

Markets and Value Chain Study of Major Commodities in the Dryland Regions of Maharashtra



Submitted to
Groundwater Survey & Development Agency (GSDA)

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Markets and Value Chain Study of Major Commodities in the Dryland Regions of Maharashtra

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Project

Landscape resource management for augmenting groundwater recharge
and sustainable intensification of farming systems and building resilience
for improved livelihoods of smallholder farmers in drylands of Maharashtra, India

Submitted to

Groundwater Survey & Development Agency (GSDA)



Contents

1. Introduction.....	1
2. Study location and study methodology	1
3. Key characteristics of the study locations: land holding, farming systems, farm implements and basic infrastructure and institutions	3
4. Market and value chain analysis in the study locations: overall scenario	5
5. Market and value chain assessment: district-wise analysis considering the major commodities	7
5.1 Buldhana.....	7
5.2 Jalna.....	10
5.3 Latur	13
5.4 Nagpur	15
5.5 Nashik.....	17
5.6 Pune.....	19
5.7 Solapur	21
6. Policy Recommendations for Sustainable Agricultural Value Chain Development in the Study Regions of Maharashtra	24
a. Strengthening Market Access Infrastructure and Reducing Transaction Costs.....	24
b. Institutionalizing Farmer Agency in Price Discovery and Market Negotiation.....	24
c. Build Crop-Specific Post-Harvest and Value Addition Ecosystems	24
d. Revitalize and Reorient Extension Services towards Market and Value Chain Skills	25
e. Improve Input Quality and Timeliness to Enhance Value Chain Competitiveness.....	25
f. Market Risk Management	25
g. Location-Specific Intervention Priorities.....	25
h. Governance and Monitoring Framework	25
i. Promote Climate-Resilient and Sustainable Practices in Value Chains	25
j. Strengthening Export-Oriented Value Chains	26
7. Conclusions and Way Forward:	26

List of Figures

Figure 1: Location of the study districts	2
Figure 2: Selected districts, talukas, villages, and distribution of sample households	2
Figure 3: Farmers' level of access to the market for selling farm produce in the study locations (in %).....	6
Figure 4: Perfection of the extent of impact of different market-related constraints on crop production across locations (%)	7
Figure 5: Household-wise farmer's price of selected commodities in Buldhana.....	9
Figure 6: Household-wise price trend of selected commodities in Jalna	11
Figure 7: Household-wise price trend of selected commodities in Latur	14
Figure 8: Household-wise price trend of selected commodities in Nagpur	16
Figure 9: Household-wise price trend of selected commodities in Nashik	18
Figure 10: Household-wise price trend of selected commodities in Pune	20
Figure 11: Household-wise price trend of selected commodities in Solapur	23

List of tables

Table 1: Average landholding size (ha) of the households across districts.....	3
Table 2: Farming systems of the Study locations.....	4
Table 3: Availability and accessibility of basic infrastructure and institutions in the study locations	4
Table 4: Level of accessibility of various farm implements in the study locations	4
Table 5: Farmers' perceptions on challenges related to post-harvest and markets across seven districts (%).....	6
Table 6: Area under cultivation and price variability of major commodities in Buldhana district.....	8
Table 7: Summary of market access, challenges, and value chain insights for major crops in Buldhana	9
Table 8: Area under cultivation and price variability of major commodities in Jalna district.....	11
Table 9: Summary of market access, challenges, and value chain insights for major crops in Jalna	12
Table 10: Area under cultivation and price variability of major commodities in Latur district.....	13
Table 11: Summary of market access, challenges, and value chain insights for major crops in Latur.....	14
Table 12: Area under cultivation and price variability of major commodities in Nagpur district	16
Table 13: Summary of market access, challenges, and value chain insights for major commodities in Nagpur	17
Table 14: Area under cultivation and price variability of major commodities in Nashik district	18
Table 15: Summary of market access, challenges, and value chain insights for major commodities in Nashik	19
Table 16: Cultivated area, price range, and price variation for selected crops in Pune district.....	21
Table 17: Summary of market access, challenges, and value chain insights for major commodities in Pune	21
Table 18: Cultivated area, price range, and price variation for selected crops in Solapur district.....	23
Table 19: Summary of market access, challenges, and value chain insights for major commodities in Solapur	23

1. Introduction

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), in partnership with the Ground Water Surveys and Development Agency (GSDA), is conducting a collaborative study focused on improving agricultural systems and livelihoods in rural Maharashtra, India. The study emphasizes both resource efficiency and enhanced agricultural productivity. It also explores sustainable farming practices and effective market integration for smallholder farmers. The central goal is to support rural communities by strengthening natural resource management, introducing climate-resilient farming techniques, and improving market access for key agricultural commodities. This initiative adopts a comprehensive approach to agricultural development, combining economic advancement with ecological sustainability and social empowerment. By equipping farmers with improved knowledge and practices and strengthening linkages across the agricultural value chain—from production to market—the project seeks to improve farmers' incomes and reduce their vulnerability to climate and market risks. A critical focus of the study is on optimizing the use of land and water resources while promoting farming systems that are both environmentally responsible and economically viable. The project also seeks to identify and promote region-specific innovations that align with agro-ecological conditions and local market opportunities. Improved market access is a core pillar of this intervention. By enhancing the efficiency of input supply chains and improving the terms under which farmers engage with output markets, the project aims to ensure that smallholder producers receive fair returns for their produce. Stronger value chain integration will also increase the availability of quality inputs and improve the competitiveness of rural farmers in regional markets.

This report provides a multidimensional assessment of the market and value chain of location-specific, most important agricultural commodities. The findings serve as a foundation for identifying strategic entry points for sustainable interventions. By mapping current practices, constraints, and opportunities across the commodity value chains, the study will inform evidence-based strategies that promote sustainable intensification, market resilience, and long-term rural development.

2. Study location and study methodology

The present market and value chain study was conducted across seven key regions in the state of Maharashtra, India (refer to Figure 1 and Figure 2). Following consultations with the funding agency, a thorough review of secondary data sources, and the implementation of a participatory scoping survey, the study identified the following districts as representative sites: Buldhana, Jalna, Latur, Nagpur, Nashik, Pune, and Solapur. Within each selected district, villages were chosen using a stratified sampling approach to ensure diversity in agro-ecological zones and socio-economic conditions. The final village selections were as follows: Ubalkhed in Motala taluka (Buldhana), Masegaon in Ghansawangi taluka (Jalna), Matephal in Latur taluka (Latur), Khursapur in Katol taluka (Nagpur), Ghorwad in Sinner taluka (Nashik), Chambali in Purandar taluka (Pune), and Bhend in Madha taluka (Solapur). These villages were strategically chosen to reflect the heterogeneity of farming systems, resource availability, and rural livelihoods across the state. To generate comprehensive and grounded insights, a total of about 500 households were surveyed across the selected villages. In addition to the structured survey tools, an extended household-level inquiry was carried out in a subset of locations to capture deeper, contextual data on farming practices, natural resource usage, and market linkages. This intensive data collection effort was aimed at improving the understanding of regional variations in agricultural production systems, input use, and farmer-market interactions. The distribution of surveyed households across the sites is presented in the accompanying figure. Through this carefully designed sampling and data collection strategy, the study aimed to construct a robust evidence base to support targeted interventions in agricultural value chains and inform sustainable rural development strategies in Maharashtra.

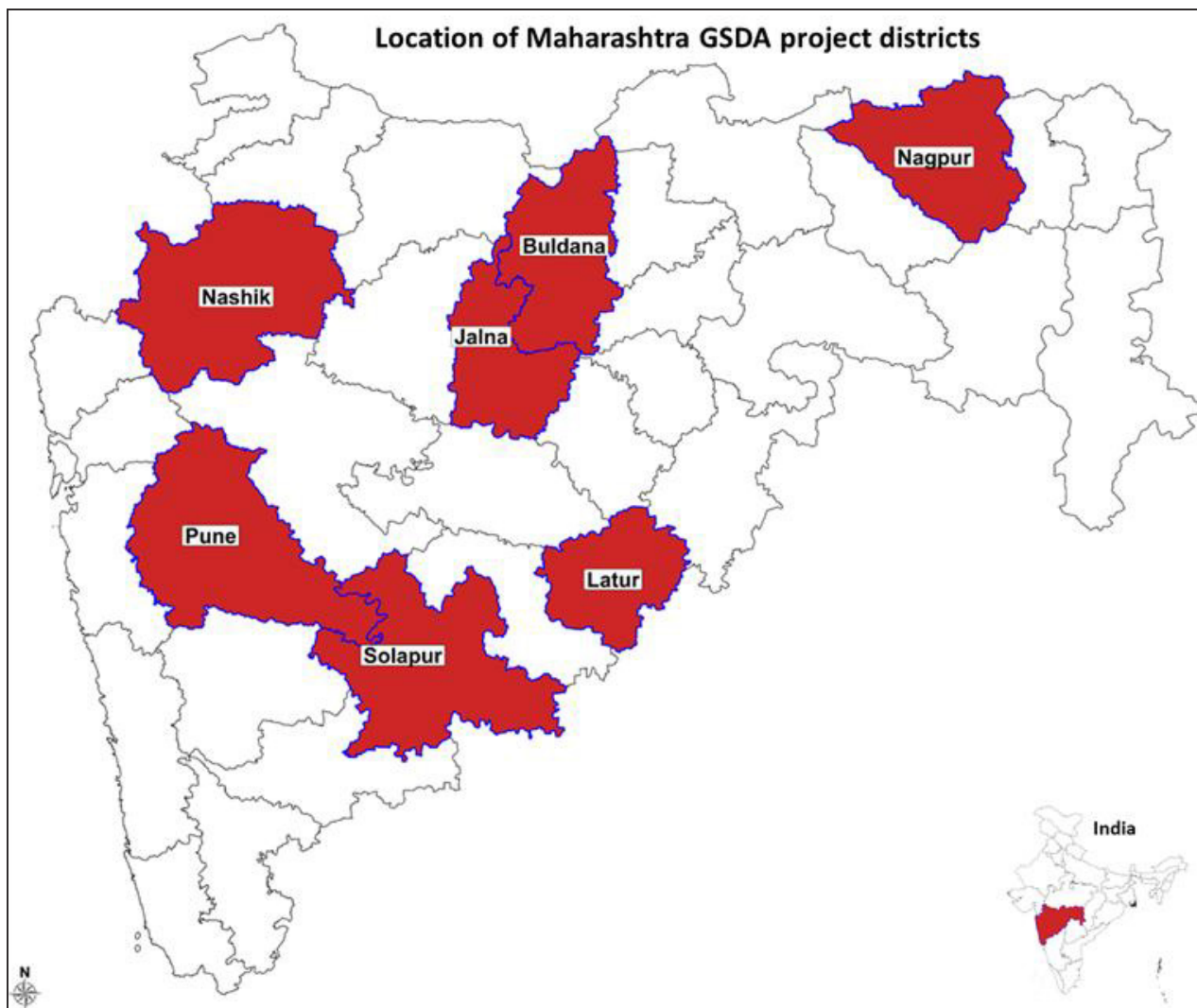


Figure 1: Location of the study districts.

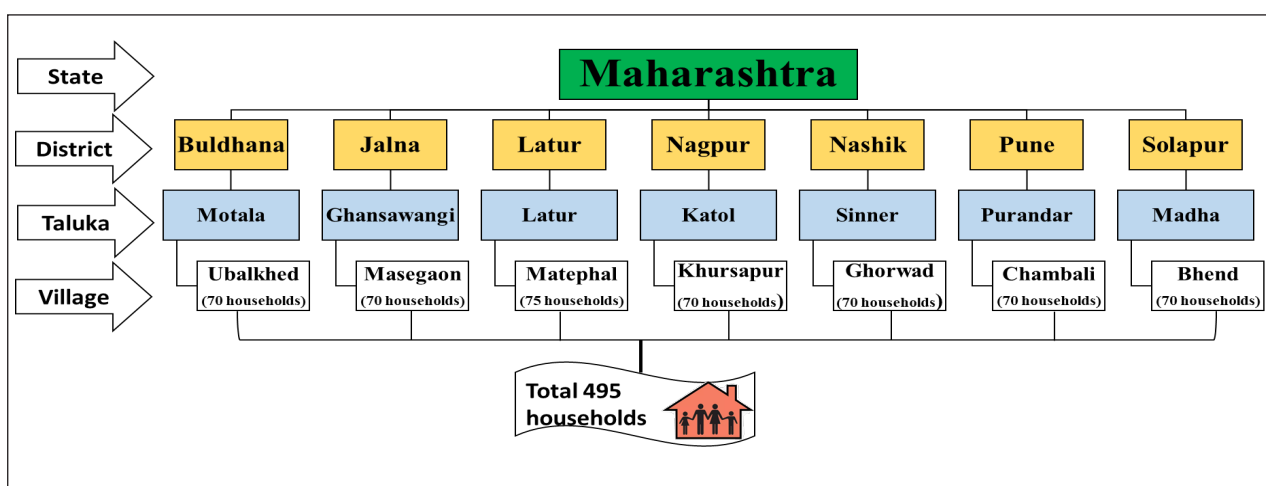


Figure 2: Selected districts, talukas, villages, and distribution of sample households.

