

## IMPACT OF E-AUCTION ON KERALA'S SPICE SECTOR: A STUDY ON CARDAMOM CULTIVATORS IN IDUKKI DISTRICT

By

**\*Jiya Tom, & \*\*Geevarghese M. Thomas**

*\*Research Scholar, Department of Economics, Catholicate College, Pathanamthitta, Kerala, India.*

*\*\*Assistant Professor, Department of Economics, K.G. College, Pampady, Kottayam, Kerala, India.*

### Abstract

*The adoption of e-auction as a transparent and technology-driven platform for the sale of cardamom has brought significant transformation in Kerala's spice sector. This study aims to evaluate the impact of e-auction on the cardamom market and its implications for cultivators in the Idukki district, with particular focus on factors influencing its adoption. The specific objectives include: (1) identifying the benefits and challenges faced by farmers in using e-auction, (2) examining the relationship between e-auction participation and price realisation, and (3) determining socio-economic and institutional factors influencing adoption. A descriptive and analytical research design was adopted. The study is based on primary data collected through direct interviews with 150 randomly selected farmers in Udumbunchola Panchayat, Idukki district. A structured interview schedule was used as the main research tool. Analytical techniques included the Garret Ranking Test to prioritise the challenges faced and logistic regression analysis to identify the determinants of e-auction adoption, using education level, farm size, access to technology, and training as independent variables. The findings reveal that training and education have a significant influence on the adoption of e-auctions, followed by technological access and farm size. E-auctions have enhanced price transparency, market efficiency, and accessibility, although issues such as a lack of trust, limited technology access, and fear of exploitation persist. The study concludes that targeted interventions such as farmer training and infrastructure support can substantially strengthen the benefits of e-auction and ensure inclusive digital participation in the spice trade.*

**Keywords:** *e-auction, adoption, cardamom, kerala, spice sector.*

### Introduction

Information and Communication Technology (ICT) has profoundly transformed the agricultural landscape in Kerala, India. The integration of

digital tools and platforms has enhanced efficiency, productivity, and transparency across various stages of the agricultural value chain. Among the key technological interventions, the introduction of electronic auction

(e-auction) systems in the spice sector marks a major milestone in modernizing agricultural marketing practices.

The emergence of e-auction platforms in Kerala's spice trade can be traced to the growing need for transparent, efficient, and equitable marketing systems. Traditional methods, such as physical auctions or sales through intermediaries, were often characterised by price manipulation, delayed payments, and high transaction costs. To overcome these inefficiencies, the Government of Kerala introduced e-auctions as a mechanism to facilitate direct, secure, and transparent transactions between buyers and sellers. These digital systems aim to improve market efficiency, reduce intermediary dependence, and ensure that farmers receive fair and competitive prices for their produce.

Cardamom, one of Kerala's most valuable spice crops, occupies a central role in the state's agricultural economy, particularly in the Idukki district located along the Western

Ghats. Historically, cardamom trading relied heavily on physical auction systems, which faced criticism for lack of transparency and operational inefficiencies. The introduction of e-auction platforms has therefore been a pivotal reform, designed to enhance market fairness, accessibility, and competitiveness for cultivators.

The potential benefits of e-auction systems for cardamom marketing are multifaceted:

1. **Enhanced Efficiency:** By eliminating the need for farmers to physically attend auction centers, e-auction reduces both time and logistical costs.
2. **Transparency:** All transactions are digitally recorded and made accessible to stakeholders, minimizing scope for manipulation.
3. **Wider Market Reach:** Farmers can connect with buyers beyond their local market boundaries, fostering greater competition and price discovery.

4. Fair Pricing: Competitive bidding environments promote fair price realization for producers.

However, the adoption of e-auction is not without challenges. Limited technological access, inadequate digital literacy, and concerns about security and system reliability remain persistent barriers, particularly for small and marginal farmers. These constraints highlight the need for targeted support mechanisms, including training, infrastructure development, and institutional guidance, to ensure inclusive participation and equitable benefits from digital market reforms.

In this context, the present study examines the impact of e-auction on cardamom cultivators in Idukki district, analysing its benefits, challenges, and the socio-economic determinants of adoption. The findings aim to contribute to a deeper understanding of how digital interventions can strengthen the spice sector and enhance the livelihoods of Kerala's farming communities.

In the above context, this paper seeks to throw light on the following research questions :

### **Research Questions**

1. What are the benefits and challenges of e-auction for cardamom farmers in Idukki district?
2. How does the use of e-auction affect the price of cardamom for farmers in Idukki district?
3. Which are the factors that influence the adoption of e-auction among cardamom farmers in Idukki district?

### **Methodology**

The study focused on cardamom farmers in Udumbumchola Panchayat, Idukki district, Kerala. After a pilot survey, a random sample of 150 farmers was selected. Data were collected through direct personal interviews using a structured interview schedule that included both open- and closed-ended questions.

