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Agricultural Commodity Futures in India: Role in Price Discovery and Price-Risk Management

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Abstract:
Agricultural commodity markets are characterised by substantial price uncertainty arising from seasonal production, weather conditions, changing demand and supply, government policies, international market movements and inadequate storage facilities. Such volatility creates significant challenges for farmers, traders, processors, exporters and other participants in the agricultural value chain. Agricultural commodity futures provide an organised mechanism for managing price risk by enabling market participants to hedge against adverse price movements and obtain information about expected future prices. This article examines the role of agricultural commodity futures in India, with particular emphasis on price discovery and price-risk management. The study adopts a conceptual and descriptive research methodology based primarily on secondary information obtained from regulatory documents, institutional publications, academic literature and commodity-market sources. The analysis highlights the functions of futures markets, including hedging, price discovery, market information, inventory management and improved marketing decisions. The study also examines the challenges of using futures for agricultural risk management, including limited awareness among farmers, fragmented landholdings, basis risk, inadequate liquidity in some contracts, contract-design issues and limited direct participation by small producers. The paper argues that agricultural commodity futures can contribute significantly to a more efficient agricultural marketing system when supported by effective regulation, adequate market infrastructure, financial literacy and institutional mechanisms such as Farmer Producer Organisations. Strengthening the linkage between physical agricultural markets and organised derivatives markets can further enhance the effectiveness of futures as instruments of price-risk management.

Keywords: Agricultural commodities, commodity futures, price discovery, price risk, hedging, farmers, derivatives market, India

1. Introduction

Agriculture is an important component of the Indian economy and provides livelihood opportunities to millions of people. However, agricultural production differs fundamentally from industrial production because it is highly dependent on biological processes, weather conditions and seasonal cycles. Farmers generally make production decisions well in advance of harvesting, while the market price at the time of sale remains uncertain.

Price fluctuations can therefore have a significant effect on agricultural income. A bumper harvest may increase market supply and cause prices to decline, whereas production shortages may result in sharp price

increases. Farmers may consequently face a situation in which satisfactory physical production does not necessarily result in satisfactory income.

Agricultural commodity futures have developed as an important mechanism for managing this uncertainty. A futures contract is a standardized agreement to buy or sell an underlying commodity or commodity-related asset at a specified future date and according to predetermined contract specifications. Participants can use futures positions to offset or reduce the impact of adverse price movements in the physical market.

The Indian commodity derivatives market has undergone substantial institutional development. Commodity derivatives have been regulated by the Securities and Exchange Board of India (SEBI) since September 2015, following the merger of the functions of the erstwhile Forward Markets Commission with SEBI. SEBI describes commodity derivatives as standardized futures and options contracts traded electronically on recognized exchanges.

The importance of futures markets extends beyond hedging. They contribute to price discovery, because futures prices incorporate the expectations and information of market participants concerning future supply, demand and market conditions. SEBI notes that financial investors contribute to price discovery and market liquidity in futures markets.

India's regulatory framework continues to evolve. SEBI's recent commodity-derivatives agenda includes measures relating to risk management, settlement mechanisms and agricultural commodity derivatives, indicating continued institutional attention to the development of the market.

Against this background, understanding the role of agricultural commodity futures in price-risk management is important for developing a more efficient agricultural marketing system.

2. Statement of the Problem

Agricultural producers face considerable uncertainty between the time of production and the time of sale. Farmers may experience declining prices at harvest, while processors and traders may face increasing procurement prices. Traditional methods of managing price risk include: forward contracts, storage, diversification, government procurement, minimum support mechanisms and crop and income diversification. However, these mechanisms may not always provide adequate or timely protection. Commodity futures provide an organised market-based mechanism through which price risk can be transferred between participants.

The central problem addressed by this study is therefore:

To what extent can agricultural commodity futures contribute to price discovery and effective price-risk management in the Indian agricultural market?