3. Key characteristics of the study locations: land holding, farming systems, farm implements and basic infrastructure and institutions

Landholding patterns and agricultural practices across districts reveal important differences that are vital for understanding local farming systems and planning interventions. As presented in Table 1, there is considerable variation in the size and type of land owned by households across districts. In Buldhana, the average household owns 2.50 hectares of cultivated land, with 0.63 ha rainfed and 1.87 ha irrigated. Similarly, Nagpur shows relatively higher total landholdings at 2.91 ha, where the irrigated portion dominates. In contrast, Solapur displays smaller holdings, with 1.21 ha rainfed and just 0.41 ha irrigated, for a total of 1.63 ha. Pune reports the lowest, with only 0.34 ha of rainfed and 0.58 ha of irrigated land. On average, farmers across all districts own 2.07 ha, with rainfed land contributing nearly 50% of the total. Notably, the share of rainfed land is highest in Jalna, followed by Latur and Nashik. These patterns underline the unequal distribution of land and irrigation access, emphasising the need for region-specific strategies to improve land and water productivity. Table 2 provides insight into the dominant farming systems observed in the study areas. Field crop cultivation emerges as the most widespread practice, highlighting the continued importance of cereals, pulses, and commercial crops for food and income. In several locations, there is a visible trend towards diversification into horticultures such as fruits, vegetables, and flowers, indicating a shift toward higher-value agriculture. This diversification not only contributes to dietary improvement but also opens up opportunities for additional income. Additionally, livestock rearing remains a common and integral component of the farming system across all locations. This mixed farming structure, where crop cultivation and livestock co-exist, supports nutrient recycling and optimizes farm resource use. These multifunctional systems reinforce the broader role of agriculture beyond production, including its contributions to income security, environmental sustainability, and cultural identity. A review of infrastructure and service access in Table 3 further highlights spatial disparities. Latur exhibits excellent service proximity, with most facilities, such as education centres, health units, agri-input dealers, and cooperatives, located within 1 km, except banks, which are about 8 km away. Solapur also shows good proximity, with several essential services situated within 0.5 km. Conversely, in Buldhana, only schools and information centres are easily accessible, while other services remain relatively distant at 5 km or more. In Nashik and Pune, accessibility is mixed, suggesting the need for improved planning to ensure equitable access to services vital for agricultural development. As mentioned in Table 4, access to farm machinery varies significantly. All locations report ownership or use of basic tools like tractors and seed drills. Buldhana, Jalna, Latur, and Nagpur have widespread use of animal-drawn ploughs and threshers. Nagpur stands out for its access to advanced machinery such as BBF makers, power weeders, and fruit-picking equipment. While Pune and Solapur also show progress in machinery access, Solapur lacks traditional tools like animal ploughs and faces gaps in specialized equipment. Limited access to implements like grading machines and happy seeders continues to pose barriers to conservation agriculture and horticultural diversification. Facilitating need-based access to modern farm equipment could play a key role in enhancing productivity and system resilience.

Table 1: Average landholding size (ha) of the households across districts.

District	Rainfed own land	Irrigated own land	Total cultivated own land
Buldhana	0.63	1.87	2.50
Jalna	2.67	0.19	2.87
Latur	1.04	0.48	1.51
Nagpur	0.83	2.08	2.91
Nashik	1.08	1.12	2.20
Pune	0.34	0.58	0.92
Solapur	0.41	1.21	1.63
Overall	1.00	1.07	2.07

Table 2: Farming systems of the Study locations.

Locations	Major farming systems
Buldhana	Field crops + Fruits + Livestock
Jalna	Field crops + Fruits + Livestock
Latur	Field crops + Vegetables + Fruits + Livestock
Nagpur	Field crops + Vegetables + Floricultural + Fruits + Livestock
Nashik	Field crops + Vegetables + Fruits + Livestock
Pune	Field crops + Vegetables + Fruits + Livestock
Solapur	Field crops + Vegetables + Fruits + Livestock

Table 3: Availability and accessibility of basic infrastructure and institutions in the study locations.

District	Educational institute		Village information centre		Primary health centre		Seed/fertilizer dealer		Bank		Cooperative society	
	Available	Distance (Km)	Available	Distance (Km)	Available	Distance (Km)	Available	Distance (Km)	Available	Distance (Km)	Available	Distance (Km)
Buldhana	Yes	0.5	Yes	0	No	5	No	5	No	5	No	17
Jalna	Yes	0.5	Yes	0	Yes	0	Yes	0	No	17	No	17
Latur	Yes	0.25	Yes	0.25	Yes	0.25	Yes	0.25	Yes	8	Yes	1
Nagpur	Yes	0	Yes	0	Yes	0	Yes	0	Yes	6	Yes	0
Nashik	Yes	0	Yes	0	No	2	Yes	0	No		Yes	0
Pune	Yes	0.1	Yes	0	Yes	0	Yes	0.1	Yes	0	Yes	0
Solapur	Yes	0.1	Yes	0	Yes	0.5	Yes	0.4	No	5	Yes	0.5

Table 4: Level of accessibility of various farm implements in the study locations.

Farm implements	Easy access						
	Buldhana	Jalna	Latur	Nagpur	Nashik	Pune	Solapur
Animal drawn plough	Yes	Yes	Yes	Yes	Yes	Yes	No
BBF maker	No	No	Yes	Yes	No	No	No
Fruit picking machine	No	No	No	Yes	No	No	No
Grading machine	No	No	Yes	Yes	No	No	No
Happy seeder	No	No	No	Yes	No	Yes	Yes
Harvester	No	No	Yes	Yes	No	No	Yes
Power operated weeder	No	No	No	Yes	Yes	Yes	Yes
Seed drill/ planter	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thresher	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tractor	Yes	Yes	Yes	Yes	Yes	Yes	Yes

4. Market and value chain analysis in the study locations: overall scenario

In the context of agricultural value chains, market access remains one of the most critical factors influencing both the productivity and income security of farming households. It directly impacts the profitability and sustainability of agriculture, particularly in rural regions. Farmers with good market access are better positioned to plan their crop cycles, manage post-harvest operations effectively, and connect with more buyers to secure better prices. On the other hand, when market access is weak, farmers face multiple challenges that not only limit their income but also increase production-related risks. The absence of post-harvest knowledge and marketing skills often leads to poor handling, storage, and distribution, especially for perishable crops. This results in spoilage and lower returns. Additionally, when farmers lack timely market information, they are less capable of making decisions about what to grow, how to price their crops, or where to sell. These constraints are further compounded when physical access to market centers is limited—particularly in remote areas—due to poor infrastructure, lack of storage, or the absence of trustworthy market intermediaries. Under such conditions, farmers may be forced to sell to middlemen at unfavorable rates, reducing their economic potential and deepening rural poverty.

As shown in Figure 3, the level of access to agricultural markets among farmers varies widely across the surveyed locations. Pune emerges as a district with relatively better market access, where the majority of farmers reported favorable conditions for selling their produce. This trend may be linked to its proximity to urban markets, strong road connectivity, and possibly more active policy support. In contrast, regions such as Latur and Nashik show a big difference, with a significant share of farmers reporting poor access to markets. This situation likely reflects ongoing infrastructural or policy-level barriers. Meanwhile, districts like Buldhana, Jalna, and Nagpur fall in the middle range, where a large number of farmers experience only moderate market access. Although this is slightly better than the lowest tier, moderate access still restricts full market participation and limits farmers' ability to negotiate prices or build long-term buyer relationships. These differences suggest that targeted support is needed to close the access gap and enable fair participation in the agricultural value chain.

To further understand the challenges, Table 5 presents farmers' perceptions of key market constraints, including (i) lack of post-harvest knowledge and marketing skills, (ii) limited access to market information, and (iii) poor physical access to markets. Across the board, lack of market access emerged as a dominant constraint, with nearly half of the respondents stating it affected them "to a large or very large extent." This perception was especially strong in areas like Latur and Pune, where many farmers felt that poor connectivity or limited buyer networks significantly hindered their operations. In contrast, districts like Buldhana and Nagpur showed a more balanced perception, with responses spread across different levels of concern, indicating relatively better conditions or varying degrees of coping strategies. When it comes to market information, a similarly widespread concern was noted, although the impact was generally reported to be slightly lower than physical access issues. Many farmers, especially in remote locations, lack up-to-date pricing and demand-related information, which prevents them from making timely and profitable marketing decisions. Again, Latur and Pune stand out as districts where this issue is more prominent, while other regions like Jalna and Nagpur appear to face this challenge to a lesser extent.

The third major concern, the lack of post-harvest management and marketing knowledge, was particularly visible in districts such as Jalna, where a significant percentage of farmers identified it as a major barrier. These gaps in knowledge could be due to limited outreach of extension services, lack of training programs, or weak linkages with agri-businesses. However, regions like Buldhana and Latur reported relatively better awareness, suggesting the potential effectiveness of ongoing capacity-building efforts in those areas. Taken together, Figure 4 and Table 5 offer a nuanced understanding of the market-related constraints faced by farmers. Some areas struggle with more than one issue at a time—poor access, limited information, and lack of skills—while others may be succeeding in addressing specific constraints

but still face gaps in other areas. These observations clearly show that a one-size-fits-all solution is unlikely to work. Instead, targeted interventions tailored to each location's unique set of challenges are needed. Improving transportation and storage infrastructure, strengthening market linkages, and expanding access to market information and post-harvest training will be crucial. In doing so, farmers can be better integrated into agricultural value chains, which may ultimately lead to improved income, reduced losses, and enhanced rural resilience.

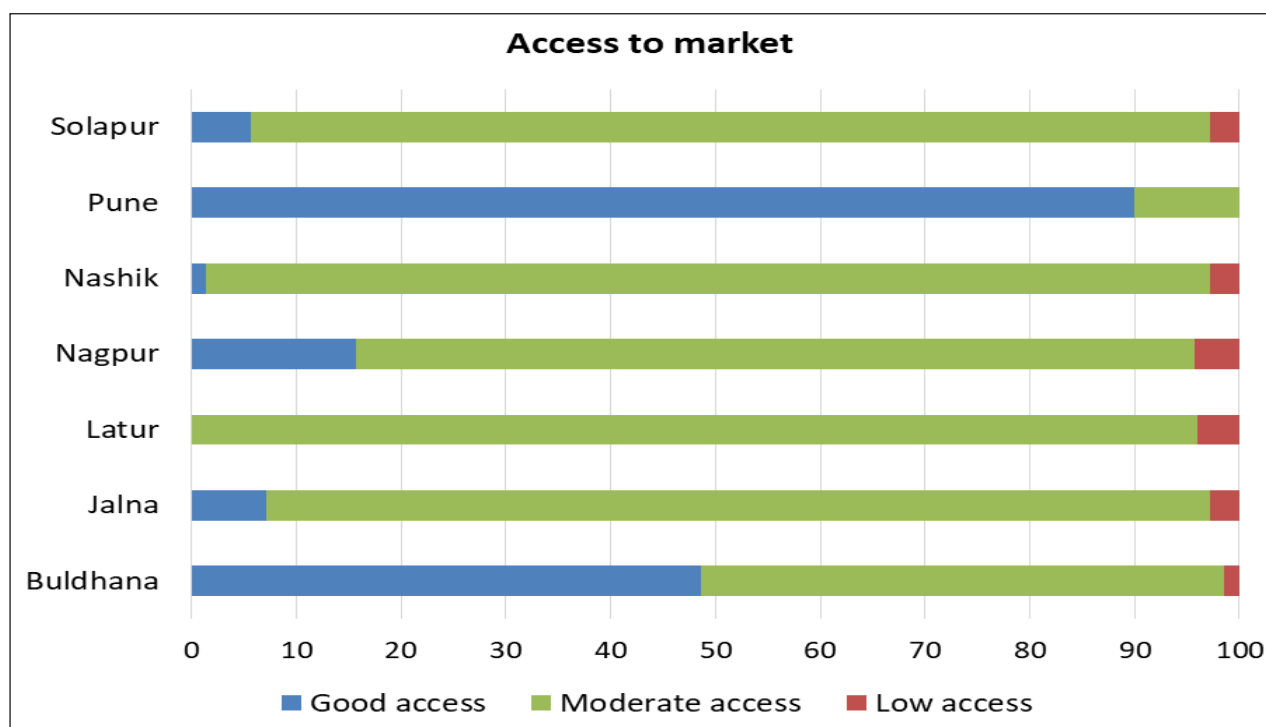


Figure 3: Farmers' level of access to the market for selling farm produce in the study locations (in %).

