International Research Journal of Innovations in Engineering and Technology (IRJIET)

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

AgriLink: Smart Agricultural Market Platform Using Data-Driven Decision Support

[1]Thota Mallika Devi, [2]K.Sreeveda, [3]Tejaswi Sai Bhimavarapu, [4]R Gayathri, [5]Chitrala Nikitha, [6]M Likitha

[1,2]Asst. Professor, Dept. of CSE (Data Science), G. Narayanamma Institute of Technology and Science, Hyderabad, India
[3,4,5,6]Dept. of CSE (Data Science), G. Narayanamma Institute of Technology and Science, Hyderabad, India
E-mail: [1]Mallika544@gmail.com, [2]r92181569@gmail.com, [3]sreeveda.karrepu@gmail.com, [4]chitralanikitha2005@gmail.com, [5]tejaswisaihimavarapu@gmail.com, [6]babloolikki@gmail.com

***Abstract* - Agriculture industry ranks amongst the most important industries which play a very critical role in economic development and livelihood generation. However, there are several challenges faced in agriculture making it hard to conduct business such as lack of price information, dependence on middlemen and inefficiencies in decision-making tool used by the farmers. In this paper, AgriLink web-based agricultural application is proposed. This will assist farmers in making effective decisions in the market. The framework provided in the paper allows farmers to make comparisons regarding crop prices, estimating profits and direct communication with the vendors. The framework makes use of inputs from the users, market price information and the process of decision making to generate an optimal solution for selling of crops. Matching algorithm matches farmers with relevant vendors based on crop types and location, and transportation costs are estimated to compute profit. Application framework for the web-based system is adopted whereby the user enters crop details and gets instant feedback. In addition to making the markets transparent, the proposed platform can be employed in ensuring that the process of agricultural digitization takes place because it can facilitate quick communication among the stakeholders without delaying decision making. The platform also has a lightweight and scalable system architecture, thus being suitable for implementation in rural areas owing to low computing power. In view of the integration of market intelligence and profitability analysis tools, the platform becomes very useful for smallholder farmers.**

Keywords: Smart Agriculture, Decision Support System, Market Analysis, Profit Forecasting, Web Platform.

I. INTRODUCTION

Farming is an important element of any economy and plays a role in feeding millions of people around the world. Because of technological advancement, farmers face problems in gathering market information on time.

The old fashioned way to look at agriculture uses intermediaries, resulting in poor transparency and reduced profits for the farmer. The absence of decision-making systems makes it difficult for farmers to make informed decisions about market conditions.

The emergence of web technologies creates an opportunity for the development of decision support systems. In this paper, we introduce Agrtlink, which is a smart agriculture application that can help you compare prices, calculate profits, and even find your vendors. Objective of this research is to increase transparency, improve profitability of farming, and remove intermediaries for the farmers. *n* recent times, the use of smart technologies in the field of agriculture has grown significantly due to the need for increased efficiency and optimal resource utilization. However, there are some farmers who lack digital technologies that would enable them to link up the market contacts, profitability calculations, as well as communications with vendors in their agricultural practice [1]. Most of the available systems only deal with a certain specific area, for instance, price information or weather predictions. As a result, there arises a definite need for the development of an integrated system that would provide overall market coverage at once.

II. LITERATURE SURVEY

2.1 Traditional Agricultural Systems

In the traditional farming system, the producers relied on manual methods for marketing their goods, and there was no knowledge about the prices being charged in the local markets. There were intermediaries such as brokers and traders who set the prices and transacted the business. These processes were not transparent, which resulted in low compensation to the producers for their produce. The pricing system had never been part of the conventional agriculture system. Hence, it made it difficult for the farmers to assess the market situation and take informed decisions [2]. Despite being an uncomplicated farming system that used little technology, it was not very efficient.

