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Krishi Bhavdarshi: An AI-Based Agricultural Price Forecasting and Market Intelligence Platform for Farmers

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ABSTRACT

Agricultural price forecasting plays a vital role in agricultural market intelligence by enabling farmers to understand price trends and make informed marketing decisions. However, inadequate access to timely and reliable market information often limits farmers' ability to identify suitable selling opportunities and improve price realization. In this context, Krishi Bhavdarshi has been developed as a bilingual Artificial Intelligence (AI)-based agricultural price forecasting platform to facilitate data-driven decision-making in agricultural marketing. The platform integrates historical and available current market prices, Minimum Support Price (MSP) information and market arrival data to analyse price behaviour and estimate potential future price movements. It covers three major commodity groups: cereals, pulses, and oilseeds. Its farmer-friendly dashboard incorporates graphical visualizations, year-wise price trends, comparative commodity analysis, forecast price changes, market outlook indicators and forecasting accuracy measures, including Mean Absolute Percentage Error (MAPE), where applicable. The platform aims to simplify complex market information and help farmers assess prevailing prices, compare them with applicable MSP benchmarks and evaluate alternative selling opportunities. It may also support farmer-producer organisations, agricultural cooperatives and extension professionals in market planning and produce marketing. By combining agricultural market data with statistical and machine learning-based forecasting approaches, *Krishi Bhavdarshi* offers a technology-enabled framework for reducing information gaps and strengthening market-oriented agricultural decision-making. Its practical effectiveness depends on data quality, model validation and changing market conditions.

Keywords: Artificial Intelligence, Agricultural Price Forecasting, Machine Learning, Agricultural Market Intelligence

INTRODUCTION

Agricultural price forecasting is an important component of agricultural market intelligence that helps farmers to understand the price behaviour and anticipate potential changes in market conditions. Agricultural commodity prices are influenced by several factors including demand and supply, seasonal market arrivals, production fluctuations, weather conditions, transportation costs and

prevailing market dynamics. Limited access to timely and reliable market information often makes it difficult for farmers to determine the appropriate time and place to sell their produce. In this context, Artificial Intelligence (AI), Machine Learning (ML), and data analytics offer opportunities to improve agricultural marketing decisions through the systematic analysis of historical market prices and the estimation of likely future price movements.

Krishi Bhavdarshi has been conceptualized and developed as a bilingual AI-based crop price forecasting platform to facilitate informed decision-making regarding the sale of agricultural produce. The platform has been developed by School of Advanced Agriculture Sciences and Technology, Chhatrapati Shahu Ji Maharaj University, Kanpur in 2026. The platform aims to bridge the information gap between farmers and agricultural markets by converting available market price data into simple, accessible and meaningful information. Its conceptual framework integrates market data collection, data processing, price pattern analysis, forecasting and decision support. Historical and available current market price data are analysed to identify relevant trends and fluctuations, while appropriate statistical and machine learning techniques can be employed to estimate future prices. The resulting information is intended to help farmers to understand prevailing market prices and assess potential future price movements. *Krishi Bhavdarshi* seeks to enable farmers to evaluate alternative selling opportunities and make more rational marketing decisions. Farmers may consider whether to sell immediately or postpone sales based on anticipated price trends, storage availability, transportation costs, crop quality and their financial requirements. However, forecasts represent estimates rather than guaranteed prices and should be interpreted alongside actual market conditions.

The platform covers three major agricultural commodity groups including cereals (bajra, barley, jowar, maize, paddy and wheat), pulses (pigeon pea, bengal gram, black gram, green gram and lentil) and oilseeds (groundnut, mustard, sesamum and soyabean). This facilitates crop-wise access to market price information and provides a structured framework for presenting price forecasting insights for different agricultural commodities. The availability and reliability of forecasts for individual crops depend on the quality, continuity and adequacy of the relevant market price data.

Krishi Bhavdarshi represents a technology-driven approach to agricultural market intelligence, with the objective of strengthening farmers' market awareness, supporting informed crop-selling decisions, improving price realization, and contributing to better farm income. By integrating AI-based forecasting with accessible agricultural market information, the platform seeks to promote a more informed, data-driven, and market-oriented approach to agricultural marketing.

Operational Framework of Krishi Bhavdarshi

Krishi Bhavdarshi is an AI-based crop price forecasting platform developed to facilitate informed decision-making regarding the marketing and sale of agricultural produce. The platform works by integrating available agricultural market price data, historical price trends, Minimum Support Price (MSP) information and market arrival data into a unified, farmer-friendly dashboard. Farmers can select an agricultural commodity and access its available

