	4.08	10.70	2.00	7.52	28.13	2000.00	1843.14	2628.97
Amravati	10.00	18.14	121.46	18.00	39.41	348.98	1800.00	2172.55	2873.21
Yavatmal	1.67	8.54	14.07	3.33	13.24	31.87	1994.01	1550.35	2265.10
Amravati Div.	244.33	584.43	810.65	448.33	1427.21	2168.95	1834.94	2442.05	2675.57
Wardha	0.67	0.33	2.18	1.00	0.23	3.88	1492.54	696.97	1779.82
Nagpur	4.33	3.33	7.00	7.67	5.09	16.79	1771.36	1528.53	2398.57
Bhandara	0.33	-	5.50	0.67	0.00	7.87	2030.30	-	1430.91
Gondia	1.67	1.84	15.36	3.00	2.71	24.92	1796.41	1472.83	1622.40
Chandrapur	0.67	0.33	6.97	0.67	0.33	13.85	1000.00	1000.00	1987.09
Gadchiroli	24.67	32.58	63.01	43.00	57.32	124.96	1743.01	1759.36	1983.18
Nagpur Div.	32.33	38.42	100.01	56.00	65.69	192.27	1732.14	1709.79	1922.51
Grand Total	3420.67	8632.26	12745.23	5443.67	22951.82	36870.49	1591.40	2658.84	2892.89

Note: TE 2002-03 = 2000-01 – 2002-03 (Avg.); TE 2012-13 = 2010-11 – 2012-13 (Avg.); TE 2022-23 = 2020-01 – 2022-23 (Avg.)

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'.

Table 3.3: Share of Districts in Total Area and Production of Maize Crop in Maharashtra: 2000-01 to 2022-23
(in per cent)

District/Division	Area			Production		
	TE 2002-03	TE 2012-13	TE 2022-23	TE 2002-03	TE 2012-13	TE 2022-23
Nashik	8.28	19.87	16.69	10.24	23.29	24.47
Dhule	1.91	6.61	5.43	1.90	6.84	4.37
Nandurbar	4.86	3.71	4.60	3.40	3.76	3.70
Jalgaon	3.30	9.65	18.08	3.96	11.32	18.60
Nashik Div.	18.36	39.83	44.81	19.50	45.22	51.15
Ahmednagar	5.94	6.80	7.62	4.79	6.30	6.86
Pune	4.52	3.07	3.98	4.25	3.32	4.29
Solapur	7.73	5.07	8.18	6.20	3.80	5.95
Pune Div.	18.19	14.93	19.78	15.24	13.42	17.10
Satara	3.67	2.40	3.22	3.93	1.69	3.27
Sangli	5.02	5.07	5.41	4.60	4.46	5.37
Kolhapur	1.97	1.11	0.39	2.17	1.01	0.38
Kolhapur Div.	10.66	8.57	9.03	10.71	7.16	9.01
Aurangabad	23.04	17.04	8.11	26.50	18.84	6.92
Jalna	14.09	7.31	5.29	14.02	6.63	6.70
Beed	1.72	1.11	1.25	1.16	0.46	0.68
Aurangabad Div.	38.84	25.46	14.64	41.68	25.92	14.29
Latur	1.59	1.04	0.89	1.21	0.64	0.38
Osmanabad	3.16	2.27	2.48	1.49	0.80	0.92
Nanded	0.27	0.12	0.69	0.23	0.06	0.49
Parbhani	0.63	0.38	0.29	0.49	0.17	0.13
Hingoli	0.15	0.14	0.20	0.13	0.07	0.08
Latur Div.	5.80	3.95	4.55	3.56	1.74	2.01
Buldhana	6.67	6.28	5.13	7.67	5.83	4.71
Akola	0.11	0.14	0.09	0.13	0.12	0.06
Washim	0.03	0.05	0.08	0.04	0.03	0.08
Amravati	0.29	0.21	0.95	0.33	0.17	0.95
Yavatmal	0.05	0.10	0.11	0.06	0.06	0.09
Amravati Div.	7.14	6.77	6.36	8.24	6.22	5.88
Wardha	0.02	0.00	0.02	0.02	0.00	0.01
Nagpur	0.13	0.04	0.05	0.14	0.02	0.05
Bhandara	0.01	0.00	0.04	0.01	0.00	0.02
Gondia	0.05	0.02	0.12	0.06	0.01	0.07
Chandrapur	0.02	0.00	0.05	0.01	0.00	0.04
Gadchiroli	0.72	0.38	0.49	0.79	0.25	0.34
Nagpur Div.	0.95	0.45	0.78	1.03	0.29	0.52
Grand Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'.

Note: TE 2002-03 = 2000-01 – 2002-03 (Avg.); TE 2012-13 = 2010-11 – 2012-13 (Avg.); TE 2022-23 = 2020-01 – 2022-23 (Avg.)

The estimates further show a rapid increase in maize production in Maharashtra, which increased from 5.44 lakh MT in TE 2002-03 to 22.95 lakh MT in TE 2012-13 and further to 36.87 lakh MT in TE 2022-23, showing more than six folds rise in the same during the last two decades (Table 3.2). It is to be noted that most of the maize production in Maharashtra comes from the districts belonging to Nashik, Pune, Aurangabad and Kolhapur divisions, which put together account for more than 90 per cent share in maize production of the state (Table 3.3). However, the period during the

last two decades also show a decline in share of Aurangabad division in maize production of Maharashtra in the face of rapid increase in this share for Nashik division. While the share of Aurangabad division in maize production of Maharashtra declined from 42 per cent in TE 2002-03 to 14 per cent in TE 2022-0-23, the Nashik division showed an increase in this share from 20 per cent to 51 per cent during the same period. The share of Pune division in maize production of Maharashtra hovered at around 15 per cent during the last two decades. Similarly, Kolhapur division showed about 10 per cent share in maize production of Maharashtra during the last two decades. The districts belonging to Amravati division showed about 6-8 per cent share and districts of Latur division showed 2-4 per cent share in maize production of Maharashtra during the last two decades.

The increase in maize production in Maharashtra over the last two decades is noticed not only due to area expansion but also significant rise in yield of maize in all the major maize growing districts. This is evident from the fact that during the period between TE 2002-03 and TE 2022-23, the yield of maize crop increased from 1691 kg/ha to 3302 kg/ha in Nashik division, 1333 kg/ha to 2501 kg/ha in Pune division, 1599 kg/ha to 2889 kg/ha in Kolhapur division, 1707 kg/ha to 2824 kg/ha in Aurangabad division, and 1835 kg/ha to 2676 kg/ha in Amravati division. In general, the state of Maharashtra showed an increase in yield of maize crop from 1591 kg/ha to 2893 kg/ha during the period between TE 2002-03 and TE 2022-23.

Thus, the estimates clearly showed a substantial increase in maize production in Maharashtra during the last two decades, which was not only contributed by sharp increase in area but also significant expansion in yield of maize in all the major maize growing districts of Maharashtra. The cumulative effect of nearly two folds rise in yield and more than three folds rise in area has resulted in more than six folds rise in production of maize crop during the last two decades.

3.4 Trend in Area, Production and Yield of Soybean Crop

Soybean (*Glycine max*), also called soja bean or soya bean, is leguminous crop belonging to pea family (Fabaceae). It is economically the most important bean in the world since it not only provides vegetable protein to millions of people but it also constitutes one of the major ingredients for hundreds of chemical products (Clemente and Cahoon, 2009). United States, Brazil, Argentina, China and India are the main producers of soybean in the world with their combined share of more than 90 per cent in global soybean production. However, the productivity of soybean in India is much lower among these countries. As against the world average productivity of soybean estimated at 2.73

metric tonnes, India has shown just 1.15 metric tonnes of productivity of soybean in 2022. India accounts for about 4 per cent of world soybean production. Since major soybean crop production in India comes from states of Madhya Pradesh and Maharashtra, the state of Maharashtra assumes considerable significance. Soybean is the major oilseed crop cultivated in the state of Maharashtra with area under the crop as proportion of GCA increasing dramatically over the last three decades. Although Madhya Pradesh is the leading producer of Soybean, Maharashtra has a substantial share in India's total soybean production. The area as well as production of soybean crop has rapidly grown in the State over time. At present, the state of Maharashtra accounts for about 45 per cent share in area and 42 per cent share in production of soybean in India (GOI, 2022).

The soybean crop is cultivated in all the districts of Maharashtra with the exception of Konkan region. The estimates relating to structural changes in area, production and yield of soybean crop cultivated across different districts of Maharashtra during the period between TE 2002-03 and TE 2022-23 are shown in Table 3.4.

There has been significant expansion in area under soybean crop in the state of Maharashtra during the last two decades. This is concomitant from the fact that the area under soybean crop in Maharashtra has increased from mere 11.67 lakh hectares in TE 2002-03 to 29.34 lakh hectares in TE 2012-13, and further to 45.93 lakh hectares in TE 2022-23, showing thereby nearly four folds rise in area under soybean crop in the State during the last two decades (Table 3.4).

The districts that account for substantial share in total soybean crop area of Maharashtra belong to the divisions of Amravati, Latur, Nagpur, and Aurangabad (Table 3.5). The division of Latur has not only shown significant and substantial increase in area under soybean crop in absolute terms but also in terms of its share in total soybean crop area of Maharashtra during the last two decades. The area under soybean crop in the division of Latur has increased from as low as 0.85 lakh hectares in TE 2002-03 to as much as 17.08 lakh hectares in TE 2022-23, showing thereby about 20 folds rise in area under soybean crop during the last two decades. The division of Latur accounted for 7 per cent share in total soybean crop area of Maharashtra in TE 2002-03, which increased to 27 per cent in TE 2012-13, and further to 37 per cent in TE 2022-23 (Table 3.5).

Incidentally, the increase in area under soybean in Latur division is noticed to be in the face of sharp decline in area under soybean crop in Nagpur division. The share of Nagpur division in soybean cropped area of Maharashtra declined sharply from 40.89 per cent in TE 2002-03 to 7.44 per cent in TE 2022-23. Similarly, the share of Kolhapur

division in soybean cropped area of Maharashtra declined sharply from 11.72 per cent in TE 2002-03 to 3.69 per cent in TE 2022-23. However, the share of Amravati division in soybean cropped area of Maharashtra increased from 32.77 per cent in TE 2002-03 to 38.02 per cent in TE 2012-13 with a decline in the same to 32.77 per cent in TE 2022-23. At present the divisions of Latur and Amravati put together account for about 70 per cent share in soybean cropped area of Maharashtra (Table 3.5).

Table 3.4: Structural Changes in Area, Production and Yield of Soybean Crop in Maharashtra: 2000-01 to 2022-23
(Area in '00' Hectares; Production in '00' Metric Tonnes; Yield in Kg/Ha)

District/Division	Area			Production			Yield		
	TE 2002-03	TE 2012-13	TE 2022-23	TE 2002-03	TE 2012-13	TE 2022-23	TE 2002-03	TE 2012-13	TE 2022-23
Nashik	68.33	571.67	899.48	89.00	832.33	1634.93	1302.50	1455.96	1817.64
Dhule	20.00	145.00	240.59	25.33	277.00	323.69	1266.50	1910.34	1345.40
Nandurbar	19.00	299.33	297.75	22.00	534.33	420.49	1157.89	1785.09	1412.23
Jalgaon	31.33	145.67	291.28	52.67	278.00	304.47	1681.14	1908.42	1045.28
Nashik Div.	138.67	1161.67	1729.10	189.00	1921.67	2683.58	1362.95	1654.23	1552.01
Ahmednagar	99.67	553.67	992.08	113.33	805.33	1663.48	1137.05	1454.53	1676.76
Pune	5.00	36.67	329.72	6.00	73.67	864.00	1200.00	2009.00	2620.41
Solapur	5.67	49.67	590.30	6.67	96.67	627.34	1176.37	1946.25	1062.75
Pune Div.	110.33	640.00	1912.09	126.00	975.67	3154.82	1142.03	1524.48	1649.93
Satara	144.00	416.67	788.57	303.67	699.00	1765.31	2108.82	1677.59	2238.62
Sangli	602.33	600.33	464.35	1170.33	1067.00	840.98	1943.00	1777.36	1811.09
Kolhapur	622.00	489.00	441.58	1166.67	1293.33	974.11	1875.68	2644.85	2205.96
Kolhapur Div.	1368.33	1506.00	1694.50	2640.67	3059.33	3580.39	1929.85	2031.43	2112.95
Aurangabad	29.67	77.67	222.72	31.00	111.00	191.31	1044.83	1429.12	858.97
Jalna	53.33	573.33	1834.05	54.67	712.00	3047.42	1025.13	1241.87	1661.58
Beed	89.00	744.00	2988.07	114.33	1139.00	4299.78	1284.61	1530.91	1438.98
Aurangabad Div.	172.00	1395.00	5044.84	200.00	1962.00	7538.51	1162.79	1406.45	1494.30
Latur	142.33	2417.67	4689.44	145.33	4981.33	6307.84	1021.08	2060.38	1345.12
Osmanabad	34.67	892.33	3174.13	25.33	1167.00	3991.40	730.60	1307.81	1257.48
Nanded	237.00	1830.67	4117.53	327.00	2618.67	4646.34	1379.75	1430.44	1128.43
Parbhani	181.33	1243.33	2626.02	262.67	1688.67	2907.62	1448.57	1358.18	1107.23
Hingoli	258.67	1485.00	2471.72	360.67	2427.67	2946.40	1394.32	1634.79	1192.04
Latur Div.	854.00	7869.00	17078.85	1121.00	12883.33	20799.59	1312.65	1637.23	1217.86
Buldhana	724.00	2546.00	4347.32	839.33	4068.67	7448.48	1159.30	1598.06	1713.35
Akola	291.33	1394.00	2317.90	342.33	2321.67	3033.11	1175.06	1665.47	1308.56
Washim	854.33	2095.33	3053.78	1096.00	3091.67	4835.92	1282.88	1475.51	1583.58
Amravati	1633.33	2931.67	2481.46	1395.67	4298.00	2204.94	854.49	1466.06	888.57
Yavatmal	754.00	2189.00	2848.13	967.33	3201.00	2672.87	1282.93	1462.31	938.46
Amravati Div.	4257.00	11156.00	15048.60	4640.67	16981.00	20195.32	1090.13	1522.14	1342.01
Wardha	1412.67	1625.00	1290.87	1653.33	1636.33	1436.42	1170.36	1006.97	1112.75
Nagpur	2073.33	2402.33	1282.81	1967.00	2276.67	911.75	948.72	947.69	710.74
Bhandara	87.33	70.00	3.05	85.33	75.00	2.51	977.10	1071.43	822.95
Gondia	0.33	0.00	0.00	0.33	0.00	0.00	1000.00	#DIV/0!	#DIV/0!
Chandrapur	1176.33	1457.33	840.31	1446.00	1411.33	999.59	1229.25	968.44	1189.55
Gadchiroli	22.67	62.00	0.41	23.00	68.00	0.27	1014.56	1096.77	658.54
Nagpur Div.	4772.67	5616.67	3417.45	5175.00	5467.33	3350.55	1084.30	973.41	980.42
Grand Total	11673.00	29344.33	45925.42	14092.33	43250.33	61302.77	1207.26	1473.89	1334.83

Note: TE 2002-03 = 2000-01 – 2002-03 (Avg.); TE 2012-13 = 2010-11 – 2011-12 (Avg.); TE 2022-23 = 2020-01 – 2022-23 (Avg.)

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'.

The production of soybean crop in Maharashtra has also grown substantially during the last two decades. The production of soybean crop in Maharashtra increased from 14.09 lakh MT in TE 2002-03 to 43.25 lakh MT in TE 2012-13, and further to

61.30 lakh MT in TE 2022-23. The divisions of Latur, Amravati, and Aurangabad are noticed to account for about 80 per cent share in total soybean crop production of Maharashtra. The share of Latur division in total soybean crop production of Maharashtra has increased substantially from 8 per cent in TE 2002-03 to 34 per cent in 2022-23.

Table 3.5: Share of Districts in Total Area and Production of Soybean Crop in Maharashtra: 2000-01 to 2022-23
(in per cent)

District/Division	Area			Production		
	TE 2002-03	TE 2012-13	TE 2022-23	TE 2002-03	TE 2012-13	TE 2022-23
Nashik	0.59	1.95	1.96	0.63	1.92	2.67
Dhule	0.17	0.49	0.52	0.18	0.64	0.53
Nandurbar	0.16	1.02	0.65	0.16	1.24	0.69
Jalgaon	0.27	0.50	0.63	0.37	0.64	0.50
Nashik Div.	1.19	3.96	3.77	1.34	4.44	4.38
Ahmednagar	0.85	1.89	2.16	0.80	1.86	2.71
Pune	0.04	0.12	0.72	0.04	0.17	1.41
Solapur	0.05	0.17	1.29	0.05	0.22	1.02
Pune Div.	0.95	2.18	4.16	0.89	2.26	5.15
Satara	1.23	1.42	1.72	2.15	1.62	2.88
Sangli	5.16	2.05	1.01	8.30	2.47	1.37
Kolhapur	5.33	1.67	0.96	8.28	2.99	1.59
Kolhapur Div.	11.72	5.13	3.69	18.74	7.07	5.84
Aurangabad	0.25	0.26	0.48	0.22	0.26	0.31
Jalna	0.46	1.95	3.99	0.39	1.65	4.97
Beed	0.76	2.54	6.51	0.81	2.63	7.01
Aurangabad Div.	1.47	4.75	10.98	1.42	4.54	12.30
Latur	1.22	8.24	10.21	1.03	11.52	10.29
Osmanabad	0.30	3.04	6.91	0.18	2.70	6.51
Nanded	2.03	6.24	8.97	2.32	6.05	7.58
Parbhani	1.55	4.24	5.72	1.86	3.90	4.74
Hingoli	2.22	5.06	5.38	2.56	5.61	4.81
Latur Div.	7.32	26.82	37.19	7.95	29.79	33.93
Buldhana	6.20	8.68	9.47	5.96	9.41	12.15
Akola	2.50	4.75	5.05	2.43	5.37	4.95
Washim	7.32	7.14	6.65	7.78	7.15	7.89
Amravati	13.99	9.99	5.40	9.90	9.94	3.60
Yavatmal	6.46	7.46	6.20	6.86	7.40	4.36
Amravati Div.	36.47	38.02	32.77	32.93	39.26	32.94
Wardha	12.10	5.54	2.81	11.73	3.78	2.34
Nagpur	17.76	8.19	2.79	13.96	5.26	1.49
Bhandara	0.75	0.24	0.01	0.61	0.17	0.00
Gondia	0.00	0.00	0.00	0.00	0.00	0.00
Chandrapur	10.08	4.97	1.83	10.26	3.26	1.63
Gadchiroli	0.19	0.21	0.00	0.16	0.16	0.00
Nagpur Div.	40.89	19.14	7.44	36.72	12.64	5.47
Grand Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'.

Note: TE 2002-03 = 2000-01 – 2002-03 (Avg.); TE 2012-13 = 2010-11 – 2011-12 (Avg.); TE 2022-23 = 2020-01 – 2022-23 (Avg.)

Although the division of Amravati also showed substantial share in soybean crop production of Maharashtra, it remained in the range of 33 to 39 per cent during the last two decades. Contrary to this, the share of Nagpur division in soybean crop production

of Maharashtra has declined sharply and steadily from 37 per cent in TE 2002-03 to 13 per cent in TE 2012-13, and further to 5 per cent in TE 2022-23. The division of Kolhapur also showed a sharp decline in its share in soybean crop production of Maharashtra, which declined from 19 per cent in TE 2002-03 to 6 per cent in TE 2022-23.

It is to be noted that though soybean crop is produced across 29 districts of Maharashtra, the districts of Latur, Nanded, Buldana, Washim, Yavatmal, Osmanabad, Parbhani and Hingoli alone account for about 60 per cent share in total soybean production of Maharashtra. These districts have shown phenomenal rise in soybean crop production during the last two decades.

The increase in soybean crop production in Maharashtra over the last two decades is noticed due to area expansion under this crop since the yield level of soybean crop has not grown much, and rather stagnated during this period. In fact, the yield level of soybean in Maharashtra increased from 1207 kg/ha in TE 2002-03 to 1474 kg/ha in TE 2012-13 with a decline in the same to 1335 kg/ha in TE 2022-23, showing hardly any expansion in the same during the last two decades. The districts belonging to Nagpur, Amravati, and Latur divisions have shown a similar trend in yield level of soybean crop from TE 2002-03 to TE 2022-23. The districts belonging to Kolhapur division invariable showed very high level of yield of soybean crop during the entire period between 2000-01 and 2022-23. The yield level of soybean crop in Kolhapur division was estimated at 1930 kg/ha in TE 2002-03, which increased to 2113 kg/ha in TE 2022-23. Even districts of Nashik and Pune divisions showed higher yield level of soybean than the State average during both TE 2012-13 and TE 2022-23. However, the districts belonging to Nashik and Pune divisions do not account for significant share in total soybean production of Maharashtra. Further, the districts of Latur and Buldana have shown higher yield of soybean than the state average, especially during the last one decade. These two districts also account for about 20 per cent share in area as well as production of soybean in Maharashtra of late.

Thus, the estimates showed about four folds rise in soybean crop production in Maharashtra during the last two decades. The sharp increase in soybean production is achieved by significant expansion in area allocation under the crop, which also increased by four folds during the same period. The increase in soybean production is mainly achieved due to area expansion as there is hardly any discernible improvement in yield of soybean during the last two decades. The districts belonging to Latur and Amravati divisions of the state have mainly accounted for the major increase in area as well as

production of soybean in Maharashtra. Although the estimates also show a sharp decline in share of Nagpur division in area as well as production of soybean in Maharashtra during last two decades, the increase in share shown by Latur division has offset the declining trend in this respect shown by Nagpur division. In general, the state of Maharashtra has done remarkably well in the production of this important oilseed crop cultivated in India.

3.5 Trend in Area, Production and Yield of Onion Crop

The diverse agro-climatic conditions enable India to produce onion in one or the other part round the year. At present, India stands as the largest producer of onion in the world with the production of 26.64 million tonnes estimated in 2022. China is the second largest producer of onion in the world. Apart from India and China, the other major producers of onion in the world are Egypt, USA, Bangladesh, Turkey, Pakistan, Indonesia, Iran and Algeria. For India, onion is a consistent earner of foreign exchange and the exports of onion and onion products reach several destinations (Kulkarni and Basargekar, 1997). One of the earlier studies found Indian onion to be highly competitive in the world markets (Gulati et.al., 1994).

Although onion is grown in several states like Orissa, Karnataka, Tamil Nadu, Madhya Pradesh, Andhra Pradesh and Bihar, most of the onion produced in India comes from Maharashtra, Karnataka and Madhya Pradesh (Shah, 2020). Maharashtra is reckoned as the leading onion producing state in the country. During 2020-21, this state accounted for 43 per cent area and 39 per cent total output of onion in the country (GOI, 2022). The state of Maharashtra is, therefore, called onion basket of India. In the state of Maharashtra, Nashik accounts for the bulk of the total onion production.

Maharashtra has been consistently accounting for the major share in onion production of India. However, the last two decades show perceptible structural changes in production as well as acreage under onion crop across various districts of Maharashtra. The estimates relating to area, production and yield of onion crop cultivated across different districts of Maharashtra during the period between TE 2003-04 and TE 2022-23 are shown in Table 3.6.

The area allocation under onion crop in Maharashtra has sharply increased from 1.34 lakh hectares to 8.20 lakh hectares during the period between TE 2003-04 and TE 2022-23, showing more than six folds rise in the same during the last two decades. Further, the estimates also show that there are only few districts in Maharashtra which account for significantly high area allocation under onion crop. These districts are Nashik,

Ahmednagar, Pune and Solapur, which together have been consistently showing more than 80 per cent share in area allocation under onion crop of the state for the last two decades. Among these districts, though Nashik shows nearly five folds rise in onion cropped area during the last two decades, it has also been showing declining share in onion cropped area of the state, which declined from 45 per cent to 36 per cent during the last two decades (Table 3.7). The district of Pune has also shown a declining share in onion cropped area of Maharashtra from 17 per cent to 10 per cent during the same period. Incidentally, the district of Ahmednagar has shown a decline in share in onion cropped area of the state from 22 per cent in TE 2003-04 to 14 per cent in TE 2013-14 with an increase in the same to 24 per cent in TE 2022-23. The estimates further showed that the district of Solapur had only 1 per cent share in onion cropped area of Maharashtra in TE 2003-04, which sharply increased to 9 per cent during the last one decade.

It deserves mention that while the districts belonging to Nashik and Pune divisions put together accounted for as much as 94 per cent share in onion cropped area of Maharashtra in TE 2003-04, their combined share in the same declined to 84 per cent in TE 2022-23. These estimates clearly showed that there were some other districts gaining ground in terms of area allocation under onion crop over time. The other districts like Osmanabad, Aurangabad and Satara have shown perceptible rise in area allocation under onion crop during the last two decades. At present, these three districts put together have been accounting for almost 8-10 per cent share in onion cropped area of the state. The remaining districts of Maharashtra have shown marginal presence in onion cropped area of Maharashtra during the last two decades.

The production of onion crop in Maharashtra has also increased significantly from 16.63 lakh tonnes in TE 2003-04 to 128.13 lakh tonnes in TE 2022-23, showing nearly eight folds rise in the same during the last two decades. All the major onion producing districts of Maharashtra have shown significant production expansion of onion during the last two decades. However, it is to be noted that though the bulk onion produced in Maharashtra still comes from the district of Nashik, the estimates also show a steady decline in its share in onion production of the state, which has come down from 48 per cent to 36 per cent during the last two decades (Table 3.7). Similarly, the district of Pune has shown a significant falling share in onion production of Maharashtra from 20 per cent to 10 per cent during the same time. On the other hand, the share of Ahmednagar district in onion production of the state has increased from 18 per cent to 27 per cent during the period between TE 2003-04 and TE 2022-23. These mixed trends in terms of share of

Nashik, Pune and Ahmednagar district in onion production of Maharashtra during the last two decades have ultimately resulted in a declining share of Nashik division and an increasing share of Pune division in onion production of Maharashtra over time. In fact, the combined share of Nashik and Pune divisions in onion production of Maharashtra has come down from 94 per cent to 85 per cent during the last two decades. It deserves mention that since area allocation under onion crop in the districts of Osmanabad, Aurangabad, Beed, and Satara has grown perceptibly, these districts are seen to show reasonable share in onion production of Maharashtra in more recent times. The other districts do not show any significant share in onion production of Maharashtra, though onion is produced in large number of districts of the state.

Table 3.6 Structural Changes in Area, Production and Yield of Onion Crop in Maharashtra: 2001-02 to 2022-23
(Area in '00' Hectares; Production in '00' Metric Tonnes; Yield in Kg/Ha)

District/Division	Area			Production			Yield		
	TE 2003-04	TE 2013-14	TE 2022-23	TE 2003-04	TE 2013-14	TE 2022-23	TE 2003-04	TE 2013-14	TE 2022-23
Nasik	606.11	1279.05	2912.77	7937.41	22843.06	45690.12	13095.66	17859.39	15686.16
Dhule	42.01	248.37	291.80	597.47	4270.46	3315.07	14222.09	17194.27	11360.62
Nandurbar	15.70	25.75	37.58	210.23	361.91	419.77	13390.45	14054.76	11170.94
Jalgaon	53.07	89.77	183.44	623.23	1319.92	3328.36	11743.55	14703.30	18144.45
Nasik Dn.	716.89	1642.94	3425.58	9368.34	28795.34	52753.31	13068.03	17526.76	15399.80
Ahmednagar	300.03	460.00	1951.79	2966.94	5975.00	34261.57	9888.81	12989.13	17553.92
Pune	225.46	406.84	802.43	3252.10	7782.35	12920.48	14424.29	19128.76	16101.63
Solapur	12.00	298.87	694.25	64.41	3899.81	9054.50	5367.50	13048.52	13042.07
Pune Dn.	537.49	1165.71	3448.48	6283.45	17657.16	56236.55	11690.36	15147.12	16307.65
Satara	23.50	72.91	188.24	214.53	1434.88	2985.69	9128.94	19680.09	15861.32
Sangli	1.70	5.73	12.35	16.87	107.25	160.37	9923.53	18733.62	12988.93
Kolhapur	1.30	1.39	1.30	12.90	16.95	18.22	9923.08	12190.65	14015.38
Kolhapur Dn.	26.50	80.03	201.88	244.30	1559.07	3164.28	9218.87	19482.29	15673.76
Aurangabad	1.60	79.56	191.25	9.57	3006.19	2825.66	5981.25	37785.19	14774.44
Jalna	2.00	4.70	62.40	11.04	24.82	965.08	5520.00	5279.79	15464.77
Beed	6.75	31.92	314.60	32.13	408.49	4600.32	4760.00	12797.15	14622.58
Aurangabad Dn.	10.35	116.18	568.26	52.74	3439.49	8391.05	5095.65	29604.84	14766.17
Latur	0.00	18.44	20.62	0.00	395.08	233.66	#DIV/0!	21426.91	11333.55
Osmanabad	5.50	82.25	339.77	29.67	702.41	4531.65	5394.55	8540.40	13337.28
Nanded	0.00	3.64	6.29	0.00	70.25	93.69	#DIV/0!	19326.00	14902.44
Parbhani	5.21	2.87	6.89	47.78	35.62	81.57	9170.83	12432.81	11842.82
Hingoli	0.00	5.14	0.76	0.00	7.79	7.86	#DIV/0!	1514.89	10406.18
Latur Dn.	10.71	112.32	374.32	77.45	1211.14	4948.43	7231.56	10782.70	13219.80
Buldhana	8.22	72.29	67.22	177.61	1249.19	927.90	21607.06	17280.26	13804.19
Akola	3.85	19.98	47.70	91.80	483.77	713.33	23844.16	24218.52	14953.53
Washim	2.47	1.25	18.55	53.37	31.25	261.70	21607.29	25000.00	14110.35
Amravati	2.56	1.79	33.67	46.70	37.12	545.55	18242.19	20793.28	16202.95
Yavatmal	2.45	5.24	3.37	52.94	95.35	48.97	21608.16	18213.94	14544.55
Amravati Dn.	19.55	100.54	170.51	422.42	1896.67	2497.46	21607.16	18865.78	14647.36
Wardha	2.93	3.13	2.12	36.54	51.38	33.97	12470.99	16440.00	16047.24
Nagpur	8.00	1.53	0.83	99.77	19.61	8.75	12471.25	12860.00	10584.68
Bhandara	2.02	1.80	0.75	25.19	22.67	2.72	12470.30	12594.44	3617.36
Gondia	0.50	0.07	0.20	6.24	0.56	2.10	12480.00	8615.38	10677.97
Chandrapur	0.53	2.64	2.21	6.61	33.88	34.51	12471.70	12845.50	15610.45
Gadchiroli	0.75	0.60	0.43	9.35	9.00	3.48	12466.67	15000.00	8100.78
Nagpur Dn.	14.73	9.75	6.53	183.70	137.10	85.53	12471.15	14057.57	13091.70
Maharashtra State	1336.22	3229.72	8200.26	16632.40	54715.12	128133.64	12447.35	16941.14	15625.56

Note: TE 2003-04 = 2001-02 – 2003-04 (Avg.); TE 2013-14 = 2011-12 – 2013-14 (Avg.); TE 2022-23 = 2020-01 – 2022-23 (Avg.)

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'.