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

2.2 Digital Agricultural Platforms

With the development of IT, digital agriculture systems came up, which were helpful to farmers in getting information on the market. Farmers could get the information on pricing and also connect with buyers. Systems like the government agricultural websites and apps made it easier for one to access price information although still required the middleman. Although they provided information, they did not make the decision-making process any easier. Although the effectiveness of provision of information through the use of digital platforms was quite satisfactory, the inclusion of elements like calculating the profit, matching buyers with vendors, and communication tools was missing in these platforms.

2.3 Data Driven Decision Support Systems

The technological development over the recent period of time has enabled the development of the data driven systems that utilize data analytics in order to take the decisions. The systems mentioned above aim at making predictions based on the prices, demand, and the general environment in the market. Some of the data-driven systems use simple models in order to aid in the process of selling. But, the majority of such systems exist as stand-alone ones. Moreover, the need for complex data entry or poor user interface is an impediment in the use of these technologies among farmers.

2.4 Comparative Analysis and Research Gaps

It is evident from the analysis of the existing techniques that there are certain limitations in their application. On the one hand, traditional methods lack transparency and efficiency, while on the other hand, modern electronic systems are limited in terms of functionality. The data-driven method helps make better decisions but is lacking in integration. It is extremely important to design an integrated platform that includes real-time price comparisons, profitability calculation, vendor matches, and communication features. The AgriLink platform which is being introduced has been designed keeping in mind the solutions to all the issues.

2.5 Requirement of Integrated Agricultural Platforms

Certain research studies have revealed the importance of technology in improving the efficiency and productivity of agriculture. Some platforms provide price dashboard while some others provide crop advising facility. But there are very few platforms which integrate different facilities within one platform itself. Any farmer would like to have systems which require minimal manual intervention and provide instant recommendations. This requires a system for integrated decision making so as to improve efficiency. This is the concept behind AgriLink.

III. PROPOSED SYSTEM

The AgriLink system that is described above will guarantee the creation of an efficient and scalable instrument which will be able to optimize agricultural market relations via the Internet. The proposed solution is intended to provide greater transparency and minimize dependence on intermediaries and to make wise decisions by using data available from the system. It runs on a data-based model where all the important functions of the system like data entry, price comparison, profit calculation, vendor match, and communication are available within the same application. The whole process of working in the suggested AgriLink system consists of several steps such as collection of data, preprocessing, analysis, decision making, and give implementation. Market relations via the Internet [3]. The proposed solution is intended to provide greater transparency and minimize dependence on intermediaries and to make wise decisions by using data available from the system. It runs on a data-based model where all the important functions of the system like data entry, price comparison, profit calculation, vendor match, and communication are available within the same application. The whole process of working in the suggested AgriLink system consists of several steps such as collection of data, preprocessing, analysis, decision making, and implementation. The whole process of working in the suggested AgriLink system consists of several steps such as collection of data, preprocessing, analysis, decision making, and implementation.

3.1 Data Acquisition and Preprocessing

The module's responsibility is to collect and process data to be used in system operations. This is done using two sources: data from user input and market prices.

The users will supply information on the kind of crop being planted, amount of crops grown, initial costs, and their selling prices. Information regarding market prices is also gathered either through the vendor's listing or otherwise.

So that uniformity and accuracy can be maintained, the collected data undergoes some preprocessing processes including data cleaning and normalization. Invalid records are removed, gaps are filled, and all data are standardized.

Values such as cost and price are normalized to make sure that there is consistency in calculations. Location values are processed in order to find distances between the farmers and traders.

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

3.2 Price Comparison Mechanism

This price comparison algorithm will help to compare the prices of crops from various vendors, and choose the best ones. This algorithm is designed to collect the necessary data on prices, which then are compared to the user-provided data.

Comparing is a process that involves taking care of a number of things like price variation, vendor availability, and others. Through this, the system ensures that the farmers are aware of the prices of the crops.

It will ensure that there are no price verification procedures or intermediaries needed.