Table 5: Farmers' perceptions on challenges related to post-harvest and markets across seven districts (%).

Locations	Lack of knowledge on post-harvest management and marketing			Lack of access to market information			Lack of access to the market		
	Does not affect	I don't know	Affected	Does not affect	I don't know	Affected	Does not affect	I don't know	Affected
Buldhana	2.86	1.43	95.71	7.14	0.00	92.86	4.29	0.00	95.71
Jalna	61.43	2.86	35.71	44.29	0.00	55.71	24.29	0.00	75.71
Latur	2.67	24.00	73.33	0.00	22.67	77.33	1.33	14.67	84.00
Nagpur	57.14	5.71	37.14	48.57	4.29	47.14	57.14	1.43	41.43
Nashik	8.57	11.43	80.00	5.71	4.29	90.00	11.43	7.14	81.43
Pune	94.29	0.00	5.71	94.29	1.43	4.29	100.00	0.00	0.00
Solapur	11.43	18.57	70.00	12.86	5.71	81.43	17.14	4.29	78.57

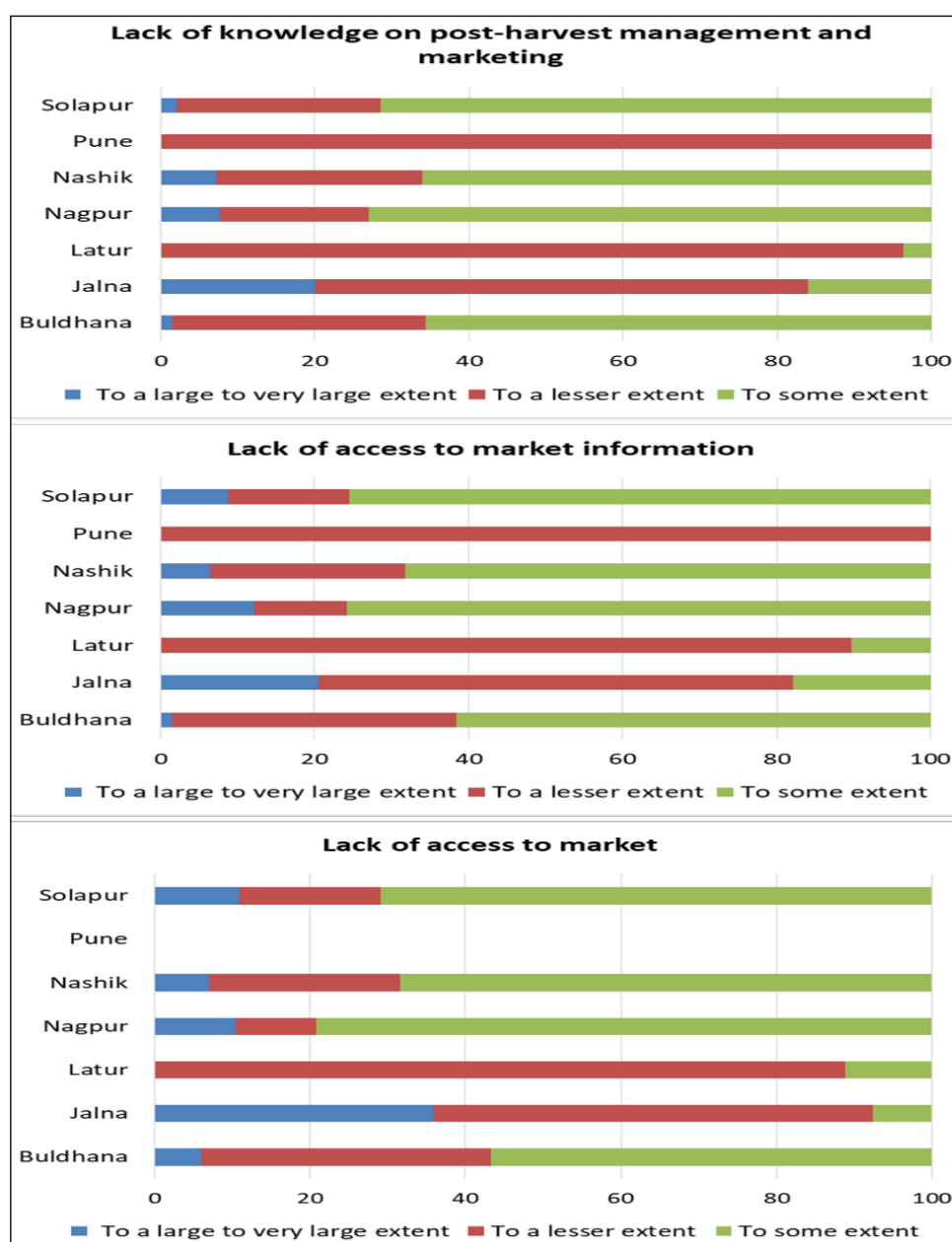


Figure 4: Perfection of the extent of impact of different market-related constraints on crop production across locations (%).

5. Market and value chain assessment: district-wise analysis considering the major commodity

5.1 Buldhana

In the present study, we have considered four major crops; chickpea, cotton, pigeonpea, and soybean, for market and value chain analysis in the Buldhana district. The data presents insights into both the extent of area under cultivation and the variability in market prices, which is a very important factor in the case of VC analysis, revealing important trends for value chain planning (Table 6 & Figure 5). Soybean, occupying the largest area of 1,100 acres, shows a price range between ₹40 and ₹70 per kg, with a median price of ₹50 and a price coefficient of variation (CV) of 9%, indicating modest price fluctuations despite its large-scale cultivation. Chickpea, grown on 500 acres, has the highest median price of ₹100 per kg,

ranging from ₹44 to ₹120, and also shows the highest price variability with a CV of 21%. This suggests high market potential but also greater price risk. Pigeonpea, cultivated on 200 acres, shows the most stable pricing pattern with a narrow range of ₹50 to ₹68, a median of ₹64, and the lowest CV at 5%, making it a more reliable crop for farmers. Cotton, grown over 100 acres, has a median price of ₹70 and a CV of 15%, showing moderate variability. These analyses suggest that while chickpea offers higher prices, soybeans dominate in area, and pigeon pea provides price stability in the local value chain.

Also, a detailed interaction with VC stakeholders highlights various challenges farmers face across the crop value chain, from input access and production to post-harvest handling and market integration. Despite the importance of these crops, farmers face numerous structural and institutional barriers that affect profitability and sustainability (Table 7). For Chickpea, the major challenges in accessing markets include transport delays, low prices, and inadequate storage infrastructure. Transport issues often arise due to the unavailability of vehicles on time and high transport costs. The absence of cold storage facilities further limits farmers' ability to preserve produce, especially when market prices are low. Most farmers sell chickpea at APMC Buldhana or to private traders in Jalgaon. Price setting is mainly influenced by buyers' unions, with farmers having little say. Although farmers access market information through phones and word of mouth, its use remains limited due to the lack of structured market advisory systems. Extension agents occasionally provide guidance, but support is inconsistent. Farmers indicated that access to good quality seeds, bank credit, and proper storage facilities could significantly improve income. Interestingly, a few farmers achieve higher yields and prices due to timely operations and selling when rates are favorable, often aided by better seed quality and access to buyers directly from home, which minimizes losses during handling.

In the case of cotton, issues like price fluctuations, middlemen exploitation, and transportation constraints are prominent. Farmers either sell to cotton factories in Khamgaon or to local agents. Again, farmers do not decide the price; it is set by purchasers' committees. Many farmers depend on fellow farmers for market information, highlighting the absence of formal price advisory channels. Unlike chickpea, extension support in cotton marketing is rarely available. The non-availability of quality pesticides and herbicides on time adds to production challenges. Farmers emphasized the need for assured MSP, training, and regulation of middlemen. A few cotton growers achieve better results by managing sowing and spraying schedules efficiently and harvesting at the right time. Those obtaining better prices usually focus on product quality and harvest timing. Losses are minimized when labour is timely, and buyers purchase directly from the farm.

Pigeon pea producers face similar issues, such as high transportation costs, low price realization, and storage shortages. Sales mainly occur at APMC, with middlemen playing a key role in price determination. Farmers depend on phone communication and word of mouth for market updates, which they use to plan sales during favourable price periods. Occasionally, extension agents assist, though not consistently. Access to machinery, credit, and soil testing are among the key missing services. Some farmers with timely access to machines and inputs manage better yields and prices. Quality production and timing of sales are critical, yet only a few can take advantage due to resource constraints.

Table 6: Area under cultivation and price variability of major commodities in Buldhana district.

Commodity	Area cultivated (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Chickpea	500	44	100	120	21
Cotton	100	45	70	100	15
Pigeonpea	200	50	64	68	5
Soybean	1100	40	50	70	9

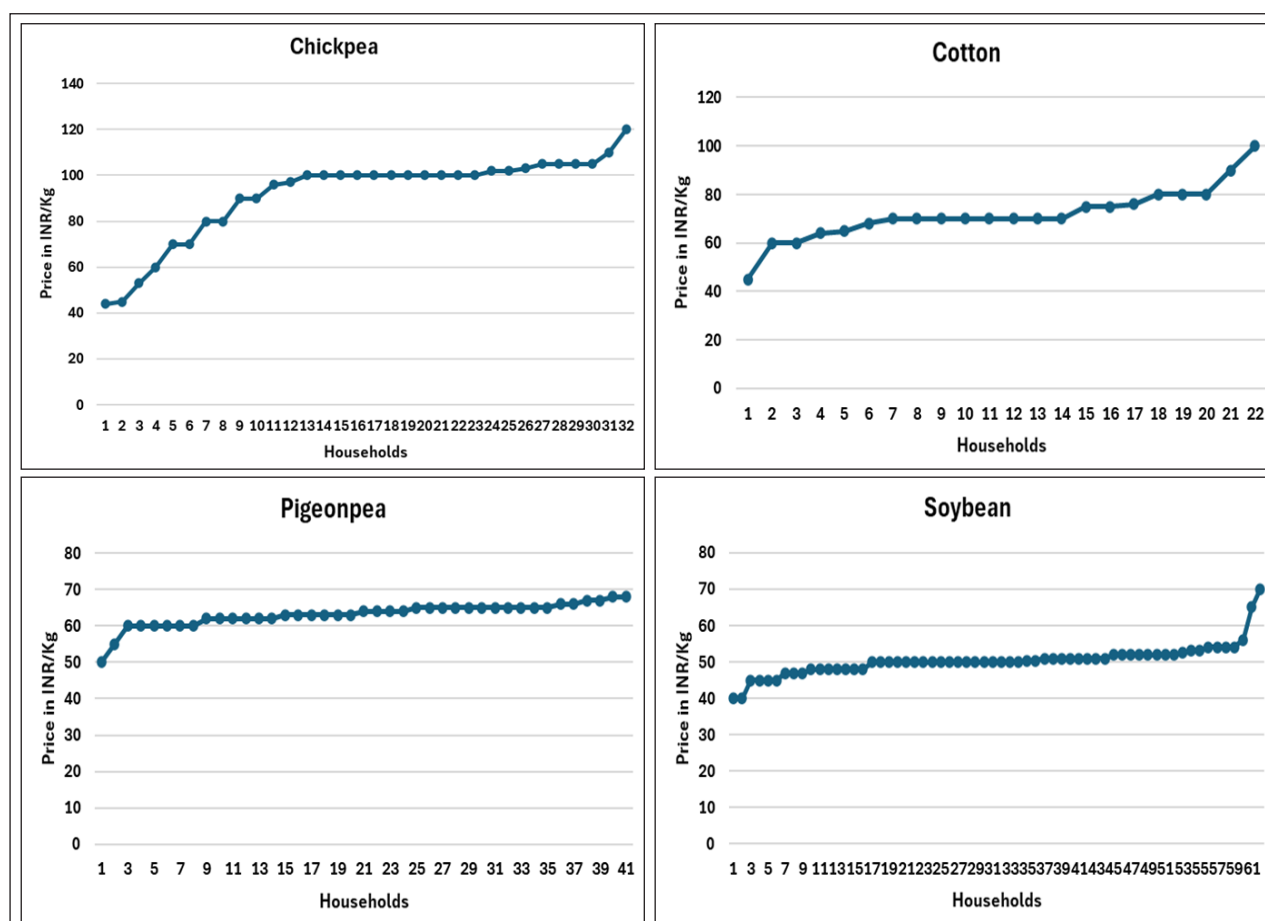


Figure 5: Household-wise farmer's price of selected commodities in Buldhana.