Table 3.7: Share of Districts in Total Area and Production of Onion Crop in Maharashtra: 2001-02 to 2022-23
(in per cent)

District/Division	Area			Production		
	TE 2003-04	TE 2013-14	TE 2022-23	TE 2003-04	TE 2013-14	TE 2022-23
Nasik	45.36	39.60	35.52	47.72	41.75	35.66
Dhule	3.14	7.69	3.56	3.59	7.80	2.59
Nandurbar	1.17	0.80	0.46	1.26	0.66	0.33
Jalgaon	3.97	2.78	2.24	3.75	2.41	2.60
Nasik Dn.	53.65	50.87	41.77	56.33	52.63	41.17
Ahmednagar	22.45	14.24	23.80	17.84	10.92	26.74
Pune	16.87	12.60	9.79	19.55	14.22	10.08
Solapur	0.90	9.25	8.47	0.39	7.13	7.07
Pune Dn.	40.22	36.09	42.05	37.78	32.27	43.89
Satara	1.76	2.26	2.30	1.29	2.62	2.33
Sangli	0.13	0.18	0.15	0.10	0.20	0.13
Kolhapur	0.10	0.04	0.02	0.08	0.03	0.01
Kolhapur Dn.	1.98	2.48	2.46	1.47	2.85	2.47
Aurangabad	0.12	2.46	2.33	0.06	5.49	2.21
Jalna	0.15	0.15	0.76	0.07	0.05	0.75
Beed	0.51	0.99	3.84	0.19	0.75	3.59
Aurangabad Dn.	0.77	3.60	6.93	0.32	6.29	6.55
Latur	0.00	0.57	0.25	0.00	0.72	0.18
Osmanabad	0.41	2.55	4.14	0.18	1.28	3.54
Nanded	0.00	0.11	0.08	0.00	0.13	0.07
Parbhani	0.39	0.09	0.08	0.29	0.07	0.06
Hingoli	0.00	0.16	0.01	0.00	0.01	0.01
Latur Dn.	0.80	3.48	4.56	0.47	2.21	3.86
Buldhana	0.62	2.24	0.82	1.07	2.28	0.72
Akola	0.29	0.62	0.58	0.55	0.88	0.56
Washim	0.18	0.04	0.23	0.32	0.06	0.20
Amravati	0.19	0.06	0.41	0.28	0.07	0.43
Yavatmal	0.18	0.16	0.04	0.32	0.17	0.04
Amravati Dn.	1.46	3.11	2.08	2.54	3.47	1.95
Wardha	0.22	0.10	0.03	0.22	0.09	0.03
Nagpur	0.60	0.05	0.01	0.60	0.04	0.01
Bhandara	0.15	0.06	0.01	0.15	0.04	0.00
Gondia	0.04	0.00	0.00	0.04	0.00	0.00
Chandrapur	0.04	0.08	0.03	0.04	0.06	0.03
Gadchiroli	0.06	0.02	0.01	0.06	0.02	0.00
Nagpur Dn.	1.10	0.30	0.08	1.10	0.25	0.07
Maharashtra State	100.00	100.00	100.00	100.00	100.00	100.00

Note: TE 2003-04 = 2001-02 – 2003-04 (Avg.); TE 2013-14 = 2011-12 – 2011-13 (Avg.); TE 2022-23 = 2020-01 – 2022-23 (Avg.)

Source: Computations are based on figures obtained from the 'Statistical Division, Commissionerate of Agriculture, Government of Maharashtra, Central Building, Pune'.

Although the state of Maharashtra shows more than six folds increase in area and nearly eight folds rise in production of onion over the last two decades, there has not been much improvement in yield of onion during this period. The average yield of onion in Maharashtra was estimated at 12,447 kg/ha in TE 2003-04, which increased to 16,941 kg/ha in TE 2013-14 with a decline in the same to 15,626 kg/ha in TE 2022-23. Thus, the estimates show that the average onion yield in Maharashtra increased by 36 per cent during the period between TE 2003-04 and TE 2013-14 with a decline in the same by 8 per cent in TE 2022-23. In general, the major onion growing districts of Maharashtra showed an increase in onion yield during the period between TE 2003-04 and TE 2013-

14, and a decline in the same thereafter, which consequently led to decline in average yield of onion in Maharashtra in more recent times.

Despite the fact that the state of Maharashtra has been consistently accounting for bulk of India's total output of onion for the past several decades, the state lags far behind many states in terms of yield of onion. The onion yield in Maharashtra is estimated to be even lower than the national average (GOI, 2022). The states like Madhya Pradesh, Gujarat, Bihar, Haryana, Rajasthan and Uttar Pradesh have shown higher yield of onion as against Maharashtra. The state of Maharashtra has to do a lot of catching up to increase onion yield in the near future. An increase in yield of onion coupled with rise in area allocation under the crop will surely further improve the position of Maharashtra in onion production of India.

3.6 Summary

The farmers in Maharashtra over time have become increasingly price conscious and commercial oriented. There are also other factors like rise in human population, growing urbanization, rise in income levels, changes in consumption pattern, growing demand for specific food and non-food crops, etc. which have led to significant changes in cropping pattern of Maharashtra in favour of those crops which have high consumer demand such as oilseeds and horticultural crops. Although the estimates in general show a steady decline in area under cereals as proportion to GCA over the last four decades, the period gone by is also marked with sharp increase in area under maize within cereals. The pulses have shown an increase in their area as proportion of GCA mainly due to significant increase in area under gram (Bengal gram) and tur (red gram) crops over time. The estimates show that there has been about two folds rise in share of oilseeds in GCA of Maharashtra during the last four decades, which has been mainly accounted for by substantial increase in area under soybean. However, among various vegetable crops, the area under onion as proportion of GCA increased significantly only during the last one decade or so. This is despite the fact that bulk of the onion produced in India comes from Maharashtra and the state is considered as the onion basket of the country.

The estimates showed a substantial increase in maize production in Maharashtra during the last two decades, which was not only contributed by sharp increase in area but also significant expansion in yield of maize in all the major maize growing districts of Maharashtra. The cumulative effect of nearly two folds rise in yield and more than three folds rise in area has resulted in more than six folds rise in production of maize crop in Maharashtra during the last two decades.

The production of soybean crop in Maharashtra has grown by about four folds during the last two decades. The increase in soybean production is mainly achieved due to area expansion as there is hardly any discernible improvement in yield of soybean during the last two decades. The districts belonging to Latur and Amravati divisions of the state have mainly accounted for the major increase in area as well as production of soybean in Maharashtra. In general, the state of Maharashtra has done remarkably well in the production of this important oilseed crop cultivated in India.

The state of Maharashtra has also shown more than six folds rise in area and about eight folds rise in production of onion over the last two decades. The increase in production of onion is mainly contributed by area expansion since there has not been much improvement in yield of onion, which though increased by 36 per cent between TE 2003-04 and TE 2013-14 but declined by 8 per cent in TE 2022-23. Despite the fact that the state of Maharashtra has been consistently accounting for bulk of India's total output of onion for the past several decades, the state lags far behind many states in terms of yield of onion. The states like Madhya Pradesh, Gujarat, Bihar, Haryana, Rajasthan and Uttar Pradesh have shown higher yield of onion as against Maharashtra. This makes it necessary to enhance onion yield in Maharashtra, especially due to the fact that much of consumer demand of onion in India is met by the state.

The estimates clearly reveal that the state of Maharashtra assumes considerable importance in the cultivation of maize, onion and soybean. While the last two decades show rapid increase in area and production of maize crop in Maharashtra, there has also been substantial increase in area and production of onion in the state over time. The area under soybean has also grown sharply over time in the state. There is, therefore, a need to further understand not only the production but also the marketing pattern of these valued crops cultivated in the state.

CHAPTER – IV

CHARACTERISTICS OF SELECTED FARMERS

4.1 Introduction

This chapter mainly deals with the socio-economic profile of the selected beneficiary farmers of PML, DML, and APMC for the reference crops maize, onion and soybean drawn from the districts of Ahmednagar, Nashik and Yavatmal since the socio-economic characteristics of farmers have a profound influence on the decision making process in the marketing of produce and profitability of crop enterprise. The resource endowments have been compared for the farmers who were marketing of their maize, onion and soybean crop produce through innovative and traditional marketing channels. The information relating to sample size of farmers for the innovative marketing channels such as PML and DML and traditional marketing channel like APMC for each of the selected crops, their age, gender, education status, social group/ caste composition, occupational status, land use pattern, irrigated area, sources of irrigation, cropping pattern, etc. has been analysed and discussed for various beneficiary farmers who were marketing their selected crop produce through innovative and traditional marketing channels. The knowledge of the background of the sampled farmers is essential since the viability of any enterprise and marketing of produce heavily depend on the favorable attitudinal changes towards adoption of superior technical inputs, which in turn, depends on technical skills and resource position of the farmers (Shah, 2021). In general, this chapter focuses on demographic profile of selected farmers, characteristics of their operational holdings, structure of tenancy, sources of irrigation, cropping pattern, etc.

4.2 Sample Size of Farmers for the Selected Crops

In order to assess comparative advantage of marketing of produce through innovative and traditional marketing channels, it was decided to select three reference crops from three sampled districts. The selected crops were identified as maize, onion and soybean, which were selected from the districts of Ahmednagar, Nashik and Yavatmal, respectively. Further, from each of the selected sampled districts, a sample of 80 beneficiary farmers was selected, which encompassed 40 beneficiary farmers of DML, 10 beneficiaries of PML and 30 beneficiary farmers of APMC. In all, the study covered 240 sampled farmers with the selection of 80 farmers from each of the three districts of Ahmednagar, Nashik and Yavatmal. The distribution of sampled beneficiary farmers of

innovative and traditional marketing channels for the three reference crops selected from three sampled districts is presented in Table 4.1.

Table 4.1: Distribution of Sampled Beneficiary Farmers of Innovative and Traditional Marketing Channels in Maharashtra

District	Selected Crops	No of Sample Farmers using Innovative Channels		No of Sample Farmers using the Traditional Channel of APMC	Total Sample Farmers
		DML	PML		
Ahmednagar	Maize	40	10	30	80
Nasik	Onion	40	10	30	80
Yavatmal	Soybean	40	10	30	80
Total		120	30	90	240

In this study, the sampled farmers diverting their produce through direct marketing license holders (DML) and private market license holders (PML) were treated as beneficiaries of innovative marketing channels, whereas sampled farmers diverting their produce through Agriculture Produce Market Committee (APMC) were considered as beneficiaries of traditional marketing channel.

4.3 Socio-economic Characteristics of the Selected Farmers

The socio-economic characteristics of sampled beneficiaries of innovative and traditional marketing channels have been assessed for each of the selected crops with specific focus on their gender, proportion of respondents belonging to various age groups, education status of households, their caste status, occupational status, membership of various organization, etc. The age profile of sampled respondents for each of the selected crops drawn from the selected districts is presented in Table 4.2.

Table 4.2: Age Profile of Sampled Respondents of Innovative and Traditional Marketing Channels

Name of Districts/ Crops	Age (Years)	Marketing Channels			Overall
		PML	DML	APMC	
Sample Size		30	120	90	240
Ahmednagar (Maize)	18-35	7 (70.00)	8 (20.00)	7 (23.33)	22 (27.50)
	36-59	3 (30.00)	24 (60.00)	22 (73.33)	49 (61.25)
	Over 60	-	8 (20)	1 (3.33)	9 (11.25)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Nashik (Onion)	18-35	4 (40.00)	13 (32.50)	5 (16.67)	22 (27.50)
	36-59	4 (40.00)	21 (52.50)	15 (50.00)	40 (50.00)
	Over 60	2 (20.00)	6 (15.00)	10 (33.33)	18 (22.50)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Yavatmal (Soybean)	18-35	1 (10.00)	7 (17.50)	5 (16.67)	13 (16.25)
	36-59	7 (70.00)	28 (70.00)	17 (56.67)	52 (65.00)
	Over 60	2 (20.00)	5 (12.50)	8 (26.67)	15 (18.75)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Total	18-35	12 (40.00)	28 (23.33)	17 (18.89)	57 (23.75)
	36-59	14 (46.67)	73 (60.83)	54 (60.00)	141 (58.75)
	Over 60	4 (13.33)	19 (15.83)	19 (21.11)	42 (17.50)
	Total	30 (100)	120 (100)	90 (100)	240 (100)

Note: Figures in parenthesis are percentages to the total

Source: Field Survey

The distribution of various sampled respondents across various age groups with all the farmers put together revealed that 59 per cent of them belonged to 36-59 years of age group, 24 per cent to 18-35 years of age group and the remaining 18 per cent to above 60 years of age group. Further, the age profile of farmers using PML marketing channel revealed that 47 per cent of them belonged to 36-59 years of age group, 40 per cent to 18-35 years of age group, and the remaining 13 per cent above 60 years of age group. Similarly, in case of sampled farmers using DML marketing channel, about 61 per cent of them were in the age group of 36-59 years, 24 per cent of them belonged to 18-35 years of age group, and the remaining 16 per cent to above 60 years of age group. The farmers using traditional marketing channel of APMC also showed very high proportion of them belonging to 36-59 years of age group. Thus, majority of sampled farmers using innovative and traditional marketing channels belonged to 36-59 years of age group, and the lowest proportion of them belonged to over 60 years of age category. In general, more than 80 per cent of sample farmers using innovative as well as traditional marketing channels to market their maize, onion and soybean crop were less than 60 years of age with majority of them falling in the 36-59 years of age category.

The estimates further showed that the gender profile of respondents was in favour of male since 97 per cent of these respondents using innovative and traditional marketing channels in the marketing of their maize, onion and soybean crop produce belonged to male and only 3 per cent belonged to female category (Table 4.3).

Table 4.3: Gender Profile of Respondents of Innovative and Traditional Marketing Channels

Name of Districts/ Crops	Gender	Marketing Channels			Overall
		PML	DML	APMC	
Sample Size		30	120	90	240
Ahmednagar (Maize)	Male	10 (100)	36 (90.00)	30 (100)	76 (95.00)
	Female	-	4 (10.00)	-	4 (5.00)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Nashik (Onion)	Male	10 (100)	39 (97.50)	28 (93.33)	77 (96.25)
	Female	-	1 (2.50)	2 (6.67)	3 (3.75)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Yavatmal (Soybean)	Male	10 (100)	40 (100)	30 (100)	80 (100)
	Female	-	-	-	-
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Total	Male	30 (100)	115 (95.83)	88 (97.78)	233 (97.08)
	Female	-	5 (4.17)	2 (2.22)	7 (2.92)
	Total	30 (100)	120 (100)	90 (100)	240 (100)

Note: Figures in parenthesis are percentages to the total

In case of soybean crop, the gender profile of respondents was cent per cent in favour of male, and it was only in case of maize and onion crops that a few respondents

belonging to female category used DML and APMC marketing channels in the marketing of their produce.

The sampled respondents using innovative and traditional marketing channels in the marketing of their maize, onion and soybean crops were found to be relatively well educated. The education status of sampled respondents drawn from the districts of Ahmednagar, Nashik and Pune for maize, onion and soybean crops is shown in Table 4.4.

Table 4.4: Education Status of Respondents of Innovative and Traditional Marketing Channels

Name of Districts/ Crops	Education of the Head of Household	Marketing Channels			Overall
		PML	DML	APMC	
Sample Size		30	120	90	240
Ahmednagar (Maize)	Illiterate	-	2 (5.00)	1 (3.33)	3 (3.75)
	Primary	-	6 (15.00)	3 (10.00)	9 (11.25)
	Secondary	1 (10.00)	11 (27.50)	9 (30.00)	21 (26.25)
	Higher Secondary	2 (20.00)	13 (32.50)	7 (23.33)	22 (27.50)
	Graduate and above	7 (70.00)	8 (20)	10 (33.34)	25 (31.25)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Nashik (Onion)	Illiterate	-	2 (5.00)	3 (10.00)	5 (6.25)
	Primary	-	3 (7.50)	4 (13.33)	7 (8.75)
	Secondary	2 (20.00)	16 (40.00)	5 (16.67)	23 (28.75)
	Higher Secondary	5 (50.00)	11 (27.50)	10 (33.33)	26 (32.50)
	Graduate and above	3 (30.00)	8 (20.00)	8 (26.67)	19 (23.75)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Yavatmal (Soybean)	Illiterate	-	1 (2.50)	1 (3.33)	2 (2.50)
	Primary	-	2 (5.00)	4 (13.33)	6 (7.50)
	Secondary	5 (50.00)	8 (20.00)	7 (23.33)	20 (25.00)
	Higher Secondary	3 (30.00)	14 (35.00)	7 (23.34)	24 (30.00)
	Graduate and above	2 (20.00)	15 (37.50)	11 (36.67)	28 (35.00)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Total	Illiterate	-	5 (4.17)	5 (5.56)	10 (4.17)
	Primary	-	11 (9.17)	11 (12.22)	22 (9.17)
	Secondary	8 (26.67)	35 (29.17)	21 (23.33)	64 (26.67)
	Higher Secondary	10 (33.33)	38 (31.67)	24 (26.67)	72 (30.00)
	Graduate and above	12 (40.00)	31 (25.83)	29 (32.22)	72 (30.00)
	Total	30 (100)	120 (100)	90 (100)	240 (100)

Note: Figures in parenthesis are percentages to the total

The sampled respondents drawn from the districts of Ahmednagar, Nashik and Yavatmal for maize, onion and soybean crops put together showed very high proportion of them attaining education beyond secondary level. In general, the education status revealed that only 4 per cent of sampled respondents were illiterate, 9 per cent attained education up to primary level, 27 per cent up to secondary level, 30 per cent up to higher secondary level, and remaining 30 of respondents were graduates and above, showing more than 85 per cent of them attaining education up to secondary level and above. The sampled respondents using innovative and traditional marketing channels in the

marketing of their maize, onion and soybean crops by and large showed similar pattern in terms of their status of education since majority of them attained education up to secondary level and above. The estimates also showed that illiteracy was relatively higher among respondents using traditional marketing channel as compared to respondents using innovative marketing channels.

It was further observed that majority of sampled respondents using innovative and traditional marketing channels in the marketing of their maize, onion and soybean crop produce belonged to general category of social group, followed by OBC category. The information relating to social group status of sampled respondents drawn from the districts of Ahmednagar, Nashik and Yavatmal for maize, onion and soybean crops is brought out in Table 4.5.

Table 4.5: Social Group of Respondents of Innovative and Traditional Marketing Channels

Name of Districts/ Crops	Social Groups	Marketing Channels			Overall
		PML	DML	APMC	
Sample Size		30	120	90	240
Ahmednagar (Maize)	General	6 (60.00)	29 (72.50)	17 (56.67)	52 (65.00)
	OBC	2 (20.00)	7 (17.50)	10 (33.33)	19 (23.75)
	SC	1 (10.00)	1 (2.50)	2 (6.67)	4 (5.00)
	ST	-	1 (2.50)	1 (3.33)	2 (2.50)
	VJNT	1 (10.00)	2 (5.00)	-	3 (3.75)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Nashik Onion)	General	4 (40.00)	29 (72.50)	9 (30.00)	42 (52.50)
	OBC	1 (10.00)	11 (27.50)	18 (60.00)	30 (37.50)
	SC	5 (50.00)	-	2 (6.67)	7 (8.75)
	ST	-	-	-	-
	VJNT	-	-	1 (3.33)	1 (1.25)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Yavatmal (Soybean)	General	2 (20.00)	7 (17.50)	5 (16.67)	14 (17.50)
	OBC	6 (60.00)	24 (60.00)	19 (63.33)	49 (61.25)
	SC	1 (10.00)	3 (7.50)	2 (6.67)	6 (7.50)
	ST	1 (10.00)	2 (5.00)	1 (3.33)	4 (5.00)
	VJNT	-	4 (10.00)	3 (10.00)	7 (8.75)
	Total	10 (100)	40 (100)	30 (100)	80 (100)
Total	General	12 (40.00)	65 (54.17)	31 (34.44)	108 (45.00)
	OBC	9 (30.00)	42 (35.00)	47 (52.22)	98 (40.83)
	SC	7 (23.33)	4 (3.33)	6 (6.67)	17 (7.08)
	ST	1 (3.33)	3 (2.50)	2 (2.22)	6 (2.50)
	VJNT	1 (3.33)	6 (5.00)	4 (4.44)	11 (4.58)
	Total	30 (100)	120 (100)	90 (100)	240 (100)

Note: Figures in parenthesis are percentages to the total

In general, it was observed that about 45 per cent of total sampled respondents using innovative and traditional marketing channels in the marketing of their maize, onion and soybean crops belonged to general category, 41 per cent to OBC category, 7

per cent to SC category, 3 per cent to ST category and about 5 per cent to VJNT category. The estimates relating to caste profile also showed that the proportion of sampled respondents using innovative marketing channel in the marketing of their maize, onion and soybean crops was relatively higher for general category as compared to other social group categories of farmers. Thus, the farmers belonging to general category were less positively inclined to market their produce through traditional marketing channel of APMC, especially in case of soybean and onion crop. In fact, it was further observed that in case of farmers using the traditional marketing channel of APMC in the marketing of their maize, onion and soybean crops, about 52 per cent of them belonged to OBC category and 34 per cent to general category, whereas this proportion almost reverted in case of sampled respondents using innovative marketing channel of DML in the marketing of their selected crops.

Thus, the caste profile of sampled respondents for the three selected crops was found to be invariably in favour of general and OBC category, which held by and large true of both innovative and traditional marketing channel since about 85 per cent of total sampled respondents belonged to these two social groups.

It is to be noted that though the main occupation of sampled respondents was crop cultivation, some among them also showed other activities as their main occupation. Therefore, the main occupation of sampled respondents was categorized as: (i) crop cultivation, (ii) agricultural allied activities such as dairy, poultry, fishery, etc., and (iii) non-farm business activity/job/labour activity. The information relating to main occupation of sampled respondents drawn from the districts of Ahmednagar, Nashik and Pune for maize, onion and soybean crops is shown in Table 4.6

The sampled respondents using traditional and innovative marketing channels for the marketing of their maize, onion and soybean crops were mainly engaged in crop cultivation activities since 95 per cent of them aired their view in favour of cultivation practice as their main occupation. However, about 2 per cent among them showed agricultural allied activities as their main occupation, whereas nearly 3 per cent of them aired their view in favour of non-farm business and other related activities as their main occupation. In case of soybean crop, all the sampled respondents drawn from the district of Yavatmal showed crop cultivation as their main occupation. Similarly, in case of onion crop, cultivation practice was found to be the main occupation for all the sample respondents with the sole exception of a case where non-farm business activity turned out to be the main occupation. In fact, it was only in case of maize crop that about 14 per cent

of sampled respondents aired their view in favour of agricultural allied activities and non-farm business activities as their main occupation, whereas the remaining majority of 86 per cent showed cultivation as their main occupation.

Table 4.6: Main Occupation of Respondents of Innovative and Traditional Marketing Channels

Name of Districts/ Crops	Main Occupation	Marketing Channels			Overall
		PML	DML	APMC	
Sample Size		30	120	90	240
Ahmednagar (Maize)	Cultivation	8 (80.00)	33 (82.50)	28 (93.33)	69 (86.25)
	Agri-allied activities (Dairy/Poultry/Fishery)	1 (10.00)	3 (7.50)	1 (3.33)	5 (6.25)
	Non-Farm business / Job/ Labour	1 (10.00)	4 (10.00)	1 (3.33)	6 (7.50)
	Total	10 (100.00)	40 (100.00)	30 (100.00)	80 (100.00)
Nashik (Onion)	Cultivation	10 (100.00)	39 (97.50)	30 (100.00)	79 (98.75)
	Agri-allied activities (Dairy/Poultry/Fishery)	-	-	-	-
	Non-Farm business / Job/ Labour	-	1 (2.50)	-	1 (1.25)
	Total	10 (100.00)	40 (100.00)	30 (100.00)	80 (100.00)
Yavatmal (Soybean)	Cultivation	10 (100.00)	40 (100.00)	30 (100.00)	80 (100.00)
	Agri-allied activities (Dairy/Poultry/Fishery)	-	-	-	-
	Non-Farm business / Job/ Labour	-	-	-	-
	Total	10 (100.00)	40 (100.00)	30 (100.00)	80 (100.00)
Grand Total	Cultivation	28 (93.33)	112 (93.33)	88 (97.78)	228 (95.00)
	Agri-allied activities (Dairy/Poultry/Fishery)	1 (3.33)	3 (2.50)	1 (1.11)	5 (2.08)
	Non-Farm business / Job/ Labour	1 (3.33)	5 (4.17)	1 (1.11)	7 (2.92)
	Total	30 (100.00)	120 (100.00)	90 (100.00)	240 (100.00)

Note: Figures in parenthesis are percentages to the total

Thus, crop cultivation turned out to be the main occupation of almost all the sampled respondents for soybean and onion crops, and it was only in case of maize crop that about 14 per cent of them showed agricultural allied activities and non-farm business activities as their main occupation. However, in general, about 95 per cent of sampled respondents for maize, onion and soybean crop showed crop cultivation as their main occupation, whereas the remaining 5 per cent of them aired their view in favour of agricultural allied activities and non-farm business activities as their main occupation. The sampled respondents also showed higher proportion of them using innovative marketing channels in the marketing of their maize, onion, and soybean crop as compared to traditional marketing channel.

It could be further observed that the respondents using innovative and traditional marketing channels for the marketing of their maize, onion and soybean crop produce

were not only relatively well educated but also possessed membership of various organizations and associations. The association of farmers with various active farmers welfare related organizations creates better awareness among them about supply-demand situation and other market forces determining prices of crop produce. The association also exposes them to prevailing domestic and international market situations and, at times, helps them to develop bargaining power and raise their voice against government regulations in the export trade of their produce.

The respondents using innovative and traditional marketing channels for the marketing of their maize, onion and soybean crop produce were found to be members of various organizations and associations such as cooperative societies, self-help groups (SHG), farmer producer organizations (FPO), and crop specific associations viz. Onion Growers Association, Onion Farmers Group, Maize Growers Association, Soybean Processors Association of India, etc. The membership of sampled respondents using innovative and traditional marketing channels in the marketing of their crop produce is shown in Table 4.7.

Table 4.7: Organizational Membership of Respondents using Innovative and Traditional Marketing Channels

Name of Districts/ Crops	Member of Organization	Marketing Channels			Overall
		PML	DML	APMC	
Sample Size		30	120	90	240
Ahmednagar (Maize)	No Membership	-	-	-	-
	SHG	1 (10.00)	8 (20.00)	7 (23.33)	16 (20.00)
	FPO	-	4 (10.00)	1 (3.33)	5 (6.25)
	Cooperative Society	5 (50.00)	18 (45.00)	15 (50.00)	38 (47.50)
	Any Other	4 (40.00)	10 (25.00)	7 (23.33)	21 (26.25)
	Total	10 (100.00)	40 (100)	30 (100.00)	80 (100.00)
Nashik (Onion)	No Membership	1 (10.00)	4 (10.00)	-	5 (6.25)
	SHG	1 (10.00)	1 (2.50)	1 (3.33)	3 (3.75)
	FPO	-	2 (5.00)	1 (3.33)	3 (3.75)
	Cooperative Society	4 (40.00)	16 (40.00)	16 (53.33)	36 (45.00)
	Any Other	4 (40.00)	17 (42.50)	12 (40.00)	33 (41.25)
	Total	10 (100.00)	40 (100)	30 (100.00)	80 (100.00)
Yavatmal (Soybean)	No Membership	3 (30.00)	5 (12.50)	14 (46.67)	22 (27.50)
	SHG	-	2 (5.00)	1 (3.33)	3 (3.75)
	FPO	-	8 (20.00)	-	8 (10.00)
	Cooperative Society	7 (70.00)	24 (60.00)	11 (36.67)	42 (52.50)
	Any Other	-	1 (2.50)	4 (13.33)	5 (6.25)
	Total	10 (100.00)	40 (100)	30 (100.00)	80 (100.00)
Grand Total	No Membership	4 (13.33)	9 (7.50)	14 (15.56)	27 (11.25)
	SHG	2 (6.67)	11 (9.17)	9 (10.00)	22 (9.17)
	FPO	-	14 (11.67)	2 (2.22)	16 (6.67)
	Cooperative Society	16 (53.33)	58 (48.33)	42 (46.67)	116 (48.33)
	Any Other	8 (26.67)	28 (23.33)	23 (25.56)	59 (24.58)
	Total	30 (100.00)	120 (100)	90 (100.00)	240 (100.00)

Note: (i) Figures in parenthesis are percentages to the total; (ii) 'Any other' includes Onion Growers Association, Onion Farmers Group, The Maize Growers Association, The Soybean Processors Association of India, etc.

The membership profile of sampled respondents using innovative and traditional marketing channels in the marketing of their crop produce showed that about 48 per cent of them were members of various cooperative societies, 9 per cent possessed membership of SHGs, 7 per cent acquired membership of FPOs, and 25 per cent of them turned out to be members of various crop specific associations such as Onion Growers Association, Onion Farmers Group, Maize Growers Association, Soybean Processors Association of India, etc. However, it was also observed that 11 per cent of total respondents were not at all members of any organization/association.

It was further observed that the membership of cooperative societies and various crop specific associations was relatively higher for sampled onion farmers since about 85 per cent of them held membership of these organizations as against membership of such organizations observed to be of the order of 74 per cent for sampled maize farmers and 60 per cent for soybean farmers. The estimates also showed that about 28 per cent of total soybean farmers did not show any membership of various organizations, whereas this proportion stood at 6 per cent for onion farmers and nil for maize farmers.

Thus, it was generally observed that about 75 per cent of sampled maize, onion and soybean crop farmers using innovative and traditional marketing channels to market their produce possessed membership of various cooperative societies as well as crop specific associations. The membership of these organizations was relatively higher among onion farmers, followed by maize and soybean farmers. Further, no specific distinct trend could be observed regarding membership of respondents using innovative and traditional marketing channels to market their crop produce.

4.4 Characteristics of Operational Holding

Land is the main resource base of the farmer in the production process. The economic and social progress of farmers largely depends on the size of their operational holdings and area under irrigation (Shah, 2021). Keeping in view the significance of land resources, it was thought essential to show the land use pattern of sampled farmers using innovative and traditional marketing channels to market their maize, onion and soybean crop produce. The estimates relating to the magnitude of owned land, operational land, leased in and out land, net operated area, and area under irrigation for sampled farmers using innovative and traditional marketing channels to market their maize, onion and soybean crop produce are shown in Table 4.8 for the reference year 2022-23, and in Table 4.9 for the reference year 2023-24.

The average size of operational owned land holding for the reference year 2022-23 was estimated at 3.92 acres for maize farmers, 3.57 acres for onion farmers and 6.29 acres for soybean farmers with an overall average of 4.59 acres for all the farmers put together cultivating three selected crops. The estimates also showed that about 98 per cent of operational owned land holding of onion farmers was under irrigation, whereas this proportion stood at 96 per cent for maize farmers and as low as 69 per cent for soybean farmers. In general, about 84 per cent of operational owned land holding of all the farmers put together cultivating three selected crops was under irrigation. Since soybean crop is mainly cultivated under rainfed conditions, the soybean farmers showed relatively low proportion of their operational owned land holding under irrigation.

It could be further observed that the sampled onion and soybean farmers neither showed any leased-in nor leased-out area, and only maize farmers showed some unirrigated leased-in area, which resulted in marginal increase in their net-operated area. The average size of net operated area for the reference year 2022-23 was estimated at 4.46 acres for sampled maize farmers, 3.57 acres for onion farmers and 6.29 acres for soybean farmers with an overall average of 4.77 acres for all the farmers put together cultivating three selected crops. The estimates also showed that 85 per cent of net operated area was under irrigation for maize farmers, 98 per cent for onion farmers and 69 per cent for soybean farmers with an overall average of 81 per cent for the average category of sampled farmers cultivating the selected crops.

The average size of operational owned land as well as net operated area of maize and onion farmers turned out to be marginally lower for the reference year 2023-24 as against in 2022-23, which was mainly due to fragmentation and selling of owned land among some of these sampled farmers. The average size of operational owned land for the reference year 2023-24 was worked out at 3.77 acres for maize farmers, 3.47 acres for onion farmers and 6.29 acres for soybean farmers with an overall average of 4.51 acres for the average category of farmers cultivating three selected crops. The estimates also showed that the proportion of operational owned land under irrigation was 96 per cent for maize farmers, 98 per cent for onion farmers and 69 per cent for soybean farmers with an average of 84 per cent for all the farmers put together cultivating three selected crops. Further, since there was neither any leased-in nor any leased-out area for onion and soybean farmers, the net operated area and operational owned land for these farmers remained the same. However, some of the sampled maize farmers showed unirrigated leased-in area, which resulted in marginally higher net operated area for these farmers.