3.3 Profit Estimator Model

This module will calculate the expected profit that will be realized from each transaction using the cost method. The calculation is done using the formula:

Profit = Selling Price – (Investment + Transportation Cost)

Where:

- Selling price is obtained from the vendor
- Investment is production cost
- Transportation cost is calculated using the distance

This will assist the farmers in identifying the sale option with the maximum profit.

3.4 Vendor Matching Mechanism

Matching of the vendor is done by the module by matching the farmers to the vendors that match their needs on various grounds. While doing vendor selection, the following parameters are used among others: The above-mentioned criteria are used to allocate the vendor in the following manner:

- Distance between farmer and vendor
- Transportation cost estimate
- Expected profit calculation

The vendor who makes the most money will be the perfect vendor.

3.5 Communication and Transaction Mechanism

This module ensures that there are direct communications between the farmer and the merchant. This module contains an interface where the user can communicate and negotiate on prices.

Due to there being no intermediaries, this module ensures increased transparency for the benefit of the farmers.

3.6 Web-Based Deployment Using Flask

This entire process is done through a web application that is built using Flask. The web application acts as an easy-to-use user interface. Using this web application, users will be able to:

- Enter the details regarding their crops
- Check the comparative analysis of prices
- Know the amount of profit they may make on their crops
- Find the right vendor for their needs
- Interact with their vendors

The design of the system allows it to be efficient, allowing its use in real world agriculture settings.

- Distance between farmer and vendor
- Transportation cost estimate
- Expected profit calculation

The vendor who makes the most money will be the perfect vendor.

3.7 Communication and Transaction Mechanism

This module ensures that there are direct communications between the farmer and the merchant. This module contains an interface where the user can communicate and negotiate on prices [4].

Due to there being no intermediaries, this module ensures increased transparency for the benefit of the farmers.

3.8 Web-Based Deployment Using Flask

This entire process is done through a web application that is built using Flask. The web application acts as an easy-to-use user interface. Using this web application, users will be able to:

- Enter the details regarding their crops
- Check the comparative analysis of prices
- Know the amount of profit they may make on their crops
- Find the right vendor for their needs
- Interact with their vendors

The design of the system allows it to be efficient, allowing its use in real world agriculture settings.

International Research Journal of Innovations in Engineering and Technology (IRJIET)
ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

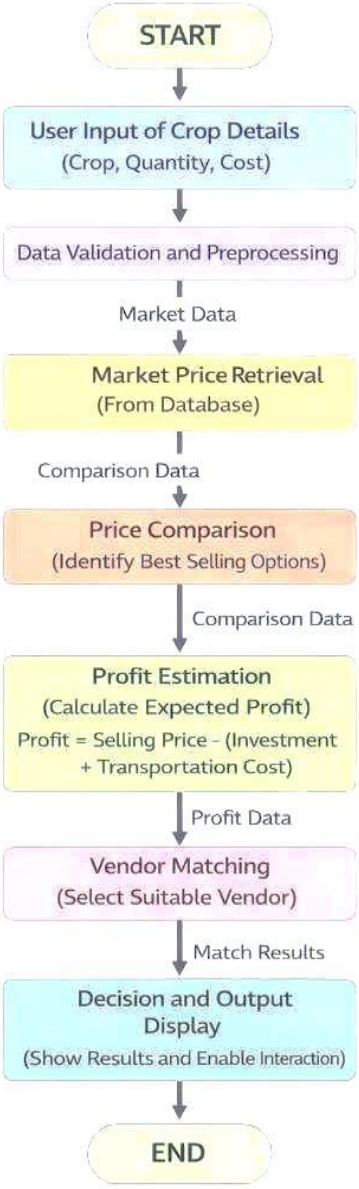

Figure 1: Agrilink process

AgriLink solution that is suggested has to be focused on providing the convenient and efficient way for the interaction between agriculture markets in form of web-based application. The primary idea behind the suggested solution is to enhance transparency, decrease the dependency on intermediaries, and provide the possibility to make decisions based on the latest information.