Table 7: Summary of market access, challenges, and value chain insights for major crops in Buldhana.

Commodity	Main market challenges	Price decision	Market info access	Extension support	Key support needed	Successful farmers criteria
Chickpea	Transport delays, low price, storage issues	Buyer union	Phone, word of mouth	Occasional guidance	Storage, good seeds, credit, training	Timely operations, better seed, home selling
Cotton	Price fluctuations, middlemen exploitation, transport cost	Purchasers committee	Word of mouth	Not available	Assured MSP, training, regulate middlemen	Timely sowing/spraying, quality harvest
Pigeonpea	Transport cost, low price, lack of storage	Middlemen	Phone, word of mouth	Sometimes helpful	Storage, soil testing, training, credit	Use of machinery, quality produce, timing
Soybean	Low price, transport issues, poor storage	Based on input costs, influenced by buyers	Phone (SMS)	Not available	MSP, crop insurance, digital platform, input quality	Organic inputs, drying, sorting, good seeds

For soybeans, despite being cultivated in the largest area, low prices, transport difficulties, and poor storage conditions affect profitability. Prices are mostly calculated by farmers based on input costs, but final rates are still buyer-driven. Market information is accessed through mobile messages, helping farmers decide whether to sell or wait. However, there is no consistent support from extension agents. Additional concerns include poor quality fertilizers, lack of digital payment access, and difficulty obtaining bank credit. Farmers achieving better outcomes often use organic fertilizers and micronutrients like sulfur, zinc, and boron. They also dry the produce thoroughly and separate lower-quality seeds before marketing, which helps them fetch better prices. Losses during post-harvest can be reduced through improved drying, storage, and handling practices.

Across all crops, a common pattern emerges farmers achieving higher productivity and better prices tend to have timely access to quality inputs, labour, market information, and storage. Challenges such as price manipulation by intermediaries, inconsistent support from extension agents, and inadequate infrastructure continue to hinder inclusive value chain development. Addressing these bottlenecks with targeted policies, such as assured MSPs, input quality regulation, training, digital platforms for market access, and financial services, could substantially improve farmers' income and resilience in the Buldhana region.

5.2 Jalna

We have examined four major crops, chickpea, cotton, pigeon pea, and soybean, in Jalna district to understand the market and value chain dynamics. The analysis focuses on the challenges faced by farmers in accessing markets, price realization, input supply, and infrastructural gaps. These insights are crucial for identifying systemic issues and informing suitable interventions. Among the selected commodities, chickpea, cotton, and soybean are cultivated over 1,500 acres each, whereas pigeon pea covers a comparatively smaller area of 500 acres. In terms of price variability, Chickpea exhibits the highest price fluctuation with a coefficient of variation (CV) of 22%, indicating major inconsistencies in the market. This is followed by soybean (CV of 14%), cotton (CV of 10%), and pigeon pea, which shows the least variability with a CV of only 6%. Although the maximum price for chickpea reached as high as ₹97/kg, the median price remained stuck at ₹45/kg, suggesting most farmers could not take advantage of price highs. In contrast, cotton showed a slightly better median price of ₹75/kg, but its minimum price was still low at ₹42/kg. Soybean also shows a similar price pattern with a median of ₹47.5/kg and a maximum price of ₹70/kg, yet most farmers report selling at much lower rates due to various constraints. Pigeon pea stands out with the highest minimum and median prices (₹70 and ₹78, respectively), and relatively stable prices, yet challenges in accessing markets persist (Table 8 & Figure 6).

Across all four crops, farmers in Jalna largely depend on local traders to sell their produce, particularly in markets located in Partur, Selu, and Jalna towns (Table 9). A consistent concern raised by the farmers is that they are unable to decide the selling price of their products, as prices are set by traders or buyers in a monopolistic way. This issue of price determination is particularly dominant in the case of soybean and pigeon pea, where traders exercise strong control without transparent mechanisms. The absence of government-regulated Minimum Support Prices (MSP) enforcement further weakens farmers' bargaining power.

Another important finding is the lack of access to timely and accurate market information. Most farmers reported that they do not receive updates about market trends, price fluctuations, or demand patterns through any structured channels such as extension agents, cooperatives, or digital media. This information asymmetry limits their ability to sell produce at the right time and right place. Moreover, the role of extension agents in providing guidance on market access or price realization appears minimal or absent in all locations surveyed.

Table 8: Area under cultivation and price variability of major commodities in Jalna district.

Commodity	Cultivated area (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Chickpea	1500	45	45	97	22
Cotton	1500	42	75	90	10
Pigeonpea	500	70	78	90	6
Soybean	1500	40	47.5	70	14

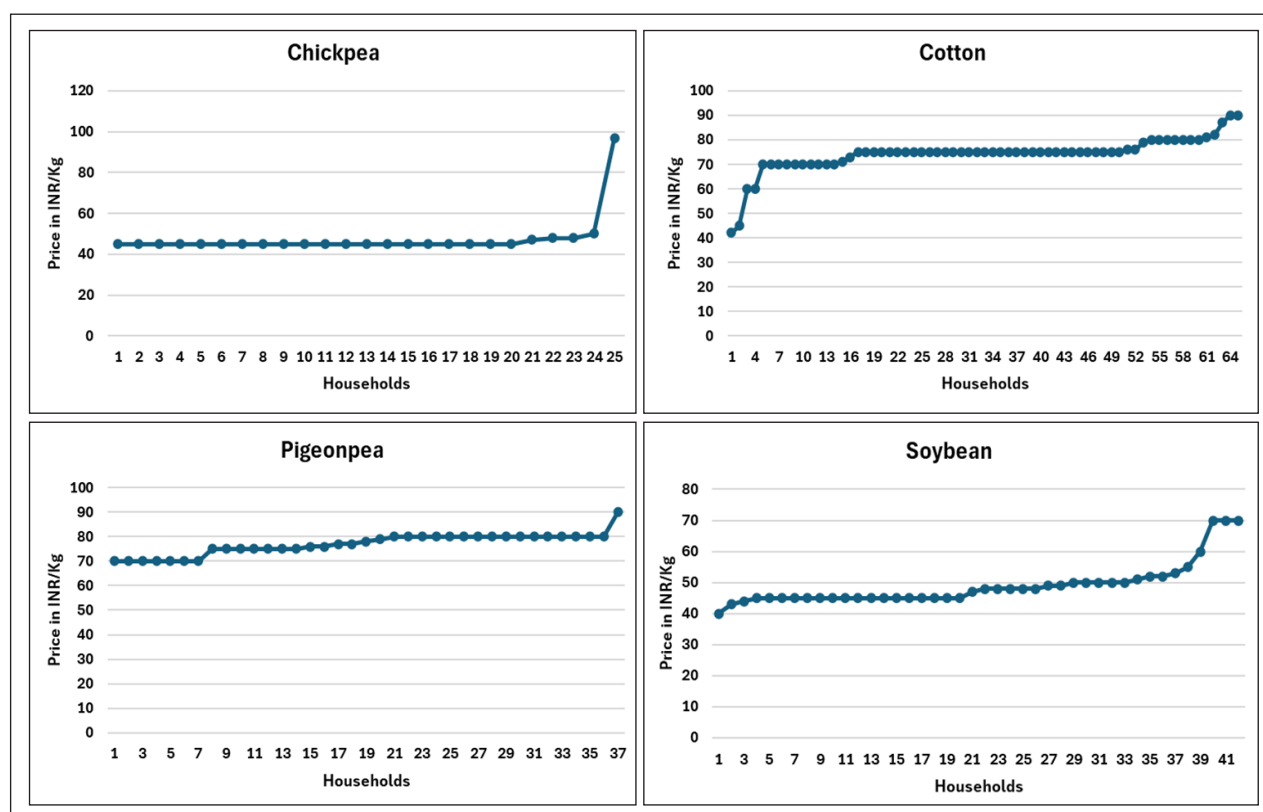


Figure 6: Household-wise price trend of selected commodities in Jalna.

The data reveals significant challenges related to physical infrastructure and input supply. Across all crops, transport and storage issues are major concerns. Farmers frequently face difficulties in arranging vehicles on time and often incur high transportation costs, forcing them to sell produce at low prices. Lack of adequate storage also leads to crop damage, especially in chickpea and soybean, where moisture control is crucial for price realization. Cotton farmers noted that they are sometimes compelled to sell when prices are low due to the absence of proper storage facilities. These problems are worsened by high costs and inconsistent availability of critical inputs such as quality seeds and fertilizers. For example, soybean and pigeon pea farmers reported paying high prices for fertilizers, while chickpea and cotton growers highlighted issues related to seed quality and availability.

Policy interventions that could make a meaningful difference include assured procurement at MSP, improved infrastructure for storage and transportation, and subsidies for quality seeds and fertilizers. In addition, there is a strong need for establishing farmer-friendly information systems through mobile alerts or cooperative platforms, especially since most farmers currently rely on informal sources like word-of-mouth or personal experience. Extension services must also be revitalized to offer timely and accurate advice on both production practices and market dynamics.

Table 9: Summary of market access, challenges, and value chain insights for major crops in Jalna.

Commodity	Main market challenges	Price decision maker	Market info access	Extension support	Key support needed	Successful farmers criteria
Chickpea	Transport, low price, storage issues	Traders	No	No	Transport, good quality seed, soil testing, farm machinery, crop insurance, MSP	Not observed; few practices like pest and disease management are followed by some farmers.
Cotton	Low price, transport, price fluctuations, storage issues	Traders	No	No	Storage, transport, good seed, soil testing, fertilizer, subsidies, MSP	Use of good agricultural practices, soil-based fertilizer application, storage availability
Pigeon pea	Low price, transport, storage issues	Traders	No	No	Soil testing, farm machinery, fertilizer, transport, storage, good seed, MSP	Good agricultural practices and fertilizer use based on soil testing
Soybean	Transport, low price, price fluctuations, storage issues	Traders	No	No	Storage, transport, quality seed, soil testing, fertilizer, subsidies, MSP	Good agri-practices, drying seeds, use of storage, soil-based fertilizer application

Interestingly, very few farmers in the district are reportedly achieving high yields or commanding better prices. In the case of soybeans, some farmers are able to get higher prices when storage facilities are available and when they manage to reduce moisture content through proper post-harvest practices. For cotton, better outcomes are seen among those who follow good agricultural practices and apply fertilizers based on soil testing. However, such examples remain isolated, as most farmers lack the required knowledge, resources, and institutional support to replicate these results.

Overall, the market and value chain scenario in Jalna reflects a complex set of interrelated challenges. Price volatility, limited market access, input constraints, and poor infrastructure are common across crops. Addressing these issues will require a multi-pronged strategy that combines physical infrastructure development, policy reforms, and capacity-building for farmers to ensure a more equitable and efficient market ecosystem.

5.3 Latur

The market and value chain study conducted in Latur district presents findings on four different agricultural commodities that represent diverse farming systems in the region. The analysis covers soybean, sugarcane, vegetables, and milk production, showing how these commodities perform in local markets and what challenges farmers face during production and marketing.