3. Objectives of the Study

The study has the following objectives:

1. To explain the concept and characteristics of agricultural commodity futures.
2. To examine the role of futures markets in agricultural price discovery.
3. To analyse the role of futures in managing agricultural price risk.
4. To examine the benefits of futures for farmers and other agricultural-market participants.
5. To identify the major challenges affecting the adoption of agricultural futures in India.
6. To suggest measures for improving the effectiveness of agricultural commodity futures as risk-management instruments.

4. Review of Literature

The literature on commodity futures generally identifies two principal economic functions: price discovery and risk management.

Earlier research on agricultural futures markets focused extensively on whether futures markets improve the efficiency of spot markets and whether futures prices provide reliable information about future spot prices.

The Indian policy literature has also recognised the risk-management role of futures. A SEBI expert-committee report notes that the National Agricultural Policy, 2000, supported the expansion of futures markets as a mechanism for reducing wide price fluctuations and hedging risk. The report also refers to the Guru Committee's emphasis on futures trading for price-risk management and agricultural marketing. Research also indicates that integration between physical and derivatives markets is important. Agricultural spot markets are often fragmented because of differences in location, quality and production conditions, whereas exchange-traded futures contracts are highly standardised. This creates challenges in linking the two markets effectively

The existing literature therefore suggests that the effectiveness of futures depends not merely on the existence of an exchange but also on liquidity, market access, standardisation, information availability and institutional infrastructure.

5. Research Gap

Although substantial literature exists on commodity futures, several gaps remain.

First, much of the literature focuses on the general functioning of derivatives markets, while relatively less attention is given to the practical integration of agricultural futures with the needs of small and marginal farmers.

Second, the Indian agricultural market has undergone significant institutional and regulatory changes. Therefore, earlier findings need to be interpreted in the context of the current regulatory environment.

Third, there is a need for greater emphasis on the role of FPOs, cooperatives and institutional aggregators in connecting small producers with organised derivatives markets.

Fourth, price-risk management should not be viewed exclusively as a financial-market issue. It depends on the interaction among production, storage, physical markets, warehousing, transportation and derivatives markets.

This paper attempts to address these issues through a conceptual analysis of agricultural commodity futures in India.

6. Research Methodology

6.1 Research Design: The study adopts a descriptive and conceptual research design.

6.2 Nature of Data: The study is based primarily on secondary data.

6.3 Sources of Data: Information is obtained from SEBI publications and regulatory documents, commodity-exchange information, government and institutional reports, academic literature, policy documents and published research relating to agricultural commodity derivatives.

SEBI provides regulatory and market information relating to commodity derivatives and has established a comprehensive risk-management framework for the segment.

6.4 Method of Analysis: The study is a conceptual paper. It is a descriptive and comparative analysis.
6.5 Scope: The study focuses on agricultural commodity futures and their contribution to: price discovery and price-risk management for income stability and interpretation of institutional and regulatory developments.

7. Conceptual Understanding of Agricultural Commodity Futures

A futures contract is a standardised derivative contract through which participants agree to buy or sell an underlying commodity at a future date under predetermined contractual specifications. The major elements include: Underlying commodity, Contract quantity, Quality specification, Contract month, Price, Delivery/settlement mechanism, Margin requirements, Exchange and clearing mechanism. The standardisation of contracts enables trading on an organised exchange.

8. Futures as an Instrument of Price-Risk Management

The basic principle of futures hedging is to take a futures position that offsets the price exposure in the physical market.
Farmer's position; A farmer who expects to sell a commodity in the future is exposed to the risk of a price decline.
Simplified relationship:
Physical commodity → Long exposure to falling prices
A suitable futures hedge can reduce the effect of this adverse movement.
Buyer/Processor's position: A processor who expects to purchase a commodity in the future is exposed to the risk of a price increase.
Simplified relationship:
Future procurement → Exposure to rising prices, A suitable futures hedge can help manage this exposure.