Table 4.8: Characteristics of Operational Holdings (Acres per Household) of Farmers: 2022-23

Sample Size	Marketing Channels	Total Owned Land	Un-cultivable Owned Land	Operational Owned land			Leased in			Leased out			Net Operated area		
				Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total
Ahmednagar (Maize)															
10	PML	5.04	0.84	4.20	-	4.20	-	-	-	-	-	-	4.20	-	4.20
40	DML	4.31	0.56	3.50	0.25	3.75	0.03	1.05	1.08	-	-	-	3.53	1.30	4.83
30	APMC	4.96	0.91	3.97	0.09	4.05	-	-	-	-	-	-	3.97	0.09	4.05
80	Total	4.64	0.73	3.77 (96.01)	0.16 (3.99)	3.92 (100.00)	0.02 (2.33)	0.53 (97.67)	0.54 (100.00)	-	-	-	3.78 (84.70)	0.69 (1.53)	4.46 (100.00)
Nashik (Onion)															
10	PML	2.98	0.33	2.65	-	2.65	-	-	-	-	-	-	2.65	0.00	2.65
40	DML	4.12	0.69	3.40	0.04	3.44	-	-	-	-	-	-	3.40	0.04	3.44
30	APMC	4.66	0.61	3.93	0.13	4.05	-	-	-	-	-	-	3.93	0.13	4.05
80	Total	4.18	0.61	3.50 (98.16)	0.07 (1.84)	3.57 (100.00)	-	-	-	-	-	-	3.50 (98.16)	0.07 (1.84)	3.57 (100.00)
Yavatmal (Soybean)															
10	PML	6.72	1.12	3.80	1.80	5.60	-	-	-	-	-	-	3.80	1.80	5.60
40	DML	7.37	0.82	4.76	1.80	6.55	-	-	-	-	-	-	4.76	1.80	6.55
30	APMC	7.25	1.08	3.92	2.25	6.17	-	-	-	-	-	-	3.92	2.25	6.17
80	Total	7.24	0.95	4.33 (68.74)	1.97 (31.26)	6.29 (100.00)	-	-	-	-	-	-	4.33 (68.74)	1.97 (31.26)	6.29 (100.00)
Overall															
30	PML	4.91	0.76	3.55	0.60	4.15	-	-	-	-	-	-	3.55	0.60	4.15
120	DML	5.26	0.69	3.89	0.70	4.58	0.01	0.35	0.36	-	-	-	3.90	1.05	4.94
90	APMC	5.62	0.87	3.94	0.82	4.76	-	-	-	-	-	-	3.94	0.82	4.76
240	Total	5.35	0.76	3.87 (84.11)	0.73 (15.89)	4.59 (100.00)	0.01 (2.33)	0.18 (97.67)	0.18 (100.00)	-	-	-	3.87 (81.04)	0.91 (18.96)	4.77 (100.00)

Note: Figures in parenthesis are percentages to the total

Table 4.9: Characteristics of Operational Holdings (Acres per Household) of Farmers: 2023-24

Sample Size	Marketing Channels	Total Owned Land	Un-cultivable Owned Land	Operational Owned land			Leased in			Leased out			Net Operated area		
				Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total	Irrigated	Un-irrigated	Total
Ahmednagar (Maize)															
10	PML	4.49	0.14	4.35	-	4.35	-	-	-	-	-	-	4.35	-	4.35
40	DML	4.03	0.41	3.38	0.25	3.63	0.03	1.05	1.08	-	-	-	3.40	1.30	4.70
30	APMC	4.03	0.28	3.69	0.07	3.75	-	-	-	-	-	-	3.69	0.07	3.75
80	Total	4.09	0.33	3.62 (96.01)	0.15 (3.99)	3.77 (100.00)	0.02 (2.33)	0.53 (97.67)	0.54 (100.00)	-	-	-	3.63 (84.29)	0.68 (15.71)	4.30 (100.00)
Nashik (Onion)															
10	PML	2.75	0.10	2.65	-	2.65	-	-	-	-	-	-	2.65	0.00	2.65
40	DML	3.58	0.29	3.26	0.04	3.30	-	-	-	-	-	-	3.26	0.04	3.30
30	APMC	4.54	0.57	3.85	0.13	3.97	-	-	-	-	-	-	3.85	0.13	3.97
80	Total	3.84	0.37	3.40 (98.11)	0.07 (1.89)	3.47 (100.00)	-	-	-	-	-	-	3.40 (98.11)	0.07 (1.89)	3.47 (100.00)
Yavatmal (Soybean)															
10	PML	5.82	0.22	3.80	1.80	5.60	-	-	-	-	-	-	3.80	1.80	5.60
40	DML	6.96	0.41	4.82	1.74	6.55	-	-	-	-	-	-	4.82	1.74	6.55
30	APMC	6.78	0.62	3.92	2.25	6.17	-	-	-	-	-	-	3.92	2.25	6.17
80	Total	6.75	0.46	4.36 (69.23)	1.94 (30.77)	6.29 (100.00)	-	-	-	-	-	-	4.36 (69.23)	1.94 (30.77)	6.29 (100.00)
Overall															
30	PML	4.35	0.15	3.60	0.60	4.20	-	-	-	-	-	-	3.60	0.60	4.20
120	DML	4.86	0.37	3.82	0.68	4.49	0.01	0.35	0.36	-	-	-	3.83	1.03	4.85
90	APMC	5.12	0.49	3.82	0.82	4.63	-	-	-	-	-	-	3.82	0.82	4.63
240	Total	4.89	0.39	3.79 (84.09)	0.72 (15.91)	4.51 (100.00)	0.01 (2.33)	0.18 (97.67)	0.18 (100.00)	-	-	-	3.80 (80.96)	0.90 (19.04)	4.69 (100.00)

Note: Figures in parenthesis are percentages to the total

The average size of net operated area for the reference year 2023-24 was worked out at 4.30 acres for maize farmers, 3.47 acres for onion farmers and 6.29 acres for soybean farmers with an overall average of 4.69 acres for the average category of farmers cultivating three selected crops. The estimates further showed that the proportion of net operated area under irrigation was 84 per cent for maize farmers, 98 per cent for onion farmers and 69 per cent for soybean farmers with an overall average of 81 per cent for the average category of sampled farmers cultivating the selected crops.

Thus, though the land holding characteristics of sampled maize, onion and soybean farmers by and large remained same during the reference years 2022-23 and 2023-24, some of the sampled maize and onion farmers also showed fragmentation and selling of land in 2023-24, which resulted in marginal decline in average size of owned land holding and net operated area of these farmers during 2023-24 as against in 2022-23.

4.5 Sources of Irrigation and Cropping Intensity

Details regarding extent of area under irrigation and sources of irrigation on the farms belonging to sampled maize, onion and soybean farmers using innovative and traditional marketing channels to market their crop produce are provided in Table 4.10 and Table 4.11 for the reference years 2022-23 and 2023-24, which also incorporate estimates relating to gross cropped area (GCA) and intensity of cropping on the farm.

The sampled maize, onion and soybean farmers were found to use various sources of irrigation on their farms, which included open well, tube well, farm pond, canal, and tank/ lift irrigation. However, the major net operated area of these farmers was found to be under open well irrigation, followed by tube well and canal irrigation.

The estimates during the reference year 2022-23 showed that about 59 per cent of the net operated area of sampled maize farmers was under open well irrigation, 15 per cent under tube well irrigation, 2 per cent under farm pond, about 7 per cent under canal irrigation, 2 per cent under tank/ lift irrigation, and the remaining 15 per cent remained rainfed (Table 4.10). The sampled onion farmers showed 93 per cent of their net operated area under open well irrigation, 1 per cent under tube well irrigation, 3 per cent under farm pond, 1 per cent under canal irrigation and the remaining 2 per cent as un-irrigated area. As for sampled soybean farmers, about 65 per cent of their net operated area was under open well irrigation, 3 per cent under tube well irrigation, about 1 per cent under tank/ lift irrigation, and the remaining 31 per cent remained un-irrigated.

Thus, in general, the estimates for the reference year 2022-23 showed that about 70 per cent of the net operated area of sampled farmers cultivating three selected crops

was under open well irrigation, 6 per cent under tube well irrigation, about 2 per cent each under farm pond and canal irrigation, 1 per cent under tank/lift irrigation, and the remaining 19 per cent remained un-irrigated. Further, since the average per household net operated area turned out to be 4.45 acres for maize farmers, 3.57 acres for onion farmers and 6.29 acres for soybean farmers with an overall average of 4.71 acres for the average category of farmers, and as the GCA of these farmers stood at 6.3 acres, 4.71 acres, 7.04 acres, and 6.02 acres, respectively, the intensity of cropping was worked out at 142 per cent for maize farmers, 132 per cent for onion farmers, 112 per cent for soybean farmers, and 126 per cent for the average category of farmers cultivating three selected crops. Therefore, the estimates for the reference year 2022-23 showed the highest intensity of cropping for maize farmers and lowest for soybean farmers.

It could be further observed that the estimates relating to land use pattern and proportion of net operated area under irrigation from various sources were by and large similar in 2023-24 as compared to these estimates observed in 2022-23. During the reference year 2023-24, the sampled maize farmers showed 59 per cent of their net operated area under open well irrigation, 14 per cent under tube well irrigation, 2 per cent under farm pond, nearly 9 per cent under canal irrigation, and the remaining 16 per cent under rainfed condition (Table 4.11). As in case of 2022-23, the sampled onion farmers during 2023-24 again showed 93 per cent of their net operated area under open well irrigation, about 1 per cent under tube well irrigation, 3 per cent under farm pond, 1 per cent under canal irrigation, and the remaining 2 per cent as un-irrigated area. Similarly, during 2023-24, the soybean farmer showed about 66 per cent of their net operated area was under open well irrigation, 3 per cent under tube well irrigation, about 1 per cent under tank/ lift/ river irrigation, and the remaining 31 per cent as un-irrigated area.

Thus, in general, the sampled farmers cultivating three selected crops during 2023-24 showed about 71 per cent of their net operated area under open well irrigation, 6 per cent under tube well irrigation, about 2 per cent under farm pond, 3 per cent under canal irrigation, less than 1 per cent under tank/ lift/ river irrigation and the remaining 19 per cent as un-irrigated area. Further, during 2023-24, the intensity of cropping was estimated at 138 per cent on sampled maize farms, 132 per cent on sampled onion farms, and 111 per cent on sampled soybean farms, with an overall average intensity of cropping estimated at 124 per cent on the farms belonging to sampled farmers cultivating three selected crops. Therefore, the estimates for the reference year 2023-24 also showed the highest intensity of cropping for maize farmers and lowest for soybean farmers.

Table 4.10: Sources of Irrigation, Net Operated Area and Cropping Intensity of Farmers: 2022-23

Sources of Irrigation/ GCA/ Cropping Intensity	Name of Districts and Marketing Channels															
	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soybean)				Overall			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (30)	DML (120)	APMC (90)	Total (240)
	Net Operated Area (in Acres/ HH)															
Open well	1.10	2.88	2.78	2.62	2.65	3.34	3.48	3.31	3.80	4.51	3.65	4.10	2.52	3.58	3.30	3.34
Tube well	1.10	0.51	0.76	0.68	-	0.05	0.07	0.05	-	0.13	0.27	0.16	0.37	0.23	0.36	0.30
Farm pond	0.80	-	-	0.10	-	-	0.30	0.11	-	-	-	-	0.27	-	0.10	0.07
Canal	1.20	0.13	0.20	0.29	-	-	0.08	0.03	-	-	-	-	0.40	0.04	0.09	0.11
Other	-	-	0.23	0.09	-	-	-	-	-	0.13	-	0.06	-	0.04	0.08	0.05
Total Irrigated NOA	4.20	3.52	3.97	3.77	2.65	3.39	3.93	3.50	3.80	4.76	3.92	4.32	3.55	3.89	3.94	3.86
Total Un-irrigated NOA	-	1.30	0.08	0.68	-	0.04	0.13	0.07	1.80	1.79	2.25	1.97	0.60	1.04	0.82	0.90
Total Irrigated + Un-irrigated NOA	4.20	4.82	4.05	4.45	2.65	3.43	4.05	3.57	5.60	6.55	6.17	6.29	4.15	4.93	4.76	4.77
	Net Operated Area – Share (%)															
Open well	26.19	59.75	68.64	58.88	100	97.38	85.93	92.72	67.86	68.85	59.16	65.18	60.72	72.62	69.33	70.02
Tube well	26.19	10.58	18.77	15.28	-	1.46	1.73	1.4	-	1.98	4.38	2.54	8.92	4.67	7.56	6.29
Farm pond	19.05	-	-	2.25	-	-	7.41	3.08	-	-	-	-	6.51	-	2.1	1.47
Canal	28.57	2.70	4.94	6.52	-	-	1.98	0.84	-	-	-	-	9.64	0.81	1.89	2.31
Other	-	-	5.68	2.02	-	-	-	-	-	1.98	-	0.95	-	0.81	1.68	1.05
Total Irrigated NOA	100.00	73.03	98.02	84.72	100	98.83	97.04	98.04	67.86	72.67	63.53	68.68	85.54	78.9	82.77	80.92
Total Un-irrigated NOA	-	26.97	1.98	15.28	-	1.17	3.21	1.96	32.14	27.33	36.47	31.32	14.46	21.1	17.23	18.87
Total Irrigated + Un-irrigated NOA	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	GCA and Cropping Intensity															
Total GCA (in Acres)	63.00	288.37	153	504.37	38.00	195.00	144.00	377.00	61.00	292.75	209.25	563.00	162.00	776.12	506.25	1444.37
GCA/HH (in Acres)	6.30	7.21	5.10	6.30	3.80	4.875	4.80	4.71	6.10	7.32	6.975	7.04	5.40	6.47	5.63	6.02
Cropping Intensity (%)	150	149.56	125.93	141.55	143.4	142.08	118.52	132.16	108.93	111.74	113.11	111.93	130.12	131.09	118.28	126.19

Note: In the Source of Irrigation, the type "Other" refers to lift, river, and tanker irrigation.

Table 4.11: Sources of Irrigation, Net Operated Area and Cropping Intensity of Farmers: 2023-24

Sources of Irrigation/ GCA/ Cropping Intensity	Name of Districts and Marketing Channels															
	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soybean)				Overall			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (30)	DML (120)	APMC (90)	Total (240)
	Net Operated Area (in Acres/ HH)															
Open well	1.35	2.84	2.56	2.55	2.65	3.21	3.46	3.23	3.80	4.57	3.65	4.13	2.60	3.54	3.22	3.30
Tube well	1.00	0.43	0.69	0.60	-	0.05	-	0.03	-	0.13	0.27	0.16	0.33	0.20	0.32	0.26
Farm pond	0.80	-	-	0.10	-	-	0.30	0.11	-	-	-	-	0.27	-	0.10	0.07
Canal	1.20	0.13	0.43	0.38	-	-	0.08	0.03	-	-	-	-	0.40	0.04	0.17	0.14
Other	-	-	-	-	-	-	-	-	-	0.13	-	0.06	-	0.04	-	0.02
Total Irrigated NOA	4.35	3.40	3.68	3.62	2.65	3.26	3.84	3.40	3.80	4.82	3.92	4.35	3.60	3.82	3.81	3.79
Total Un-irrigated NOA	-	1.30	0.07	0.68	-	0.04	0.13	0.07	1.80	1.73	2.25	1.93	0.60	1.02	0.81	0.89
Total Irrigated + Un-irrigated NOA	4.35	4.70	3.75	4.30	2.65	3.29	3.97	3.47	5.60	6.55	6.17	6.29	4.20	4.85	4.63	4.68
	Net Operated Area – Share (%)															
Open well	31.03	60.43	68.27	59.3	100	97.57	87.15	93.08	67.86	69.77	59.16	65.66	61.9	72.99	69.55	70.51
Tube well	22.99	9.15	18.4	13.95	-	1.52	-	0.86	-	1.98	4.38	2.54	7.86	4.12	6.91	5.56
Farm pond	18.39	-	-	2.33	-	-	7.56	3.17	-	-	-	-	6.43	-	2.16	1.50
Canal	27.59	2.77	11.47	8.84	-	-	2.02	0.86	-	-	-	-	9.52	0.82	3.67	2.99
Other	-	-	-	-	-	-	-	-	-	1.98	-	0.95	-	0.82	-	0.43
Total Irrigated NOA	100.00	72.34	98.13	84.19	100	99.09	96.73	97.98	67.86	73.59	63.53	69.16	85.71	78.76	82.29	80.98
Total Un-irrigated NOA	-	27.66	1.87	15.81	-	1.22	3.27	2.02	32.14	26.41	36.47	30.68	14.29	21.03	17.49	19.02
Total Irrigated + Un-irrigated NOA	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	GCA and Cropping Intensity															
Total GCA (in Acres)	57.00	283.62	135.50	476.12	38.00	184.25	143.50	365.75	61.00	293.25	202	556.25	156.00	761.12	481.00	1398.12
GCA/HH (in Acres)	5.70	7.09	4.52	5.95	3.80	4.61	4.78	4.57	6.10	7.33	6.73	6.95	5.20	6.34	5.34	5.83
Cropping Intensity (%)	131.03	151.01	120.44	138.48	143.4	139.85	120.59	131.92	108.93	111.93	109.19	110.59	123.81	130.88	115.49	124.38

Note: In the Source of Irrigation, the type "Other" refers to lift, river, and tanker irrigation.

The foregoing estimates relating to land use pattern and proportion of net operated area under different sources of irrigation for the reference years 2022-23 and 2023-24 showed similar observations since, during both these years, about 59 per cent of net operated area of sampled maize farmers was under open well irrigation, 14-15 per cent under tube well irrigation, about 2 per cent under farm pond, 7-9 per cent under canal irrigation, and the remaining 15-16 per cent under rainfed conditions. The sampled onion farmers during these two reference years showed about 93 per cent of their net operated area under open well irrigation, about 1 per cent under tube well irrigation, 3 per cent under farm pond, 1 per cent under canal irrigation, and the remaining 2 per cent under rainfed conditions. As for sampled soybean farmers, there was much lower area under irrigation from various sources, and these farmers during both the reference years showed about 65-66 per cent of their net operated area under open well irrigation, 2-3 per cent under tube well irrigation, nearly 1 per cent under tank/lift/river irrigation, and the remaining 31 per cent under rainfed conditions. In general, the sampled farmers cultivating three selected crops during the reference years 2022-23 and 2023-24 showed about 70-71 per cent of their net operated area under open well irrigation, 6 per cent under tube well irrigation, about 1-2 per cent under farm pond, 2-3 per cent under canal irrigation, about 1 per cent under tank/ lift/ river irrigation, and the remaining 19 per cent as un-irrigated area. The intensity of cropping was estimated at about 140 per cent on the sampled farms of maize farmers, 132 per cent on the sampled farms of onion farmers, and about 112 per cent on the sampled farms of soybean farmers with an overall intensity of cropping estimated at about 125 per cent on the farms belonging sampled farmers cultivating three selected crops. The intensity of cropping by and large remained similar during both the reference years for the sampled maize, onion and soybean farmers.

4.6 Cropping Pattern

Cropping pattern assumes considerable significance in determining farmer's net annual income through crop husbandry. Though farmers prefer to grow those crops that yield higher net returns, they are also constrained to grow several low value field crops due to varied agro-climatic conditions as well as topography and soil type across various regions or within the same region. In general, the cropping pattern of irrigated area differs from the cropping pattern of un-irrigated area. While high value commercial field crops are usually grown under irrigated conditions, low value subsistence crops find place under rainfed conditions (Shah, 2013 and 2021). However, there are several important course cereal, pulses and oilseed crops like *bajra*, *maize*, *jowar*, *mung*, *tur*, *gram*,

soyabean, sunflower, etc. that find place in terms of output and area allocation even under dry or rainfed conditions. Generally, the growth of agricultural sector of any state or region chiefly depends on the pattern of cropping, environmental factors, irrigation status, institutional development, soil type, topography, etc. (Nayak, 2016; Mandal and Bezbaruah, 2013).

The information on proportion of gross cropped area allocation under different crops grown under irrigated and rainfed conditions across different seasons by the sampled maize, onion and soybean farmers during the reference years 2022-23 and 2023-24 is provided in Table 4.12 and Table 4.13.

The estimates during the reference year 2022-23 showed that the GCA of all the sampled maize farmers estimated at 504.37 acres comprised of 83.35 per cent area under irrigation and the remaining 16.65 per cent area under rainfed condition. Although maize farmers cultivated large number of crops during kharif, rabi and summer seasons, the cropping pattern of these farmers was seen to be in favour of cultivation of maize, soybean, onion, cotton, wheat, sugarcane and horse gram. The gross irrigated area of maize farmers estimated at 83.35 per cent of GCA encompasses 51 per cent area under kharif season, 29 per cent under rabi season, less 1 per cent under summer crops and nearly 3 per cent under perennial crops. On the other hand, the gross un-irrigated area of maize farmers estimated at 16.35 per cent of GCA included nearly 9 per cent area under kharif crops and about 8 per cent area under rabi crops. Among various crops cultivated by maize farmers under irrigated conditions, maize crop alone accounted for about 41 per cent share in GCA with both kharif and rabi seasons put together. The maize farmers further showed 11 per cent of their GCA under soybean crop, 4 per cent under cotton, nearly 3 per cent under kharif onion, about 5 per cent under wheat, 9 per cent under rabi onion, and nearly 3 per cent under sugarcane (Table 4.12). Under un-irrigated conditions, the maize farmers in general showed about 1 per cent area under kharif maize, nearly 8 per cent under soybean and about 7 per cent under horse gram. The other crops cultivated by sampled maize farmers turned out to be bajra, tur, moong, urad, groundnut, and cotton.

The cropping pattern estimates of all the sampled onion farmers put together during the reference year 2022-23 showed that their GCA estimated at 377 acres included as much as 97.81 per cent area under irrigation and the remaining 2.19 per cent under rainfed condition, showing almost entire GCA under irrigation. The cropping pattern of onion farmers was found to be in favour of cultivation of large number of crops, which mainly included onion, soybean, maize, tomato, cabbage, wheat, and sugarcane. The

gross irrigated area of onion farmers during the reference year 2022-23 estimated at 97.81 per cent of GCA included 65 per cent area under kharif season, 30 per cent under rabi season, about 1 per cent under summer crops and 2 per cent under perennial crops. A few crops cultivated by onion farmers under un-irrigated conditions during kharif and rabi seasons included maize, soybean, tomato, cabbage, and onion, which together accounted for 2.19 per cent share in GCA. However, among various crops cultivated by onion farmers under irrigated conditions, onion crop alone accounted for 57 per cent share in GCA, which included both kharif and rabi onion. The sampled onion farmers also showed about 3 per cent of their GCA under maize crop, 18 per cent under soybean, 4 per cent each under tomato and cabbage, 5 per cent under wheat and nearly 2 per cent under sugarcane (Table 4.12). A few other crops cultivated by sampled onion farmers under un-irrigated condition like rice, groundnut, jowar, carrot, etc. were found to have miniscule share in GCA.

The sampled soybean farmers were found to cultivate less number of crops on their farms as against sampled maize and onion farmers. The cropping pattern estimates of all the sampled soybean farmers put together showed that their GCA estimated at 563 acres during the reference year 2022-23 encompassed 71.27 per cent area under irrigation and the remaining 28.73 per cent under rainfed condition. The major crops cultivated by soybean farmers included soybean, cotton, wheat, jowar and tur. The gross irrigated area of soybean farmers during the reference year 2022-23 estimated at 71.37 per cent of GCA included 62 per cent area under kharif crops, 9 per cent under rabi crops and nearly 1 per cent area under summer crops. The cropping pattern of soybean farmers under irrigated condition further showed about 52 per cent of their GCA under soybean crop, 9 per cent under cotton, 5 per cent under wheat, 3 per cent under jowar, and nearly 1 per cent each under gram and sesame crop (Table 4.12). Under un-irrigated conditions, the soybean farmers showed 21 per cent of their GCA under soybean, 2 per cent under tur, 4 per cent under cotton, and nearly 1 per cent each under wheat and jowar. Thus, the soybean crop cultivated under irrigated and unirrigated condition put together accounted for as much as 73 per cent share in GCA of sampled farmers with share of soybean cultivated under irrigated condition accounting for much higher share as against un-irrigated condition.

The foregoing cropping pattern estimates of sampled maize, onion and soybean farmers showed large number of crops cultivated by them during the reference year 2022-23. Although cropping pattern predominated by maize crop for maize farmers, onion crop for onion farmers, and soybean among soybean farmers, they also cultivated other crops.

Table 4.12: Cropping pattern of farmers (% of GCA for the reference year 2022-23)

Crop	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soybean)				Overall			
	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total
Kharif - Share (%)																
Maize	37.3	27.42	33.99	30.64	-	4.36	3.13	3.45	-	-	-	-	14.51	11.28	11.16	11.6
Bajra	-	-	4.25	1.29	-	-	-	-	-	-	-	-	-	-	1.28	0.45
Jowar	-	0.35	-	0.20	-	-	-	-	-	-	-	-	-	0.13	-	0.07
Rice	-	-	-	-	-	0.51	-	0.27	-	-	-	-	-	0.13	-	0.07
Tur	0.79	0.17	-	0.2	-	-	-	-	-	0.34	1.43	0.71	0.31	0.19	0.59	0.35
Moong	-	-	1.96	0.59	-	-	-	-	-	-	-	-	-	-	0.59	0.21
Urad	0.79	-	-	0.10	-	-	-	-	-	-	-	-	0.31	-	-	0.03
Soybean	-	12.48	13.07	11.1	26.32	24.87	6.94	18.17	57.38	55.59	44.92	51.82	27.78	31.86	24.49	28.82
Groundnut	-	-	-	-	-	0.51	0.35	0.4	-	-	-	-	-	0.13	0.10	0.10
Cotton	-	1.04	11.76	4.16	-	-	-	-	4.92	9.91	9.80	9.33	1.85	4.12	7.60	5.09
Onion	13.49	0.35	3.27	2.87	26.32	21.03	54.17	34.22	-	-	-	-	11.42	5.41	16.40	9.94
Tomato	-	-	-	-	10.53	4.62	1.39	3.98	-	-	-	-	2.47	1.16	0.40	1.04
Cabbage	-	-	-	-	-	2.05	7.64	3.98	-	-	-	-	-	0.52	2.17	1.04
Cauliflower	-	-	-	-	-	0.51	-	0.27	-	-	-	-	-	0.13	-	0.07
Kharif Total	52.38	41.81	68.30	51.16	63.16	58.46	73.61	64.72	62.30	65.84	56.15	61.86	58.64	55.06	64.79	58.87
Rabi- Share (%)																
Maize	10.32	9.97	11.11	10.36	-	1.03	-	0.53	-	-	-	-	4.01	3.96	3.36	3.76
Wheat	12.7	2.25	5.56	4.56	5.26	7.44	2.08	5.17	4.10	4.70	4.54	4.57	7.72	4.48	4.15	4.73
Jowar	1.59	-	-	0.20	-	0.26	0.35	0.27	4.10	3.42	2.39	3.11	2.16	1.35	1.09	1.35
Mung	-	-	1.31	0.40	-	-	-	-	-	-	-	-	-	-	0.40	0.14
Gram	4.76	2.43	-	1.98	-	-	-	-	-	-	2.39	0.89	1.85	0.90	0.99	1.04
Horse gram	-	0.35	-	0.20	-	-	-	-	-	-	-	-	-	0.13	-	0.07
Groundnut	-	1.73	-	0.99	-	-	-	-	-	-	-	-	-	0.64	-	0.35
Cotton	-	1.21	-	0.69	-	-	-	-	-	-	-	-	-	0.45	-	0.24
Onion	18.25	8.00	7.84	9.23	31.58	25.26	17.88	23.08	-	-	-	-	14.51	9.32	7.46	9.25
Carrot	-	-	-	-	-	0.38	-	0.20	-	-	-	-	-	0.10	-	0.05
Tomato	-	-	-	-	-	1.03	1.39	1.06	-	-	-	-	-	0.26	0.40	0.28
Total Rabi	47.62	25.94	25.82	28.61	36.84	35.38	21.70	30.31	8.20	8.11	9.32	8.57	30.25	21.59	17.83	21.24
Summer - Share (%)																
Maize	-	-	0.65	0.20	-	0.51	-	0.27	-	-	-	-	-	0.13	0.20	0.14
Groundnut	-	-	-	-	-	0.26	-	0.13	-	-	-	-	-	0.06	-	0.03
Sesame	-	-	-	-	-	-	-	-	-	0.68	1.31	0.84	-	0.26	0.54	0.33
Onion	-	-	1.31	0.40	-	1.54	-	0.80	-	-	-	-	-	0.39	0.40	0.35
Total Summer	-	-	1.96	0.59	-	2.31	-	1.19	-	0.68	1.31	0.84	-	0.84	1.14	0.85
Perennial- Share (%)																
Sugarcane	-	3.12	3.92	2.97	-	3.08	-	1.59	-	-	-	-	-	1.93	1.19	1.45
Total Irrigated	100.00	70.87	100.00	83.35	100.00	99.23	95.31	97.81	70.49	74.64	66.79	71.27	88.89	79.42	84.94	82.41

Table 4.12: Cont..... Cropping pattern of farmers (% of GCA for the reference year 2022-23)

Crop	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soybean)				Overall			
	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total
Kharif - Share (%)																
Maize	-	2.43	-	1.39	-	-	0.52	0.2	-	-	-	-	-	0.90	0.15	0.54
Tur	-	-	-	-	-	-	-	-	-	1.02	3.82	1.95	-	0.39	1.58	0.76
Soybean	-	13.18	-	7.53	-	0.77	-	0.40	19.67	19.21	23.89	21.00	7.41	12.34	9.88	10.92
Cotton	-	-	-	-	-	-	-	-	9.84	2.73	4.54	4.17	3.70	1.03	1.88	1.63
Tomato	-	-	-	-	-	-	0.87	0.33	-	-	-	-	-	-	0.25	0.09
Cabbage	-	-	-	-	-	-	0.69	0.27	-	-	-	-	-	-	0.20	0.07
Total Kharif	-	15.60	-	8.92	-	0.77	2.08	1.19	29.51	22.97	32.26	27.13	11.11	14.66	13.93	14.00
Rabi- Share (%)																
Wheat	-	-	-	-	-	-	-	-	-	1.02	0.96	0.89	-	0.39	0.40	0.35
Jowar	-	-	-	-	-	-	-	-	-	1.37	-	0.71	-	0.52	-	0.28
Horse Gram	-	12.83	-	7.34	-	-	-	-	-	-	-	-	-	4.77	-	2.56
Onion	-	0.69	-	0.40	-	-	1.74	0.66	-	-	-	-	-	0.26	0.49	0.31
Tomato	-	-	-	-	-	-	0.87	0.33	-	-	-	-	-	-	0.25	0.09
Total Rabi	-	13.52	-	7.73	-	-	2.60	0.99	-	2.39	0.96	1.60	-	5.93	1.14	3.58
Summer - Share (%)																
Total Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perennial- Share (%)																
Total perennial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Un-irrigated	-	29.13	-	16.65	-	0.77	4.69	2.19	29.51	25.36	33.21	28.73	11.11	20.58	15.06	17.59
GCA Irrigated + Un-irrigated (Area in Acres)	63.00 (100.00)	288.37 (100.00)	153.00 (100.00)	504.37 (100.00)	38.00 (100.00)	195.00 (100.00)	144.00 (100.00)	377.00 (100.00)	61.00 (100.00)	292.75 (100.00)	209.25 (100.00)	563.00 (100.00)	162.00 (100.00)	776.12 (100.00)	506.25 (100.00)	1 444.37 (100.00)

Note: Figure in Parenthesis are indicating Gross Un-Irrigated Area under crop

Table 4.13: Cropping pattern of farmers (% of GCA for the reference year 2023-24)