Table 10 and Figure 7 show the area cultivated, price ranges, and price variability for key commodities. Among them, soybeans have the highest cultivated area (1,976 acres), followed by sugarcane (865 acres),

while vegetables are cultivated only in limited areas. Milk, although not grown like crops, is produced by around 200 households in the district. The price variation among these commodities shows interesting patterns. Soybean prices range from INR 40 to 60 per kg, with a median of INR 50 and a price coefficient of variation (CV) of 8%, indicating a relatively stable market. Sugarcane sold per kg, shows a slightly higher price fluctuation (CV of 12%) with prices ranging from INR 2.5 to 3.5 per kg. Vegetables, on the other hand, show highly fluctuating prices with no fixed range, pointing toward market instability and inconsistent demand. Milk prices are reported between INR 50 to INR 60 per liter, suggesting slightly higher stability compared to vegetables.

Farmers in Latur district face various challenges in accessing markets and receiving fair prices for their produce (Table 11). For soybeans, the primary issues include low prices, a lack of buyers, and transportation constraints. Many farmers sell their produce in local markets, and prices are generally determined based on production quantity and quality. While some farmers access market information through mobile phones and consult with other farmers, it does not always translate into better prices due to weak infrastructure such as storage and transport, and the lack of timely availability of good-quality seeds and fertilizers. A few farmers, however, manage to achieve better yields and prices through consistent hard work, timely access to inputs, and proper irrigation—factors that are not universally accessible. Sugarcane producers also reported low prices and transportation problems. Most of the sugarcane is sold to nearby sugar mills, where price determination is often based on sugar density and quality. While market information is somewhat accessible via phones or area managers, the ability to act on this information is limited. Farmers highlighted that delays in input supply, especially seeds and fertilizers, affect their productivity. Nonetheless, a few farmers achieve higher yields by following timely cultural practices, although their pricing outcomes remain similar to others, suggesting that market access, not just production, limits income growth.

Vegetable producers suffer the most from price instability and access issues. Due to limited cultivation area and smaller market size, farmers receive very low prices, and face difficulty in transporting their produce to better markets. Many do not have any access to market information or extension services and rely entirely on their own understanding and local connections. High seed prices and untimely fertilizer availability further aggravate the problem. Losses during harvest, post-harvest handling, and transport are significant, especially in the absence of proper storage or cold chain facilities. While some farmers manage better prices due to hard work and timely action, such success is not widespread.

Milk producers in Latur primarily sell to local consumers or dairies. The price is largely dependent on milk fat content and is influenced by local shopkeepers and intermediaries. Market information access is poor, and packaging facilities are not adequately developed, reducing the ability of farmers to command premium prices. Extension agents rarely provide support in price negotiation or market access, and most farmers feel that support for quality testing and price assurance, such as Minimum Support Price (MSP), could help improve returns.

Table 10: Area under cultivation and price variability of major commodities in Latur district.

Commodity	Cultivated area (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Soybean	1976	40	50	60	8
Sugarcane	865	2.5	3	3.5	12
Vegetables	Limited area	Highly fluctuated price			
Milk	200 households	Average price INR 50 to INR 60 per liter			

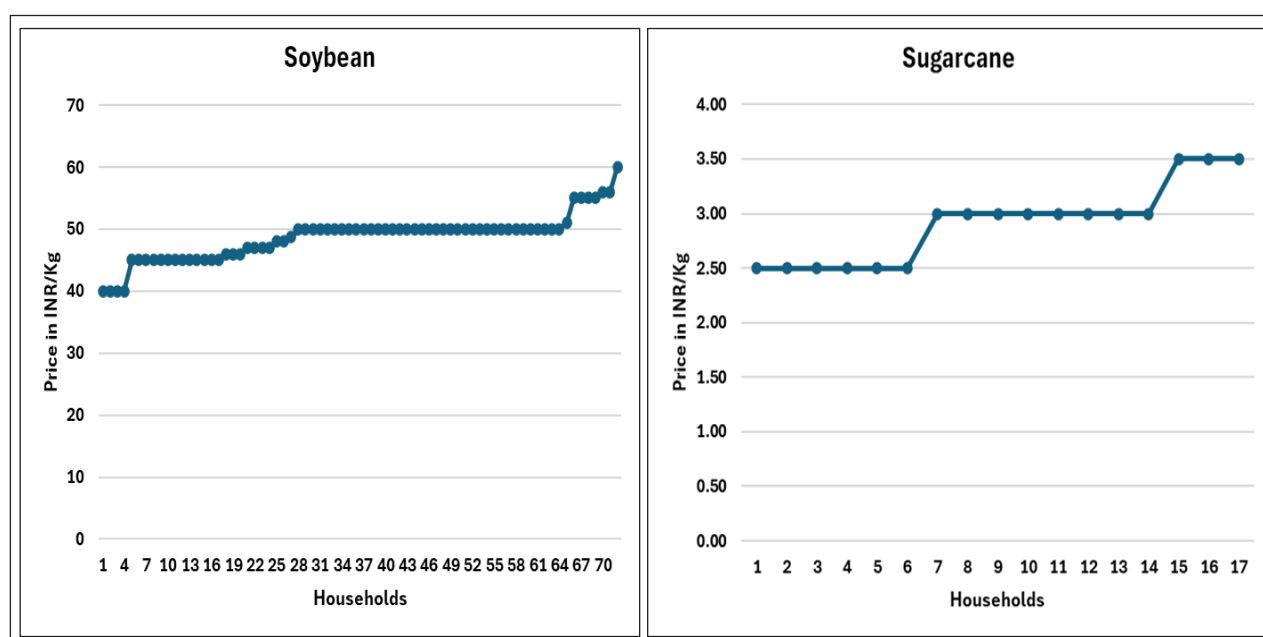


Figure 7: Household-wise price trend of selected commodities in Latur.

Table 11: Summary of market access, challenges, and value chain insights for major crops in Latur.

Commodity	Main Market Challenges	Price Decision Basis	Market Info Access	Extension Support	Key Support Needed	Successful Farmers Criteria
Soybean	Low price, lack of buyers, transportation issues	Based on production quantity and quality	Mobile phones, peer communication	Limited or irregular	Storage facilities, transport infrastructure, timely quality input supply	Hard work, timely access to seeds and fertilisers, irrigation access
Sugarcane	Low price, transportation constraints	Based on sugar density and quality	Mobile phones, area manager inputs	Minimal involvement	Timely input supply, fair pricing mechanism	Timely cultural practices
Vegetables	Price volatility, poor transportation, small market access	Market driven, varies widely day to day	Very limited or none	Absent or informal	Storage/ cold chain, affordable inputs, price support mechanism	Timely action, self-marketing efforts
Milk	Dependence on local vendors, weak price realization	Based on fat content, decided by shopkeepers	Poor access, minimal dairy coordination	Rarely available	Packaging, quality testing facilities, assured price via cooperative or MSP support	Own production, hard work, consistent quality

5.4 Nagpur

The market and value chain study conducted in Nagpur district presents findings on four important field crops that farmers grow in this region. The analysis covers cotton, pigeonpea, soybean, and wheat, showing how these crops perform in local markets and what problems farmers face when selling their produce. The cultivated area data shows that soybean covers the largest area with 500 acres, which is almost double the area of other crops. Wheat cultivation covers 300 acres, which is slightly higher than cotton at 250 acres. Pigeonpea has the smallest cultivated area with 200 acres, making it a little lower than the other field crops. This pattern suggests that farmers in Nagpur district prefer growing soybean because it might give better returns or fit well with local farming conditions. Price analysis reveals interesting differences between these four commodities. Cotton gets the highest median price at 75 INR per kilogram, followed by pigeonpea at 70 INR per kilogram, which is slightly lower than cotton. Soybean sells for 45 INR per kilogram, showing a big difference compared to cotton and pigeonpea prices. Wheat has the lowest median price at 25 INR per kilogram, which is much lower than all other crops in the study. When we look at price ranges, cotton shows the smallest price variation from 65 to 80 INR per kilogram. Pigeonpea has a wider price range from 60 to 100 INR per kilogram, showing higher maximum prices than cotton. Soybeans display the biggest price range from 40 to 90 INR per kilogram. Wheat prices stay within a narrow range from 23 to 30 INR per kilogram, which is almost similar to cotton in terms of price stability. The coefficient of variation data tells us about price fluctuations for each crop. Wheat shows the most stable prices with only 5% variation, followed by cotton at 6% variation. These two crops give farmers more predictable income compared to others. Pigeon pea faced a moderate price fluctuation at 18%, while soybean shows the highest price variation at 20%. This means soybean and pigeonpea farmers face more uncertainty about the prices they will get for their crops (Table 12 & Figure 8).

All four crops face the same main challenge in market access: low prices as this problem affects every farmer in the district, regardless of which crop they grow (Table 13). Cotton, pigeonpea, soybean, and wheat farmers all struggle with low prices that do not cover their high production costs. This situation makes farming less profitable and creates financial stress for farmers. Farmers sell their crops in similar market locations. Cotton, pigeonpea, and soybean farmers mostly sell in Katol or Karanja markets. Wheat farmers prefer Karanja market for selling their produce. These markets serve as the main trading centers for field crops in the district, giving farmers access to buyers and traders. Price decision processes vary slightly between crops. Cotton and soybean farmers find that prices depend on the quality of their produce. Pigeonpea and wheat farmers also base prices on production quality, but government policies have more influence on their price decisions. Cotton farmers work with graders who assess quality and decide prices.

Wheat farmers deal with brokers who help in price negotiations. Government influence is strongest for pigeonpea and soybean pricing. All farmers have access to market information through phone calls and word of mouth. The government plays an important role in sharing price information with farmers. Agriculture Department conveys messages through Krishisahayak for cotton farmers. For other crops, government officials send messages directly to farmers' mobile numbers. This system helps farmers stay informed about current market prices and trends. Additionally, farmers use this market information by working with government agencies and agricultural departments. The communication system helps farmers decide when to sell their crops and which markets to approach. Extension agents provide guidance to all farmers about getting proper prices and accessing better markets. This support helps farmers make informed decisions about their crop sales. Storage facilities are the biggest need of all crops. Cotton, pigeon pea, soybean, and wheat farmers all lack adequate storage infrastructure near their villages. They need godowns and cold storage facilities to store their crops properly and sell at better prices. Soil testing services are also needed for cotton, pigeonpea, and soybean cultivation. Cotton farmers specifically need good-quality seeds along with storage facilities.

The main support policy that farmers want is higher minimum support prices (MSP) for all crops. They also demand better storage infrastructure to reduce post-harvest losses and get better prices for their produce. These requests show that farmers need both price protection and infrastructure development to improve their farming income. High-yielding farmers in the district achieve better results through specific practices. Cotton farmers who get high yields produce about 1100 kg per acre, while soybean farmers achieve 1400 kg per acre. Wheat farmers with good yields produce around 1500 kg per acre. These successful farmers focus on maintaining better quality production throughout the growing season. Farmers who earn higher prices follow similar strategies. Cotton, soybean, and wheat farmers who earn more focus on better-quality production and use available storage facilities effectively. Having access to storage helps them wait for better prices instead of selling immediately after harvest, allowing them to get higher returns compared to farmers who sell quickly.

