

**RESEARCH ARTICLE :**

Impact of e-mandi on commodity prices using double difference method

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SUMMARY : Study on impact of electronic initiatives vis-à-vis e-mandi on agricultural marketing was carried out in selected APMC markets of Karnataka during the year 2017. E mandi provides complete end to end solution by computerizing of all the activities from gate entry to exit. One of the important provisions under this system are electronic tendering instead of manual tendering, integration of APMC markets and online payment etc. Electronic tendering process reduces the malpractices like price manipulations etc. and brings higher competition and efficiency in marketing process. Price realization in e-mandi is more compare to prices in non e-mandi. In copra and onion Rs. 292 and 113 higher prices compare to prices in non e-mandi, respectively. Majority of the stakeholders involved in e-mandi are satisfied with the different provisions of e-mandi. But, some of the components like participation of traders from different APMC market, lack of proper grading system and online payment system is not upto satisfactory level, which hinders the farmers to realize better prices for their produce.

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KEY WORDS :E-mandi, APMC,
Difference in
difference method**BACKGROUND AND OBJECTIVES**

Changing scenario of Indian agriculture, agricultural marketing plays crucial role in increasing producer share in consumer rupee, doubling farmers' income thereby increasing country's national income. Overall welfare of the stakeholders involved in agricultural marketing in general and farmers in particular are mainly depends on transparent and efficient marketing process. But, Indian agricultural marketing characterized by some shortcomings like lack of adequate market infrastructure, existence of large number of middlemen, various mal practices like faulty

weighing, unauthorized deductions, lack of adequate market information and poor price discovery mechanisms etc.

Historically, government intervenes as a watch dog role in marketing process to bring transparency and increase efficiency in marketing and for overall development of the sector. Some of the important interventions are, regulation of the market, commodity specific laws, establishment of commodity boards, ensuring quality standards etc. one such intervention is regulation of market which began during 1960s leads to government control over markets. Regulated market is

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characterized by competitive bidding process, specified area as a market, supervision of market committee and set of rules and regulations for conducting operations. Over the time central government coming out with model APMC act but Agril. Marketing is a state subject; it's upto state government to take final call upon guidelines and enact laws.

Based on model APMC act of union government, majority of the states enacted APMR legislation. This legislation covers 7161 APMC markets which includes more than 98 per cent of the identified primary whole sale markets in the country (Acharya, 2006). But, regulated markets are facing shortcomings like traders cartelization leads to non transparent price discovery, faulty weighing and unauthorized deductions etc. Therefore to bring more transparency in price discovery and efficiency in agricultural marketing the Dept. of marketing, Government of Karnataka, introduced the information and communication technology in terms computerization of all the activities in the APMC market including electronic tendering instead of manual tendering.

E-mandi initiative was first attempt in the country by government of Karnataka with the help NCDEX, which created special purpose vehicle called Rashtriya e market services ltd (Rems). The e-tender system was first introduced in 2006-07 on pilot basis for paddy in the Mysore regulated market. It is now operational in 156 regulated markets in the state. Trading activities are integrated with all the APMC markets trader from any APMC markets can participate in any APMC market with unique username and password. The new system aims at increasing marketing efficiency by enhancing transparency in the tendering process and reducing the time period for finalizing the tender process. This apart, the system is expected to increase the competition in agriculture marketing, reduce cartel among the traders, immediate online payment settlement. With this background present study attempts,

- To study the awareness and impact of e-mandi on different stakeholders
- To study the impact of e-mandi on prices of agricultural commodity's.