Crop	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soybean)				Overall			
	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total
Kharif - Share (%)																
Maize	41.23	29.37	47.60	35.98	-	4.61	0.70	2.60	-	-	-	-	15.06	12.06	13.62	12.93
Bajra	-	-	2.21	0.63	-	-	-	-	-	-	-	-	-	-	0.62	0.21
Tur	0.88	-	-	0.11	-	-	-	-	-	-	0.99	0.36	0.32	-	0.42	0.18
Urad	0.88	-	-	0.11	-	-	-	-	-	-	-	-	0.32	-	-	0.04
Soybean	-	11.28	12.55	10.29	26.32	25.92	7.67	18.80	58.20	56.61	49.01	54.02	29.17	32.29	26.40	29.92
Cotton	-	1.06	5.90	2.31	-	-	-	-	4.10	6.14	6.93	6.20	1.60	2.76	4.57	3.25
Onion	12.28	0.71	4.43	3.15	26.32	23.88	55.05	36.36	-	-	-	-	10.90	6.04	17.67	10.59
Tomato	-	-	-	-	10.53	3.66	1.39	3.49	-	-	-	-	2.56	0.89	0.42	0.91
Cabbage	-	-	-	-	-	1.63	7.67	3.83	-	-	-	-	-	0.39	2.29	1.00
Total Kharif	55.26	42.42	72.69	52.57	63.16	59.7	72.47	65.07	62.3	62.75	56.93	60.58	59.94	54.43	66.01	59.03
Rabi - Share (%)																
Maize	11.40	10.49	16.24	12.23	-	0.54	-	0.27	-	-	-	-	4.17	4.04	4.57	4.24
Wheat	14.04	0.35	2.21	2.52	5.26	5.97	2.09	4.37	-	5.37	6.19	5.08	6.41	3.65	3.85	4.02
Jowar	1.75	-	-	0.21	-	0.27	0.35	0.27	8.20	-	0.99	1.26	3.85	0.07	0.52	0.64
Gram	5.26	3.17	-	2.52	-	-	-	-	-	-	2.48	0.90	1.92	1.18	1.04	1.22
Groundnut	-	1.76	-	1.05	-	-	-	-	-	-	-	-	-	0.66	-	0.36
Onion	12.28	7.43	4.43	7.15	31.58	26.46	19.69	24.33	-	-	-	-	12.18	9.17	7.12	8.80
Carrot	-	-	-	-	-	1.09	-	0.55	-	-	-	-	-	0.26	-	0.14
Tomato	-	-	-	-	-	1.09	1.39	1.09	-	-	-	-	-	0.26	0.42	0.29
Total Rabi	44.74	23.20	22.88	25.69	36.84	35.41	23.52	30.90	8.20	5.37	9.65	7.24	28.53	19.29	17.52	19.71
Summer - Share (%)																
Onion	-	-	-	-	-	1.63	-	0.82	-	-	-	-	-	0.39	-	0.21
Total Summer	-	-	-	-	-	1.63	-	0.82	-	-	-	-	-	0.39	-	0.21
Perennial- Share (%)																
Sugarcane	-	3.70	4.43	3.47	-	3.26	-	1.64	-	-	-	-	-	2.17	1.25	1.61
Total Irrigated	100.00	69.33	100.00	81.73	100.00	100.00	95.99	98.43	70.49	68.12	66.58	67.82	88.46	76.28	84.77	80.56

Table 4.13: Cont..... Cropping pattern of farmers (% of GCA for the reference year 2023-24)

Crop	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soybean)				Overall			
	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total
Kharif - Share (%)																
Maize	-	3.09	-	1.84	-	-	0.52	0.21	-	-	-	-	-	1.15	0.16	0.68
Tur	-	-	-	-	-	-	-	-	-	2.39	1.49	1.80	-	0.92	0.62	0.72
Soybean	-	13.49	-	8.03	-	-	-	-	21.31	25.06	28.47	25.89	8.33	14.68	11.95	13.04
Cotton	-	-	-	-	-	-	-	-	8.20	2.05	3.47	3.24	3.21	0.79	1.46	1.29
Tomato	-	-	-	-	-	-	0.52	0.21	-	-	-	-	-	-	0.16	0.05
Cabbage	-	-	-	-	-	-	0.70	0.27	-	-	-	-	-	-	0.21	0.07
Total Kharif	-	16.57	-	9.87	-	-	1.74	0.68	29.51	29.5	33.42	30.92	11.54	17.54	14.55	15.84
Rabi- Share (%)																
Wheat	-	-	-	-	-	-	-	-	-	1.02	-	0.54	-	0.39	-	0.21
Jowar	-	-	-	-	-	-	-	-	-	1.36	-	0.72	-	0.53	-	0.29
Horse Gram	-	13.4	-	7.98	-	-	-	-	-	-	-	-	-	4.99	-	2.72
Onion	-	0.71	-	0.42	-	-	1.74	0.68	-	-	-	-	-	0.26	0.52	0.32
Tomato	-	-	-	-	-	-	0.52	0.21	-	-	-	-	-	-	0.16	0.05
Total Rabi	-	14.10	-	8.40	-	-	2.26	0.89	-	2.39	-	1.26	-	6.18	0.68	3.59
Summer - Share (%)																
Total Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perennial- Share (%)																
Total Perennial	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Unirrigated	-	30.67	-	18.27	-	-	4.01	1.57	29.51	31.88	33.42	32.18	11.54	23.72	15.23	19.44
GCA Irrigated + Un-irrigated (Area in acres)	57.00 (100.00)	283.62 (100.00)	135.50 (100.00)	476.12 (100.00)	38.00 (100.00)	184.25 (100.00)	143.50 (100.00)	365.75 (100.00)	61.00 (100.00)	293.25 (100.00)	202.00 (100.00)	556.25 (100.00)	156.00 (100.00)	761.12 (100.00)	481.00 (100.00)	1398.12 (100.00)

Note: Figure in Parenthesis are indicating Gross Irrigated Area under crop

The general cropping pattern of sampled maize, onion and soybean farmers during 2022-23 showed that their combined GCA estimated at 1444.37 acres encompassed 82.41 per cent area under irrigated and 17.59 per cent under rainfed condition. The major area allocation of these farmers was found to be under maize, soybean, onion, and to certain extent cotton, and wheat. The estimates further showed that the combined gross irrigated area of these farmers estimated at 82.41 per cent of GCA encompassed 58.87 per cent area under kharif crops, 21.24 per cent under rabi crops, 0.85 per cent under summer crops and 1.45 per cent under perennial crops. The combined gross un-irrigated area of these farmers estimated at 17.59 per cent of GCA covered 14 per cent area under kharif crops and 3.58 per cent under rabi crops. Among various crops cultivated by maize, onion and soybean farmers under irrigated conditions, the combined area allocation under kharif, rabi and summer seasons turned out to be 15.50 per cent of GCA for maize, 28.82 per cent for soybean, 19.54 per cent for onion, 5.09 per cent for cotton, 4.73 per cent for wheat, and the remaining 8.73 per cent of gross irrigated area under various other crops like bajra, jowar, rice, tur, moong, tomato, cabbage, gram, groundnut, sesame, etc. Sugarcane showed 1.45 per cent share in GCA among crops cultivated under irrigated condition (Table 4.12). Under un-irrigated conditions, the sampled maize, onion and soybean farmers put together showed 10.92 per cent of their GCA under soybean crop, 1.63 per cent under cotton, 0.54 per cent under maize, 0.31 per cent under onion, 2.56 per cent under horse gram and the remaining 1.63 per cent of gross un-irrigated area under various other crops such as tur, tomato, cabbage, jowar, etc. Thus, the cropping pattern estimates during 2022-23 clearly showed that maize, onion and soybean crops predominated the cropping pattern of the selected sampled farmers since the combined gross irrigated and unirrigated area allocation under kharif, rabi, and summer seasons turned out to be 16.04 per cent of GCA for maize, 19.85 per cent for onion, 39.74 per cent for soybean crop, showing 75.63 per cent of their GCA under these three major crops cultivated by them.

The cropping pattern estimates during 2023-24 showed less number of crops cultivated by sampled maize, onion and soybean farmers as against the crops cultivated by them during 2022-23. These sampled farmers also showed slightly lower GCA in 2023-24 as against in 2022-23. The GCA of all the sampled maize farmers put together estimated at 476.12 acres during 2023-24 encompassed 81.73 per cent area under irrigation and 18.27 per cent under rainfed condition. The gross irrigated area of maize farmers estimated at 81.73 per cent of GCA included 52.57 per cent area under kharif

crops, 25.69 per cent area under rabi crops, and 3.47 per cent area under perennial crops. Among various crops cultivated by maize farmers under irrigated conditions, maize crop alone accounted for about 48.21 per cent share in GCA, which included area under both kharif and rabi maize (Table 4.13). Further, the maize farmers showed 10.29 per cent of their GCA under soybean crop, 2.31 per cent under cotton, 10.30 per cent under kharif and rabi onion, 3.47 per cent under sugarcane, 2.52 per cent each under wheat and gram, and the remaining 2.11 per cent of their GCA under irrigation on account of area allocation under other crops like bajra, tur, urad, jowar, and groundnut.

The GCA of all the sampled onion farmers put together estimated at 365.75 acres during 2023-24 encompassed 98.43 per cent area under irrigation and 1.57 per cent un-irrigated area. The estimated 98.43 per cent of GCA under irrigation of onion farmers included 65.07 per cent area under kharif crops, 30.90 per cent under rabi crops, 0.82 per cent under summer crops and 1.64 per cent under perennial crops. Although onion farmers mainly cultivated onion and soybean on their farmers, the cropping pattern of these farmers also included several other crops like maize, tomato, cabbage, wheat, jowar, carrot, and sugarcane. Among various crops cultivated by onion farmers under irrigated conditions, onion crop alone accounted for 61.56 per cent share in GCA, which included kharif, rabi and summer onion. As for other crops, the onion farmers showed 2.60 per cent of their GCA under kharif maize, 18.80 per cent under soybean, 3.49 per cent under kharif tomato, 3.83 per cent under cabbage, 0.27 per cent under rabi maize, 4.37 per cent under wheat, 0.27 per cent under jowar, 0.55 per cent under carrot, 1.09 per cent under rabi tomato, and 1.64 per cent under sugarcane (Table 4.13). A few crops cultivated by onion farmers under un-irrigated condition like maize, tomato, cabbage, and onion showed just 1.57 per cent share in GCA. However, since onion farmers also showed 0.68 per cent share of rabi onion in GCA under rainfed condition, the combined share of onion in GCA turned out to be 62.24 per cent. Thus, though cropping pattern of onion farmers included several crops, onion and soybean were the major two crops cultivated by them, which showed 81 per cent share in GCA during 2023-24 (Table 4.13).

The crops cultivated by sampled soybean farmers during 2023-24 were very few, which mainly included soybean, cotton, wheat, and some other crops like tur, jowar and gram. The estimates showed that the GCA of all the soybean farmers put together estimated at 556.25 acres during 2023-24 encompassed 67.82 per cent area under irrigation and 32.18 per cent rainfed area. The gross irrigated area of these farmers estimated at 67.82 per cent of GCA during 2023-24 included 60.58 per cent area under

kharif crops and 7.24 per cent area under rabi crops. The cropping pattern of soybean farmers under irrigated condition further showed about 54.02 per cent of their GCA under soybean crop, 6.20 per cent under cotton, 5.08 per cent under wheat, 1.26 per cent under jowar, 0.90 per cent under gram and 0.36 per cent each under tur crop (Table 4.13). As for crops cultivated under rainfed condition, the soybean farmers showed 25.89 per cent of their GCA under soybean, 1.49 per cent under tur, 3.24 per cent under cotton, 0.54 per cent under wheat and 0.72 per cent area under jowar. Thus, the area allocation under soybean crop for sampled soybean farmers was as much as 79.91 per cent of GCA, which covered both irrigated and unirrigated area. The cotton turned out to be the next major crop cultivated by them, followed by wheat. In fact, cotton crop cultivated under irrigated and un-irrigated condition accounted for more than 9 per cent share in GCA of soybean farmers during 2023-24 (Table 4.13).

Although the cropping pattern estimates of sampled maize, onion and soybean farmers in general showed many crops cultivated by them during the reference year 2023-24, the major crops were maize, onion, and soybean. The estimates showed that the combined GCA of sampled maize, onion and soybean farmers estimated at 1398.12 acres encompassed 80.56 per cent area under irrigated and 19.44 per cent area under rainfed condition. The major crops cultivated by these farmers under irrigated condition included maize, onion, and soybean. However, they also showed reasonable area allocation under some other crops cultivated by them under irrigated condition, which included cotton, wheat and sugarcane. The estimates showed that the combined gross irrigated area of these farmers estimated at 80.56 per cent of GCA encompassed 59.03 per cent area under kharif crops, 19.71 per cent under rabi crops, 0.21 per cent under summer crops and 1.61 per cent under perennial crops. The combined gross un-irrigated area of these farmers estimated at 19.44 per cent of GCA covered 15.84 per cent area under kharif crops and 3.59 per cent under rabi crops. It was further observed that the gross irrigated area of all the maize, onion and soybean farmers put together included 17.17 per cent of GCA under maize, 29.92 per cent under soybean, 19.60 per cent under onion, 3.21 per cent under cotton, 4.02 per cent under wheat, and the remaining 6.64 per cent under other crops like bajra, tur, urad, tomato, cabbage, jowar, gram, groundnut, carrot, tomato and sugarcane. Among other crops cultivated under irrigated condition, sugarcane showed 1.61 per cent share in GCA of selected farmers (Table 4.13). Under un-irrigated conditions, the selected maize, onion and soybean farmers put together showed 13.04 per cent of their GCA under soybean crop, 1.39 per cent under cotton, 0.68 per cent under maize, 0.72 per

cent under tur, 2.72 per cent under horse gram and the remaining 0.89 per cent of gross un-irrigated area under various other crops such as tomato, cabbage, wheat, jowar, etc.

Thus, the cropping pattern estimates during 2023-24 also showed that maize, onion and soybean were the only major crops that accounted for bulk of area allocation under their cultivation since the combined gross irrigated and unirrigated area allocation during kharif, rabi, and summer seasons turned out to be 17.85 per cent of GCA for maize, 19.92 per cent for onion, 42.96 per cent for soybean crop, showing 80.73 per cent of their GCA under these three major crops cultivated by them.

4.7 Summary

The socio-economic characteristics of sampled farmers using innovative and traditional marketing channels were assessed with specific focus on their gender, age profile, education status, caste status, occupational status, membership of various organization, etc. The gender profile of farmers was found to be in favour of male since 97 per cent of respondents were male only 3 per cent belonged to female category. In fact, the gender profile of soybean farmers was cent per cent in favour of male, and it was only in case maize and onion farmers that a few belonged to female category.

The age profile showed that more than 80 per cent of selected maize, onion and soybean farmers using innovative as well as traditional marketing channels were less than 60 years of age with majority of them falling in the 36-59 years of age category.

The education status showed that the sampled respondents using innovative and traditional marketing channels in the marketing of their maize, onion and soybean crops were relatively well educated since very high proportion of them attained education beyond secondary level. The estimates also showed that illiteracy was relatively higher among respondents using traditional marketing channel as compared to respondents using innovative marketing channels.

The caste profile of sampled respondents turned out to be invariably in favour of general and OBC category since about 85 per cent of total sampled respondents belonged to these two social groups. This held true of both for farmers using innovative and traditional marketing channel

The estimates further showed that sampled respondents using traditional and innovative marketing channels for the marketing of their maize, onion and soybean crops were mainly engaged in crop cultivation activities since 95 per cent of them aired their view in favour of cultivation practice as their main occupation.

It was also observed that the respondents were not only well educated but also possessed membership of various organizations and associations. About 75 per cent of sampled maize, onion and soybean farmers were membership of various cooperative societies as well as crop specific associations. The membership of organizations was relatively higher among onion farmers, followed by maize and soybean farmers.

The estimates relating to land utilization pattern showed that the average size of net operated area was higher for soybean as against maize and onion farmers, which stood at 6.29 acres for soybean farmers, 4.46 acres for maize farmers and 3.57 acres for onion farmers in 2022-23 and 6.29 acres for soybean farmers, 4.30 acres for maize farmers and 3.47 acres for onion farmers in 2023-24. The estimates further showed that the proportion of net operated area under irrigation was about 85 per cent for maize farmers, 98 per cent for onion farmers and 69 per cent for soybean farmers during both the reference year under consideration. Although the land holding characteristics of maize, onion and soybean farmers remained same during the reference years 2022-23 and 2023-24, some of the maize and onion farmers also showed fragmentation and selling of land in 2023-24, which resulted in marginal decline in average size of owned land holding and net operated area of these farmers during 2023-24 as against 2022-23.

The estimates relating to irrigation status of sampled farmers showed by and large same proportion of their net operated area under various sources of irrigation. The sampled farmers cultivating three selected crops during the reference years 2022-23 and 2023-24 showed about 70-71 per cent of their net operated area under open well irrigation, 6 per cent under tube well irrigation, about 1-2 per cent under farm pond, 2-3 per cent under canal irrigation, about 1 per cent under tank/ lift/ river irrigation, and the remaining 19 per cent as un-irrigated area. The intensity of cropping by and large remained similar during both the reference years for the sampled maize, onion and soybean farmers. It was estimated at about 140 per cent on the farms belonging to maize farmers, 132 per cent on the farms of onion farmers, and about 112 per cent on the farms of soybean farmers with an overall average of 125 per cent on the average farms.

The cropping pattern estimates during the reference years 2022-23 and 2023-24 showed that the sampled maize, onion and soybean farmers cultivated various crops under irrigated as against unirrigated conditions since area allocation under irrigation was as much as about 82 per cent of the gross cropped area (GCA) for maize farmers, 98 per cent for onion farmers and about 70 per cent for soybean farmers. Although the selected maize, onion and soybean farmers cultivated large number of crops on their farm like

maize, onion, soybean, cotton, bajra, tur, urad, tomato, cabbage, wheat, jowar, gram, groundnut, etc., the major area allocation was found to be under maize, onion, soybean, and to certain extent cotton crop.

The sampled maize farmers showed 43 per cent of their GCA under maize crop in 2022-23 and 51 per cent in 2023-24. These maize farmers further showed 19 per cent of their GCA under soybean in 2022-23 and 18 per cent in 2023-24. The area allocation under onion for maize farmers was found to be 13 per cent of their GCA in 2022-23 and 11 per cent in 2022-23. These estimates clearly showed that about 75 per cent of GCA of sampled maize farmers was under maize, soybean and onion crop in 2022-23 and 80 per cent in 2023-24. Thus, the cropping pattern of maize farmers was invariably in favour of cultivation of three major crops, and the other crops cultivated by them had very less share in GCA during both 2022-23 and 2023-24.

The cropping pattern estimates of sampled onion farmers showed that 59 per cent of their GCA was under onion in 2022-23 and 63 per cent in 2023-24. Soybean was the next major crop cultivated by onion farmers, which accounted for 19 per cent share in GCA during both 2022-23 and 2023-24. The estimates further showed that maize crop cultivated by onion farmers accounted for 4.45 per cent share in GCA in 2022-23 and 2.48 per cent 2023-24. Thus, the cropping pattern of onion farmers was chiefly inclined towards cultivation of onion, followed by soybean and maize crop. These three crops put together accounted for about 82 per cent share in GCA in 2022-23 and 84 per cent in 2023-24. The other crops cultivated by onion farmers like rice, groundnut, tomato, cabbage, carrot, sugarcane, etc. had very marginal presence in term of area allocation during both 2022-23 and 2023-24.

The sampled soybean farmers showed substantial area allocation under soybean, followed by cotton crop. The area allocation of soybean farmers under soybean crop was found to be as high as 76 per cent of GCA in 2022-23 and 80 per cent in 2023-24. The other major crop dominating the cropping pattern of soybean farmer was cotton, which accounted for 14 per cent share in GCA in 2022-23 and about 10 per cent in 2023-24. These estimates clearly showed that about 90 per cent of area allocation of soybean farmers was under soybean and cotton crop during both 2022-23 and 2023-24. The remaining 10 per cent of GCA of soybean farmers was chiefly accounted for by other crops like wheat, jowar, gram, tur, sesame, etc.

CHAPTER – V

PROFITABILITY ANALYSIS OF SELECTED CROPS AND FARMERS' PERCEPTIONS ANALYSIS

5.1 Introduction

Having discussed and evaluated in brief the structural changes in area, production and productivity of selected maize, onion and soybean crop across various districts and regions of Maharashtra during the last two decades and changes in cropping pattern of the state over last four decades in chapter III and socio-economic characteristics, cropping pattern, land utilization pattern, irrigation status, etc. of sampled maize, onion and soybean farmers using innovative and traditional marketing channels to market their produce in chapter IV, this chapter mainly examines the extent of cost involved in the cultivation and marketing of selected maize onion and soybean crops cultivated by selected maize onion and soybean farmers. It subsequently performs a profitability analysis for the selected maize onion and soybean crops. It also delves into analysing perceptions of selected maize, onion and soybean farmers regarding their source of information of innovative marketing channels, reasons and preference for specific marketing channel, problems faced by them in the marketing of their produce through innovative and traditional marketing channels, and suggested measures to improve effectiveness of marketing of produce through innovative marketing channels vis-à-vis traditional marketing channels.

5.2 Cost of Cultivation and Marketing Cost for Selected Crops

It has been widely argued that in the typical rural setting, maximization of net return is the ultimate goal of the producer which largely depends on the cost structure to be followed by such enterprising household. However, maximization of profit requires a balance between the increase in production and various components of costs (Shah, 2021). In fact, it is the structure of cost and returns that is most crucial not only for the producers but also for the consumers and policy makers since these two key elements provide an effective linkage between the producer and consumers for rational fixation of prices of the produce (Shah. 2011 and 2021). It is, therefore, essential to broadly evaluate not only various components of input costs but also output value of selected crops cultivated by sampled maize, onion and soybean farmers.

It deserves mention that the net return from crop enterprise not only depends on prices received in the marketing of produce and production volume but also on the extent of cost involved in various crop cultivation and marketing activities. The sampled maize,

onion and soybean farmers using innovative and traditional marketing channels showed significant differences in cultivation and marketing cost of their crop produce. A break-up with respect to various components of labour and material input cost involved in cultivation and marketing of selected maize onion and soybean crops cultivated by the selected sampled farmers is presented in Table 5.1 and Table 5.2 for the reference years 2022-23 and 2023-24, respectively.

The selected maize, onion and soybean farmers were observed to incur expenditure towards number of cultivation and marketing related activities and operations, which not only included expenses towards labour cost but also material input cost. The cultivation operation included activities such as land preparation, seed sowing, applications of FYM, organic/bio-fertilizer, chemical fertilizer, plant protection chemicals, use of major and minor nutrients, irrigation charges, weeding and plant protection measures, and harvesting and threshing activity. The activities included under marketing operation revolved around drying, sorting and grading, packing, movement of produce from farm to store and store to market, loading, unloading and handling of produce on farm and market, etc. The sampled maize, onion and soybean farmers incurred significant expenses towards various activities involved in cultivation and marketing operation, which involved both labour and material input cost.

The cost estimates for maize crop presented in Table 5.1 for the reference year 2022-23 revealed that there was not much difference in per acre total cost of maize for the farmers diverting their produce through innovative and traditional marketing channel. The average per acre total cost of maize was estimated at Rs.31,213, which included 27 per cent share with respect to expenses towards labour cost involved in various cultivation operations, 7 per cent share towards labour cost in marketing activities, 61 per cent share for the expenses towards material inputs used in cultivation operation, and 5 per cent share towards expenses for material used in marketing of produce. Thus, the cultivation activity accounted for 87 per cent share in total cost of maize with 61 per cent of this share being accounted for by material input and 26 per cent by labour input. The remaining 13 per cent share in total cost of maize was accounted for by marketing cost, which included both labour and material input used in marketing. Further, though the per acre total cost of maize was estimated at Rs.32,690 for farmers using PML marketing channel, Rs.31,107 for DML channel and Rs.30,858 for APMC marketing channel, the estimates also showed that the combined marketing expenses towards labour and material input remained relatively lower for the maize crop being diverted through PML and DML

marketing channel. The average per acre combined marketing cost of labour and material input for maize crop was estimated at Rs.3,672 for farmers using PML channel, Rs.3,942 for DML channel and Rs.4,062 for APMC channel with an overall average of Rs.3,952 for the produce being marketed through both innovative and traditional marketing channel put together. The cost estimates for maize crop further showed that expenses towards land preparation activity accounted for the major share in material input cost, followed by expenses on harvesting and threshing, seed cost, and cost of fertilizer and nutrient application. Further, the activities like harvesting and threshing, weeding and plant protection measures, land preparation and seed sowing showed relatively higher share in total labour cost involved in the cultivation operation of maize crop.

Thus, although the cost estimates showed marginally higher per acre total cost of maize for farmers using innovative marketing channel, the combined marketing expenses towards labour and material input was lower for farmers using innovative PML and DML marketing channel as against traditional APMC channel. However, the estimates also showed significantly high expenses towards material input used in cultivation of maize crop, which alone accounted for about 60 per cent share in total cost of maize.

As against maize, the cultivation of onion was found to be highly labour intensive since labour cost alone accounted for major share in cultivation of this valued vegetable crop. Although the average per acre total cost of onion during the reference year 2022-23 was estimated at Rs.78,963, it also turned out to be much higher for the farmers using traditional marketing channel as against innovative marketing channel. The per acre total cost of onion was estimated at Rs.67,647 for farmers using PML marketing channel, Rs.77,873 for DML marketing channel and Rs.84,190 for APMC marketing channel, showing farmers using traditional marketing channel of APMC incurred 24 per cent higher cost of onion as against farmers using PML marketing channel and 8 per cent higher cost as against farmers using DML marketing channel. In general, the average per acre cost of onion estimated at Rs.78,963 encompassed 51 per cent expenses towards labour cost involved in various cultivation operations, 5 per cent expenses towards labour cost in marketing activities, 37 per cent expenses towards material inputs used in cultivation operation, and 7 per cent expenses for material used in marketing of onion produce. Thus, the combined share of labour and material input used in cultivation turned out to be about 88 per cent of total cost of onion with the remaining 12 per cent being accounted for labour and material input used in marketing of produce. The estimates further showed much higher marketing cost of onion for farmers using traditional

marketing channel as against farmers using innovative marketing channel since the average per acre combined marketing expenses of onion towards labour and material input was as much as Rs.12,369 for farmers using APMC marketing channel as against such expenses estimated at Rs.8,556 for farmers using PML marketing channel, and Rs.8,131 for farming using DML marketing channel. It was further observed that labour cost involved in seed sowing, harvesting and threshing activity and application of irrigation water accounted for the major share in total cost of labour used in cultivation of onion crop. On the other hand, material input used in land preparation, seed and fertilizer application accounted for major share in total material input cost of onion. The estimates also showed that farmers using traditional marketing channel of APMC incurred much higher expenses towards transportation of produce, drying, sorting, grading and packing activities as against farmers using innovative marketing channel of PML and DML.

Thus, the cost estimates for onion crop showed that the farmers using traditional marketing channel of APMC incurred 24 per cent higher cost of onion as against farmers using PML marketing channel and 8 per cent higher cost as against farmers using DML marketing channel. The farmers using traditional marketing channel also showed much higher marketing cost as against farmers using innovative marketing channels, especially with respect to expenses towards transportation of produce, drying, sorting, grading and packing activities. Even the combined expenditure towards labour and material input used in cultivation was higher for farmers using traditional marketing channel. Among various cultivation activities, labour cost involved in seed sowing, harvesting and threshing activity and application of irrigation water, and material input used in land preparation, seed and fertilizer application accounted for major share in total cost of onion cultivated by farmers using innovative and traditional marketing channel.

The soybean crop cultivated by sampled farmers also showed higher cost involved in material inputs as against labour cost involved in various cultivation operations like maize crop. The estimates during the reference year 2022-23 showed higher per acre total cost of soybean for the farmers using traditional marketing channel as against farmers using innovative marketing channel since it was estimated at Rs.24,118 for farmers using APMC marketing channel as against Rs.21,705 for farmers using DML channel and Rs.22,204 for farmers using PML channel. Thus, the farmers using APMC marketing channel showed 11 per cent higher per acre total cost of soybean as against farmers using DML marketing channel and 9 per cent higher cost as against farmers using PML marketing channel. The estimates further showed that the average per

acre cost of soybean estimated at Rs.22,673 included 30 per cent expenses towards labour input involved in various cultivation operations, 6 per cent expenses towards labour cost in marketing activities, 59 per cent expenses towards material inputs used in cultivation operation, and 5 per cent expenses for material used in marketing of soybean crop produce. Thus, labour and material input used in cultivation operation put together showed 89 per cent share in total cost of soybean with the remaining 11 per cent share in cost of soybean being accounted for labour and material input used in marketing of produce. The estimates also showed relatively higher marketing cost of soybean for farmers using traditional marketing channel of APMC as against farmers using innovative marketing channel of DML since the average per acre combined marketing expenses of soybean towards labour and material input was Rs.2,923 for farmers using APMC marketing channel and Rs.2,272 for farmers using DML marketing channel. As for expenses towards inputs used in cultivation operations, it was observed that cost of seed, material input used in land preparation, harvesting and threshing activity and application of fertilizer accounted for the major share in total cost of soybean. The labour input used in harvesting and threshing activity also showed significantly high share in cost of soybean. The estimates also showed that farmers using traditional marketing channel of APMC incurred marginally higher expenses towards transportation of produce, drying, sorting, and grading activities as against farmers using innovative marketing channel of DML.

Thus, the estimates showed higher per acre cost of soybean for farmers using traditional marketing channel as against farmers using innovative marketing channel. The farmers using APMC marketing channel showed 11 per cent higher per acre total cost of soybean as against farmers using DML marketing channel and 9 per cent higher cost as against farmers using PML marketing channel. The estimates also showed relatively higher marketing cost of soybean for farmers using traditional marketing channel of APMC as against farmers using innovative marketing channel of DML. It was also observed that the farmers using traditional marketing channel of APMC incurred marginally higher expenses towards transportation of produce, drying, sorting, and grading activities as against farmers using innovative marketing channel of DML. In general, labour and material input used in cultivation operation showed 88 per cent share in total cost of soybean and the remaining 12 per cent share being accounted for by marketing cost.