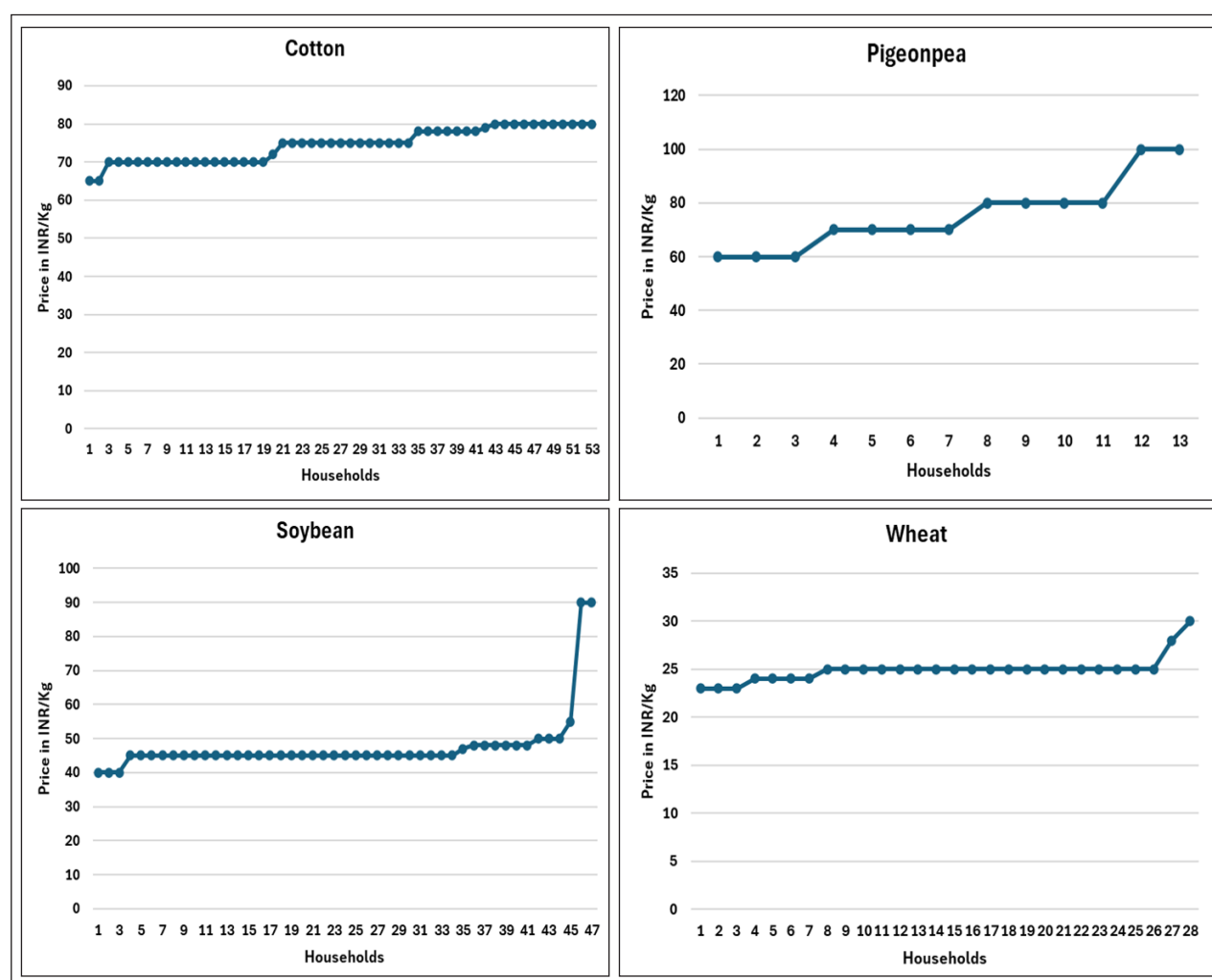


Figure 8: Household-wise price trend of selected commodities in Nagpur.

Table 12: Area under cultivation and price variability of major commodities in Nagpur district.

Commodity	Cultivated area (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Cotton	250	65	75	80	6
Pigeonpea	200	60	70	100	18
Soybean	500	40	45	90	20
Wheat	300	23	25	30	5

Table 13: Summary of market access, challenges, and value chain insights for major commodities in Nagpur.

Commodity	Main Market Challenges	Price Decision Basis	Market Info Access	Extension Support	Key Support Needed	Successful Farmers Criteria
Cotton	Low price, High production cost	Depending on quality, the Grader influences	Yes	Yes	Storage infrastructure, soil testing, and quality seeds	Higher yield (~1100 kg/acre), better quality, access to storage
Pigeonpea	Low price, High production cost, Wild animal damage	Quality of production; Govt influences	Yes	Yes	Storage facilities, soil testing	Not reported; No significant price gain observed
Soybean	Low price, High production cost	Depending on quality, the Govt influences	Yes	Yes	Storage facilities, soil testing, higher MSP	Higher yield (~1400 kg/acre), better quality, access to storage
Wheat	Low price, High production cost	Quality of production; Broker influences	Yes	Yes	Storage infrastructure, high-quality seeds, higher MSP	Higher yield (~1500 kg/acre), better quality seed, storage access

5.5 Nashik

In the context of market and value chain analysis in Nashik district, the production and marketing of major crops such as soybean, wheat, tomato, and onion reveal several interesting patterns, market-related challenges, and variations in price behavior. Across these crops, farmers are facing a common set of problems including high transport costs, poor storage facilities, lack of access to real-time market information, and input-related difficulties. These constraints directly affect farmers' income and productivity. Looking at the price trends, soybean shows a wider price range, with a minimum price of ₹42/kg and a maximum of ₹90/kg, while the median price stays at ₹52/kg. This large gap indicates that although some farmers manage to get better prices, many others continue to sell at lower rates. The price coefficient of variation (CV) for soybeans is 12%, which suggests moderate price fluctuation. Similarly, wheat prices are a little more stable, with a lower CV of 11%, and price range from ₹20 to ₹32/kg. The median price of ₹24/kg is only slightly higher than the minimum, suggesting limited scope for price negotiation for most farmers. Tomato and onion prices show a different pattern. For tomatoes, the minimum price was ₹5/kg, while the maximum reached ₹18/kg, with a median at ₹10/kg. The price CV is 27%, showing high price variability. Onion price also varies widely, ranging between ₹5/kg to ₹20/kg, with a median of ₹11/kg. But what stands out most is its price CV of 43%, which is the highest among all four crops. This means onion prices fluctuate drastically, creating income insecurity for growers. Despite having a cultivated area of 500 acres, onion growers face unpredictable price swings, which makes income planning extremely difficult. In comparison, wheat cultivation covers about 150 acres but shows better price consistency, though it suffers from other bottlenecks (Figure 9 & Table 14).

From a marketing perspective, all four crops face significant transport and storage challenges (Table 15). High transport costs are a consistent issue across all commodities, particularly affecting perishables like tomatoes and onions. Farmers reported that transporting produce to market hubs such as Padurli and Panduli incurs heavy costs, especially when middlemen are involved. Onion farmers also pointed out the

problem of exploitation by middlemen who take high commissions while giving low prices to farmers. Similarly, soybean and tomato growers reported that prices are often decided by traders or influenced by seed quality and fruit appearance rather than market demand. Storage remains another major bottleneck. Tomato and onion are highly perishable and require immediate marketing or storage under controlled conditions, which is rarely available. Farmers store onions at home when they don't get a good market price, but due to a lack of cold storage, the produce is often affected by pests, weather changes, or diseases. Similarly, soybean farmers reported moisture-related losses and lack of proper godowns or insecticide treatment, which reduces the quality and price of the crop post-harvest. Market information access is better in Nashik compared to some other districts, as most farmers reported getting updates through phones, word of mouth, or from other farmers. However, this information is often insufficient or delayed. Only a few farmers mentioned the role of extension agents, and in most cases, extension support for market access or price guidance was absent. The information that farmers do receive is mainly used for understanding price trends rather than for influencing negotiations. In terms of support systems, farmers expressed the need for cold storage facilities, better packaging, transportation support, soil testing, good quality seed, and proper training. Especially for tomato and soybean farmers, better packaging and access to timely fertilizer and machinery were highlighted as key needs. Wheat farmers emphasized the need for improved soil testing and the availability of agricultural inputs on time. The role of training was also stressed, particularly for tomato and soybean, where good outcomes were observed among those who had training in modern practices and used high-quality seeds.

Table 14: Area under cultivation and price variability of major commodities in Nashik district.

Commodity	Cultivated area (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Soybean	350	42	52	90	12
Wheat	150	20	24	32	11
Tomato	600	5	10	18	27
Onion	500	5	11	20	43

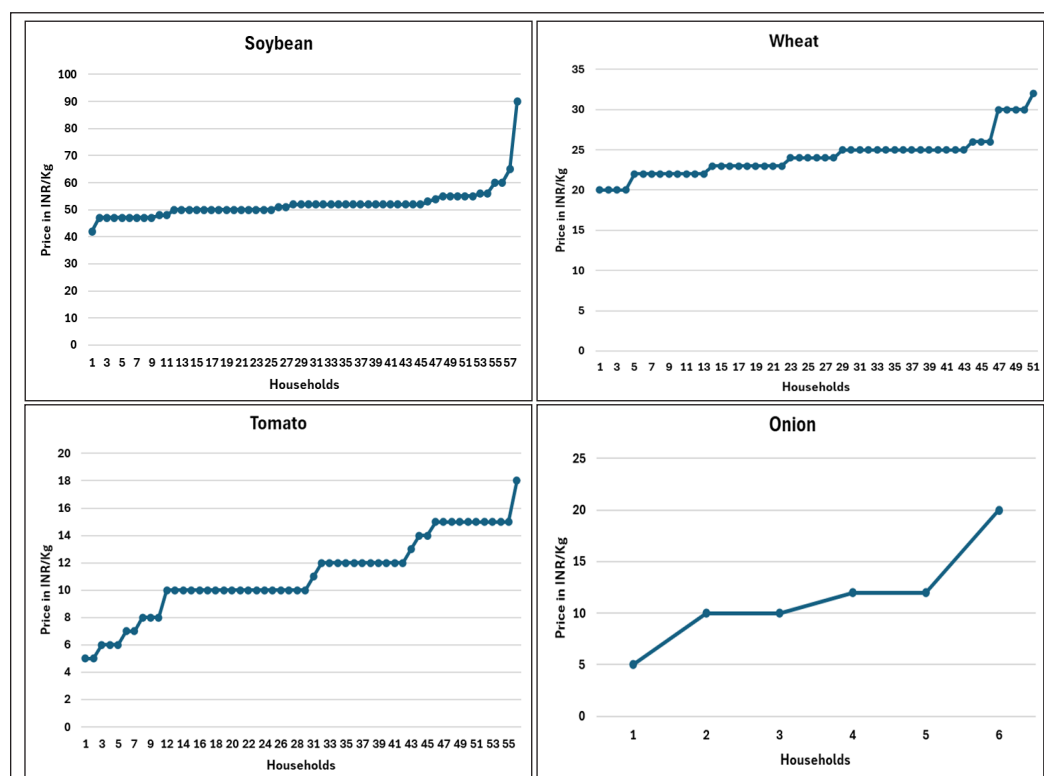


Figure 9: Household-wise price trend of selected commodities in Nashik.

Table 15: Summary of market access, challenges, and value chain insights for major commodities in Nashik.

Commodity	Main Market Challenges	Price Decision Basis	Market Info Access	Extension Support	Key Support Needed	Successful Farmers Criteria
Onion	Low price, storage issues, middlemen exploitation, high transport cost	Size and quality of onion	Yes	Yes	Cold storage, transport, weighing, soil testing, machinery, farmer training	Timely sowing, good standing crop, weed control, cold storage awareness, market timing
Soybean	Transport cost, low price, storage issues	Seed quality and variety	Yes	No	Packaging, storage, soil testing, fertilizer, farm machinery, MSP, crop insurance	Good seed, high quality input, timely weed management and fertilizer use, timely harvesting, price info access
Tomato	Transport cost, price fluctuation, storage issue, low price	Fruit quality	Yes	No	Packaging, cold storage, transport, fertilizer, soil testing, farm machinery	Agriculture training, good storage, timely harvesting, market price awareness
Wheat	Transport cost, storage issues	Seed quality and seed variety	Yes	No	Cold storage, transport, packaging, fertilizer, farm machinery, crop insurance	Soil testing, weed control, good seed, timely harvesting and sowing, market price knowledge

5.6 Pune

The market and value chain study conducted in Pune district shows interesting patterns across four major horticultural commodities: chrysanthemum, carrot, custard apple, and sugarcane. These crops show different levels of market performance and farmer challenges, which helps us understand how agricultural value chains work in this region.

As shown in Table 16 and Figure 10, the area under cultivation varies widely across crops. Sugarcane is cultivated on the smallest area (90 acres), whereas carrot and chrysanthemum are grown on 220 acres each. Custard apples were cultivated on 160 acres. The price variation, measured in terms of minimum, median, and maximum values, also shows notable contrasts. Chrysanthemum shows a minimum price of INR 40 per kg and a maximum of INR 80 per kg, with a coefficient of variation (CV) of 22%, suggesting moderate price instability. Carrot has the highest price fluctuation among the selected crops with a CV of 25%, where prices range from INR 10 to 35 per kg. This wide range highlights the impact of factors such as weather and quality. Custard apples show the least price volatility, with a fixed maximum and median price at INR 40 and a CV of just 8%. Sugarcane, on the other hand, has a narrow price band from INR 3 to INR 4 per kg, with a CV of 15%, showing limited variability.