A Garret Ranking Test was used to identify and rank the main challenges

faced by farmers in using e-auction platforms. To determine the factors influencing adoption, a logistic regression model was applied, with education level, farm size, access to technology, and training received as independent variables, and adoption of e-auction as the dependent variable.

These analytical tools helped assess the major issues, benefits, and determinants of e-auction adoption among cardamom cultivators in the study area.

**Findings**

This section presents the key findings derived from the statistical analysis of primary data collected from 150 cardamom farmers in Udumbumchola Panchayat, Idukki district. The study employed logistic regression to determine the socio-economic factors influencing the adoption of e-auction and Garret ranking to evaluate the magnitude of challenges faced by the farmers.

The logistic regression model included education level, farm size, access to technology, and training received as independent variables, with adoption

of e-auction as the dependent variable. The estimated model was specified as,

$$\text{Logit}(P) = \ln(P / (1 - P)) = b_0 + b_1(\text{EL}) + b_2(\text{FS}) + b_3(\text{AT}) + b_4(\text{TR})$$

Where EL = Education Level

FS = Farm Size

AT = Access to Technology

TR = Training Received

**Table 1. Model Statistics**

Variable	Odds Ratio
Education Level	1.87
Farm Size	1.49
Access to Technology	1.89
Training Received	4.57

The model statistics reveal that all variables have a positive influence on the adoption of e-auction among cardamom farmers. The odds ratio values indicate the strength of each variable's effect. *Training received* has the highest odds ratio (4.57), showing that trained farmers are over four times more likely to adopt e-auction than those without training. *Access to*

*technology* (1.89) and *education level* (1.87) also play significant roles, meaning farmers with better education and access to technology are nearly twice as likely to adopt e-auction. *Farm size* (1.49) has a moderate positive effect, suggesting that larger farms are more inclined to participate in e-auction platforms (Table 1).

Overall, the results suggest that improving training opportunities, technological access, and farmer education can substantially increase the adoption of e-auction systems in the cardamom sector.

**Table 2. Impact of education on adoption**

<b>Education Level</b>	<b>Adoption Rate ( in Percentage )</b>
Less than 10 <sup>th</sup>	83.8
12 <sup>th</sup>	88.4
Degree	92.3
Above Graduation	96.8

The table 2 shows that the adoption rate of e-auction increases steadily with the level of education. Farmers with lower educational qualifications (below 10th standard) have an

adoption rate of 83.8%, while those with a 12th standard education show 88.4% adoption. The rate rises further to 92.3% among degree holders and reaches the highest level of 96.8% among those with education above graduation.

This indicates that education plays a significant role in influencing farmers' ability and willingness to adopt e-auction systems. Higher education levels likely enhance awareness, digital literacy, and confidence in using technology-based platforms, thereby increasing participation in e-auction activities.

**Table 3. Impact of technology on adoption**

<b>Access to technology</b>	<b>Adoption Rate ( in percentage )</b>
No access	86.2
Having access	92.4

The table 3 indicates that access to technology significantly improves the adoption rate of e-auction among farmers. Farmers who lack access to technological resources show an adoption rate of 86.2%, while those

having access to technology exhibit a higher rate of 92.4%.

This suggests that technological access plays a crucial role in enabling farmers to participate effectively in e-auction platforms. Availability of digital tools and internet connectivity enhances their ability to engage with online trading systems, thereby increasing the overall adoption level.

**Table 4. Impact of training on adoption**

<b>Status of training</b>	<b>Adoption Rate ( in percentage )</b>
No training	83.5
Having training	97.2

Training has the strongest impact with an odds ratio of 4.57. Adoption rates significantly increase from 83.5 percent (no training) to 97.2 percent (with training). Farm size has a moderate impact with an odds ratio of 1.49. For each unit increase in farm size, the likelihood of adoption increases by 49 percent (Table 4).

It is inferred from the model that investing in farmer training

programmes and improving access to technology could significantly increase e-auction adoption rates among cardamom farmers. It demonstrates that training and education level are the most significant factors in e-auction adoption, followed by access to technology and size of farm.

The analysis of the data show that the majority of farmers (70percent) had used the e-auction platform at least once. The perceived benefits of e-auction included increased transparency (50percent), reduced transaction costs (40percent), increased accessibility (40percent) and improved price discovery (30percent).

The perceived challenges of e-auction included lack of trust in the system, lack of access to technology, lack of understanding of the platform, unfamiliarity with the process, dependence on technology, fear of exploitation, security concerns and lack of personal interaction.

A Garret ranking test was conducted to analyse the magnitude of each challenge and found that lack of trust in the system is the top ranked

problem (40percent), followed by lack of technological access (38percent), fear of exploitation (33percent), unfamiliarity with the process of e-auction (29percent) lack of platform understanding (25percent), security concerns (22percent) and lack of personal interaction is the least ranked problem with Garret score of 9percent.