Table 5.1a: Item wise Labour and Material Input Cost for Cultivation Activity of Selected Crops: 2022-23

(Rs./Acre)

Activity	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)
Labour Cost for Cultivation												
Land Preparation	1333	1400	1067	1267	1583	1841	1417	1650	1180	1048	1029	1057
Seed Sowing	1290	1253	1086	1195	12580	11268	12140	11759	880	1205	1082	1118
FYM, Organic/Bio-fertilizer	500	220	238	262	500	760	670	694	825	512	650	603
Major and minor nutrients	771	798	554	703	1260	3024	2538	2621	600	493	493	506
Chemical fertilizer	517	684	703	671	400	550	480	505	200	-	-	25
Irrigation charges	-	-	-	-	2750	3800	5750	4400	-	-	-	-
Plant protection chemicals	660	740	659	700	1330	2557	1985	2189	571	685	610	643
Weeding and plant protection measures	3300	1471	1117	1567	4500	5265	5667	5320	940	778	1031	893
Harvesting and threshing	2375	2285	1507	2005	11500	10125	11367	10763	1650	2051	1947	1962
Total Labor Cost for Cultivation (a)	10746 (32.87)	8851 (28.45)	6930 (22.46)	8370 (26.82)	36403 (53.81)	39190 (50.33)	42014 (49.9)	39900 (50.53)	6846 (30.83)	6771 (31.2)	6841 (28.36)	6807 (30.02)
Material Input Cost for Cultivation												
Land Preparation*	4730	4590	5120	4806	6050	6758	7190	6831	2310	2303	2317	2309
Seed	2576	2670	2550	2613	5480	6283	5427	5861	2595	2824	2907	2826
FYM, Organic/Bio-fertilizer	1700	1433	1000	1304	1400	2933	3638	3006	1200	1259	2750	1811
Major and minor Fertilizers	1330	1448	1362	1401	2920	6093	4690	5170	1184	1179	1464	1287
Other Nutrients	850	1142	1927	1400	1083	1650	2345	1840	-	-	-	-
Irrigation charges	1200	1167	1100	1146	1500	1200	1400	1313	1200	1250	1150	1206
Plant protection chemicals	1036	1343	1250	1269	2680	4437	3817	3985	1386	1288	1312	1309
Weeding and plant protection measures**	1300	1310	1719	1462	1575	1200	1300	1284	1140	857	942	924
Harvesting and threshing	3550	3212	3839	3490	-	-	-	-	1430	1702	1514	1598
Total Material Input Cost for Cultivation (b)	18272 (55.89)	18314 (58.87)	19867 (64.38)	18891 (60.52)	22688 (33.54)	30553 (39.23)	29807 (35.40)	29290 (37.09)	12445 (56.05)	12662 (58.34)	14356 (59.52)	13270 (58.53)
Total Cost of Cultivation c= (a)+(b)	29018 (88.77)	27165 (87.33)	26797 (86.84)	27261 (87.34)	59091 (87.35)	69743 (89.56)	71821 (85.31)	69190 (87.62)	19291 (86.88)	19433 (89.53)	21197 (87.89)	20077 (88.55)

Note: *Hiring Charges for Tractor and Other Machinery used for Land Preparation

** Charges for Weeding and plant protection measures

Table 5.1b: Item wise Labour and Material Input Cost for Marketing Activity of Selected Crops: 2022-23

(Rs./Acre)

Activity	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)
Labor Cost for Marketing												
Drying, Sorting and Grading	1100	1470	1050	1266	1240	1267	1230	1250	1500	1005	1225	1149
Packaging (Bag)	426	420	467	438	1100	1103	1533	1264	171	152	202	173
Farm to Store (on farm)	-	-	-	-	-	-	-	-	-	-	-	-
Store to Market	-	-	-	-	-	-	-	-	-	-	-	-
Loading Unloading and Handling Charges on Farm	276	382	446	392	1059	791	1241	993	105	87	89	90
Loading Unloading and Handling, market fee on Market	225	0	306	143	679	-	1214	540	71	-	94	44
Electricity Cost	-	-	-	-	-	-	-	-	-	-	-	-
weighing cost	-	-	-	-	-	-	-	-	-	-	-	-
Total Labor Cost for Marketing (d)	2027 (6.2)	2272 (7.3)	2269 (7.35)	2239 (7.17)	4078 (6.03)	3161 (4.06)	5218 (6.2)	4047 (5.13)	1847 (8.32)	1244 (5.73)	1610 (6.68)	1456 (6.42)
Material Input Cost for Marketing												
Drying, Sorting and Grading	-	-	-	-	-	-	-	-	-	-	-	-
Packaging (Bag and any other) ***	558	578	608	587	1125	1500	1750	1547	228	190	227	208
Farm to Store (on farm or at home)	565	594	438	532	1110	1560	1786	1589	213	219	172	200
Store to Market	522	498	567	527	2243	1910	3308	2476	625	619	842	704
Loading Unloading and Handling Charges on Farm	-	-	-	-	-	-	-	-	-	-	-	-
Loading Unloading and Handling, market fee on Market	-	-	-	-	-	-	-	-	-	-	-	-
Electricity Cost	-	-	-	-	-	-	-	-	-	-	-	-
weighing cost	-	-	180	67	-	-	307	115	-	-	72	27
Total Material Input Cost for Marketing (e)	1645 (5.03)	1670 (5.37)	1793 (5.81)	1713 (5.49)	4478 (6.62)	4970 (6.38)	7151 (8.49)	5727 (7.25)	1066 (4.8)	1028 (4.74)	1313 (5.44)	1139 (5.02)
Total Marketing Cost (f) = (d + e)	3672 (11.23)	3942 (12.67)	4062 (13.16)	3952 (12.66)	8556 (12.65)	8131 (10.44)	12369 (14.69)	9774 (12.38)	2913 (13.12)	2272 (10.47)	2923 (12.12)	2595 (11.44)
Total Cultivation and Marketing Cost (c) +(f)	32690 (100.00)	31107 (100.00)	30858 (100.00)	31213 (100.00)	67647 (100.00)	77874 (100.00)	84190 (100.00)	78963 (100.00)	22204 (100.00)	21705 (100.00)	24118 (100.00)	22673 (100.00)

Note: ***Expenditure for Packaging (Bags), Travels, Purchase of Packaging Material

Table 5.2a: Item wise Labour and Material Input Cost for Cultivation Activity of Selected Crops: 2023-24

(Rs./Acre)

Activity	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)
Labour Cost for Cultivation												
Land Preparation	1300	1367	1333	1346	1667	2094	1567	1843	1060	1052	1014	1039
Seed Sowing	1260	1263	1192	1236	11450	12103	11623	11841	945	1269	1177	1194
FYM, Organic/Bio-fertilizer	500	262	175	259	500	600	725	634	567	504	650	566
Major and minor nutrients	740	838	582	730	1500	3253	1211	2268	530	496	407	467
Chemical fertilizer	517	729	582	647	463	595	713	623	-	-	-	-
Irrigation charges	-	-	-	-	2500	2000	1463	1861	-	-	-	-
Plant protection chemicals	745	820	677	757	1320	2817	2117	2367	729	763	589	693
Weeding and plant protection measures	1633	1526	1190	1413	5143	5632	6123	5755	1067	1193	1092	1139
Harvesting and threshing	2117	2521	1578	2117	12050	10269	11783	11060	1644	2164	2040	2053
Total Labor Cost for Cultivation (a)	8812 (25.33)	9326 (26.12)	7309 (21.68)	8505 (24.41)	36593 (49.89)	39363 (48.12)	37325 (46.41)	38252 (47.68)	6542 (31.09)	7441 (33.87)	6969 (29.49)	7151 (31.82)
Material Input Cost for Cultivation												
Land Preparation*	5025	5330	5617	5399	6020	7395	7377	7216	2400	2513	2453	2476
Seed	2575	2799	2579	2688	6300	7115	5560	6430	2675	2998	2993	2956
FYM, Organic/Bio-fertilizer	1700	1000	1163	1148	2167	1777	3292	2394	1067	1086	1100	1089
Major and minor Fertilizers	1895	2086	1500	1843	3580	5535	5007	5093	1370	1231	1514	1354
Other Nutrients	2040	2194	2182	2170	1794	1725	1880	1792	-	-	-	-
Irrigation charges	1400	1000	1000	1050	1200	3000	1250	2119	-	-	1500	563
Plant protection chemicals	1800	1625	1438	1577	3130	4224	4063	4027	1438	1564	1374	1477
Weeding and plant protection measures**	1850	2257	2112	2152	2500	2000	2200	2138	1260	1000	1150	1089
Harvesting and threshing	3800	4189	4086	4102	0	0	0	0	1833	1796	1554	1710
Total Material Input Cost for Cultivation (b)	22085 (63.48)	22480 (62.95)	21677 (64.3)	22129 (63.51)	26691 (36.39)	32771 (40.06)	30629 (38.08)	31209 (38.9)	12043 (57.24)	12188 (55.48)	13638 (57.71)	12714 (56.57)
Total Cost of Cultivation c = (a)+(b)	30897 (88.81)	31806 (89.07)	28986 (85.98)	30634 (87.92)	63284 (86.28)	72134 (88.18)	67954 (84.49)	69461 (86.58)	18585 (88.33)	19629 (89.35)	20607 (87.2)	19865 (88.39)

Note: *Hiring Charges for Tractor and Other Machinery used for Land Preparation

** Charges for Weeding and plant protection measures

Table 5.2b: Item wise Labour and Material Input Cost for Marketing Activity of Selected Crops: 2023-24

(Rs./Acre)

Activity	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)
Labor Cost for Marketing												
Drying, Sorting and Grading	1320	1416	1423	1407	1317	1393	1140	1289	1250	1221	1350	1273
Packaging (Bag)	413	323	408	366	938	857	550	752	109	123	125	122
Farm to Store (on farm)	-	-	-	-	-	-	-	-	-	-	-	-
Store to Market	-	-	-	-	-	-	-	-	-	-	-	-
Loading Unloading and Handling Charges on Farm	286	316	434	356	969	730	1214	941	77	86	88	86
Loading Unloading and Handling, market fee on Market	247	-	408	184	1044	-	1600	730	84	-	116	54
Electricity Cost	-	-	-	-	-	-	-	-	-	-	-	-
weighing cost	-	-	-	-	-	-	-	-	-	-	-	-
Total Labor Cost for Marketing (d)	2266 (6.51)	2055 (5.75)	2673 (7.93)	2313 (6.64)	4268 (5.82)	2980 (3.64)	4504 (5.6)	3712 (4.63)	1520 (7.22)	1430 (6.51)	1679 (7.1)	1535 (6.83)
Material Input Cost for Marketing												
Drying, Sorting and Grading	-	-	-	-	-	-	-	-	-	-	-	-
Packaging (Bag and any other) ***	573	588	613	596	1833	2248	2283	2209	212	202	232	215
Farm to Store (on farm or at home)	458	708	571	625	1455	1642	1759	1662	207	221	176	202
Store to Market	595	554	689	610	2504	2793	3394	2982	517	487	865	632
Loading Unloading and Handling Charges on Farm	-	-	-	-	-	-	-	-	-	-	-	-
Loading Unloading and Handling, market fee on Market	-	-	-	-	-	-	-	-	-	-	-	-
Electricity Cost	-	-	-	-	-	-	-	-	-	-	-	-
weighing cost	-	-	182	68	-	-	542	203	-	-	71	27
Total Material Input Cost for Marketing (e)	1626 (4.67)	1850 (5.18)	2055 (6.1)	1899 (5.45)	5792 (7.9)	6683 (8.17)	7978 (9.92)	7056 (8.79)	936 (4.45)	910 (4.14)	1344 (5.69)	1076 (4.79)
Total Marketing Cost (f) = (d + e)	3892 (11.18)	3905 (10.93)	4728 (14.03)	4212 (12.09)	10060 (13.72)	9663 (11.81)	12482 (15.52)	10768 (13.42)	2456 (11.67)	2340 (10.65)	3023 (12.79)	2611 (11.62)
Total Cultivation and Marketing Cost (c) + (f)	34789 (100.00)	35709 (100.00)	33712 (100.00)	34845 (100.00)	73342 (100.00)	81795 (100.00)	80433 (100.00)	80228 (100.00)	21040 (100.00)	21967 (100.00)	23632 (100.00)	22475 (100.00)

Note: ***Expenditure for Packaging (Bags), Travels, Purchase of Packaging Material

The cost estimates relating to cultivation and marketing activities for the reference year 2023-24 are presented in Table 5.2, which showed wide differences in per acre cost of maize, onion and soybean crop. The estimates showed the highest per acre cost for onion, followed by maize and soybean. However, the trend relating to the extent of expenditure towards labour and material input used in cultivation and marketing activities for the three selected crops was found to be similar for the reference year 2023-24 as noticed during the reference year 2022-23.

The farmers using innovative and traditional marketing channel did not show any discernible difference in per acre total cost of maize since it was estimated at Rs.34,789 for farmers using PML marketing channel, Rs.35,709 for farmers using DML marketing channel and Rs.33,712 for farmers using APMC marketing channel. The estimates showed that the average per acre total cost of maize estimated at Rs.34,845 during the reference year 2023-24 included 24 per cent share with respect to expenses towards labour input used in cultivation operations, 7 per cent share towards labour cost involved in marketing, 64 per cent share towards material inputs used in cultivation, and 5 per cent share towards expenses for material used in marketing of produce. These estimates clearly showed that labour and material input used in cultivation accounted for 88 per cent share in total cost of maize crop. The remaining 12 per cent share in total cost of maize was accounted for by marketing cost, which included both labour and material input used in marketing. The estimates also showed higher marketing cost for farmers using traditional marketing channel as against farmers using innovative marketing channel. The combined marketing expenses towards labour and material input for maize crop turned out to be Rs.4,728 for farmers using traditional marketing channel of APMC, Rs.3,892 for farmers using PML channel and Rs.3,905 for farmers using DML marketing channel. The higher marketing cost for farmers using APMC marketing channel was mainly due to relatively higher expenses incurred by them towards packing, transportation, loading and unloading activities as against farmers using innovative marketing channels. The cost estimates for maize crop further showed that expenses towards land preparation activity accounted for the major share in material input cost, followed by expenses on harvesting and threshing, seed cost, and cost of fertilizer and nutrient application. It was further observed that the activities like harvesting and threshing, weeding and plant protection measures, land preparation and seed sowing accounted for relatively higher share in total labour cost involved in the cultivation operation of maize crop.

Thus, although the farmers using innovative and traditional marketing channel did not show any discernible difference in per acre total cost of maize during the reference year 2023-24, the average per acre marketing cost turned out to be relatively higher for farmers using traditional marketing channel of APMC since they incurred higher expenses towards packing, transportation, loading and unloading activities as against farmers using innovative marketing channels. However, in general, the cost estimates for maize crop showed that expenses towards land preparation activity accounted for the major share in material input cost, followed by expenses on harvesting and threshing, seed cost, and cost of fertilizer and nutrient application. This held true for both farmers using innovative and traditional marketing channel.

The cultivation of onion was not only found to be labour intensive but also more expensive as against maize crop. The estimates showed marginally higher cost of onion during the reference year 2023-24 as against 2022-23. The per acre total cost of onion during the reference year 2023-24 was estimated at Rs.73,342 for farmers using PML marketing channel, Rs.81,795 for farmers using DML marketing channel and Rs.80,433 for farmers using APMC marketing channel with an overall average of Rs.80,228. Thus, although there was hardly any difference in cost of onion for farmers using DML marketing channel and APMC channel, the farmers using PML marketing channel showed 9 per cent lower cost of onion as against farmers using APMC marketing channel. In general, the average per acre cost of onion estimated at Rs.80,228 encompassed 48 per cent share towards labour cost involved in various cultivation operations, 5 per cent share towards labour cost in marketing activities, 39 per cent share in expenses towards material inputs used in cultivation operation, and 9 per cent share in expenses for material used in marketing of onion produce. Thus, cultivation operation involving labour and material input put together showed 87 per cent share in total cost of onion with the remaining 13 per cent share in cost being accounted for labour and material input used in marketing of produce. The estimates further showed much higher marketing cost of onion for farmers using traditional marketing channel as against farmers using innovative marketing channel since the average per acre combined marketing expenses of onion towards labour and material input was estimated at Rs.12,485 for farmers using APMC marketing channel, Rs.10,060 for farmers using PML marketing channel, and Rs.9,663 for farming using DML marketing channel, showing 29 per cent higher marketing cost for farmers using APMC channel as against farmers using DML marketing channel, and 24 per cent higher marketing cost as against farmers using PML marketing channel. The

estimates further revealed that the labour cost involved in seed sowing, harvesting and threshing activity, weeding and plant protection measures accounted for the major share in total cost of labour used in cultivation of onion crop. On the other hand, material input used in land preparation, seed and fertilizer application accounted for major share in total material input cost of onion. It was also observed that the farmers using traditional marketing channel of APMC incurred much higher expenses towards transportation of produce, drying, sorting, grading and packing activities as against farmers using innovative marketing channel of PML and DML.

Thus, the cultivation of onion was not only found to be highly labour intensive but also expensive. Although the estimates showed hardly any difference in cost of onion for farmers using DML and APMC marketing channel, the per acre cost of onion was 9 per cent lower for farmers using PML marketing channel as against farmers using APMC marketing channel. In general, the expenses incurred towards labour and material input used in cultivation operation accounted for 87 per cent share in total cost of onion and the rest 13 per cent share in cost being accounted for labour and material input used in marketing of produce. The estimates also showed much higher marketing cost of onion for farmers using traditional marketing channel as against farmers using innovative marketing channel. The farmers using traditional marketing channel of APMC showed 29 per cent higher marketing cost as against farmers using DML marketing channel and 24 per cent higher marketing cost as against farmers using PML marketing channel. It was further observed that the farmers using traditional channel of APMC incurred much higher expenses towards transportation of produce, drying, sorting, grading and packing activities as against farmers using innovative marketing channel of PML and DML.

The soybean crop cultivated by sampled farmers showed by and large similar cost estimates during the reference year 2023-24 as shown during 2022-23. The estimates during the reference year 2023-24 showed higher per acre total cost of soybean for the farmers using traditional marketing channel as against farmers using innovative marketing channel. The per acre cost of soybean during 2023-24 was estimated at RS.21,040 for farmers using PML marketing channel, Rs.21,967 for farmers using DML channel and Rs.23,632 for farmers using APMC marketing channel, which clearly showed that farmers using APMC marketing channel incurred 12 per cent higher per acre total cost of soybean as against farmers using PML marketing channel, and 8 per cent higher cost as against farmers using DML marketing channel. The farmers using APMC marketing channel not only showed higher total cost of soybean but also higher expenses

incurred by them towards marketing cost since the average per acre combined marketing expenses of soybean towards labour and material input was Rs.3,023 for farmers using APMC marketing channel, Rs.2,456 for farmers using PML marketing channel and Rs.2,340 for farmers using DML marketing channel. These estimates showed that the farmers using APMC marketing incurred 23 per cent higher marketing cost of soybean as against farmers using PML marketing channel and 29 per cent higher marketing cost as against farmers using DML marketing channel. In general, the average per acre cost of soybean estimated at Rs.22,475 encompassed 32 per cent expenses towards labour input involved in various cultivation operations, 7 per cent expenses towards labour cost in marketing activities, 56 per cent share in expenses towards material inputs used in cultivation operation, and 5 per cent expenses for material used in marketing of soybean crop produce. Thus, labour and material input used in cultivation operation put together showed 88 per cent share in total cost of soybean with the remaining 12 per cent share in cost being accounted for labour and material input used in marketing of produce. It was further observed that cost of seed, material input used in land preparation, harvesting and threshing activity and application fertilizer accounted for the major share in total material input cost of soybean. The labour input used in harvesting and threshing activity also showed significantly high share in cost of soybean.

Thus, although soybean crop cultivated by sampled farmers showed by and large similar cost estimates during the reference year 2022-23 and 2023-24, per acre cost of soybean during 2023-24 turned out to be 12 per cent higher for farmers using APMC marketing as against farmers using PML marketing channel and 8 per cent higher cost as against farmers using DML marketing channel. The estimates further showed that the farmers using APMC marketing incurred 23 per cent higher marketing cost of soybean as against farmers using PML marketing channel and 29 per cent higher marketing cost as against farmers using DML marketing channel. In general, labour and material input used in cultivation operation put together showed 88 per cent share in total cost of soybean with the remaining 12 per cent share in cost being accounted for labour and material input used in marketing of produce. It was also observed that cost of seed, material input used in land preparation, harvesting and threshing activity and application of fertilizer accounted for the major share in total cost of soybean.

5.3 Profitability Analysis for Selected Crops

The profitability analysis is performed for the selected maize, onion and soybean crop cultivated by sampled farmers on per acre as well as on per quintal basis with a view

to ascertain the element of net returns accrued to farmers in output price received by them and the margin of return accrued to them in the value of output from selected crops measured on per acre basis. The estimates relating to production volume, wastage, quantity of output retained and sold, output price, value of output, cost of production and the net returns for the three selected crops are also brought out in Table 5.3 and Table 5.4 for the reference years 2022-23 and 2023-24, respectively. The net return generation from the three selected crops are estimated both on per acre and per quintal basis.

The estimates presented in Table 5.3 hardly showed any productivity difference for maize among sampled beneficiaries of innovative and traditional marketing channel, which hovered at around 23 qtl./acre. The estimates also showed that these beneficiaries of innovative and traditional marketing channel sold about 98 per cent of their maize output as marketed surplus. However, the estimates relating to value of output revealed that it was the highest for DML beneficiary farmers and lowest for PML beneficiary farmers. The per acre value of output of maize during 2022-23 was estimated at Rs.47,732 for PML beneficiaries, Rs.50,771 for DML beneficiaries and Rs.49,003 for APMC beneficiaries. The higher per acre value of output and lower cost of maize led to higher per acre net returns for DML and APMC beneficiaries as against PML beneficiaries. The per acre net returns for maize was estimated at Rs.15,042 for PML beneficiaries, Rs.19,664 for DML beneficiaries and Rs.18,144 for APMC beneficiaries, which clearly showed that DML beneficiaries generated 31 per cent higher per acre net returns from maize as against PML beneficiaries, and 8 per cent higher net returns as against APMC beneficiaries. Further, since net return per quintal was estimated at Rs. 662 for PML beneficiaries, Rs. 843 for DML beneficiaries and Rs. 766 for APMC beneficiaries, the DML beneficiaries showed 27 per cent higher per quintal net return from maize as against PML beneficiaries and 10 per cent higher per quintal net return as against APMC beneficiaries. Thus, although output price of maize did not differ much among beneficiaries of innovative and traditional marketing channel, the beneficiaries of DML invariably showed higher net returns from maize both on per acre and per quintal basis as against PML and APMC beneficiaries.

It was further observed from Table 5.3 that during 2022-23 the productivity of onion did not show much difference on sampled farms and it varied from 73 qtl /acre for PML beneficiary farms to 76 qtl/acre for DML beneficiary farms. In general, the beneficiaries of innovative and traditional marketing channel sold about 93 per cent of their onion output as marketed surplus. The estimates further showed that the output price

of onion was relatively higher for farmers using innovative marketing channel as against farmers using traditional channel since it was estimated at Rs.1,537 for PML beneficiaries, Rs.1,661 for DML beneficiaries and Rs.1,492 for APMC beneficiaries. The higher output price led to higher value of output of onion for farmers using innovative marketing channel. The average per acre value of output of onion estimated at Rs.1,12,142 for PML beneficiaries, Rs.1,26,217 for DML beneficiaries and Rs.1,11,742 for APMC beneficiaries revealed that it was 13 per cent higher for DML beneficiaries as against APMC beneficiaries. Incidentally, the APMC beneficiaries showed the highest cost of onion and lowest output value of onion, which resulted in significantly low net returns from onion crop cultivated by them. The per acre net returns from onion estimated at Rs.44,495 for PML beneficiaries, Rs.48,344 for DML beneficiaries and Rs.27,552 for APMC beneficiaries clearly showed that the DML beneficiaries generated about 75 per cent higher net returns from onion as against APMC beneficiaries and 9 per cent higher net returns as against PML beneficiaries. Further, the higher cost per quintal and lower prices of onion ultimately led to very low per quintal net returns from onion for APMC beneficiaries. The per quintal net returns estimated at Rs.368 for APMC beneficiaries, Rs.636 for DML beneficiaries and Rs.610 for PML beneficiaries revealed that DML beneficiaries received 73 per cent higher per quintal net returns from onion as against APMC beneficiaries and about 4 per cent higher per quintal net returns as against PML beneficiaries. Thus, although there was not much difference in productivity of onion for beneficiaries of innovative and traditional marketing channel, the higher cost of coupled with lower prices on offer for onion ultimately resulted in very low returns from onion for beneficiaries of APMC as against beneficiaries of innovative marketing channel of DML and PML.

The estimates furnished in Table 5.3 showed by and large same productivity of soybean on sampled farms belonging to beneficiaries of innovative and traditional marketing channel, which turned out to be 7 qtl /acre. These beneficiary farmers were also found to divert their entire soybean produce in the market as marketed surplus. The estimates showed that during 2022-23, the value of output of soybean was found to be marginally higher for PML beneficiaries. The average per acre value of output of soybean was estimated at Rs.32,330 for PML beneficiaries, Rs.31,732 for DML beneficiaries and Rs.30,977 for APMC beneficiaries. However, the higher cost of soybean coupled with lower output prices on offer led to much lower net return from this valued crop for farmers using APMC marketing channel as against beneficiaries of PML and DML. The

average per acre net returns estimated at Rs.10,126 for PML beneficiaries, Rs.10,026 for DML beneficiary and Rs.6,856 for APMC beneficiaries revealed that beneficiaries of innovative marketing channel received about 46-48 per cent higher net returns from soybean as against beneficiaries of traditional marketing channel of APMC. The output price of soybean received by APMC beneficiaries was estimated at Rs.4,483, which turned out to be lower than Rs.4,653 received by DML beneficiaries, and Rs.4,619 received by PML beneficiaries. The higher cost and lower prices consequently resulted in lower per quintal net returns from soybean for APMC beneficiaries. The per quintal net returns from soybean estimated at Rs.1,447 for PML beneficiaries, Rs.1,470 for DML beneficiaries and RS.993 for APMC beneficiaries showed that PML and DML beneficiaries received 46-48 per cent higher per quintal net returns from soybean as against APMC beneficiaries. Thus, despite the fact that the productivity of soybean was similar for beneficiaries of innovative and traditional marketing channel, the higher cost and lower prices resulted in much lower returns from soybean for APMC beneficiaries as against beneficiaries of innovative marketing channel.

The estimates brought out in Table 5.4 showed similar productivity of maize on the farms belonging to beneficiaries of innovative and traditional marketing channel, which hovered at around 24 qtl./acre. In general, about 98 per cent of maize output was sold as marketed surplus by the sampled farmers. The estimates during 2023-24 further showed that per acre value of maize output was much higher for the beneficiaries of DML as against beneficiaries of APMC and PML. The per acre value of output of maize during 2023-24 was estimated at Rs.51,705 for PML beneficiaries, Rs.56,879 for DML beneficiaries and Rs.52,330 for APMC beneficiaries, showing 9 per cent higher value of output of maize for DML beneficiaries as against APMC beneficiaries. The beneficiaries of DML also showed relatively higher cost of maize as against beneficiaries of APMC and PML. However, per acre net returns for maize turned out to be higher for DML beneficiaries as against APMC beneficiaries. The per acre net returns for maize was estimated at Rs.16,916 for PML beneficiaries, Rs.21,168 for DML beneficiaries and Rs.18,616 for APMC beneficiaries, showing that DML beneficiaries received 14 per cent higher net returns from maize as against APMC beneficiaries, and 25 per cent higher net returns as against PML beneficiaries. The output price of maize estimated at Rs.2,219 for PML beneficiaries, Rs.2,352 for DML beneficiaries and Rs.2,178 for APMC beneficiaries showed relatively higher price for beneficiaries of innovative channels as against beneficiaries of traditional channel.

Table 5.3: Value of Output, Cost of Production, Material Cost and Net Returns for Selected Crops: 2022-23

Particulars	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)
Production (Qtl./Acre)	22.72	23.33	23.70	23.36	72.95	75.98	74.87	75.15	7.00	6.82	6.91	6.87
Retention (Qtl./Acre)	0.64	0.40	0.52	0.47	0.59	0.94	0.57	0.73	-	-	-	-
Wastage (Qtl./Acre)	0.11	0.04	0.05	0.05	5.05	4.82	4.89	4.88	-	-	-	-
Sold quantity (Qtl./Acre)*	21.97	22.89	23.13	22.84	67.32	70.22	69.40	69.54	7.00	6.82	6.91	6.87
Value of Output (Rs./Acre)**	47731.99	50770.51	49002.83	49758.67	112142.39	126217.22	111741.98	117794.62	32329.57	31731.62	30976.91	31523.54
Production Cost (Rs./Acre) (a)	29018	27165	26797	27261	59091	69743	71821	69190	19291	19433	21197	20077
Marketing Cost (Rs./Acre) (b)	3672	3942	4062	3952	8556	8131	12369	9774	2913	2272	2923	2595
Production and Marketing Cost (Rs./Acre) C = (a)+(b)	32690	31107	30859	31213	67647	77874	84190	78964	22204	21705	24120	22672
Net Return (Rs./Acre)***	15041.99	19663.51	18143.83	18545.67	44495.39	48343.22	27551.98	38830.62	10125.57	10026.62	6856.91	8851.54
Price (Rs./Quintal)	2100.88	2176.19	2067.63	2130.08	1537.25	1661.19	1492.48	1567.46	4618.51	4652.73	4482.91	4588.58
Production Cost (Rs./Qtl.)@ (a)	1277.20	1164.38	1130.68	1166.99	810.02	917.91	959.28	920.69	2755.86	2849.41	3067.58	2922.42
Marketing Cost (Rs./Qtl.)@@ (b)	161.62	168.97	171.39	169.18	117.29	107.02	165.21	130.06	416.14	333.14	423.01	377.73
Production and Marketing Cost (Rs./Qtl.) C = (a)+(b)****	1438.82	1333.35	1302.07	1336.17	927.31	1024.93	1124.48	1050.75	3172.00	3182.55	3490.59	3300.15
Net Return (Rs./Quintal)*****	662.06	842.84	765.56	793.91	609.94	636.26	368.00	516.71	1446.51	1470.18	992.32	1288.43

Note: *Sold quantity (Qtl/ Acre) = Production (Qtl. /Acre) - Retention (Qtl. /Acre) -Wastage (Qtl. /Acre)

**Value of Output (Rs./Acre) = Production (Qtl./Acre) × Price (Rs./Quintal)

***Net Return (Rs./Acre) = Value of Output (Rs./Acre) - Cost of Production (Labour + Input Cost)(Rs./Acre)

**** Production and Marketing Cost (Rs./Qtl.)= Production and Marketing Cost (Labour + Input Cost) (Rs./Acre) / Production (Qtl./Acre)

@ Production Cost (Rs./Qtl.) = Production Cost (Labour + Input Cost) (Rs./Acre) / Production (Qtl./Acre)

@@ Marketing Cost (Rs./Qtl.) = Marketing Cost (Labour + Input Cost) Rs./Acre) / Production (Qtl./Acre)

*****Net Return (Rs / quintal) = Net Return (Rs./Acre) / Production (Qtl./Acre)

Table 5.4: Value of Output, Cost of Production, Material Cost and Net Returns for Selected Crops: 2023-24

Particulars	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)
Production (Qtl./Acre)	23.30	24.18	24.03	24.02	75.00	70.34	73.67	72.40	6.02	6.33	6.27	6.28
Retention (Qtl./Acre)	0.89	0.52	0.46	0.54	0.84	0.76	0.33	0.56	0.00	0.00	0.00	0.00
Wastage (Qtl./Acre)	0.11	0.05	0.05	0.06	5.52	4.30	4.14	4.34	0.00	0.00	0.00	0.00
Sold quantity (Qtl./Acre)*	22.30	23.61	23.53	23.42	68.64	65.28	69.20	67.50	6.02	6.33	6.27	6.28
Value of Output (Rs./Acre)**	51705.03	56878.61	52329.89	54584.01	117000.00	124849.28	112782.88	118193.00	27324.96	29008.68	28175.31	28552.90
Production Cost (Rs./Acre) (a)	30897	31806	28986	30634	63284	72134	67954	69461	18585	19629	20607	19865
Marketing Cost (Rs./Acre) (b)	3892	3905	4728	4212	10060	9663	12482	10768	2456	2340	3023	2611
Production and Marketing Cost (Rs./Acre) C = (a)+(b)	34789	35711	33714	34846	73344	81797	80436	80229	21041	21969	23630	22476
Net Return (Rs./Acre)***	16916.03	21167.61	18615.89	19738.01	43656	43052.28	32346.88	37964	6283.96	7039.68	4545.31	6076.9
Price (Rs./Quintal)	2219.1	2352.3	2177.69	2272.44	1560	1774.94	1530.92	1632.5	4539.03	4582.73	4493.67	4546.64
Production Cost (Rs./Qtl.)@ (a)	1326.05	1315.38	1206.24	1275.35	843.79	1025.50	922.41	959.41	3087.21	3100.95	3286.60	3163.22
Marketing Cost (Rs./Qtl.)@@ (b)	167.04	161.50	196.75	175.35	134.13	137.38	169.43	148.73	407.97	369.67	482.14	415.76
Production and Marketing Cost (Rs./Qtl.) C = (a)+(b)****	1493.09	1476.88	1403.00	1450.71	977.92	1162.88	1091.84	1108.14	3495.18	3470.62	3768.74	3578.98
Net Return (Rs / quintal)*****	726.01	875.42	774.69	821.73	582.08	612.06	439.08	524.36	1043.85	1112.11	724.93	967.66

Note: *Sold quantity (Qtl/ Acre) = Production (Qtl. /Acre) - Retention (Qtl. /Acre) -Wastage (Qtl. /Acre)

**Value of Output (Rs./Acre) = Production (Qtl./Acre) × Price (Rs./Quintal)

***Net Return (Rs./Acre) = Value of Output (Rs./Acre) - Cost of Production (Labour + Input Cost)(Rs./Acre)

**** Production and Marketing Cost (Rs./Qtl.)= Production and Marketing Cost (Labour + Input Cost) (Rs./Acre) / Production (Qtl./Acre)

@ Production Cost (Rs./Qtl.) = Production Cost (Labour + Input Cost) (Rs./Acre) / Production (Qtl./Acre)

@@ Marketing Cost (Rs./Qtl.) = Marketing Cost (Labour + Input Cost) Rs./Acre) / Production (Qtl./Acre)

It could be further noted that since net return per quintal was estimated at Rs.726 for PML beneficiaries, Rs.875 for DML beneficiaries and Rs.775 for APMC beneficiaries, the DML beneficiaries showed 13 per cent higher per quintal net return from maize as against APMC beneficiaries. Thus, despite relatively higher cost, the beneficiaries of DML showed higher net returns from maize crop, both on per acre and per quintal basis, as against APMC beneficiaries, which was mainly due to higher output prices of maize received by them.