Farmers across all crops in Pune reported price fluctuation as a major market-related challenge (Table 17). In the case of carrots, most farmers sell their produce at the Pune market, where buyers play a dominant

role in price setting based on quality. Farmers reported that they usually receive market information via phone and word of mouth, which helps them coordinate with buyers and respond to price changes, though not always effectively. Many farmers mentioned that guidance from extension agents has been beneficial, but they also stressed the need for better training in good practices, especially grading and packaging, to fetch higher prices. Weather conditions were identified as a major challenge in dealing with input suppliers and service providers, which indirectly affects the marketability of carrot. Similarly, chrysanthemum growers sell primarily at the Pune market. The price is largely determined by the buyer, and market information is mostly accessed through word of mouth. Farmers adapt by cutting flowers early in the morning and ensuring proper grading and packaging. Although training and good quality seed support are available to some extent, farmers highlighted that timely and specialized training would help improve income. The dependency on buyers makes the price highly unpredictable, and weather-related challenges were again mentioned as critical issues affecting input access. Custard apple farmers mainly sell in Saswad market, and price determination rests solely with buyers. Market information flows mostly by word of mouth, and while farmers try to manage timing and packaging to reduce losses, they expressed a lack of guidance from extension agents. Better training and knowledge about agricultural practices, including proper sorting and grading, could help improve returns. While a few farmers were found to achieve better prices due to these practices, the majority lag behind due to a lack of awareness and skill. Weather fluctuations again played a role in input-related challenges.

In the case of sugarcane, farmers rely on both local buyers and juice vendors. Price setting is a joint process involving both farmers and buyers, primarily based on quality. Unlike other crops, sugarcane farmers also obtain price and market information through phones and informal communication channels. Although extension agents do not provide significant guidance in this crop, farmers have expressed the need for quality seed and higher minimum support prices (MSP) to improve productivity and income. Interestingly, some farmers are achieving high yields and better prices due to good planning and use of quality inputs, yet others struggle due to labor issues and weather-related disruptions. Harvesting and post-harvest operations also pose significant losses, which could be reduced through better labor management and infrastructure.

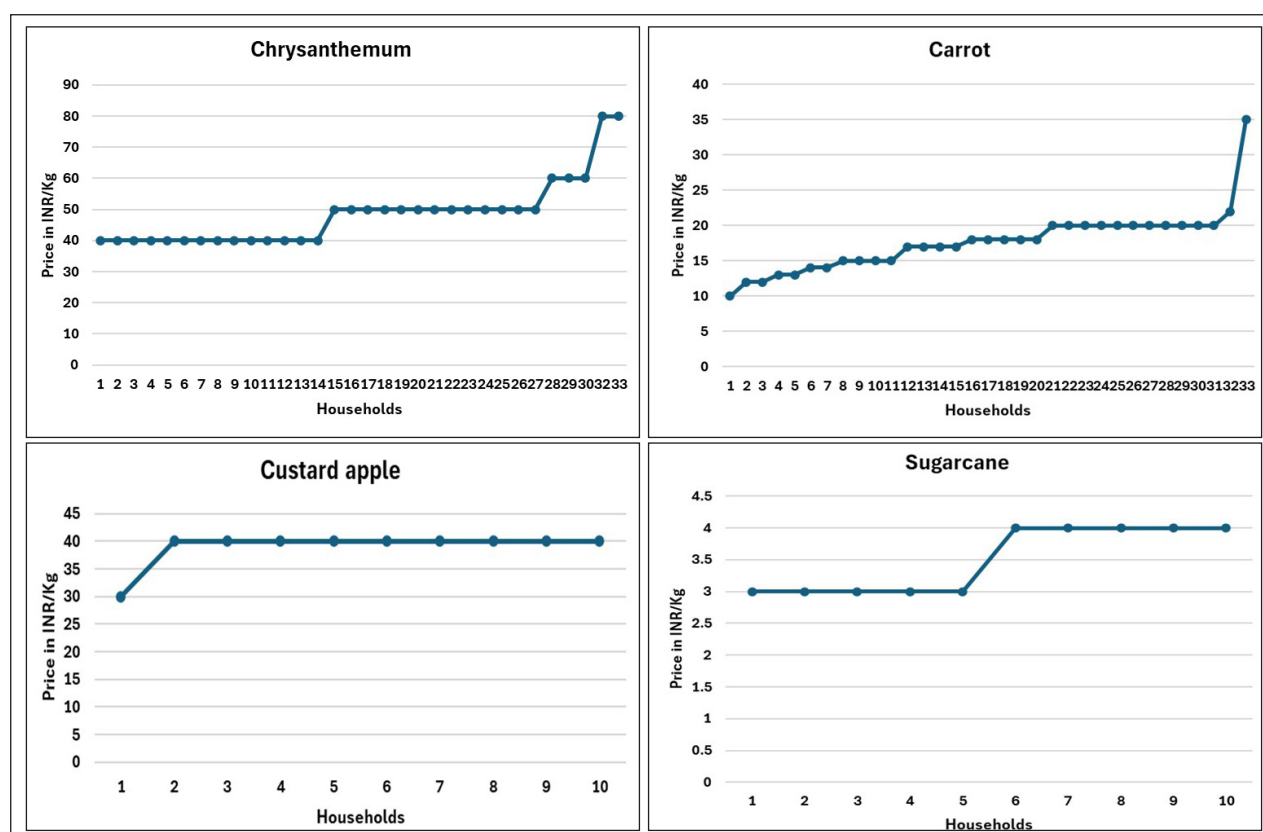


Figure 10: Household-wise price trend of selected commodities in Pune.

Table 16: Cultivated area, price range, and price variation for selected crops in Pune district.

Commodity	Cultivated area (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Chrysanthemum	220	40	50	80	22
Carrot	220	10	18	35	25
Custard apple	160	30	40	40	8
Sugarcane	90	3	3.5	4	15

Table 17: Summary of market access, challenges, and value chain insights for major commodities in Pune.

Commodity	Main Market Challenges	Price Decision Basis	Market Info Access	Extension Support	Key Support Needed	Successful Farmers Criteria
Carrot	Price fluctuations due to weather and quality	Buyer decides based on quality	Yes	Yes	Training in good practices, Higher MSP	Proper planning, grading, and packing
Custard Apple	Price fluctuation, price decided by buyer	Buyer determines price	Yes	No	Training, better price information	Sorting, grading, timely practices
Chrysanthemum	Buyer dependency, price fluctuation	Buyer decides the price	Yes	Yes	Training, good quality seeds, higher MSP	Timely cutting, grading, proper packing
Sugarcane	Seed quality and weather-related issues	Decided by the buyer and the farmer based on quality	Yes	No	Training, good quality seed, higher MSP	Use of good seeds, maintaining product quality

5.7 Solapur

The market and value chain study conducted in Solapur district examines four diverse agricultural commodities that represent different farming systems in the region. The analysis covers black gram, onion, guava, and sweet corn/maize, showing how these crops perform in local and distant markets and what challenges farmers face during production and marketing. Among these, sweet corn is cultivated on the largest area, around 400 acres, followed by onion (300 acres), black gram (250 acres), and guava (150 acres). The price pattern of these crops shows some noticeable variation. For example, onion shows the highest price fluctuation with a coefficient of variation (CV) of 35%, while sweet corn shows the lowest variation at 10%. Black gram and guava have a moderate price variation, with CVs of 20% and 15% respectively. The median prices also vary. Black gram is sold at a median price of INR 60 per kg, which is slightly higher than guava at INR 30, and much higher than onion at INR 16. Sweet corn has a median price of INR 22, which is almost similar to guava but lower than black gram (Figure 11 & Table 18).

In terms of market access, most black gram farmers in Solapur sell their produce at Barshi market. However, they face frequent issues with price instability, mainly because traders or agents are the ones who decide prices, and there is little government intervention through Minimum Support Price (MSP) centers. Many farmers pointed out that the price of black gram depends a lot on its quality, particularly the dark black color, which is highly preferred in the market. Storage is another major problem. Because there is no proper storage facility, farmers are often forced to sell immediately after harvest, when the prices are low. Some successful black gram farmers manage better outcomes by applying good agricultural practices, using fertilizers based on soil testing, and sowing earlier than others. These farmers also suffer fewer post-harvest losses by using specific machines during harvesting. Despite these efforts, significant losses still occur due to poor storage and unavailability of cold storage infrastructure (Table 19).

For Guava, farmers usually transport their produce to distant markets like Pune, Mumbai, and sometimes even Kerala. A major concern here is the lack of consistent buyers and proper transportation infrastructure. Roads are poorly maintained, and this affects the quality of the produce during transport. Many guava farmers said that prices are decided by agents based on fruit size and appearance, with larger and better-glazed guavas fetching better prices. Unlike black gram, guava storage challenges are even more serious, as the fruit is highly perishable. Some farmers have started using improved packaging techniques, but packaging costs remain very high. Progressive farmers who apply organic fertilizers and good farming practices are able to achieve yields as high as 30,000 kg per acre, which is much higher than average. These farmers also tend to receive better prices, particularly when they produce smaller volumes during low-supply periods. However, others struggle to achieve the same due to lack of training, packaging knowledge, and infrastructure.

The onion market in Solapur is marked by extreme price fluctuations. Farmers reported that during times of bumper production, prices fall drastically, and there is no MSP mechanism to protect them. Most onion farmers sell their produce in the Solapur market, where traders and agents dominate the price-setting process. Quality factors like uniform size and round shape influence pricing. Storage is again a key issue—farmers without access to godowns or cold storage have to sell quickly, often at poor rates. Some successful farmers manage to get higher prices by adopting integrated pest and disease management techniques and choosing planting times that avoid market gluts. These farmers often store their produce and sell when market prices rise. Still, due to the absence of technical guidance and post-harvest support, losses during storage and transport remain high. Input quality is another issue, with complaints about expired seeds and low-quality fertilizers being sold by dealers.

In the case of sweet corn or maize, similar patterns are observed. Although cultivated on the largest area among the four crops, sweet corn farmers also struggle with storage-related price losses. The quality and moisture content of the crop are the key determinants of price. Some farmers indicated that large-sized maize fetches better market rates. However, due to pests like armyworm and other production challenges, quality is often compromised. Traders mainly decide the prices, and marketing federations have limited influence. Like other crops, access to information is mostly through phones and word of mouth, with limited formal extension support. Successful farmers are able to reduce losses and secure better prices through good agricultural practices and the use of nitrogen-based fertilizers. Yet, many farmers are not able to match their success due to the lack of cold storage and inadequate market information.

Post-harvest losses affect most crops but can be reduced through better practices. Black gram farmers face losses during harvesting because general-purpose machines are used instead of crop-specific harvesters. Onion farmers lose their produce due to inadequate storage facilities. Guava farmers do not report significant post-harvest losses. Sweet corn/maize farmers reduce losses by using proper farm machinery and maintaining good agricultural practices. Technical guidance and better infrastructure can help farmers minimize these losses and improve their income from all crops.

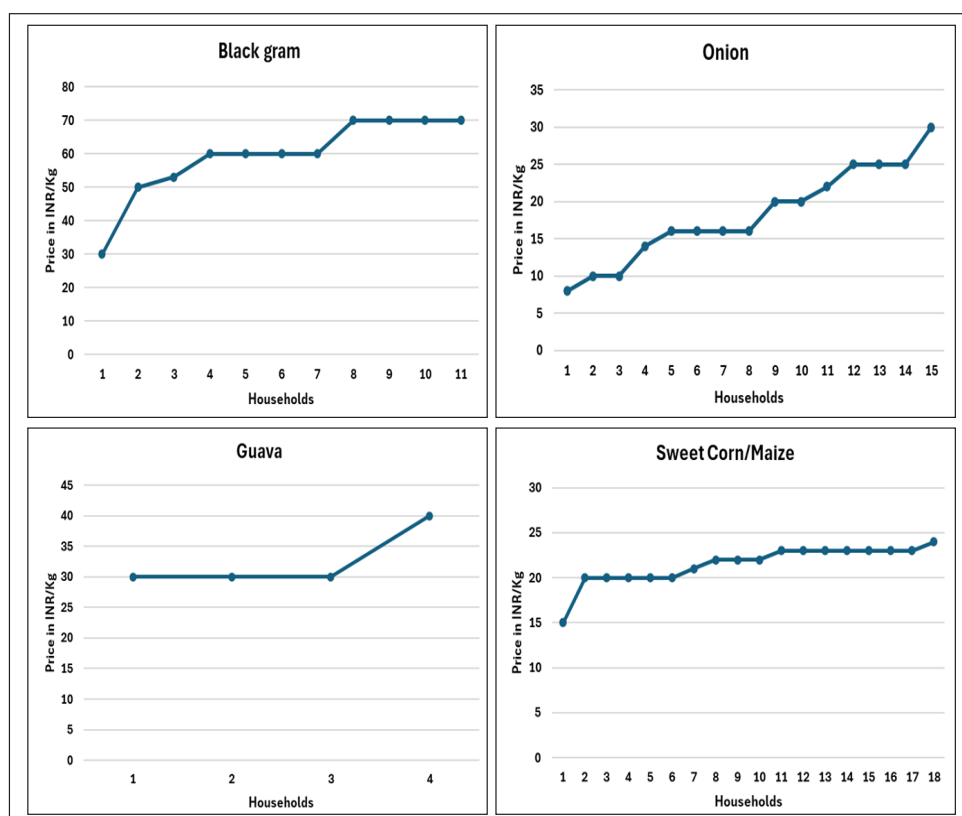


Figure 11: Household-wise price trend of selected commodities in Solapur.