AgriLink comes up with several services that include the provision for data entry, prices comparison, profit estimation, vendor search, and communication within a single platform. In this case, the user is guaranteed all functionalities in a single platform.

The first process of the system is to input the information related to the crop by the user. Input includes the crop type, quantity, initial investment, and price.

After processing the input information, the system retrieves the information relating to market price from the various sources such as vendor web sites or the database containing the price list from the government. Price comparison is done by the system among the various vendors.

This is followed by the phase of calculating the profit, which calculates profit through sales, investments, and transportation costs.

In the last step, the vendors are matched by taking into account the profit and location considerations of the vendors and the most suitable vendor is selected based on the above factors.

Finally, the output will be displayed on a website interface where users can view price comparison, profit, and vendor details. The software enables communication between the farmer and the vendor in order to negotiate and complete transactions.

The efficiency of the system is mainly characterized by its simplicity and scalability. The process is designed in such a way that no complex computation is involved, thus making it implementable. In addition to this, the modularity of the process makes it easier to add more functions in the future.

AgriLink is based on a three-layer architecture that includes presentation layer, application layer, and data layer[5]. The presentation layer includes a web-based interface where the details about the crops can be entered and results are displayed. Application layer includes price comparison, profit calculation, vendor matching, and communication processes. Data layer includes the storage of user data, crop data, vendor data, and pricing data.

For front end applications, HTML, CSS, and JavaScript languages are used. Flask is used in this case because of its simplicity and easy integration with python-based models.

Modularity will allow for future Modularity will allow for future maintenance as well as allow for the use of APIs and machine learning algorithms, among others.

3.9 System Modules

This AgriLink framework follows a particular methodology in order to ensure that decisions taken are accurate and effective. Data collection begins with the input of data concerning the crop in question, such as the type of crop,

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

quantity, investment costs, and its estimated price. This data is then subjected to processes of validation and pre-processing.

After the pre-processing stage of data is completed, the system acquires information regarding the market prices and performs a price Comparison among different sellers. The system also calculates the profit margin after considering the cost of investment and transportation.

Once the data is processed, the subsequent phase comprises vendor matching based on vendor availability and profitability. The result will finally be presented through the web interface.

1. Data Input Module

This module includes the data regarding crops such as type of crop, quantity of crops and the cost of investments which is provided by the user. The validation is done at the beginning to avoid any mistake in the calculation.

2. Price Comparison Module

This module will gather information relating to prices in markets and evaluate it to provide the best chances for sales.

3. Profit Estimation Module

This module calculates the anticipated profit from cost considerations. It considers the selling price, cost of investment, and transportation cost in the calculation process.

4. Vendor Matching Module

This module provides vendors based on crop type, locality, and profit that can be made out of it. The system will choose the vendor which provides the maximum profit with minimum transportation costs.

5. Communication Module

This module serves as a forum where the users can interact with each other.

6. Feedback and Rating Module

This module provides a mechanism for users to give feedback about their experiences related to the vendor, the quality of the delivery and overall transaction satisfaction. These ratings will enhance trust between the participants and help farmers to select trustworthy vendors in future transactions.

IV. ALGORITHM DESIGN

AgriLink adopts a vendor recommendation algorithm that uses rules in identifying the bestselling option for the farmers.

Steps:

1. Take crop type, quantity, cost of investment, and farmer's location.
2. Obtain all the vendors that deal with the crop type.
3. Compare prices quoted by all the vendors.
4. Determine the transportation cost using the distance.
5. Determine the profit as follows: Profit = Selling Price − (Cost of Investment + Transportation Cost)
6. The vendors offering the highest profit are given priority ranking.
7. Show top recommendations to the user.

This is because this algorithm saves human efforts and provides quick decision-making.