The estimates presented in Table 5.4 further showed that the productivity of onion varied from 70 qtl /acre for DML beneficiaries to 75 qtl /acre for PML beneficiaries. In general, about 93 per cent of onion output was sold as marketed surplus during 2023-24. The estimates also showed that the output price of onion was 16 per cent higher for beneficiaries of DML as against beneficiaries of APMC since it was estimated at Rs.1,775 for DML beneficiaries and Rs.1,530 for APMC beneficiaries. The higher output price led to higher value of output of onion for DML beneficiaries. The average per acre value of output of onion estimated at Rs.1,17,000 for PML beneficiaries, Rs.1,24,849 for DML beneficiaries and Rs.1,12,783 for APMC beneficiaries showed that it was 11 per cent higher for DML beneficiaries as against APMC beneficiaries. Incidentally, during 2023-24, the PML beneficiaries showed the lowest cost of onion as against DML and APMC beneficiaries. However, per acre net returns estimated at Rs.43,658 for PML beneficiaries, Rs.43,052 for DML beneficiaries and Rs.32,347 for APMC beneficiaries revealed that the DML beneficiaries received 33 per cent higher net returns from onion as against APMC beneficiaries, and this return was 35 higher for PML beneficiaries. Further, per quintal net returns estimated at Rs.439 for APMC beneficiaries, Rs.612 for DML beneficiaries and Rs.582 for PML beneficiaries showed that DML beneficiaries received 39 per cent higher per quintal net returns from onion as against APMC beneficiaries, whereas this return was 33 per cent higher for PML beneficiaries as against APMC beneficiaries. Thus, higher net returns from onion observed for DML beneficiaries was mainly due to higher output price of onion received by them, whereas PML beneficiaries showed higher net returns due to lower cost of onion as against APMC beneficiaries.

During 2023-24, the productivity of soybean was found to be 6 qtl /acre on the farms belonging to beneficiaries of innovative and traditional marketing channels, which turned out to be lower than 7 qtl /acre as noticed during 2022-23. The farmers during 2023-24 also were found to sell their entire soybean output as marketed surplus. The estimates during 2023-24 showed that the value of output of soybean was marginally

higher for DML beneficiaries as against PML and APMC beneficiaries. On the other hand, the estimated cost of soybean was higher for APMC beneficiaries as against PML and DML beneficiaries. Consequently, the average per acre net returns from soybean turned out to be significantly higher for beneficiaries of innovative channels as against beneficiaries of traditional channel. The average per acre net returns estimated at Rs.6,284 for PML beneficiaries, Rs.7,040 for DML beneficiary and Rs.4,545 for APMC beneficiaries revealed that, as against beneficiaries of APMC, the DML beneficiaries received 55 per cent higher net returns from soybean, and this higher net return for PML beneficiaries was 38 per cent. The estimates during 2023-24 further showed relatively higher output price of soybean for PML and DML beneficiaries as against APMC beneficiaries. The higher cost and relatively lower prices resulted in lower per quintal net returns from soybean for APMC beneficiaries. The per quintal net returns from soybean estimated at Rs.1,044 for PML beneficiaries, Rs.1,112 for DML beneficiaries and Rs.725 for APMC beneficiaries showed that, as against APMC beneficiaries, DML beneficiaries received 54 per cent higher per quintal net returns from soybean and this higher per quintal net return for PML beneficiaries was 44 per cent. Thus, though the productivity of soybean was by and large same for beneficiaries of innovative and traditional marketing channel, the higher cost and relatively lower prices resulted in much lower returns from soybean for APMC beneficiaries as against beneficiaries of innovative marketing channel.

5.4 Innovative and Traditional Channel – A Comparison of Beneficiaries

A comparison of beneficiaries of innovative marketing channels vis-à-vis traditional marketing channel was done with respect to estimates relating to value of output, cost of produce, net returns and output price for various selected crops cultivated by them, and estimates in this respect for 2022-23 and 2023-24 are presented in Table 5.5.

It could be readily discerned that the beneficiaries of innovative channels of PML and DML showed better performance in terms of broad profitability indicators for maize, onion and soybean crops cultivated by them as against beneficiaries of traditional marketing channel of APMC.

In case of maize, the output price was found to be 5 per cent higher during 2022-23 and 14 per cent higher during 2023-24 for beneficiaries of DML as against beneficiaries of APMC. The beneficiaries of DML also showed 10 per cent higher per quintal net returns from maize during 2022-23 and 13 per cent higher return during 2023-24 as against beneficiaries of APMC. The higher net returns from maize for beneficiaries of DML was mainly due to higher output price since these farmers also showed higher

production and marketing cost of maize as against APMC beneficiaries. It is to be further noted that the beneficiaries of PML showed 14 per cent lower per quintal net returns from maize during 2022-23 and 6 per cent lower returns during 2023-24 as against beneficiaries of APMC, which was mainly due to relatively higher cost of maize for beneficiaries of PML. The beneficiaries of PML also showed much lower value of output of maize as against beneficiaries of APMC.

The performance of beneficiaries of innovative marketing channel was much better for onion crop as against maize. During the last two years, the beneficiaries of DML not only showed 11-16 per cent higher output price but also 40-73 per cent higher per quintal net returns from onion as against beneficiaries of APMC. The beneficiaries of PML also showed 2-3 per cent higher output price and 33-66 higher net returns from onion as against beneficiaries of APMC. Not only this, beneficiaries of PML also showed 10-20 per cent lower cost of onion during the last two years as against beneficiaries of APMC. Thus, beneficiaries PML showed better performance for onion as against maize crop cultivated by them. The value of output of onion on per acre basis was also significantly high for beneficiaries of innovative channel of DML.

Table 5.5: Comparative Performance Indicators of Beneficiaries of Innovative and Traditional Channel

Particulars	Ahmednagar (Maize)		Nasik (Onion)		Yavatmal (Soybean)	
	PML over APMC	DML over APMC	PML over APMC	DML over APMC	PML over APMC	DML over APMC
	% Higher or Lower (+/-)					
2022-23						
Value of Output (Rs./Acre)**	-2.59	3.61	0.36	12.95	4.37	2.44
Production & Marketing Cost (Rs./Acre)	5.94	0.80	-19.65	-7.50	-7.94	-10.00
Net Return (Rs./Acre)***	-17.10	8.38	61.50	75.47	47.63	46.18
Price (Rs./Quintal)	1.61	5.25	3.00	11.30	3.02	3.79
Production & Marketing Cost (Rs./Quintal.)****	10.51	2.40	-17.53	-8.85	-9.12	-8.82
Net Return (Rs./Quintal)*****	-13.52	10.10	65.74	72.90	45.73	48.11
2023-24						
Value of Output (Rs./Acre)**	-1.19	8.69	3.74	10.70	-3.02	2.96
Production & Marketing Cost (Rs./Acre)	3.19	5.92	-8.82	1.69	-10.97	-7.05
Net Return (Rs./Acre)***	-9.14	13.71	34.96	33.09	38.33	55.01
Price (Rs./Quintal)	1.90	8.02	1.90	15.94	1.01	1.98
Production & Marketing Cost (Rs./Quintal)****	6.43	5.27	-10.43	6.51	-7.27	-7.93
Net Return (Rs./Quintal)*****	-6.29	13.00	32.57	39.39	44.08	53.54

Note: As in Table 5.4

The beneficiaries of innovative channel of DML and PML also showed significantly high returns from soybean as against beneficiaries of APMC. The beneficiaries of PML and DML showed 45-54 per cent higher per quintal net returns from soybean during the last two years as against beneficiaries of APMC. The higher returns from soybean for beneficiaries of innovative marketing channels was chiefly on account of higher value of output, lower cost and relatively better prices of soybean received by them as against beneficiaries of APMC.

Thus, in general, the beneficiaries of innovative channel were better placed not only in terms output prices received by them for their maize, onion and soybean crop but also on account of higher value of output and relatively much lower cost incurred by them for these crops as against beneficiaries of APMC.

5.5 Important Features of PML, DML and APMC

The marketing of produce through Private Market License (PML) holders, Direct Market License (DML) holders and Agricultural Produce Market Committee (APMC) differ due to their functional nature, which are delineated in this section.

Major Features of PML:

The marketing facilities provided by PML to traders and farmers are similar to those offered by APMC with some major difference. These markets are typically located in rural areas, which helps farmers to access these markets more conveniently and easily. Most of the PML units occupy a land area ranging from 2 to 10 acres and function similar to small-scale APMC markets. The investment in establishing PML units generally varies from Rs.1 crore to Rs.10 crore. Each of these markets is managed by a governing body consisting of 7-11 members.

The auctioning of produce is carried out during morning session with flexible timing depending upon volume of arrivals and availability of agents like traders and wholesalers. There are designated trading days for each commodity traded in the market. The market provides weighing facilities to the farmers without charging any fees. However, loading and unloading charges are applicable in the market like APMC.

The facility of Wi-Fi is provided to farmers in some of the markets like availability of such facility in Yavatmal. The prices of commodity traded in the market are determined through open auction method, and payments are directly transferred to the farmers in their bank accounts. The market also provides transport facilities up to the nearest bus stand in case farmers face difficulty to reach the market.

The market also provides free overnight boarding and lodging facility to their beneficiary farmers. There are also provisions of toilet and bathroom facilities, canteen facility, etc. There is usually a provision of multiple commodities trading within the premises of PML, which depends on market demand and local agricultural production. The membership is open to any number of farmers and there is no limit to membership. Some of the PML units also provide warehousing support and storage facilities.

Major Features of DML:

There Direct Market License (DML) holders deal with trading of some specific commodities each year and commodities traded may change depending upon the market conditions. The market demand and supply situation determines selection of commodities traded by the DML holder. There is often a partnership of DML holders with processing units for specific commodities. In case of maize, DML holders procure the crop based on the processors' requirements.

The DML holders either procure commodities at farm gate or farmers sell their produce to DML holders, which depend on the situation and demand. There is no provision of auctioning system at DML units. Since the prices for commodities are fixed on weekly basis, farmers receive information about the rates applicable for a particular week well in advance. The quantity procured at DML units is smaller as compared to APMC and PML units. The DML units usually take a week time to complete the payment process. The farmers often sell their produce to DML units as they are located closer to a farm, which reduces farmer's transportation cost.

The DML units do not charge any market fee, entry fee or levy any loading/unloading charges to the farmers. The transactions of DML units are much lower than PML or APMC markets. Since most of the DML units are established on plots smaller than 30,000 sq. ft., they lack in storage or warehouse facilities. Further, the capital investments for DML units are much lower than PML and APMC markets. The commodities purchased by DML units are usually supplied to retailers and at various malls like Reliance Mart, D mart, Star Bazaar, Godrej Mall, etc. Since DML units procure commodities based on specific quality standards such as size, appearance, colour, texture, moisture content, etc., prices on offer are better than the local market.

Major Features of APMC:

These markets are established under government regulations and governed by authorized bodies/ market committee. Since size of these markets is very large, they serve large number of villages across various Talukas or blocks within the district. Almost all

types of agricultural commodities are traded within the premises of APMC, and everyday large numbers of traders participate in the auction process. The market fees and loading/unloading charges are prescribed by the market committee and these charges vary from state to state. The prices of commodities vary everyday during auction process depending upon supply and demand situation. The payment of produce after auctioning is transferred to the farmers in their bank account. It is difficult for the farmers to anticipate final prices received by them due to high trading volume and auction based system of marketing. These markets function on daily basis. The time period of trading is fixed and usually takes place between 5:00 AM and 12:00 noon each day. There are weighing charges applicable within the market premises.

There is no provision of free food and transport facilities to the farmers in APMC markets. Most of the APMC markets lack facilities like clean toilets, canteen, hygienic food, internet or Wi-Fi, etc. There is lack of adequate market infrastructure facilities in most of the APMC markets. Even the quality of existing infrastructure facility is very poor in many cases. Since APMC markets do not offer farm-gate procurement of produce, farmers have to transport their agricultural produce to these markets. However, there are many APMC markets which provide various facilities to the farmers such as parking space, rest house, etc.

5.6 Availability of Infrastructure Facilities – APMC

The APMC established across different district, regions and states are expected to provide wide range of facilities not only to traders and market functionaries but also to farmer producers when they bring their produce for sale in the market. The existence and type of facilities differ from state to state, region to region and district to district. In general, the APMCs are expected possess various infrastructure and marketing facilities such as auction platform, weighing machines, availability of porters for loading and unloading, warehouses and cold storages, auction clerks for transparent bidding, electronic displays for price information, market grievances redressal mechanism, electricity backup for computers, canteen, rest house, technology to measure moisture content in produce, soil testing, health clinic, drinking water and water cooler, foodgrain assaying facility, ambulance, etc. The sampled beneficiaries engaged in marketing of their maize, onion and soybean crop produce through APMC were asked to air their views regarding the availability of various marketing facilities for the farmers and other stakeholders in the market. The responses of farmers regarding availability of market infrastructure related facilities at APMC are brought out in Table 5.6. It could be

observed that maize, onion and soybean cultivating farmers aired differing opinion regarding availability of various types of facilities at APMC.

Table 5.6: Availability of Market Infrastructure Facility – APMC

(Responses in Number and Percent)

Infrastructure Facility	Response	Ahmednagar (Maize)	Nashik (Onion)	Yavatmal (Soybean)	Overall
	Sample size	30	30	30	90
Facility of electricity backup for computer in the market	Yes	9 (30.00)	22 (73.33)	30 (100)	61 (67.78)
	Free	-	-	-	-
	Paid	9 (30.00)	22 (73.33)	30 (100)	61 (67.78)
Facility of rest house in the market	Yes	2 (6.67)	-	13 (43.33)	15 (16.67)
	Free	-	-	-	-
	Paid	2 (6.67)	-	13 (43.33)	15 (16.67)
Facility to share market grievance in writing	Yes	10 (33.33)	2 (6.67)	3 (10)	15 (16.67)
	Free	10 (33.33)	2 (6.67)	3 (10)	15 (16.67)
	Paid	-	-	-	-
Electronic display for price information from related markets (e-NAM)	Yes	1 (3.33)	1 (3.33)	-	2 (2.22)
	Free	1 (3.33)	1 (3.33)	-	2 (2.22)
	Paid	-	-	-	-
Transparent bidding facility in the market	Yes	16 (53.33)	10 (33.33)	28 (93.33)	54 (60)
	Free	16 (53.33)	10 (33.33)	28 (93.33)	54 (60)
	Paid	-	-	-	-
Technology to measure moisture content in produce	Yes	20 (66.67)	22 (73.33)	29 (96.67)	71 (78.89)
	Free	20 (66.67)	22 (73.33)	29 (96.67)	71 (78.89)
	Paid	-	-	-	-
Facility of weighing machines in the market	Yes	20 (66.67)	26 (86.67)	30 (100)	76 (84.44)
	Free	-	-	-	-
	Paid	20 (66.67)	26 (86.67)	30 (100)	76 (84.44)
Availability of free labour services (porters) for loading and unloading, etc.	Yes	12 (40)	24 (80)	30 (100)	66 (73.33)
	Free	-	-	-	-
	Paid	12 (40)	24 (80)	30 (100)	66 (73.33)
Warehouse facility	Yes	8 (26.67)	16 (53.33)	5 (16.67)	29 (32.22)
	Free	-	-	-	-
	Paid	8 (26.67)	16 (53.33)	5 (16.67)	29 (32.22)
Cold storage facility	Yes	-	-	-	-
	Free	-	-	-	-
	Paid	-	-	-	-
Facility of soil testing	Yes	1 (3.33)	1 (3.33)	3 (10)	5 (5.56)
	Free	-	-	-	-
	Paid	1 (3.33)	1 (3.33)	3 (10)	5 (5.56)
Health Clinic facility	Yes	-	-	-	-
	Free	-	-	-	-
	Paid	-	-	-	-
Canteen facility	Yes	10 (33.33)	4 (13.33)	8 (26.67)	22 (24.44)
	Free	-	-	-	-
	Paid	10 (33.33)	4 (13.33)	8 (26.67)	22 (24.44)
Ambulance facility	Yes	-	-	-	-
	Free	-	-	-	-
	Paid	-	-	-	-
Food grain assaying facility	Yes	8 (26.67)	-	4 (13.33)	12 (13.33)
	Free	8 (26.67)	-	4 (13.33)	12 (13.33)
	Paid	-	-	-	-
Ticker board display	Yes	1 (3.33)	-	2 (6.67)	3 (3.33)
	Free	1 (3.33)	-	2 (6.67)	3 (3.33)
	Paid	-	-	-	-
Water Cooler facility	Yes	6 (20)	12 (40)	14 (46.67)	32 (35.56)
	Free	6 (20)	12 (40)	14 (46.67)	32 (35.56)
	Paid	-	-	-	-

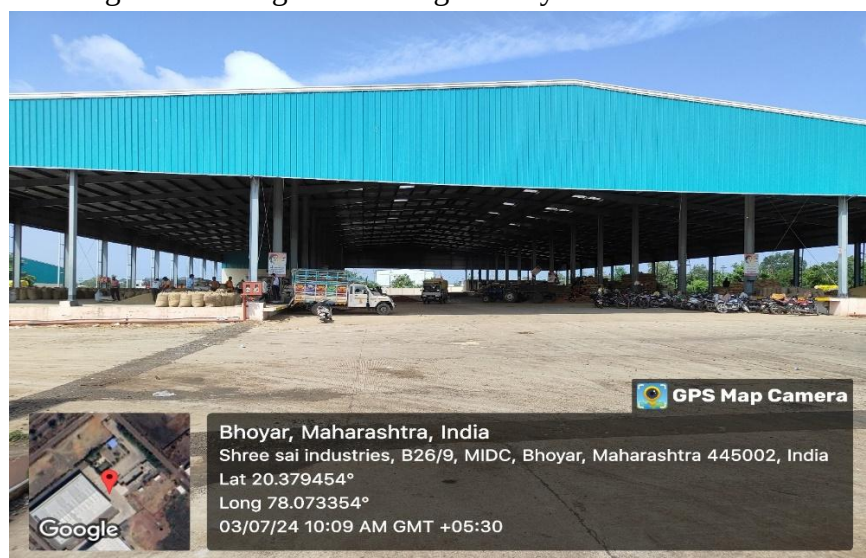
Note: Figures in parenthesis are percentages to the total sample size

Private Market Infrastructure Facility – Yavatmal

Trading and warehouse facility



Loading – Unloading and Parking Facility



Traders offices and Farmers Rest House



Source: Field Survey

It could be readily discerned from Table 5.6 that about 30-60 per cent of sampled maize farmers aired their responses in favour of availability of various facilities at APMC such as availability of weighing machines, auction clerks for transparent bidding, technology to measure moisture content in produce, porter services for loading and unloading of produce, market grievances redressal facility, electricity backup for computers, canteen, warehouse and foodgrain assaying facility. However, the responses of maize farmers were very poor in terms of availability of facilities like electronic display for dissemination of price information, soil testing facility, health clinic, ambulance, ticker board display, cold storage facility, etc.

The responses of onion farmers were more favourable in terms of availability of various facilities at APMC since about 50-90 per cent of them aired their view in favour of availability of certain specific facilities at APMC, which revolved around facility of weighing machine, technology to measure moisture content in produce, warehouse facility, porter services for loading and unloading of produce, electricity backup for computers, bidding facility and availability of water cooler facility.

The soybean farmers also favoured availability of certain specific facilities at APMC. More than 40 per cent of soybean farmers were found to air their view in favour of availability of facilities at APMC such as electricity backup for computers, technology to measure moisture content in produce, bidding facility, porter services for loading and unloading of produce, and facility of weighing machines.

Thus, the responses of maize, onion and soybean farmers in terms of availability of market infrastructure related facilities at APMC were not very encouraging since their responses were very poor for certain facilities. Although majority of these farmers favoured availability of certain specific facilities at APMC like porter services for loading and unloading of produce, technology to measure moisture content in produce, electricity backup for computers in the market, facility of transparent bidding and weighing machines, the respondents also showed their concern about poor or non-availability of certain facilities at APMC, which revolved around lack of electronic display for dissemination of price information, cold storage, health clinic and soil testing facility, foodgrain assaying facility, ticket board display facility, etc.

5.7 Availability of Infrastructure Facilities – PML

The private market license (PML) holders dealing with procurement of agricultural produce are expected to provide various facilities to producer farmers in the market. The private markets operate like many APMC. The farmers are supposed to

transport their produce to the private markets for final disposal. Like APMC, the sale of produce is undertaken through open bidding/ auction. However, the auction of specific produce takes place mostly twice in a week, unlike daily auctioning of produce at APMC. The farmers diverting their maize, onion and soybean crop produce through PML were asked to indicate various facilities available to them at PML units. The responses of farmers with respect to facilities provided by PML are presented in Table 5.7.

Table 5.7: Availability of Market Infrastructure Facility – PML

(Responses in Number and Percent)

Infrastructure and Facilities	Ahmednagar (Maize) (10)	Nashik (Onion) (10)	Yavatmal (Soybean) (10)	Overall (30)
Auction Hall	7 (70.00)	10 (100.00)	10 (100.00)	27 (90.00)
Godown	7 (70.00)	8 (80.00)	10 (100.00)	25 (83.33)
Internal Roads	7 (70.00)	9 (90.00)	10 (100.00)	26 (86.67)
Drinking Water Facility	9 (90.00)	9 (90.00)	10 (100.00)	28 (93.33)
Residence Facility for Farmer	9 (90.00)	3 (30.00)	10 (100.00)	22 (73.33)
Toilet Facility	9 (90.00)	8 (80.00)	9 (90.00)	26 (86.67)
Firefighting Facility	9 (90.00)	5 (50.00)	10 (100.00)	24 (80.00)
Residence for <i>Hamals</i> / Porters	9 (90.00)	6 (60.00)	10 (100.00)	25 (83.33)
Others (wi-fi- facility)	1 (10.00)	1 (10.00)	4 (40.00)	6 (20.00)

Note: Figures in parenthesis are percentages to the total sample size

The responses of farmers diverting their maize, onion and soybean crop produce through PML were quite encouraging since majority of these farmers aired their view in favour many facilities available at these private markets, which encompassed availability of auction hall, godown, internal road within market, drinking water facility, toilet facility, firefighting facility, residence facility for porters and farmers. In terms of availability of market infrastructure facility, private markets were better off as compared to APMC.

5.8 Source of Information about DML and PML Marketing Channels

There are several possible ways through which information regarding availability of innovative marketing channels and their underlying perceived benefits can be disseminated among farmers, and important among these encompass: fellow farmers, license holder traders, Gram Panchayat, relatives and friends, Agri-assistants, MSAMB/ Marketing department officials, SHGs, FPOs, cooperative societies, etc. The responses of sampled maize, onion and soybean farmers regarding their source of information about availability of innovative marketing channels are brought out in Table 5.8.

Although there are multiple sources to make farmers aware about the innovative marketing channels, the sampled beneficiary farmers mainly acquired information about their existence either from fellow farmers or licensed traders, friends and relatives.

Table 5.8: Source of Information about DML and PML Marketing Channels

(Responses in Number and Percent)

Source of Information	Ahmednagar (Maize)			Nashik (Onion)			Yavatmal (Soybean)			Overall		
	PML (10)	DML (40)	Total (50)	PML (10)	DML (40)	Total (50)	PML (10)	DML (40)	Total (50)	PML (30)	DML (120)	Total (150)
Fellow Farmer	8 (80.00)	26 (65.00)	34 (68.00)	10 (100.00)	39 (97.50)	49 (98.00)	4 (40.00)	10 (25.00)	14 (28.00)	22 (73.33)	75 (62.50)	97 (64.67)
License holder trader	5 (50.00)	28 (70.00)	33 (66.00)	2 (20.00)	20 (50.00)	22 (44.00)	3 (30.00)	15 (37.50)	18 (36.00)	10 (33.33)	63 (52.50)	73 (48.67)
Gram Panchayat	2 (20.00)	8 (20.00)	10 (20.00)	-	1 (2.50)	1 (2.00)	-	5 (12.50)	5 (10.00)	2 (6.67)	14 (11.67)	16 (10.67)
Relative and Friends	2 (20.00)	19 (47.50)	21 (42.00)	1 (10.00)	12 (30.00)	13 (26.00)	5 (50.00)	13 (32.50)	18 (36.00)	8 (26.67)	44 (36.67)	52 (34.67)
Agri- Assistant	1 (10.00)	1 (2.50)	2 (4.00)	2 (20.00)	3 (7.50)	5 (10.00)	1 (10.00)	7 (17.50)	8 (16.00)	4 (13.33)	11 (9.17)	15 (10.00)
MSAMB/ Marketing department	1 (10.00)	6 (15.00)	7 (14.00)	2 (20.00)	4 (10.00)	6 (12.00)	-	-	-	3 (10.00)	10 (8.33)	13 (8.67)
SHG	-	3 (7.50)	3 (6.00)	-	-	-	-	-	-	-	3 (2.50)	3 (2.00)
FPO	-	2 (5.00)	2 (4.00)	-	-	-	-	-	-	-	2 (1.67)	2 (1.33)
Cooperative Society	-	-	-	-	1 (2.50)	1 (2.00)	-	-	-	-	1 (0.83)	1 (0.67)

Note: Figures in parenthesis are percentages to the total sample size

As much as 65 per cent of sampled beneficiary farmers of innovative marketing channels acquired information regarding availability of marketing facilities through PML and DML from fellow farmers, and nearly 50 per cent among them received such information from licensed traders. About 35 per cent of beneficiary farmers received information regarding innovative channels from friends and relatives. Very few beneficiary farmers were found to depend on other sources to acquire information regarding innovative channels. The other major sources through which farmers acquired information about innovative marketing channels were Gram Panchayat, agricultural assistants and officials of marketing department.

5.9 Reason for Selecting Market Channels

At the time of survey, the sampled farmers were asked to indicate the reasons that weighed in favour of selecting innovative and traditional marketing channels for the final disposal of their maize, onion and soybean crop produce. The major reasons for the selection of innovative and traditional marketing channels revolved around: (a) receipt of better prices of produce, (b) reduction in overall cost of produce, (c) reduction in marketing cost, (d) reduction in transportation cost, and (e) availability of marketing facilities on daily basis. The responses of maize, onion and soybean farmers regarding reasons for their preference for specific marketing channel for marketing of their produce are brought out in Table 5.9.

It was observed that the maize farmers were diverting their produce through innovative marketing channel of PML and DML mainly due to availability of better prices of produce and also on account of reducing overall cost of produce, including marketing and transportation cost. On the other hand, the major reason for maize farmers that weighed in favour of using traditional marketing channel of APMC was the availability of various marketing facility on daily basis or as and when required since these market remain functional every day. The other reasons that weighed in favour of APMC channel for the marketing of maize crop produce were better prices on offer, reduction in marketing and other costs, etc.

In case of onion, the reasons for farmer's preference of innovative channel of PML and DML for the marketing of their produce were availability of better prices of produce and reduction in transportation cost. The APMC channel was preferred by onion farmers mainly due to availability of various marketing facility on day to day basis and also on account receiving remunerative prices of produce and reduction in cost, including marketing cost (Table 5.9).

Table 5.9: Reason for Selection of Innovative and Traditional Marketing Channels

(Responses in Number and Percent)

Reasons	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)				Overall			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (30)	DML (120)	APMC (90)	Total (240)
For Receiving Better Price	10 (100.00)	40 (100.00)	22 (73.00)	72 (90.00)	8 (80.00)	30 (75.00)	23 (77.00)	61 (76.00)	3 (30.00)	12 (30.00)	22 (73.00)	37 (46.00)	21 (70.00)	82 (68.00)	67 (74.00)	170 (71.00)
For Reducing Overall Costs	10 (100.00)	39 (98.00)	23 (77.00)	72 (90.00)	3 (30.00)	17 (43.00)	23 (77.00)	43 (54.00)	2 (20.00)	16 (40.00)	24 (80.00)	42 (53.00)	15 (50.00)	72 (60.00)	70 (78.00)	157 (65.00)
For Reducing Marketing Costs	9 (90.00)	39 (98.00)	22 (73.00)	70 (88.00)	7 (70.00)	14 (35.00)	23 (77.00)	44 (55.00)	2 (20.00)	14 (35.00)	22 (73.00)	38 (48.00)	18 (60.00)	67 (56.00)	67 (74.00)	152 (63.00)
For Reducing Transportation Costs	8 (80.00)	35 (88.00)	16 (53.00)	24 (30.00)	7 (70.00)	31 (78.00)	16 (53.00)	54 (68.00)	6 (60.00)	13 (33.00)	18 (60.00)	37 (46.00)	21 (70.00)	44 (37.00)	50 (56.00)	115 (48.00)
Availability of marketing facilities on daily basis	6 (60.00)	26 (65.00)	30 (100.00)	62 (78.00)	1 (10.00)	10 (25.00)	30 (100.00)	41 (51.00)	2 (20.00)	1 (3.00)	30 (100.00)	33 (41.00)	9 (30.00)	37 (31.00)	90 (100.00)	136 (57.00)

Note: Figures in parenthesis are percentages to the total sample size

The major reason that weighed in favour of soybean farmer's preference of innovative marketing channel was reduction in transportation cost and to certain extent on account of receiving remunerative prices for their produce. However, in case of soybean, the traditional channel of APMC was mostly preferred by farmers due to functional nature of these markets on daily basis, and also on account of other reasons like availability of better prices of produce, cost reduction, including overall marketing and transportation cost (Table 5.9).

Thus, in general, while availability of better prices of produce and reduction in marketing cost turned out to be the major reasons for farmer's preference of innovative channel of PML and DML, the traditional channel of APMC was preferred by maize, onion and soybean farmers mainly due to their day to day functioning, which helped them to avail marketing facilities on daily basis. The other reasons for farmer's preference of APMC were availability of better prices of produce and cost reduction, including overall marketing and transportation cost.

5.10 Problems/ Issues Faced by Farmers in Marketing of Produce

The perceptions of beneficiary farmers were also ascertained with respect to the problems/ issues faced by them in marketing of their maize, onion and soybean crop produces through innovative and traditional marketing channels, and the problems reported by them are presented in Table 5.10.

Although there could be wide range of problems/ issues faced by farmers in marketing of their produce through specific marketing channel adopted by them, the major problems/ issues faced by the sampled maize, onion and soybean farmers revolved around: (a) lower prices on offer than expected, (b) lower accrual of expected profit (c) delay in payment of produce, (d) high transportation cost, and (e) lower level of MSP.

It could be readily discerned from Table 5.10 that while majority of farmers using PML channel to market their maize crop did not face any problem, some among them showed lower prices and lower accrual of profit as their major concern. The major issues faced by the beneficiaries of DML were lower than expected prices, delay in payment of produce and lower accrual of expected profit from maize crop. Most of the beneficiaries of APMC also showed lower than expected price of maize as the major issue faced by them, while some among them did not reveal any problem faced by them.

In case of onion, while majority of beneficiaries of PML did not comment on problems faced by them, some among them also showed their concern for lower prices and lower accrual of profit.