Table 18: Cultivated area, price range, and price variation for selected crops in Solapur district.

Commodity	Cultivated area (ac)	Price (INR/Kg)			
		Minimum	Median	Maximum	Price CV (%)
Black gram	250	30	60	70	20
Onion	300	8	16	30	35
Guava	150	30	30	40	15
Sweet Corn/Maize	400	15	22	24	10

Table 19: Summary of market access, challenges, and value chain insights for major commodities in Solapur.

Commodity	Main Market Challenges	Price Decision Basis	Market Info Access	Extension Support	Key Support Needed	Successful Farmers Criteria
Black gram	Price fluctuation, poor storage, quality-dependent pricing	Traders/Agents, quality (black color)	Mostly through phone and local networks	Limited or lacking	Storage facilities, fair pricing, MSP procurement	Timely sowing, fertilizer use based on soil test, better harvest practices
Guava	Perishability, poor transport, high packaging cost, distance to markets	Traders/Agents, size, shine, and uniformity	Phone calls, agents, local sources	Very limited	Packaging, cold storage, transportation infrastructure	Organic fertilizer use, timing production during low-supply periods
Onion	Extreme price crash during surplus, poor storage, and low MSP coverage	Traders/Agents, size, shape, moisture	Phone, informal sources	Inadequate; not crop-specific	Storage, quality input, technical guidance	Pest/disease management, offseason selling, selective storage
Sweet corn (maize)	Quality and moisture-related losses, pest damage, and low market control	Mostly traders, kernel size and quality	Mobile phone, peer farmers	Minimal support	Pest control, post-harvest support, cold storage	Use of nitrogen fertilizer, pest control, early harvest practices

6. Policy Recommendations for Sustainable Agricultural Value Chain Development in the Study Regions of Maharashtra

The market and value chain analysis across Buldhana, Jalna, Latur, Nagpur, Nashik, Pune, and Solapur show that the sustainability of agricultural livelihoods in Maharashtra does face systemic bottlenecks in market access, infrastructure, institutional support, and producer agency in price formation.

Addressing these requires location-specific yet system-wide interventions that combine investment in physical infrastructure, institutional strengthening, and farmer capability strengthening. The following recommendations are directly derived from the study's empirical results, with additional measures to ensure long-term resilience.

a. Strengthening Market Access Infrastructure and Reducing Transaction Costs

In Latur, Nashik, Jalna, and Solapur, high transport costs and limited buyer networks force distress sales immediately post-harvest. Perishable crops such as onion, tomato, guava, and chrysanthemum suffer substantial post-harvest losses due to the absence of cold chains and logistical proximity constraints, while storage gaps persist even in relatively better-connected districts like Pune and Nagpur. Significant investment in rural market infrastructure, including modern storage, efficient transport networks, and cold chain systems, is essential. Decentralized Integrated Market Infrastructure Hubs (IMIHS) may be developed in public-private partnership mode, combining primary processing, grading, weighing, packaging, and storage facilities, strategically located in key production clusters and connected to FPOs and cooperatives. These hubs must link to both APMCs and direct buyer platforms, with cold storage prioritised in high-loss districts and solar-powered units in off-grid areas. Shared logistics and FPO/cooperative-led transport pooling can lower the marketing costs.

b. Institutionalizing Farmer Agency in Price Discovery and Market Negotiation

Across all districts, prices are largely set by buyers or intermediaries, with weak MSP enforcement and limited transparent price information. Strengthening farmer collectives, cooperatives, and FPOs for aggregation, grading and packaging, and digitalization of supply chain will enhance bargaining power and market access. Procurement infrastructure for MSP crops maybe be expanded in the lagging districts, and policy support for incentivizing private investments, entrepreneurs, and women SHGs on need-based infrastructure to improve resilience of value chains, especially for high-risk and perishable crops. Digital Market Information Systems must be scaled, providing real-time price data and e-trading facilities accessible via mobile apps, community radio, and free SMS in Marathi, with a focus on lagging regions. Dedicated price negotiation cells within FPOs, their capacity built also on legal and technical aspects, will facilitate forward contracts and direct institutional sales.

c. Build Crop-Specific Post-Harvest and Value Addition Ecosystems

The study highlights crop-specific bottlenecks: onion requires ventilated storage and grading; guava needs rapid packaging and transport; soybean benefits from drying and sorting; and cotton from fibre quality testing. Commodity-specific infrastructure packages should be facilitated for each major crop, with targeted investment in value addition. On-farm processing units and aggregation centres run by farmer cooperatives/FPOs can improve value retention and readiness for larger markets. However, the value addition activities must start with identifying potential markets and demand for the products. Policies should also incentivize private sector partnerships for technology transfer in processing and packaging, ensuring that innovations reach smallholders.

d. Revitalize and Reorient Extension Services towards Market and Value Chain Skills

Extension contact is minimal and production-focused, leaving a gap in marketing and post-harvest handling skills. Extension services must be revitalized with a clear shift towards demand-driven production, marketing, price negotiation, and quality compliance. At least 30% of content should be market-oriented, including e-NAM participation, digital payments, and contract farming processes. Tailored capacity-building programs should leverage successful farmers as peer mentors, ensuring that practical, locally tested solutions are diffused across farming communities. Partnerships with agritech startups can help deliver targeted agro and advisory services through digital channels.

e. Improve Input Quality and Timeliness to Enhance Value Chain Competitiveness

Delayed or counterfeit inputs and inadequate soil testing undermine quality and profitability. QR-coded input verification should be introduced alongside stricter market regulation. Input distribution must align with sowing calendars, and mobile soil testing services should be expanded, particularly in cotton–soybean and onion–vegetable belts. Improved access to certified seeds for high-value crops can further strengthen competitiveness. FPOs and cooperatives can play an important role here.

f. Market Risk Management

Price volatility is extreme for onion, tomato, guava, and chickpea, with MSP crops also vulnerable when procurement fails. Establishing a market intelligence cell at the state and regional level, especially for volatile commodities, can guide farmers on sowing and marketing decisions. Forward contract facilitation for FPOs and targeted policy assurance for high-risk crops will further strengthen farmer resilience. Additionally, facilitating warehouse receipt financing systems can allow farmers to store produce during low-price periods and sell when markets are more favourable.

g. Location-Specific Intervention Priorities

District priorities should reflect local constraints: soybean drying and chickpea storage in Buldhana; transport pooling and MSP enforcement in Jalna; vegetable cold storage and dairy quality testing in Latur; cotton and wheat storage in Nagpur; cold chains for tomato and onion in Nashik; grading for chrysanthemum and carrot in Pune; and onion storage and guava packaging in Solapur.

h. Governance and Monitoring Framework

To avoid misalignment with farmer needs, District/Cluster Value Chain Committees should oversee intervention roll-out, supported by annual sustainability audits tracking farm-gate prices, post-harvest loss reduction, and procurement coverage. Public–Private Partnerships should be leveraged for infrastructure investment, with farmer ownership shares ensuring inclusive benefits. A state-level Value Chain Policy Coordination Unit should be established to align investments, monitor outcomes, and ensure continuous integration of farmer feedback.

i. Promote Climate-Resilient and Sustainable Practices in Value Chains

Given the vulnerability of many crops to climate variability, policies should incentivize water-efficient irrigation, integrated pest management, and climate-resilient crop varieties. Integrating these practices within value chains will safeguard productivity, reduce risk, and enhance long-term competitiveness.

j. Strengthening Export-Oriented Value Chains

For crops with strong export potential, such as grapes, pomegranate, onion, and certain floriculture products, dedicated export facilitation cells may be strengthened. These would provide compliance support for quality standards, certifications, and international market linkages, ensuring farmers can capture higher-value markets.

7. Conclusions and Way Forward:

This district-level value chain assessment across Buldhana, Jalna, Latur, Nagpur, Nashik, Pune, and Solapur confirms that Maharashtra's agricultural potential is substantial, yet its potential has not been fully harnessed mainly due to market-facing bottlenecks. Across the study sites, the dominant constraints are clear and recurring: inadequate storage and post-harvest infrastructure, weak cold chains for perishables, high and fragmented transport costs, asymmetric market information, erratic input quality and timing, limited extension support oriented to markets, and insufficient institutional mechanisms that allow producers to influence price discovery. The evidence shows that these structural weaknesses shape outcomes more than agronomic potential; where production improvements exist, their benefits remain fragile and localized because farmers cannot reliably store, aggregate, or sell into remunerative value chains.

The immediate implication is that piecemeal interventions will only have limited effect. Perishables such as onion, tomato, and guava display particularly high price volatility and loss, while bulk crops such as soybean and chickpea suffer from low returns when storage, grading, and market linkages are absent. At the same time, pockets of success documented in the field — farmers gaining premiums through drying, grading, or direct sales — demonstrate that targeted investments and institutional support can yield measurable gains. The challenge is to scale those localized practices across district-appropriate value chains in ways that preserve producers' agency and economic upside.

The way forward requires an integrated, place-based strategy that aligns infrastructure, institutions, and information. Strategically located market hubs with grading, storage, and small-scale processing (linked to existing APMC and direct buyer channels), decentralised cold chains for high-risk horticulture, and shared logistics to lower freight costs must be prioritized in the clusters the study identifies as most vulnerable. Strengthening farmer collectives, cooperatives and FPOs is essential so aggregation and contract negotiation become routine rather than exceptional. Digital market information and simple e-trading channels — delivered in local language and via SMS/voice for smallholders — will reduce information asymmetry and support better timing of sales.

Operational measures must reorient extension to market outcomes: advisory systems should combine post-harvest handling, quality standards and negotiation skills with proven production advice, and amplify peer learning through farmer champions. Input integrity can be addressed through verification systems and better supply timing, while product quality improvements should be linked to market incentives. Risk instruments — reinforced MSP procurement where appropriate, a rapid response price-stabilisation mechanism for perishables, market-linked insurance that covers price as well as yield risk, and warehouse-receipt financing — will reduce forced distress sales and permit strategic storage and value capture.

Implementation must be locally anchored and accountable. District/Cluster Value Chain Committees (including FPOs, local administration, extension and private partners) should steer pilots, monitor a compact set of indicators (farm-gate price realisation, post-harvest loss reduction, FPO market share), and guide adaptive scaling. Public-private partnerships can mobilize finance and technology but must embed farmer governance and equitable benefit sharing. A phased approach — pilot, evaluate, refine, scale — combined with cross-district learning, will allow the state to convert the study's evidence into visible improvements in incomes, reduced losses, and more resilient, inclusive value chains.



About

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a pioneering non-profit organization focused on scientific research for development, committed to transforming dryland farming and agri-food systems. Working with global partners, ICRISAT develops innovative solutions to address hunger, poverty, and environmental degradation, benefiting 2.1 billion people across the drylands of Asia, Africa, and beyond.

ICRISAT was established under a Memorandum of Agreement between the Government of India and CGIAR, dated 28 March 1972. In accordance with the Headquarters Agreement, the Government of India has extended the status of a specified "International Organization" to ICRISAT under section 3 of the United Nations (Privileges and Immunities) Act, 1947 of the Republic of India through Extraordinary Gazette Notification No. UI/222(66)/71, dated 28 October 1972, issued by the Ministry of External Affairs, Government of India.

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