V. RESULTS AND DISCUSSION

5.1 Experimental Setup

The AgriLink system that was recommended is a web-based program developed using the Flask framework to guarantee that the program is simple, effective, and instantly usable. The AgriLink system is expected to help farmers make informed decisions by integrating all the necessary factors such as the crop input, comparing prices in the market, estimating profits, and finding vendors.

The dataset provided in AgriLink system comprises user specified details regarding crops such as crop type, production volume, cost of investment and selling price, as well as market prices provided by vendors from different databases.

In order to evaluate the effectiveness of the, approach, its implementation has been performed under different conditions with various crop types, pricing strategies and vendor availability [6]. The evaluation of the system was essential in order to check its responsiveness and efficiency under different conditions.

Moreover, there was a need to test the system to determine its usability and convenience in use because testing covers all aspects related to the performance and reliability of the system. Performance of the system can be determined by the ability of the system to give the right recommendations and save time and efforts.

It is important to note that in contrast to sophisticated computational models, the suggested system does not require extensive computing power.

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

5.2 Observations

It may be noted from the experiment results that the AgriLink system proved to be very efficient when used by the agricultural markets to make their decisions. It is able to compare different prices from different vendors and choose the best one based on the situation at hand.

The profit prediction approach is also proved to be practical as it takes into account not only investments but also transportation costs that depend on the distance between farmers and vendors.

Vendor matching module has been designed very well for determining appropriate vendors via profitability and proximity analysis. This will significantly save a lot of time involved in manual comparison and search of buyers by farmers.

In addition to that, the communication facility provided by the system enables users to communicate with the farmers and vendors without any third party involvement [7].

The system produces highly consistent and reliable results, which are immune to variations in input conditions.

In addition, the user interface shows the results in a properly formatted, which makes it easy for the users to understand and utilize the information contained in it. This adds to the usability of the system.

Table 1: Comparison with Traditional System

Feature	Traditional System	Agrilink
Price Transparency	Low	High
Profit Estimation	Not Available	Available
Vendor Matching	Manual	Automatic
Communication	Limited	Direct
Decision Support	Low	High
Efficiency	Low	High

5.3 Performance Evaluation

Performance of the suggested system was assessed on the basis of its performance speed, usability, and consistency. In various test cases involving different crops and data sets provided by different vendors, the system produced the output in a matter of seconds.

User tests showed that the results presented in the form of tables, graphs, and vendor rankings can be easily understood by farmers [8]. It saves considerable amount of time required for the price analysis and selecting a buyer in case of manual market comparisons.

5.4 Comparative Evaluation

There are many advantages to the proposed AgriLink system compared to traditional ones. Traditional systems rely on mediators and experience and are characterized by low transparency and low profits.

In contrast, the AgriLink system uses a data-oriented approach that helps farmers analyze the current market state and make appropriate decisions. This system integrates three different processes - price comparison, profit estimation, and supplier recommendation into a single process.

Unlike traditional techniques, where one should invest efforts and rely on experience, the AgriLink system does everything automatically. Thanks to the simplicity of the system, it can be easily integrated using web-based interfaces and without significant computational resources.