Table 5.10: Problems faced by Farmers in Marketing of Produce through Various Channels

(Responses in Number and Percent)

Problems/ Issues	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)				Overall			
	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (10)	DML (40)	APMC (30)	Total (80)	PML (30)	DML (120)	APMC (90)	Total (240)
Price was lower than expectation	2 (20.00)	27 (67.50)	15 (50.00)	44 (55.00)	2 (20.00)	15 (37.50)	13 (43.33)	30 (37.50)	-	25 (62.50)	22 (73.33)	47 (58.75)	4 (13.33)	67 (55.83)	50 (55.56)	121 (50.42)
Profit received was lower	1 (10.00)	9 (22.50)	7 (23.33)	17 (21.25)	2 (20.00)	6 (15.00)	2 (6.67)	10 (12.50)	9 (90.00)	7 (17.50)	6 (20.00)	22 (27.50)	12 (40.00)	22 (18.33)	15 (16.67)	49 (20.42)
Instant cash is not received	-	12 (30.00)	-	12 (15.00)	-	5 (12.50)	-	5 (6.25)	-	2 (5.00)	-	2 (2.50)	-	19 (15.83)	-	19 (7.92)
High transportation cost	-	3 (7.50)	2 (6.67)	5 (6.25)	-	-	-	-	-	-	-	-	-	3 (2.50)	2 (2.22)	5 (2.08)
MSP need to be increased	-	-	3 (10.00)	3 (3.75)	-	-	-	-	-	3 (7.50)	-	3 (3.75)	-	3 (2.50)	3 (3.33)	6 (2.50)
No Problems	6 (60.00)	5 (12.50)	6 (20.00)	17 (21.25)	2 (20.00)	2 (5.00)	-	4 (5.00)	-	-	1 (3.33)	1 (1.25)	8 (26.67)	7 (5.83)	7 (7.78)	22 (9.17)
No Comments	1 (10.00)	1 (2.50)	2 (6.67)	4 (5.00)	6 (60.00)	22 (55.00)	16 (53.33)	44 (55.00)	1 (10.00)	6 (15.00)	4 (13.33)	11 (13.75)	8 (26.67)	29 (24.17)	22 (24.44)	59 (24.58)

Note: (i) Figures in parenthesis are percentages to the total sample size

(ii) Multiple responses in some cases

It could be further observed that most of the onion farmers also did not comment on problems faced by them in using DML marketing channel. However, many among them showed their concern for lower prices on offer for onion marketed through DML. Incidentally, while most of the onion farmers using APMC channel also reserved their comments on problems faced by them, more than 40 per cent of these beneficiaries showed lower prices as their major cause of concern.

In case of soybean, 90 per cent of beneficiaries of PML showed lower profit as their major cause of concern, whereas majority of beneficiaries of DML showed lower than expected price as the major issue of concern. The beneficiaries of APMC also showed lower prices of soybean as an issue of concern. .

Thus, in general, the major issue faced by the farmers in the marketing of their maize, onion and soybean produce through innovative channel of DML was the lower than expected price of the crop, which also held true in case of beneficiaries of traditional channel of APMC. However, it is to be also noted that about 25 per cent of these farmers did not comment on any problem faced by them while marketing their crop through innovative or traditional channel of marketing.

5.11 Farmers' Suggestions to Improve Effectiveness of Marketing Channels

The sampled maize, onion and soybean farmers were finally asked to extend various suggestions to improve effectiveness of marketing of produce through innovative and traditional marketing channels, and the suggestions extended by them in this respect are brought out in Table 5.11.

In order to improve efficiency of marketing of produce through innovative and traditional markets and to make them more effective, the sampled beneficiaries of PML, DML and APMC aired their own suggestions, which included: (a) provision of financing facility for purchase of automated machinery for drying, sorting and grading of produce, (b) reduction in prices of diesel/petrol by the govt. to reduce transportation cost, (c) provision of farmer's training programme on domestic and international trade, (d) provision of higher output prices, (e) provision of warehousing and processing facilities, (f) provision of marketing insurance facilities by the govt. to reduce expenses towards post-harvest losses, (g) provision of transport facility by the marketing agency at lower rates, (h) higher MSP for maize and soybean and declaration of MSP for onion, (i) provision of agri. machinery/equipment on rental basis through marketing agency, (j) provision of credit facilities through marketing agencies, and (k) provision of food/ rest house facility by the marketing agency.

Table 5.11: Suggestions of Beneficiaries of Innovative and Traditional Marketing Channels

(Responses in Number and Percent)

Farmers Suggestions	Ahmednagar (Maize)				Nashik (Onion)				Yavatmal (Soyabean)				Overall			
	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total	PML	DML	APMC	Total
Sample Size	10	40	30	80	10	40	30	80	10	40	30	80	30	120	90	240
Provision of financing facility for purchase of automated machinery for drying, sorting and grading	1 (10.00)	5 (12.50)	-	6 (7.50)	-	3 (7.50)	4 (13.33)	7 (8.75)	1 (10.00)	-	6 (20.00)	7 (8.75)	2 (6.67)	8 (6.67)	10 (11.11)	20 (8.33)
Reduction in prices of diesel/ petrol by the govt. to reduce transportation cost	1 (10.00)	7 (17.50)	3 (10.00)	11 (13.75)	1 (10.00)	9 (22.50)	12 (40.00)	22 (27.50)	3 (30.00)	7 (17.50)	9 (30.00)	19 (23.75)	5 (16.67)	23 (19.17)	24 (26.67)	52 (21.67)
Provision farmer's training programme on domestic and international trade	-	-	-	-	-	-	-	-	-	2 (5.00)	5 (16.67)	7 (8.75)	-	2 (1.67)	5 (5.56)	7 (2.92)
Provision of higher output prices	4 (40.00)	17 (42.50)	8 (26.67)	29 (36.25)	2 (20.00)	12 (30.00)	8 (26.67)	22 (27.50)	3 (30.00)	12 (30.00)	12 (40.00)	27 (33.75)	9 (30.00)	41 (34.17)	28 (31.11)	78 (32.50)
Provision of warehousing and processing facilities	3 (30.00)	7 (17.50)	1 (3.33)	11 (13.75)	3 (30.00)	4 (10.00)	1 (3.33)	8 (10.00)	-	2 (5.00)	-	2 (2.50)	6 (20.00)	13 (10.83)	2 (2.22)	21 (8.75)
Provision of marketing insurance facility by the govt. to curb post-harvest losses	1 (10.00)	13 (32.50)	3 (10.00)	17 (21.25)	2 (20.00)	2 (5.00)	4 (13.33)	8 (10.00)	3 (30.00)	14 (35.00)	6 (20.00)	23 (28.75)	6 (20.00)	29 (24.17)	13 (14.44)	48 (20.00)
Provision of transport facility by the marketing agency at lower rates	-	3 (7.50)	7 (23.33)	10 (12.50)	-	-	3 (10.00)	3 (3.75)	-	-	3 (10.00)	3 (3.75)	-	3 (2.50)	13 (14.44)	16 (6.67)
Higher MSP for maize and soybean and declaration of MSP for onion	-	10 (25.00)	5 (16.67)	15 (18.75)	6 (60.00)	23 (57.50)	10 (33.33)	39 (48.75)	2 (20.00)	9 (22.50)	6 (20.00)	17 (21.25)	8 (26.67)	42 (35.00)	21 (23.33)	71 (29.58)
Provision of agri. machinery/ equipment on rental basis through marketing agency	-	3 (7.50)	7 (23.33)	10 (12.50)	-	6 (15.00)	10 (33.33)	16 (20.00)	1 (10.00)	6 (15.00)	2 (6.67)	9 (11.25)	1 (3.33)	15 (12.50)	19 (21.11)	35 (14.58)
Provision of credit facilities through marketing agencies	-	1 (2.50)	-	1 (1.25)	-	2 (5.00)	4 (13.33)	6 (7.50)	-	1 (2.50)	-	1 (1.25)	-	4 (3.33)	4 (4.44)	8 (3.33)
Provision of food/ rest house facility by the marketing agency	-	1 (2.50)	-	1 (1.25)	-	5 (12.50)	1 (3.33)	6 (7.50)	1 (10.00)	2 (5.00)	1 (3.33)	4 (5.00)	1 (3.33)	8 (6.67)	2 (2.22)	11 (4.58)
No Comments	4 (40.00)	3 (7.50)	8 (26.67)	15 (18.75)	1 (10.00)	6 (15.00)	4 (13.33)	11 (13.75)	-	1 (2.50)	2 (6.67)	3 (3.75)	5 (16.67)	10 (8.33)	14 (15.56)	29 (12.08)

Note: (i) Figures in parenthesis are percentages to the total sample size

(ii) Multiple responses in many cases

Through their suggestions, the majority of beneficiaries of innovative marketing channels aired their view in favour of higher prices on offer for their maize, onion and soybean crop diverted through PML and DML, provision of marketing insurance facilities by the govt. in order to reduce expenses towards post-harvest losses, an increase in MSP for maize and soybean and declaration of price support by the government for onion having higher shelf life, reduction in prices of diesel/ petrol by the government with a view to reduce transportation cost involved in agricultural produce, provision of farm machinery and equipment on rental basis through marketing agency like facilities under Custom Hiring Center (CHC), provision of warehousing and processing facility, etc. The majority of beneficiaries of traditional marketing channels also aired their view in favour of receiving better prices for their maize, onion and soybean crop marketed through APMC, reduction in prices of fuel to reduce expenses towards transportation cost, an increase in MSP of maize and soybean and price support for onion crop, and facility of Custom Hiring Center with a view to access machinery and equipment on rental basis. The provision of financing facility for purchasing automated machinery for drying, sorting and grading of produce was another important suggestion extended by the beneficiaries of both innovative and traditional channel of marketing. It is to be noted that the study conducted by Shah (2018) also favoured announcement of minimum support price (MSP) for *rabi* onion, which has longer shelf life.

Thus, the major suggestion of beneficiaries of innovative and traditional marketing channel mainly revolved around more remunerative prices on offer for their maize, onion and soybean crop, reduction in prices of fuel to reduce expenses towards transportation cost, an increase in MSP of maize and soybean and some price support for onion crop having higher shelf life, provision of facility of Custom Hiring Center with a view to access machinery and equipment on rental basis, provision of marketing insurance facilities by the govt. in order to reduce expenses towards post-harvest losses, and provision of financing facility for purchasing of automated machinery for drying, sorting and grading of produce. Appropriate measures undertaken to address these suggestions extended by beneficiaries of innovative and traditional marketing channel will not only improve effectiveness but also efficiency of these channels of marketing.

5.12 Awareness about e-NAM

As mentioned in chapter 2, in all 133 APMCs of the State are operating under e-NAM. These constitute around 43 percent of the main market yards in Maharashtra. Up to October 2024, about 481 lakh qtl of agricultural produce worth Rs 18,073 crore was e-

auctioned and e-payments of 449 crore were made. Quality assaying laboratories have been established in 118 APMCs for quality inspection & certification of agricultural commodities.

On this background, the farmers were asked whether they were aware about e NAM platform and whether and to what extent they had participated in the same for trading the selected commodities. It is interesting to note that not a single sample farmer across the districts selected was aware about the e NAM facility and hence answers could not be received for any further questions.

CHAPTER - VI

DIRECT MARKETING LICENSE HOLDERS AND PRIVATE MARKET LICENSE HOLDERS: PERSPECTIVES FROM THE FIELD

6.1 Introduction

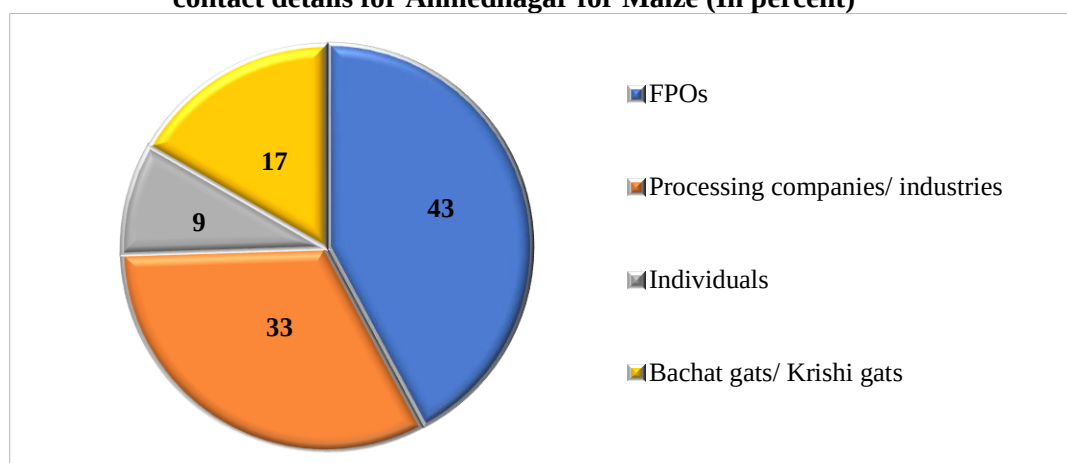
The ultimate objective of the study was to assess the comparative prices received as well as costs incurred by the farmers attached to innovative channels and also with the regulated marketing channel, i.e. the APMCs. The analysis of profitability of various types of farmers and their feedback was presented in chapter 5. Along with farmers, traders are also important stakeholders. This chapter examines the feedback of the DMLH-PMLH traders and problems faced by them while marketing agri produce. Information was collected from these traders through a structured questionnaire. For this purpose, as mentioned in section on methodology in chapter 1, 5 DMLH traders and 1 PMLH trader were contacted in each district or in other words for each crop. The total number of DMLH and PMLH traders interviewed was thus 15 and 3 respectively. This chapter attempts to seek information on profile of the traders, application procedure for getting license, reasons for choosing this channel for procuring agri produce, prices paid to farmers, problems faced and their suggestions.

6.2 Active and Non Active DML and PML License Holders in the Selected Districts

DMLH Traders

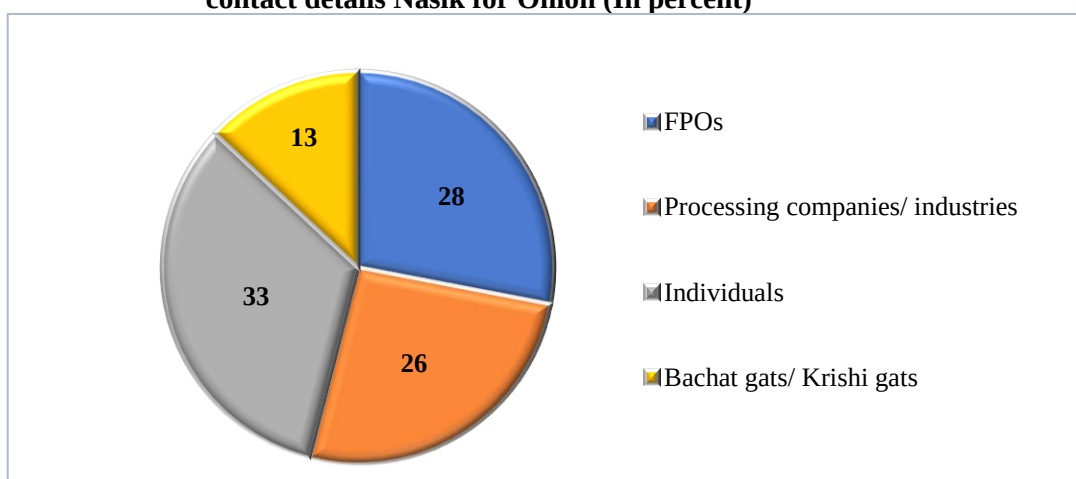
In case of the three sample districts, the examination of data revealed that 318 DM licenses were issued by the marketing department of the state. Out of these DMLH traders, 168 DMLH traders could be contacted as their full contact details were available. Figures 6.1a to 6.1c show classification of those DMLH traders who could be contacted and classified. It can be seen that mainly, the licenses have been given to FPOs, companies and to individuals also. Percentage of DM licenses issued to FPOs is highest in Ahmednagar for crop maize. Whereas in case of onion, percentage of DM licenses issued to individuals was highest, it was highest for processing companies/ industries in Yavatmal for soybean.

Figure 6. 1a: Classification of Direct Marketing License Holders with availability of full contact details for Ahmednagar for Maize (In percent)



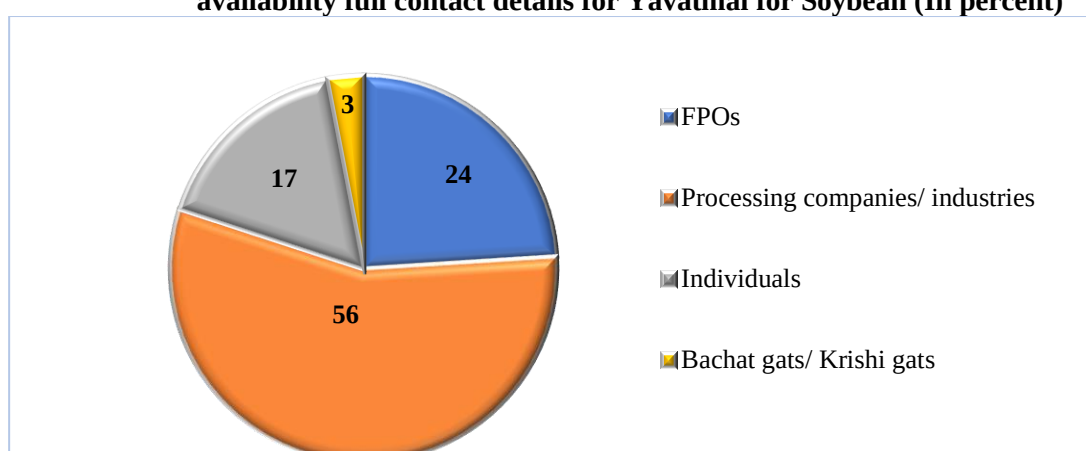
Source: Based on data provided by the office of MSAMB, Department of Marketing, GoM, Pune.

Figure 6. 1b: Classification of Direct Marketing License Holders with availability full contact details Nasik for Onion (In percent)



Source: Based on data provided by the office of MSAMB, Department of Marketing, GoM, Pune.

Figure 6.1c: Crop wise Classification of Direct Marketing License Holders with availability full contact details for Yavatmal for Soybean (In percent)



Source: Based on data provided by the office of MSAMB, Department of Marketing, GoM, Pune.

Information was collected before visiting the field for understanding the status (active/ not active) of their business through telephonic interaction. Out of the 168 DMLH, 27 percent did not respond to phone calls. 40 percent reported that they were actively engaged as DMLH traders. Table 6.1 indicates the number of active DMLH traders.

Table 6.1: Commodity wise Number of Active DML Holders (Figures in number and percent)

Sr. No	Districts	Total number of active DMLH traders during reference years (% to total licenses issued in the district for all crops)	Crop selected	Number of active traders handling the selected crop
1	Ahmednagar	14 (30)	Maize	5
2	Nashik	37 (49)	Onion	14
3	Yavatmal	17 (37)	Soybean	9

Source: Based on data provided by the office of MSAMB, Department of Marketing, GoM, Pune.

The rest of the DMLH traders, i.e. 33 percent out of 168 who could be contacted as mentioned above, informed that they were not active as DMLH. Based on the information received, reasons for not being active as DMLH trader in the three selected districts were classified. This is indicated in table 6.2.

Table 6.2: Reasons given by DMLH for being Not Active (Responses in percent)

Sr. No	Reasons for being inactive as DMLH	Not Active as DMLH traders (%)
A	Financial problems - Closed During Covid / due to fire /drought	9
B	Closure/ license surrender due to - Rent agreement pending/ migration/ closure of buyer processing unit etc.	16
C	Business yet to start	5
D	DM Channel specific issues	25
1	Not able to gain profit by buying through DM channel and selling to wholesalers as price paid for the produce might be higher than that received for the produce when sold.	9
2	Obstacles created by APMC traders- APMC commission agents/ wholesalers buy at the farm gate at a higher rate	3
3	Buying from NAFED at a lower rate and sell at a higher rate	1
	Buying Commodity from APMC market directly, for which DML license not needed	2
4	Storage not available	1
5	Farmers not responding by trading through DM channel	9
	Total	100

Source: Based on data provided by the office of MSAMB, department of Marketing, GoM, Pune and telephonic interviews conducted before the field work.

It can be seen from the table 6.2 that 9 percent reported financial problems due to various reasons and 16 percent reported closure of the business. In case of 5 percent traders, business was not started as yet at the time of telephonic interaction. 25 percent of the traders

cited various channel specific reasons for not being active DMLH. The reasons provide us with important insights.

- As seen from the table, 9 DMLH traders found the *trading business unprofitable* as frequently the price to be received for the produce was lower than the procurement price which had to be paid to the farmers.
- Another set of 9 traders reported that *farmers were not willing to sell their* produce to them through DM channel.
- 3 traders reported *APMC traders bought the produce at the farm gate at a relatively higher price* which the DMLH trader could not pay
- 2 traders reported that they *procure from APMC market directly as it was found more profitable* and for which DM license was not required.
- 1 trader reported *procurement from NAFED at relatively lower rate* and sale of this produce at relatively higher rate. Thus this was found more profitable than trading through DM channel.
- 1 trader reported that storage was not available.

It is thus noted that though in all 168 DM licenses have been issued in the three reference districts, all license holders are not active or have closed this activity. This could be true for other districts of Maharashtra also. Discussions revealed that more number of DMLH traders become active when the margins are higher in a particular season for a particular crop. Also, depending upon chances of receiving relatively higher profits, the traders become active in case of a particular commodity. Thus, the commodities traded by them by using DM license may be different every year.

PMLH traders

In case of PM channel, only 27 PMLH were there in the list of 3 selected districts provided by the state marketing department. The licenses were issued in the name of private bajar samitis/ private limited companies. Out of these 27 traders, contact details of 3 traders were incomplete. Hence they could not be contacted. Out of the remaining 24 traders, it was found that 18 were actively engaged as private market traders and 6 were not active. This can be seen from the following table. The 6 traders who were not active were not willing to share information for not being active.

Table 6.3: Commodity wise Number of Active and Not Active PMLH Traders

Sr. No	Districts	Number of Total License holders in selected sample districts			Commodity selected and number of traders of the commodity	
		Total	Not Active	Active (%)	Commodity selected	Number of active traders handling the selected commodity
1	Ahmednagar	6	-	6 (100)	Maize	6
2	Nashik	8	2	6(75)	Onion	6
3	Yavatmal	10	4	6(60)	Soybean	5
	Total	24	6	18(75)	-	17

Source: Based on data provided by the office of MSAMB, Department of Marketing, GoM, Pune and telephonic interviews conducted before the field work.

6.3 Profile of the Traders

As discussed in section 1.5 on methodology, in all 18 traders were interviewed in order to understand their perspective about the functioning of the DM and PM channel. DM licenses were given to farmer producing companies, other private agri companies and to individuals. PMLH Licenses were issued in the name of private limited companies or bazar samitis.

An examination of nature of activity of the DMLH traders shows that, they were engaged in trading and processing of the produce. In Ahmednagar, 2 DMLH traders were processing units - a livestock feed unit and a grading unit for Maize. In Nasik, they were engaged in trading as well as onion processing (drying and selling to spice units). In the third district Yavatmal, all DML holders were engaged in trading of the commodities. This can be seen from table 6.4.

Table 6.4: District wise Crop wise Classification of Activities of DMLH traders (Number and share of DMLH Traders)

Sr.	Business activities as DMLH traders	Ahmednagar	Nashik	Yavatmal
1	Trading of the commodities	3(60)	-	5(100)
2	Processing of the commodities	2(40)	-	-
3	Trading and Processing of the commodities	-	5(100)	-
	Total	100	100	100

Source: Field survey

The main activity of the PMLH traders was to establish private market for procurement of agri commodities.

The table 6.5 shows the average area of operation and investment made by the DMLH and PMLH traders. It can be seen that as expected, on an average, the area as well as investment made by the PMLH traders is higher than the DMLH traders.

Table 6.5: Average Area of Operation and Investment made by the DMLH and PMLH

Area and Investment	Ahmednagar		Nashik		Yavatmal	
	DML	PML	DML	PML	DML	PML
Average Area (Sq feet)	22,780	2,17,800	6,500	3,60,000	6,180	3,26,700
Average Investment (Rs crores)	1.28*	4.5	1.50**	3.5	1.19***	3.5

Note: * Grading, sorting unit, feed making units, ** onion cutting, drying, packaging units, *** land for parking, loading unloading, warehouses

Source: Field survey

DMLH Maize Feed Making Unit in District Ahmednagar



DMLH Onion Cutting Unit in District Nashik



DMLH Soyabean Seed Processing Unit in District Yavatmal



Source: Field Survey

6.4 Application Process for Getting License

The traders were asked about the ease of process of application to get DM/PM licenses. It can be seen from table 6.6 that almost all i.e. 17 out of 18 traders reported that the process was very easy and easy.

Table 6.6: Ease of the Online Application Submission Process for getting DM /PM License (Number of Respondents and their share in the category in percent)

Sr. No.	Online application submission process on the portal	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	Very Easy	1 (20)	-	3 (60)	1 (100)	3 (60)	1 (100)
2	Easy	3 (60)	1 (100)	2 (40)	-	2 (40)	-
3	Difficult	1 (20)	-	-	-	-	-
	Total	5 (100)	1 (100)	5 (100)	1 (100)	5 (100)	1 (100)

Note: Figures in Parenthesis are the percentage,

Source: Field Survey

Only one trader felt that the process was difficult. They were also asked about the source of knowledge about DML and PML channels. Whereas majority i.e. 12 traders out of 18 reported that they came to know about the same from the MSAMB/ marketing department officials, 6 traders informed that the source of information was fellow traders (table 6.7)

Table 6.7: Source of Knowledge about Direct Marketing License / Private Market License (Number of Respondents and their share in the category in percent)

Sr. No.	Sources of Knowledge	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	Family and friends	-	-	1 (20)	-	-	-
2	Fellow traders	1 (20)	-	3 (60)	-	2 (40)	-
3	MSAMB / marketing department officials	4 (80)	1 (100)	2 (40)	1 (100)	3 (60)	1 (100)
4	Self-search	-	-	-	1 (100)	2 (40)	-

Note: 1. Figures in Parenthesis are percentage 2. Multiple answers received

Source: Field Survey

When asked about the reasons for applying for the license, multiple answers were received. For 13 traders across the districts, the major objective was to have a better business. Reducing costs of trading and increasing profits were other reasons.

Table 6.8: Reasons for Applying the License (Number of Respondents and their Share in the category in percent

Sr. No.	Reasons for applying the License	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	For better business	3 (60)	1 (100)	5 (100)	1 (100)	2 (40)	1 (100)
2	To reduce costs	2 (40)	1 (100)	-	-	1 (20)	-
3	To increase profits	1 (20)	-	-	-	4 (80)	-

Note: 1. Figures in Parenthesis are percentage 2. Multiple answers received

Source: Field Survey

6.5 Procurement from the Farmers

It was revealed that almost all the traders had list of farmers attached with them (as mentioned in the government guidelines relating to documents required for issuing licenses) and record of number of farmers and the quantity transacted was maintained by the traders. The average number of farmers attached to the traders can be seen from table 6.9.

Table 6.9: Average Number of Farmers Attached to the Traders

Particulars	Districts and Marketing Channels					
	Ahmednagar		Nashik		Yavatmal	
	DML	PML	DML	PML	DML	PML
Sample size (No)	5	1	5	1	5	1
Average Number of farmers attached	762	62674*	362	425008*	2420	57500*

Note: * indicates number of farmers who visited private markets in the year 2023-24

Source: Field Survey

Table 6.10 shows the extent of their operations. Most of the traders have purchased the produce from within the taluka as well as from other talukas.

Table 6.10: Produce Procured during 2022-23 and 2023-24 (Number of Respondents and their share in the category in percent)

Sr. No.	Location of Produce Procurement	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	Within taluka	5 (100)	1 (100)	5 (100)	1 (100)	5 (100)	1 (100)
2	From other talukas	3 (60)	1 (100)	3 (60)	1 (100)	2 (40)	1 (100)
3	Other state/ states	-	-	-	-	-	-

Note: 1. Figures in parenthesis are percentage 2. Multiple answers received

Source: Field Survey

The traders were asked about quality of the produce procured as the price to be paid is determined based on the same. As can be seen from table 6.11, most of the traders responded that they checked the quality of the produce based on observation and/or by touching. Few traders reported that they also checked the quality by smelling the product.

One trader in Yavatmal (soybean) reported use of moisture machine for checking the quality of the produce.

Table 6.11: Checking the Quality of the Produce to be Procured (Number of Respondents and their share in the category in percent)

Sr. No.	Quality of Produce is checked	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	By look	5 (100)	1 (100)	4 (80)	1 (100)	2 (40)	-
2	By touch	3 (60)	1 (100)	4 (80)	-	3 (60)	1 (100)
3	By smell	2 (40)	-	1 (20)	-	1 (20)	-
4	Moisture Machine	-	-	-	-	1 (20)	-

Note: 1. Figures in parenthesis are percentages 2. Multiple answers received

Source: Field Survey

Further, the traders were asked if they were receiving the produce of the expected quantity. All the traders reported that they got the produce of the expected quality. They were also asked about the facilities they have for ensuring good quality of the produce procured and for connecting with the farmers. It can be seen from table 6.12 that five of the total traders were involved in creating awareness about post-harvest practices and maintaining quality of produce. Drone spraying services were also provided by one of the traders. This indicates various ways in which the traders make an attempt to reduce the cost of production/ of marketing of their seller farmers.

Table 6.12: Various Services Provided to the Farmers (Number of Respondents and their share in the category in percent)

Sr. No	Services provided to Farmers	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	Creating awareness among farmers about post-harvest practises for maintaining quality of produce.	1 (20)	1 (100)	1 (20)	-	1 (20)	1 (100)
2	Providing drone spraying services	1 (20)	-	-	-	-	-
3	No response	3 (60)	-	-	1(100)	2 (40)	-

Note: 1. Figures in parenthesis are percentage 2. Multiple answers received

Source: Field Survey

6 traders also reported that they provided payment immediately to the farmers after the procurement for the benefit of the farmers.

Procurement of Maize by a DMLH Trader in District Ahmednagar from the Farm gate



Source: Field Survey

Onion storage with a DMLH Trader in District Nashik



Source: Field Survey

Soyabean Storage of a DMLH Trader in District Yavatmal



Source: Field Survey

Maize Private Market – Ahmednagar District



Source: Field Survey

Onion Trader Section in Private Market – Nashik District



Source: Field Survey

Auction of Soybean in a Private Market – Yavatmal District



Source: Field Survey

6.6 Sale of the Procured Produce by the Traders in 2022-23 and 2023-24

It can be seen from table 6.13 that after procuring the crop from the farmers, the traders have sold their produce to multiple buyers.