9. Role in Price Discovery

Price discovery is one of the most important functions of a futures market.
Futures prices incorporate information concerning: expected production; inventories; weather conditions; consumption; exports and imports; international prices; government policies; and market expectations.
Therefore: Information → Market expectations → Futures trading → Futures price → Price signal
These price signals can provide useful information to farmers, traders, processors and policymakers. SEBI's material specifically notes that financial investors add liquidity and depth and contribute to the effectiveness of price discovery.

10. Futures and Agricultural Marketing: Futures markets can complement physical agricultural markets. The relationship can be represented as:
Production → Storage → Physical Market → Futures Market → Risk Management → Sale
Farmers and agricultural enterprises can use information from futures markets while deciding whether to: sell immediately; store commodities; enter into a hedge; delay sale; or to plan future production.
However, futures prices should be treated as market information rather than guaranteed forecasts of future spot prices.

11. Futures and Income Stabilisation: Agricultural income depends on both quantity produced and price received.

A simplified relationship is:

Farm Income = Quantity Sold × Price Realised

While farmers may have limited control over the quantity produced, they can potentially reduce the impact of adverse price movements through appropriate hedging mechanisms.

Therefore:

Price volatility ↓ → Price-risk exposure ↓ → Revenue uncertainty ↓ → Income stability ↑

Futures cannot eliminate all agricultural risks, but they can reduce exposure to price fluctuations.

12. Major Benefits: Reduction in Price Risk, Price Discovery, Improved Market Transparency, Better Planning, Risk Transfer - Price risk can be transferred from participants who wish to hedge to those willing to assume market risk. Improved Market Efficiency -a liquid derivatives market can strengthen the linkage between expectations and prices.

13. Challenges: Limited Awareness - Many farmers are unfamiliar with derivatives and hedging. Small Farm Holdings - Small-scale producers may find standardised exchange contracts difficult to use individually. Basis Risk -The local spot price may not move exactly in line with the futures price. Contract Mismatch - Contract quantity, quality, delivery location or expiry may not perfectly match the farmer's physical exposure. Liquidity - Some agricultural contracts may not have sufficient trading activity for effective hedging. Financial Literacy- Understanding margins, contract specifications and hedge ratios requires specialised knowledge. Physical-Market Fragmentation -SEBI's expert committee has highlighted the fragmented and non-standardised nature of agricultural spot markets as a major challenge in integrating them with standardised derivatives markets.

14. Analysis and Interpretation:

The conceptual analysis suggests that the effectiveness of agricultural futures can be understood through five major dimensions:

Dimension	Contribution of Futures
Price discovery	Provides forward-looking price signals
Risk management	Reduces exposure to adverse price movements
Market information	Aggregates expectations of participants
Marketing	Supports timing and planning decisions
Market efficiency	Strengthens linkage between market expectations and prices

The analysis indicates that futures markets are most effective when there is sufficient participation from hedgers, traders, processors, exporters and financial investors. SEBI emphasises that financial investors contribute to liquidity and market depth, which are important for effective price discovery. However, the benefits do not automatically reach small farmers. The major transmission challenge is the gap between the organised derivatives market and the fragmented physical agricultural market. Consequently, institutional aggregation becomes important.

15. Role of Farmer Producer Organisations:

FPOs can potentially act as a bridge between farmers and organised commodity markets. The model can be represented as:

Individual Farmers
↓
Farmer Producer Organisation
↓
Aggregation of Produce
↓
Market Information
↓
Professional Risk Management
↓
Commodity Futures Market
↓
Improved Price-Risk Management

This approach can overcome some of the problems associated with small quantities and limited individual market knowledge.

16. Regulatory Framework:

Commodity derivatives in India are regulated by SEBI. The regulatory framework is intended to promote fair and transparent trading, clearing and settlement and protect market integrity. SEBI has established risk-management requirements for commodity derivatives, including mechanisms concerning price limits, settlement and other controls. The regulatory framework is continuing to evolve. In 2026, SEBI has been examining issues including physical settlement in selected agricultural commodity derivatives and broader risk-management arrangements.