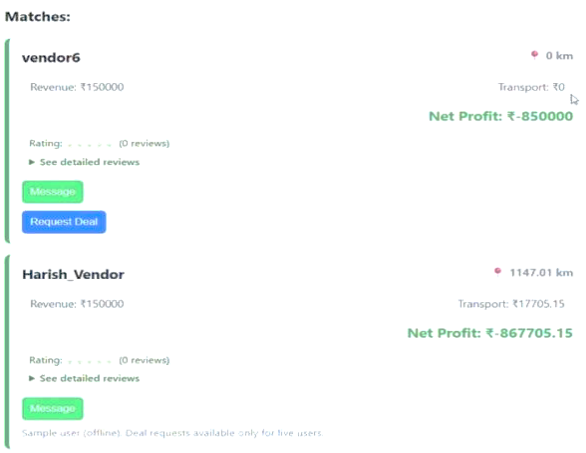

Figure 2: Crop Input and Price Comparison Interface

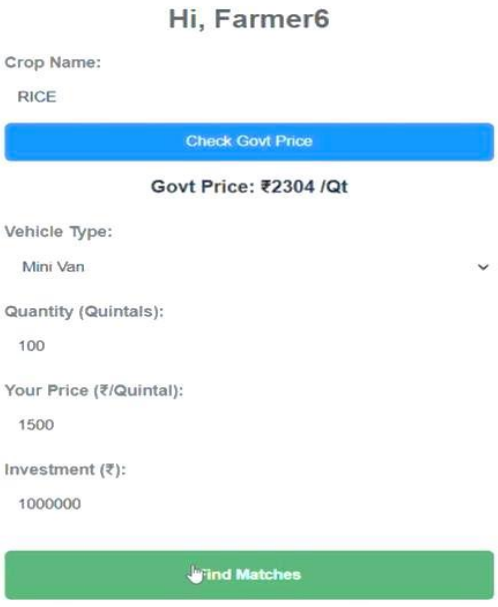

Figure 3: Vendor Matching and Profit Estimation Output

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

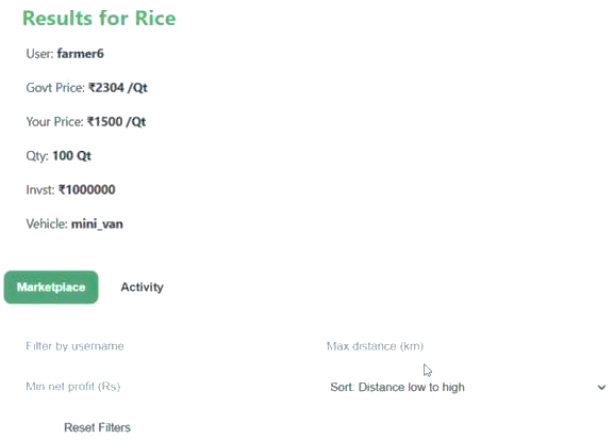

Figure 4: Matching Results and Vendor Selection Interface

Figure 5: User Rating and Feedback Interface

The following screenshots show that AgriLink application is able to function in real-time. The program provides crop information and compares prices to come up with profit estimates [9]. The above outputs clearly indicate which option is more profitable.

In case of multiple vendors, the AgriLink system will select the vendor whose profit is maximized and transportation cost minimized.

5.5 Future Scope

There are quite a few advanced functions that can be added to the current version of AgriLink. Live crop prices could be updated through real-time market APIs. The prediction of future crop demands and prices can be done using machine learning algorithms. The use of a mobile app would provide easy access for the farmers living in the countryside [11]. Support for multiple languages would boost usage even more.

5.6 Limitations

But there are certain difficulties involved in this system despite its effectiveness. The first problem with the system is that its capability of giving accurate results is dependent upon the availability and correctness of input data. errors or However, inaccuracies by the user may alter the results obtained [10].

Secondly, the system makes use of static data for its market data and this might prove to be problematic when it comes to ensuring that the correct answer is reached due to changes in vendors' prices as well as other variables like transport expenses.

Lastly, there is lack of predictive analytics in the system and this could have been helpful in decision making.

Some of the improvements to be done in future include real-time API market data integration, advanced analytics incorporation, among others.

VI. CONCLUSION

AgriLink is an innovative agricultural market portal that enables decision making about the sale of crops using modern web technology and analysis. AgriLink integrates pricing, profitability calculations, vendor identification, and direct communication into one comprehensive system.

The dependence on intermediaries becomes less, which allows the producers to gain profits from the sale of their produce. The experiments show that the described model is efficient, practical, and scalable for use in reality. Further improvements will make it possible for AgriLink to get a lot of opportunities in the sphere of digital agriculture. For example, it will include machine learning and current data about the situation in the market.