Table 6.13: Sale of the Procured Produce by the Traders in 2022-23 and 2023-24 (Responses in number and their share in the category)

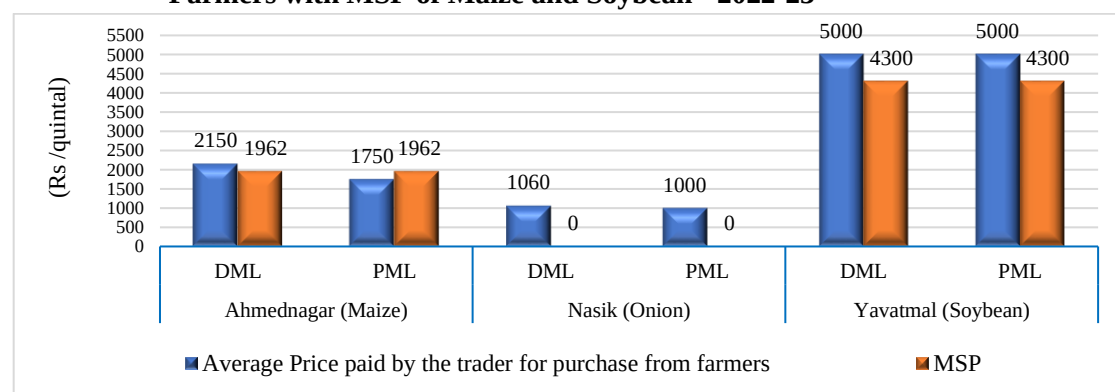
Sr. No	Sold the produce procured from farmers to	Ahmednagar		Nasik		Yavatmal	
		DML	PML	DML	PML	DML	PML
1	APMC	1(20)	1(100)	2 (40)	1(100)	-	1(100)
2	Processing unit	3(60)	-	-	-	1(20)	-
3	Traders from other districts/ states	1(20)	1(100)	-	1(100)	2(40)	1(100)
4	Wholesaler		1(100)	-	-	3(60)	1(100)
5	Retailer			4(80)	-	-	
6	Used for own processing unit	1(20)		1(20)	-	-	

Note: 1. Figures in Parenthesis are percentage 2. Multiple answers received

Source: Field Survey

The traders were asked about the price they paid to the farmers while procuring their produce. It can be observed from Figures 6.2 and 6.3 that on an average, price paid by the DML traders was higher than the PML traders in the year 2022-23 as well as 2023-24.

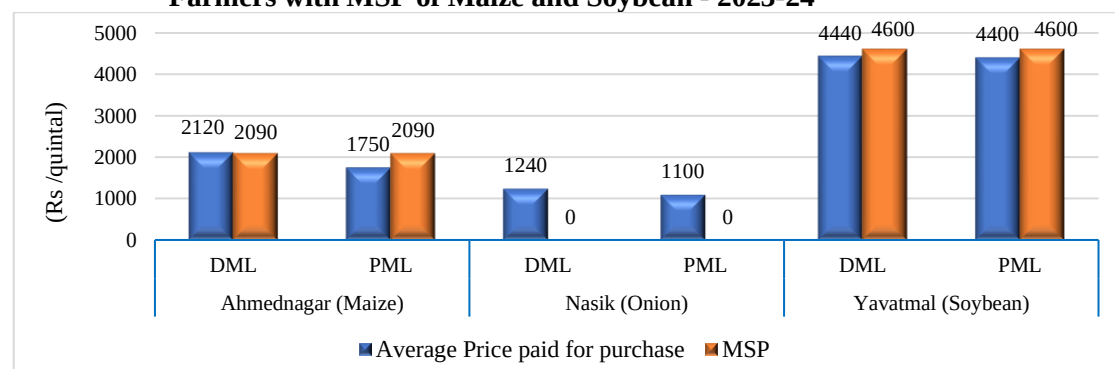
Figure 6.2: Comparison of the Average Price Paid by the DMLH and PMLH Traders to Farmers with MSP of Maize and Soybean - 2022-23



Note: The prices paid by the traders do not reflect average prices paid to the sample farmers of our study.

Source: Field Survey

Figure 6.3: Comparison of the Average Price Paid by the DMLH and PMLH Traders to Farmers with MSP of Maize and Soybean - 2023-24



Note: The prices paid by the traders do not reflect prices paid to the sample farmers of our study.

Source: Field Survey

It is interesting to note that the average price paid by the DML traders was more than the MSP for the concerned years in case of maize. The PML prices were however were less than the MSP. In case of soybean, the price paid by DML was higher than the

MSP for the year 2022-23. However, the price was little higher than the MSP in 2023-24. Same pattern was noted for payment by PML in case of soybean.

6.7 Awareness and Perspectives of Traders

Table 6.14 presents the awareness of the traders and their perceptions. It is interesting to note that not a single trader that was interviewed was aware of e NAM. Next, they were asked about the difficulties they faced during the procurement process. In all, 5 DML farmers out of 15 pointed out problems relating to inadequate grading and sorting infrastructure. The major issue raised here was that they were using manual machinery for sorting and grading. However, the modern machinery was more efficient and automatic, but was highly expensive and hence unaffordable. Next, some of the traders informed that they had to connect with farmers to attract business and that the farmers required doorstep procurement/ pick up of the produce. This posed difficulties. One more difficulty for DMLH and PMLH traders was that the farmers had to be paid cash instantly. Fluctuating prices in the APMC market was also one of the problems faced. It was revealed that the volume traded of a particular commodity being comparatively lower, the purchase price of the DMLH traders remains the same for a few days till the transactions are taking place. However, by the time procurement transactions are over, the price in the market may change thus adversely affecting the profit margins of the DMLH traders. Lastly one of the responses revealed that the farmers preferred APMC channel for marketing as they felt secure with the same.

Table 6.14: Perception of the Traders (In percent)

Sr. No.	Perceptions of Traders	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	Sample Size	5	1	5	1	5	1
1	Traders not aware about e NAM	5 (100)	1(100)	5 (100)	1 (100)	5 (100)	1 (100)
2	Difficulties faced during procurement of the produce						
	• Grading and sorting Issues	3(60)	-	1 (20)	-	1 (20)	1(100)
	• Bargaining with farmers and competition for attracting farmers	2(40)	-	2 (40)	-	4 (80)	-
	• Door step pick up required by farmers	2 (40)	-	-	-	-	-
	• Price fluctuations and fluctuating profit margins	1 (100)	-	1 (100)	-	1 (100)	-
	• Farmers need instant cash payment	-	1(100)	1 (20)	-	2 (40)	-
	• Farmers feel secure with APMC market	-	-	-	1 (100)	-	-
3	Constraints faced in storing the produce						
	• Lack of adequate godowns / warehouses	3 (60)	1(100)	5 (100)	-	3 (60)	-
	• Deterioration of quality due to weather changes	-	-	-	-	2 (40)	1 (100)

Sr. No.	Perceptions of Traders	Districts and Marketing Channels					
		Ahmednagar		Nashik		Yavatmal	
		DML	PML	DML	PML	DML	PML
	• Rodents and fungus damaging the produce	-	-	1 (20)	-	3 (60)	1 (100)
	• No Subsidy facilities for maintaining the storehouses	-	-	2 (40)	-	-	-
4	Suggestions by traders						
	• Provide Subsidy for construction of storage facilities	2 (40)	-	4 (80)	-	1 (20)	-
	• Provide subsidy for export and Transport Facilities	2 (40)	1(100)	1 (20)	-	-	-
	• Government should establish Krishi Mall /Farm Input Mall/ Auzaar bank and provide subsidy for equipment purchase.	-	-	-	-	-	1 (100)
	• MSP should increase, so that farmers as well as traders benefit due to higher prices	2 (40)	-	-	-	-	-
	• Import duty on edible oil should be raised so as to give a boost to Indian market for oilseeds which can lead to higher margins for the traders and benefit to farmers.	-	-	-	-	2 (40)	-

Note: 1. Figures in Parenthesis are percentage 2. Multiple answers received

Source: Field Survey

The suggestions mainly relate to the expectation of the traders to have subsidized storage facilities, export and transport facilities. One of the respondent also suggested establishment of a farm input mall which will support purchase of equipment / machinery needed during purchase of the commodity. It was also suggested that the MSP of crops as well as tariffs on imports (of edible oil) should increase so that it will provide lead to increase in domestic market prices of concerned crops and provide incentive to increase area under the crop.

6.8 Summary

Based on the data provided by the marketing department of the state government relating to total DM licenses issued in the three sample districts of Ahmednagar, Nasik and Yavatmal, only around 52 percent (or 168) of the traders could be contacted due to availability of full contact details. Out of these 168 DMLH traders, 27 percent did not respond to phone calls. 40 percent reported that they were actively engaged as DMLH traders. Out of these, only the selected crop specific traders were contacted. The rest, i.e. 33 percent informed that they were not active during reference years as DMLH due to DM channel specific problems as well as other financial issues.

In case of PMLH traders, out of a total of 27 traders in the 3 selected districts, contact details of 3 traders were incomplete. Hence they could not be contacted. Out of the

remaining 24 traders, it was found that 18 were actively engaged as private market traders and 6 were not active. It is thus noted that though the number of DM and PM licenses issued is very high in Maharashtra, all of the license holders may not be active either on temporary / permanent basis. As far as the process of getting license is concerned, almost all i.e. 17 out of 18 traders reported that the application process for getting DM and PM license was easy. Whereas majority i.e. 12 traders out of 18 reported that they came to know about the same from the MSAMB/ marketing department officials, 6 traders informed that the source of information was fellow traders. For 13 or 72 percent of the traders interviewed across the districts, the major objective for operating through innovative channel was to have better business. Others reported reducing costs of trading as well as increasing profits as major reason for adopting innovative channel.

Data relating to prices paid by the traders to the farmers while procuring the produce revealed that the average price paid by DML traders was higher than that paid by the PML traders in the year 2022-23 as well as 2023-24 for maize as well as onion. It is interesting to note that the average price paid by the DML traders was more than the MSP for the concerned years in case of maize. The PML maize prices however were less than the MSP in both the years. In case of soybean, the price paid by DML was higher than the MSP for the year 2022-23. However, the DML as well as PML price was less than the MSP in 2023-24.

As far as awareness of the traders is concerned, it was found that none of them was aware about the e NAM initiative. The major concerns reported by the traders were regarding need to compete with APMC traders for connecting with more and more farmers by paying them a remunerative price. Also, availability of adequate warehouse spaces was also reported as one of the concerns. Hence, their suggestions focused on subsidy for construction of storage facilities, transport and export of produce, announcement of higher MSP and higher import duty on edible oils for the benefit of farmers as well as traders.

CHAPTER – VII

SUMMARY AND CONCLUSIONS

7.1 Major Findings Emerging from the Study

This chapter presents major findings of the study based on the secondary collected from the state marketing department and government publications as well as primary data collected from the field.

7.2 Major findings – Secondary data

7.2.1 APMCs and Marketing Reforms in Maharashtra

- The state of Maharashtra can be considered as a pioneer as far as the system of agri marketing is considered as the *first ever APMC in India* was established in Maharashtra in the year 1886 at Karanja Lad, in district Akola of the vidarbha region for marketing of cotton.
- In the post-independence period Maharashtra has acquired top position as the state with highest number (930) of total APMC main and sub market yards
- However, it can also be noted that Maharashtra is also a state with highest number (243) of non-functional market yards. The share of these to the total market yards is almost 21 percent.
- As per the recent decision, the state government will be establishing 65 APMCs in talukas with non-existent APMCs under the initiative ‘One Taluka, One Market Committee’
- The state adopted model APMC Act of the central government in 2006 and also became a pioneer as far as market reforms are concerned. Thereby it permitted sale of agri commodities through different channels apart from the traditional channel of APMCs. It is the state which has issued highest number of licenses for direct marketing and private markets.
- The value of ‘Agricultural Marketing and Farmer Friendly Reforms Index (AMFFRI)’ launched by NITI Ayog in 2016 was highest for the state of Maharashtra
- 133 APMC mandis in the state are connected with the electronic marketing platform under e NAM which was initiated by the central government in the year 2016.
- Overall, it is found that the state has permitted sale of agri commodities through different channels apart from the traditional channel of APMCs and has been a pioneer state in that context. *However, the available data shows that the turnover of*

APMCs in year 2019-20 was approximately 7 times higher than that under DM and PM channels.

- *Thus, APMCs of the state still remain the main destination for sale and purchase of agri commodities in the state*

7.2.2 Cropping Pattern Changes in Maharashtra

- Although the estimates show a steady decline in area under cereals as proportion to GCA over the last four decades in Maharashtra, there has also been sharp increase in area under maize within cereals.
- The increase in area under pulses as proportion of GCA is mainly due to significant increase in area under Bengal gram and red gram over time.
- The estimates show about two folds rise in share of oilseeds in GCA of Maharashtra during the last four decades, which has been mainly due to substantial increase in area under soybean.
- Among various vegetable crops, the area under onion as proportion of GCA increased significantly only during the last one decade or so. This is despite the fact that bulk of the onion produced in India comes from Maharashtra and the state is considered as the onion basket of the country.

7.2.3 Trend in Area, Production and Yield of Maize Crop

- The increase in maize production is not only due to sharp increase in area but also significant expansion in yield of maize in all the major maize growing districts of Maharashtra.
- The cumulative effect of nearly two folds rise in yield and more than three folds rise in area has resulted in more than six folds rise in production of maize crop in Maharashtra during the last two decades.

7.2.4 Trend in Area, Production and Yield of Soybean Crop

- The production of soybean crop in Maharashtra has grown by about four folds during the last two decades, which is mainly achieved due to area expansion as estimates hardly show any discernible improvement in yield of soybean during the last two decades.
- The districts belonging to Latur and Amravati divisions of the state have mainly accounted for the major increase in area as well as production of soybean in Maharashtra. In general, the state of Maharashtra has done remarkably well in the production of this important oilseed crop cultivated in India.

7.2.5 Trend in Area, Production and Yield of Onion Crop

- There has been six folds rise in area and about eight folds rise in production of onion in Maharashtra over the last two decades. The increase in production of onion is mainly contributed by area expansion since there has not been much improvement in yield of onion.
- Despite the fact that Maharashtra has been consistently accounting for bulk of India's total output of onion for the past several decades, the state lags far behind many states in terms of yield of onion.
- The states like Madhya Pradesh, Gujarat, Bihar, Haryana, Rajasthan and Uttar Pradesh have shown higher yield of onion as against Maharashtra.

7.3 Socio-economic Characteristics of the Selected Farmers

- Overall, 97 per cent of respondents were male and only 3 per cent belonged to female category. In fact, the gender profile of soybean farmers was cent per cent in favour of male, and it was only in case maize and onion farmers that a few belonged to female category.
- The age profile showed that more than 80 per cent of selected maize, onion and soybean farmers using innovative as well as traditional marketing channels were less than 60 years of age with majority of them falling in the 36-59 years of age category.
- The education status showed that the sampled respondents using innovative and traditional marketing channels in the marketing of their maize, onion and soybean crops were relatively well educated since very high proportion of them attained education beyond secondary level.
- The estimates also showed that illiteracy was relatively higher among respondents using traditional marketing channel as compared to respondents using innovative marketing channels.
- The caste profile of sampled respondents turned out to be invariably in favour of general and OBC category since about 85 per cent of total sampled respondents belonged to these two social groups. This held true of both for farmers using innovative and traditional marketing channel.
- 95 percent of the sampled respondents using traditional and innovative marketing channels for the marketing of their maize, onion and soybean crops reported crop cultivation as the major occupational activity.

- The estimates further showed that the proportion of net operated area under irrigation was about 85 per cent for maize farmers, 98 per cent for onion farmers and 69 per cent for soybean farmers.
- Although the land holding characteristics of maize, onion and soybean farmers remained same during the reference years 2022-23 and 2023-24, some of the maize and onion farmers also showed fragmentation and selling of land in 2023-24, which resulted in marginal decline in average size of owned land holding and net operated area of these farmers during 2023-24 as against 2022-23.
- The cropping pattern estimates during the reference years 2022-23 and 2023-24 showed that the sampled maize, onion and soybean farmers cultivated various crops under irrigated as against un-irrigated conditions since area allocation under irrigation was as much as about 82 per cent of GCA for maize farmers, 98 per cent for onion farmers and about 70 per cent for soybean farmers.
- Although the selected farmers cultivated large number of crops on their farm, the major area allocation was found to be under maize, onion, soybean, and to certain extent cotton crop.

7.4 Cultivation and Marketing Cost for Selected Crops

- The sampled maize, onion and soybean farmers using innovative and traditional marketing channels showed significant differences in cultivation and marketing cost of their crop.
- The differences were noticed not only with respect to labour and material input cost involved in cultivation operations but also in terms expenses incurred towards labour and material input used in marketing of produce.
- Although the farmers using innovative and traditional marketing channel did not show any discernible difference in per acre total cost of *maize* during the last two years, the average per acre marketing cost of maize turned out to be relatively higher for farmers using traditional marketing channel of APMC since they incurred higher expenses towards packing, transportation, loading and unloading activities as against farmers using innovative marketing channels
- The cultivation of *onion* was found to be more labour intensive with significantly high element of cost as against maize. The cost estimates for onion crop during 2022-23 showed that the farmers using traditional marketing channel of APMC incurred 24 per cent higher cost of onion as against farmers using PML marketing channel

and 8 per cent higher cost as against farmers using DML marketing channel. The estimates further showed much higher marketing cost of onion for farmers using traditional marketing channel as against farmers using innovative marketing channel.

- In case of soybean, the farmers using innovative marketing channels were found to incur relatively less expenditure towards various cultivation and marketing operations as against farmers using traditional marketing channels.
- During the last two years, the farmers using APMC marketing channel showed 9-12 per cent higher per acre total cost of soybean as against farmers using PML marketing channel and 8-11 per cent higher cost as against farmers using DML marketing channel.
- In general, labour and material input used in cultivation operation put together showed 88 per cent share in total cost of soybean with the remaining 12 per cent share in cost being accounted for labour and material input used in marketing of produce.

7.5. Profitability Analysis for Selected Crops

Profitability Analysis for Selected Crops: 2022-23

- During 2022-23, *though the APMC farmers showed higher net returns from maize as against PML farmers, the net returns from maize was 10 per cent higher on per quintal basis and 8 per cent higher on per acre basis for beneficiaries of DML as against APMC beneficiaries.*
- The APMC farmers not only showed higher cost of onion but also lower price and output value, which resulted in much lower net returns from onion crop cultivated by them as against beneficiaries of DML and PML. *The DML farmers showed 75 per cent higher per acre net returns from onion as against APMC farmers, and this return was 73 per cent higher for them on per quintal basis. Similarly, as against APMC farmers, the PML farmers showed 61 per cent higher net returns from onion on per acre basis and 66 per cent higher returns on per quintal basis.*
- The higher cost and lower output price resulted in lower returns from soybean for the APMC farmers. *The estimates showed that PML and DML farmers received 46-48 per cent higher net returns from soybean as against APMC farmers, both on per acre and per quintal basis.*

Profitability Analysis for Selected Crops: 2023-24

- The estimates showed that DML farmers received 13-14 per cent higher net returns from maize on per quintal and per acre basis as against APMC farmers. The PML farmers also showed 25 per cent higher per acre net return from maize as against APMC farmers.
- In case of onion, higher price and output value for DML farmers and lower cost for PML farmers resulted in significantly high net returns for them as against of APMC. The average per acre net return from onion was found to be 33 per cent higher for DML beneficiaries and 35 per cent higher for PML beneficiaries as against APMC farmers. Similarly, the average per quintal net return from onion was seen to be 39 per cent higher for DML farmers and 33 per cent higher for PML farmers as against APMC farmers.
- Thus, output price and cost played an important role in determining the extent of returns from onion for the farmers of innovative and traditional marketing channel.
- As for soybean, the estimates during 2023-24 showed relatively higher value of output for DML farmers as against PML and APMC farmers, whereas cost was higher for APMC farmers as against PML and DML farmers. As a result, the average per acre net return from soybean turned out to be 55 per cent higher for DML farmers and 38 per cent higher for PML farmers as against APMC farmers.
- The higher cost and relatively lower prices also resulted in lower per quintal net returns from soybean for APMC farmers. As against APMC farmers, the average per quintal net return from soybean was 54 per cent higher for DML farmers and 44 per cent higher for PML farmers.
- Thus, higher cost and relatively lower prices resulted in much lower returns from soybean for APMC farmers as against farmers of innovative marketing channel.

7.6 Availability of Infrastructure Facilities

- Although wide range of facilities are expected to be available at APMC, the responses of maize, onion and soybean farmers in terms of availability of market infrastructure related facilities at APMC were not very encouraging.
- Majority of farmers aired their view in favour availability of certain specific facilities at APMC like porter services for loading and unloading of produce, facility of weighing machines, technology to measure moisture content in produce, electricity backup for computers in the market and facility of transparent bidding,

- The respondents also showed their discontent for poor or non-availability certain facilities at APMC, especially with respect to lack of electronic display for dissemination of price information and ticket board display facility, poor grievances redressal facility, non-availability of cold storage, health clinic and ambulance facility, lack of soil testing and food grain assaying facility, etc.
- The PML farmers favoured private markets mainly due to availability of many facilities in these markets such as availability of auction hall, godown, internal road within market, drinking water facility, toilet facility, firefighting facility, residence facility for porters and farmers.
- Thus infrastructure facilities available at PML also played a crucial role in encouraging farmers to divert their produce through these markets.

7.7 Reasons for Selecting Market Channels

- Availability of better prices of produce and reduction in marketing cost turned out to be the major reasons for farmer's preference of innovative channel of PML and DML
- The traditional channel of APMC was preferred by these farmers mainly due to their day to day functioning, which helped them to avail marketing facilities on daily basis. The other reasons that weighed in favour of APMC were availability of remunerative prices of produce and overall cost reduction, including marketing and transportation cost.

7.8 Problems/ Issues Faced by Farmers in Marketing of Produce

- The major issue faced by the farmers in marketing of their maize, onion and soybean produce through innovative channel of DML was the *lower than expected price* of the crop, which also held true in case of beneficiaries of traditional channel of APMC. The PML farmers showed lower profit as their major cause of concern. However, it deserves mention that about 25 per cent of these farmers did not comment on any problem faced by them while marketing their crop through innovative or traditional channel of marketing.

7.9 Farmers Suggestions to Improve Effectiveness of Marketing Channels

- The major suggestion of farmers of innovative and traditional marketing channel mainly revolved around more remunerative prices on offer for their maize, onion and soybean crop, reduction in prices of fuel to reduce expenses towards transportation cost, an increase in MSP of maize and soybean and some price support for onion crop having higher shelf life.

- Provision of facility of Custom Hiring Center with a view to access machinery and equipment on rental basis, provision of marketing insurance facilities by the govt. in order to reduce expenses towards post-harvest losses, and provision of financing facility for purchasing automated machinery for drying, sorting and grading of produce were some other suggestions.

7.10 Feedback from DMLH and PMLH traders

- Based on the data provided by the marketing department of the state government relating to total DM licenses issued in the three sample districts of Ahmednagar, Nasik and Yavatmal, only around 52 percent (or 168) of the traders could be contacted due to availability of full contact details.
- Out of these 168 DMLH traders, 27 percent did not respond to phone calls. 40 percent reported that they were actively engaged as DMLH traders. Out of these, only the selected crop specific traders were contacted. The rest, i.e. 33 percent informed that they were not active during reference years as DMLH due to DM channel specific problems as well as other financial issues.
- In case of PMLH traders, out of a total of 27 traders in the 3 selected districts, contact details of 3 traders were incomplete. Hence they could not be contacted. Out of the remaining 24 traders, it was found that 18 were actively engaged as private market traders and 6 were not active.
- It is thus noted that though the number of DM and PM licenses issued is very high in Maharashtra, all of the license holders may not be active either on temporary / permanent basis.
- As far as the process of getting license is concerned, almost all i.e. 17 out of 18 traders reported that the application process for getting DM and PM license was easy.
- Whereas majority i.e. 12 traders out of 18 reported that they came to know about the same from the MSAMB/ marketing department officials, 6 traders informed that the source of information was fellow traders.
- For 13 or 72 percent of the traders interviewed across the districts, the major objective for operating through innovative channel was to have better business. Others reported reducing costs of trading as well as increasing profits as major reason for adopting innovative channel.
- Prices paid by the DMLH and PMLH traders to the farmers were compared. These were also compared with respective MSP of maize and soybean.

- It was revealed that *average price paid by DML traders was higher than that paid by the PML traders in the year 2022-23 as well as 2023-24 for maize as well as onion.*
- The average price paid by the DML traders was more than the MSP for the concerned years in case of *maize*. The PML maize prices however were less than the MSP in both the years.
- In case of *soybean*, the price paid by DML was higher than the MSP for the year 2022-23. However, the DML as well as PML price was less than the MSP in 2023-24.
- As far as awareness of the traders is concerned, it was found that *none of them was aware about the e NAM initiative.*
- The major concerns reported by the DMLH and PMLH traders were regarding need to compete with APMC traders for connecting with more and more farmers by paying them a remunerative price.
- Also, need for adequate warehouse spaces was also reported as one of the concerns.
- Hence, their suggestions focused on subsidy for construction of storage facilities, transport and export of produce, announcement of higher MSP and higher import duty on edible oils for the benefit of farmers as well as traders.

It is revealed that each marketing channel has benefits to offer to the farmers. There are also concerns or problems in case of each of the channels. The farmers depending upon various factors, take decision to sell the produce through a particular channel every year. Similarly, traders especially DMLH traders take decision to be active or not active and about the crop to be traded depending upon several factors. The coexistence of various channels of marketing thus provides alternatives to farmers so that they can take decision to sell the produce based on marketing cost and price received associated with each channel so as to increase profitability of the crop.

CHAPTER - VIII

POLICY SUGGESTIONS

As is observed from the examination of the data, Maharashtra has highest number of APMC mandis and is also considered to be a pioneer state in carrying out marketing reforms in case of agricultural commodities. However, APMCs of the state still remain the main destination for sale and purchase of agri commodities in the state. The analysis also indicates that DML and PML farmers not only received higher output prices for their maize, onion and soybean crops but also generated much higher net returns from these crops as against farmers using traditional channel of APMC. However, it is revealed that there is a need to strengthen marketing of agri produce through both the marketing channels. Based on the analysis of the data, following are the policy suggestions with the ultimate objective of strengthening and improvement in the existing market infrastructure facilities, remunerative prices on offer for the produce and various other support to farmers with a view to reduce their production as well as marketing cost.

1. Reports reveal that 65 new APMCs will be established in talukas which do not have any APMC madis. It is also observed from the Draft National Policy on Agriculture that 243 or around 21 percent of the total number of APMC mandis are nonfunctional in Maharashtra. *Hence, apart from establishment of new APMC mandis, efforts should be made to use these nonfunctional facilities.*
2. The analysis of secondary data shows that increase in production of soybean and onion in case of Maharashtra has been mainly on account of area expansion. In fact, Maharashtra, though an important state as far as production of these crops is concerned, it lags behind other states as far as yield at the state level is concerned. *Hence there is need to increase yield of these crops.*
3. The study showed that the farmers using innovative channels of DML and PML not only received higher output prices for their maize, onion and soybean crops but also generated much higher net returns from these crops as against farmers using traditional channel of APMC. However, *all the farmers were concerned about lower than expected prices received* by them. They suggested increase in MSP of maize and soybean and price support for onion having higher shelf life. Therefore, suggestion to strengthen the procurement operations and increase MSP may be considered so that farmers receive remunerative price and adequate profits/ net returns over and above their costs.

4. Farmers using different marketing channels were concerned about high cost of production especially the cost of marketing. Hence based on their suggestions, efforts should be made to reduce fuel and transportation cost, to provide facility of custom hiring centre for post-harvest equipment, to provide marketing insurance facilities and financing facility for purchasing of automated machinery for drying, sorting and grading of produce needs to be considered.
5. The farmers using APMC mandis for sale of their produce were concerned about poor or lack of facilities such as electronic display for dissemination of price information, cold storage, health clinic and soil testing facility, food grain assaying facility, ticket board display facility, etc. *Hence there is a need to improve facilities extended by APMC mandis.*
6. As far as the traders are concerned, the analysis revealed that all of the DM license holders in the three selected districts may not be active either on temporary / permanent basis mainly due to their smaller scale of operations and the need to compete with other channels for giving remunerative prices to farmers. Their major suggestion was about necessity of having good quality subsidized storage facilities which would reduce their cost of storage and profitability. *Hence, efforts should be made to expand subsidized storage facilities for the DM License holder traders.*
7. None of the farmers as well as DMLH and PMLH traders who interviewed were aware about e NAM platform and its functioning. *Therefore, there is need to increase awareness of the farmers and the traders about the e NAM platform for transaction of agri commodities.*

Appropriate measures and initiatives undertaken will not only improve effectiveness as well as efficiency of marketing system but also improve overall financial condition/position of farmers through expansion in production and marketing of produce.

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ANNEXURE I: COMMENTS ON DRAFT REPORT BY DESIGNATED AGRO-ECONOMIC RESEARCH CENTRE, VALLABH VIDYANAGAR, GUJARAT

Comments on the Draft Report received from
 Agro-Economic Research Centre, Gokhale Institute of Politics and Economics
 (Deemed University), Pune, Maharashtra

Comments on draft report

1.	Title of report	Comparative Advantage of Price Realization to the Farmers on sale of their Produce through Competitive and Innovative Marketing Channel vis-a-vis Traditional Channel in the State of Maharashtra
2.	Date of receipt of the Draft report	June 23, 2025
3.	Date of dispatch of the comments	July 3, 2025
4.	Comments on the Objectives of the study	Objectives of the study have been satisfied.
5.	Comments on the methodology	Study is based on Primary and secondary data.
6.	Comments on analysis, organization, presentation etc.	The study has made an attempt to compare and contrast the working of the innovative and traditional marketing channels with respect to costs incurred, prices received by the farmers and infrastructure available. The study is presented in eight chapters besides preliminary and references pages.
		However, the study can be strengthened if following suggestions are undertaken and further analysis is conducted, if possible (marketing efficiency).
		(a) On page iii, Para 3, remove ‘-‘before 81.7 and after 100
		(b) On page iv, para 2 (sampling design and methodology- Line 10.. complete the sentence.. ‘Further... Yavatmal were selected.
		(c) Page 5, Line 5... check and complete/correct sentence (The three indicators.....were.)/ delete ‘were’
		(d) On page 12, please rewrite ‘ The absence of Bihar..... these states/UTs’, Damn correct as Daman as Daman
		(e) Page 18, TOI, 2020-missing in reference list
		(f) Page 19, GoM, 2025- missing in reference list
		(g) Page 22..Table 3.1...correct as 2020/21
		(h) Page 38...Characteristics of Selected Farmers
		(i) Page 41 and 43... last para....check district selected...Pune of Yavatmal
		(j) Page 52.. Table 4.10 title delete repetitions source

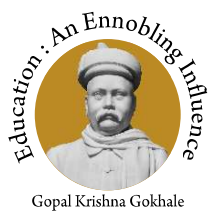
		(k)	Page 56....para 2...The sampled soyaben farmers were fond to cultivate.....onion farmers...any specific reason
		(l)	Pages 68 and 69...figures do not match with figures 5.1a to 5.2b.
		(m)	Page 83 and 84..Table 5.3 and 5.4....Cost of Production= Production Cost/Production, whether marketing =differs and why?, Separate out cost of production/qt and cost of marketing/qt so as to get better picture, Marketing efficiency would have been better to understand efficient market
		(n)	Page 87..Table inside text..% increase or decrease (+/-) or higher or lower than in %
		(o)	Page 102...5. 12.. complete the sentence... state wise..... platform.
		(p)	Page 128....suggestion 3....did you find any sale under PSS scheme to suggest higher MSP
		(q)	Page 129....suggestion 4-high cost of marketingmay not be production
		(r)	Page 129... Last para.... appropriate measure and initiatives undertaken ...far????
7.	References	Few references mentioned in text is missing	
8.	General remarks:	The study is a comprehensive study to compare and contrast the working of the innovative and traditional marketing channels with respect to costs incurred, prices received by the farmers and infrastructure available	
9.	Overall view on the acceptability of the report:		
	The report is acceptable and suggestions may be incorporated wherever possible and then treat is as a final.		

**ANNEXURE II: ACTION TAKEN BY THE AUTHORS ON THE COMMENTS OF
THE DESIGNATED CENTRE FOR THE STUDY ENTITLED**

**“COMPARATIVE ADVANTAGE OF PRICE REALIZATION TO THE FARMERS
ON SALE OF THEIR PRODUCE THROUGH COMPETITIVE AND INNOVATIVE
MARKETING CHANNEL VIS-A-VIS TRADITIONAL CHANNEL IN THE STATE
OF MAHARASHTRA”**

The authors are thankful to the reviewer for the keen interest taken and the suggestions made by him on the report.

Keeping in view objectives and focus of the study, suggestions have been incorporated



**Gokhale Institute
of Politics and
Economics**
(Deemed to be University)
Pune - 411 004

846, Shivajinagar, BMCC Road, Deccan Gymkhana, Pune 411 004.

Ph. No.: 020 - 25683300

Website: www.gipe.ac.in