The analysis revealed that the use of e-auction was positively associated with the price of cardamom received by farmers ( $p < 0.05$ ). This means that the use of e-auction is likely to result in higher prices for cardamom received by farmers.

The logistic regression analysis indicated that all four variables, education level, farm size, access to technology, and training received, had a positive impact on e-auction adoption among cardamom farmers. The odds ratio for education (1.87) implies that with each increase in education level, the probability of adoption rises by 87 percent. Similarly, access to technology (1.89) and training (4.57) show strong positive relationships with adoption. Farm size had a moderate effect (1.49), indicating

that larger farms are more likely to adopt digital trading systems.

Training emerged as the most influential factor, with adoption rates increasing from 83.5% (no training) to 97.2% (trained farmers). Furthermore, 70% of farmers had used the e-auction platform at least once. The perceived benefits included transparency (50%), lower transaction costs (40%), and better price discovery (30%). The Garret ranking of challenges showed that lack of trust, technological barriers, and fear of exploitation were the top issues faced.

A significant positive correlation was found between e-auction participation and the price realized by farmers ( $p < 0.05$ ), confirming that e-auction leads to improved price outcomes compared to traditional physical auctions.

Overall, the results indicate that education, training, and technological access are the most significant factors promoting e-auction adoption among cardamom farmers. E-auction has successfully enhanced transparency, competitiveness, and pricing efficiency

in the cardamom market, although technological barriers and trust issues continue to constrain its full potential. The findings emphasize the need for capacity-building programs and digital infrastructure development to ensure greater inclusivity and effectiveness of e-auction platforms in Kerala's spice sector.

### **Suggestions**

The following suggestions are made to overcome the difficulties of e-auction:

1. **Establishing trust:** Provide accountability and transparency in the e-auction process by putting in place safeguards like independent auditing, secure payment methods, and unambiguous dispute resolution processes.
2. **Offering access to technology:** Make investments in stronger technological infrastructure and assistance services for individuals in need, like technical support and remote training.
3. **Enhancing comprehension:** To assist customers in better understanding how to use the platform, provide clear and concise user manuals, tutorials, and training sessions. Farmers should receive education and assistance from the government to help them comprehend and utilise the e-auction platform.
4. **Process streamlining:** To make the e-auction process easier to use and less confusing, it should be simplified. To test and improve the procedure, think about running a pilot programme with a limited number of users.
5. **Reducing reliance on technology:** Take into account providing substitute bidding choices, such as telephone or manual bidding.
6. **Minimizing fear of exploitation:** Take action to stop bid manipulation and fraud by using verified bidders and establishing clear standards for bidder conduct.
7. **Increasing security:** To safeguard sensitive data and fend against hacking and other online assaults, invest in strong security measures.

8. Increasing interpersonal communication: Take into account providing online or in-person support to assist consumers who are unsure of the procedure and require assistance.

## Conclusion

The study concludes that the implementation of e-auction has markedly improved the efficiency, transparency, and price realization in the cardamom market of Idukki district. However, technological barriers, lack of awareness, and mistrust continue to hinder its full potential.

To enhance the system's effectiveness, it is essential to:

- Expand digital literacy and training programs for farmers,
- Ensure stable internet and infrastructure support in rural areas,
- Establish robust dispute resolution mechanisms and data security safeguards, and
- Promote policy-level interventions to integrate smallholders effectively into digital markets.

Future research can explore comparative analyses of e-auction adoption across different spice crops, as well as the long-term socio-economic impact of digital trading platforms on small and marginal farmers in Kerala.

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### ABOUT THE AUTHORS



**Jiya Tom** is a research scholar specializing in agricultural economics. She has served as a guest faculty member in the Department of Economics at SB College and Assumption College, Changanacherry, Kerala, where she has taught undergraduate and postgraduate courses related to agricultural and development economics. Her research interests include agricultural marketing, crop insurance, and the socio-economic challenges faced by spice

*cultivators in Kerala. She has published several papers on agricultural development, market efficiency, and farmer welfare, with a particular focus on the cardamom and pepper sectors. Her current research investigates the effects of liberalization and digital transformation on the spice economy and rural livelihoods in South India. Her research focuses on the socio-economic dynamics of spice cultivators in Kerala, with particular emphasis on market efficiency, price volatility, and agricultural policy impacts.*



**Dr Geevarghese M. Thomas** is an Associate Professor in the Department of Economics at KG College Pampady, affiliated with Mahatma Gandhi University, Kerala. He holds a Ph.D. in Economics and has over a decade of teaching and research experience. His research focuses on informal labor markets, women's empowerment in the unorganized sector, and rural development. Dr. Thomas has published in reputed journals and has presented several papers at UGC-sponsored national and regional seminars. His academic interests include agricultural marketing, rural development, and sustainable farming practices. He has published extensively in peer-reviewed journals on issues related to farm productivity and agrarian livelihoods.

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