REFERENCES

[1] A.Sharma, R. Verma, and P. Gupta, "AI-Based Real-Time Market Place for Fresh Produce with Integrated Quality Assessment and Direct Buyer-Seller interaction ", *International Journal of Computer Applications*, vol. 182, no. 45, pp. 25– 30, July 2021.

[2] Nandakumar, C., Anisha, T., Harshavardhan, B., Divya, P.,& Sai Krishna, S. (2023). EcoFresh – An integrated farmer market platform with AI-powered NLP chatbot to strengthen agricultural trade and simplify e-commerce operations. *International Journal of Advanced Research in Science, Communication and Technology*, 8(2).

[3] S. R. Nandurkar, V. R. Thool, and R. C. Thool, "Design and Development of Precision Agriculture System Using Wireless Sensor Network", *International Journal of Advanced Computer Science and Applications*, vol. 5, no. 6, 2014.

[4] Mittal, S., & Mehar, M. (2016). Socio-economic factors affecting adoption of modern information and

ISSN (online): 2581-3048
Volume 10, Issue 9, pp 130-137, September-2026
https://doi.org/10.47001/IRJIET/2026.109014

communication technology by farmers in India. *Indian Journal of Agricultural Economics*.

[5] Khanna, A., & Kaur, S. (2019). Evolution of Internet of Things (IoT) and its significant impact in the field of Precision Agriculture. *Computers and Electronics in Agriculture*.

[6] K. Nirmal Ravi Kumar, "Minimum support prices and market price dynamics in Indian agriculture", *Discover Sustainability*, vol. 7, article 1305, 2026. This paper studies relationships between minimum support prices, production costs, domestic market prices, and international prices in Indian agriculture.

[7] P. Kumar, R. R. Kumar, and G. K. Jha, "Agricultural price forecasting with multivariate singular spectrum analysis across multiple Indian markets," *Discover Artificial Intelligence*, vol. 6, article 980, 2026. This research concentrates on the forecasting of agricultural prices across multiple Indian markets.

[8] P. Mahajan, A. A. Muley, and M. R. Fegade, "Forecasting agricultural commodity prices using machine learning models," *Discover Informatics*, vol. 1, article 15, 2026. The research utilizes historical AGMARKNET data from Maharashtra and uses machine-learning-based approach for agricultural commodities.

[9] K. Dipu, N. Tyagi, and R. Khan, "Explainable AI-Based Crop Price Prediction Model for Robust Stakeholder Decision-Making," *2026 IEEE 6th International Conference on Computing, Power, and Communication Technologies (IC2PCT)*, 2026. DOI: 10.1109/IC2PCT68894.2026.11584437. The paper focuses on explainable AI for crop-price prediction and presents forecasts through a decision-support dashboard.

[10] M. Shamsul Arefin, M. I. S. Mahin, F. A. Mily, M. S. H. Sani, M. I. Rehan, and T. I. Sumon, "AGRO AI: A compact solution for modernizing the agriculture using NASA's satellite data and artificial intelligence," *Applied Food Research*, vol. 6, article 101678, 2026. The system combines satellite data, IoT data, AI, and an agricultural chatbot for real-time recommendations.

[11] "AIoTU: An open-source IoT and machine learning platform for smart agriculture and yield prediction," *SoftwareX*, vol. 34, article 102613, 2026. The platform combines IoT, weather information, machine learning, real-time monitoring, and yield prediction for smart agriculture.

Citation of this Article:

Thota Mallika Devi, K.Sreeveda, Tejaswi Sai Bhimavarapu, R Gayathri, Chitrala Nikitha, & M Likitha. (2026). AgriLink: Smart Agricultural Market Platform Using Data-Driven Decision Support. *International Research Journal of Innovations in Engineering and Technology - IRJIET*, 10(9), 130-137. Article DOI https://doi.org/10.47001/IRJIET/2026.109014

****