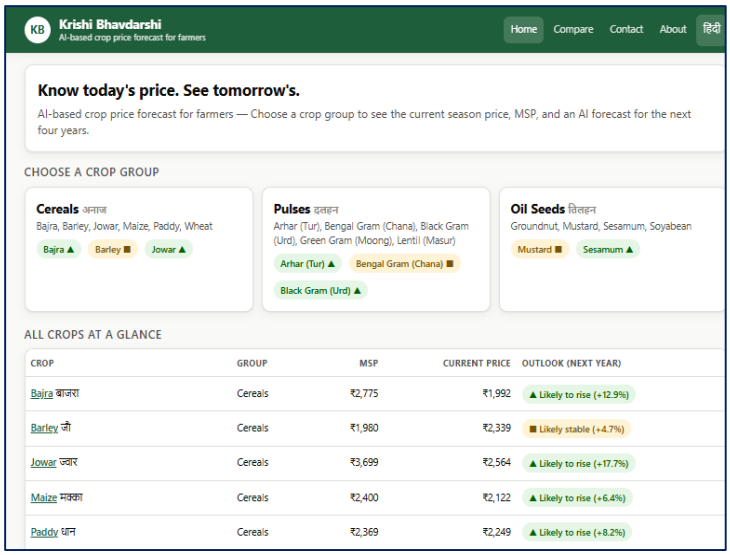


Fig 1. User Friendly Dashboard of Krishi Bhavdarshi

current-season market price, compare the prevailing price with the applicable MSP and examine historical price movements to understand market behaviour over time. The platform uses data analysis and forecasting techniques to estimate likely future price movements for upcoming agricultural seasons. Its dashboard presents historical and forecast prices through graphical visualizations and year-wise tables, enabling users to compare past trends, current market conditions and projected prices. It also incorporates market arrival analysis to provide insights into seasonal changes in the quantity of produce reaching agricultural markets and their potential implications for price movements. The forecasting framework is intended to use suitable statistical, machine learning and ensemble modelling approaches to analyse available data and generate price estimates. By presenting complex market information in a simple and accessible format, *Krishi Bhavdarshi* aims to reduce information gaps between farmers and agricultural markets and strengthen farmers' capacity to evaluate alternative selling opportunities. The information provided can help farmers assess whether to sell their produce immediately or consider postponing sales, taking into account forecast trends, local market prices, storage and transportation costs, produce quality and immediate financial requirements. The reliability of these decisions depends on the quality of the underlying data and the accuracy of the forecasting models; therefore, predicted prices and market arrivals should be treated as indicative estimates rather than guaranteed outcomes.

Comparative Agricultural Commodity Price Forecasting and Decision Support Framework

Krishi Bhavdarshi incorporates a comparative agricultural commodity price forecasting framework that enables farmers to examine and compare the prevailing market prices and estimated future prices of different agricultural commodities for a selected forecasting year. The dashboard consolidates key indicators including

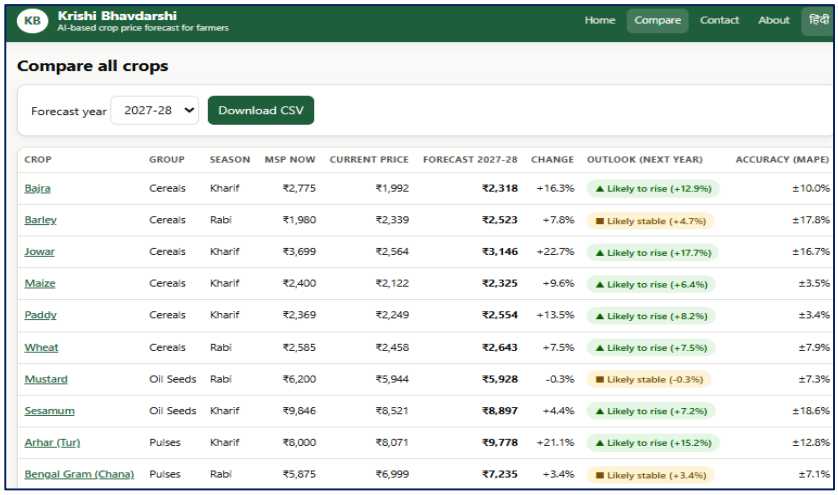


Fig 2. Comparative Agricultural Commodity Price Forecasting

commodity category, marketing season, current Minimum Support Price (MSP), prevailing market price, forecast price, percentage change in the forecast price, expected market outlook, and forecast accuracy. This integrated presentation allows users to assess the relative price behaviour of different commodities and identify potential marketing opportunities based on data-driven insights.

The framework operates by analysing available historical market price data and applying suitable statistical and machine learning techniques to estimate future price movements. The forecast results are presented alongside current market prices and MSP benchmarks to facilitate comparative assessment. The percentage change indicator represents the expected change in the forecast price relative to the current market price, while the market outlook classifies the anticipated price movement into categories such as likely to rise and likely to remain stable. In addition, the Mean Absolute Percentage Error (MAPE) indicator provides information on the predictive performance of the forecasting model based on the data and validation procedure used. These indicators help translate complex analytical outputs into an understandable format for farmers and other agricultural stakeholders.

From a practical perspective, the comparative forecasting framework can support farmers in evaluating alternative selling opportunities, planning the timing of crop sales and strengthening their understanding of market conditions. In the similar sense, a forecast indicating a potential increase in prices may encourage farmers with suitable storage facilities and sufficient financial resources to assess the feasibility of postponing sales. Conversely, an anticipated decline may prompt consideration of earlier marketing, depending on prevailing local prices and associated costs. The framework may also support farmer-producer organisations, agricultural cooperatives, and extension professionals in market planning, produce aggregation and the identification of potential marketing channels. However, projected prices should not be interpreted as guaranteed outcomes, and decisions must account for storage and transportation.

CONCLUSION

Krishi Bhavdarshi is a promising AI-based agricultural price forecasting platform designed to strengthen farmers' access to market intelligence and support informed crop-selling decisions. By integrating historical market prices, current market information, Minimum Support Price (MSP) benchmarks, market arrivals, and price forecasting techniques, the platform provides a comprehensive framework for understanding agricultural commodity price behaviour. Its comparative dashboard and graphical visualizations enable farmers to assess prevailing market conditions, examine anticipated price movements, and evaluate potential marketing opportunities across cereals, pulses, and oilseeds. The platform can also assist farmer-producer organisations, agricultural cooperatives, and extension professionals in market planning and marketing strategy development. Although price forecasts are subject to uncertainty and depend on data quality and model accuracy, their systematic use alongside local market conditions, storage costs, transportation expenses, and farmers' financial requirements can contribute to better-informed marketing decisions.