This continuing regulatory development is important because agricultural commodities have distinctive characteristics involving seasonality, perishability, quality variation and government intervention.

17. Findings

The study identifies the following major findings:

1. Agricultural commodity futures can serve as important instruments for managing price risk.
2. Futures markets contribute to price discovery by aggregating market expectations.
3. Futures can improve the predictability of revenue and procurement costs.
4. The benefits extend beyond farmers to processors, traders and exporters.
5. Small and marginal farmers face significant barriers to direct participation.
6. FPOs and cooperatives can potentially improve access to organised risk-management mechanisms.
7. Basis risk remains an important limitation.
8. Liquidity is essential for efficient hedging.
9. Efficient physical-market infrastructure is necessary for effective integration with derivatives markets.

10. Regulatory supervision is essential for maintaining market integrity and controlling systemic and market risks.

18. Suggestions and Policy Implications:

Strengthen Farmer Awareness: Agricultural extension programmes should introduce basic concepts of futures and hedging in regional languages.

Promote FPO-Based Hedging: FPOs should be encouraged to aggregate produce and explore professionally managed price-risk strategies.

Improve Contract Design: Exchanges should design contracts considering: production cycles; quality; location; seasonality; and realistic market requirements.

Increase Market Liquidity: Greater participation from genuine commercial hedgers can improve liquidity and reduce the difficulty of entering and exiting positions.

Strengthen Warehousing: Scientific warehouses, assaying, grading and electronic warehouse systems can strengthen the connection between physical commodities and derivatives markets.

Improve Market Information: Farmers should receive timely information concerning: spot and futures prices; production; stocks; weather; and domestic and international demand.

Encourage Professional Intermediation: FPOs and agricultural organisations should have access to qualified professionals who understand commodity risk management.

Strengthen Spot-Derivatives Integration : The physical and derivatives markets should be developed as complementary components of an integrated agricultural marketing system. SEBI's expert committee similarly emphasised the importance of liquidity, market access, infrastructure and strong linkages between the two markets.

19. Limitations of the Study

The study is conceptual and relies primarily on secondary information. It does not conduct a primary survey of farmers or estimate the effectiveness of individual hedging strategies using farm-level data.

The paper therefore does not claim that all farmers can benefit equally from commodity futures. Actual effectiveness depends on commodity, location, contract characteristics, basis behaviour, liquidity, transaction costs and the participant's ability to access and understand the derivatives market.

20. Conclusion

Agricultural commodity futures have an important role to play in India's agricultural price-risk management framework. Agricultural prices are inherently uncertain because production is seasonal, supply conditions are influenced by weather and demand is affected by domestic and international developments. Futures provide an organised mechanism through which participants can manage exposure to adverse price movements.

The analysis shows that the importance of agricultural futures extends beyond hedging. They contribute to price discovery, market transparency, information dissemination and marketing decisions. Futures prices can provide useful signals regarding market expectations and thereby assist farmers and other agricultural participants in planning production, procurement and sales.

Nevertheless, significant challenges remain. Small and fragmented farm holdings, low financial literacy, basis risk, liquidity constraints and the fragmented nature of physical agricultural markets restrict the direct use of futures by many farmers. The solution is therefore not simply to encourage individual farmers to

trade futures. Instead, greater emphasis should be placed on institutional aggregation, FPO participation, professional risk management, improved warehousing and stronger integration between physical and derivatives markets.

India's regulatory framework is also continuing to evolve, with SEBI reviewing aspects of agricultural commodity derivatives, including settlement and risk-management arrangements.

Overall, agricultural commodity futures should be viewed as one component of a broader agricultural risk-management system. When supported by appropriate regulation, market infrastructure, financial literacy and institutional participation, futures markets can contribute to greater price stability, improved market efficiency and more informed agricultural marketing decisions.

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