RESOURCES AND METHODS

The study carried by utilizing both the primary and secondary data. Primary data on awareness and impact of e-mandi on farmers and trader was collected and

secondary data in respect of price movements of selected crops from the sample markets has been analyzed to examine the impact of e-mandi on farm prices. The primary information was collected from 90 farmers, 30 traders in 3 APMC markets of Karnataka using a pre-tested structured questionnaire. The e-tendering is a multi stage process. This system has got the following functionalities to carry out the APMC activities:

- In-Gate Entry –The agricultural commodities entering the market are recorded into the system using this option and system generates the unique LOT Number for each entry. This LOT Number is used for displaying in the market for quoting by the traders
 - Quoting – The traders, after verifying the quality of the commodity, will quote their prices for each of the LOT on the system using this option.
 - Tender Declaration – Using this option, the officer will click the button to process all the quotes and declare the tender awardees.
 - Weight and Bill entry – Once the tender is declared, the weight of the commodity is measured for each of the LOT and sale bill is prepared by the CA to the traders. These details will be entered into the system to raise the demand for market fee against the sale.
 - Receipt – This option is used to enter the cheque/cash/DD received from the traders/CAs into the system and generate the receipt.
 - Reconciliation – Once the bank gives the realization statement of the instruments, the details can be recorded into the system. Now, system posts these receipts into the trader/CA ledger.
 - DCB Statement – The DCB statement for each of the traders and CAs can be generated.
 - Permit – The traders can enter the permit details and generate the permit from this system whenever they are moving the purchased commodities from the market.
 - Out-Gate Entry – Using this option, the outgoing commodity details can be entered into the system.
 - User Administration – This module helps the authorized officer of the APMC to create/freeze the user login accounts for the staff of APMC, traders and CAs.
 - MIS Reports - The officers/officials can generate number of reports and registers using this module. This system automatically prepares the Tender declaration slip, DCB statement, bank statement, etc.

Based on the discussion with the department officials, three markets from three divisions were selected to study various aspects of the e-tendering. The information on

prices and arrivals collected from secondary sources in respect of identified markets has been analyzed only for selected crops. The crops are selected based on arrival proportion in the market, regional importance, availability of consistent information and discussion with the market officials. In order to achieve the different objectives of the study, simple descriptive statistical techniques like averages, percentages, graphical analysis and to analyse the impact of e-mandi on farm prices by using double difference method have been used to describe the basic features of the primary information collected. The Difference in Difference (DID) is a very simple and intuitive method which helps to circumvent the problem of endogeneity problem. DID approach DID is appropriate when the interventions are as good as random, conditional on time and group fixed effects. Formally, the DID model can be specified as a two-way fixed-effect linear regression model.

$$Y_{it} = \delta D_i + \alpha T_i + \beta D_i T_i + u_i$$

Y_{it} = Price of Kopra/ Onion in market i , year t .

D_i = Post treatment dummy which takes value of 1 after market is brought under e-trading, zero otherwise.

T_i = Treatment dummy, $i=1$ if the market is under e-trading, 0 otherwise.

δ = Is the co-efficient for interaction term, indicating the price differential due to the e-trading intervention.

We have used fixed effect panel regression model to estimate the co-efficients.

OBSERVATIONS AND ANALYSIS

The study on impact assessment of e-mandi on farm prices was carried out in three selected APMC markets of Karnataka. The study carried by utilizing both the primary and secondary data. The electronic tender system in the Mysore APMC was introduced on pilot basis during 2006. The system was introduced in Bangalore during the year 2010 and in Tiptur it was during 2010. The markets other than Tiptur, which a basically a copra market, are multi commodity markets. The same has been reflected by the large number of market functionaries operating in Bangalore and Mysore market.

The APMC Tiptur under Bangalore division mainly deals with copra (Table 1). The Mysore APMC deals in a large number of commodities mainly ragi and maize. Since, the electronic tender system was introduced in Mysore for the first time in the year 2006. Onion and potato are the leading commodities traded in Bangalore market.

Farmers' awareness about electronic tender system and impact:

The state government has taken various steps from time to time to safeguard the interest of farmers by ensuring transparent and fair discovery mechanism of prices in the APMC markets. Manual tendering was introduced under regulated market regime but achieved a limited success as this method having large scope for manipulation of price discovery mechanism through cartelization by traders, under reporting of arrivals, etc. Electronic tendering of agricultural commodities introduced to ensure transparent discovery of prices may play a pivotal role in safeguarding the interest of farmers. It was found imperative to examine the level of awareness amongst farmers about the initiative and their perception on various aspect or benefit from the e-tendering for farmers in particular and agricultural marketing system in general. Considering the limited practical involvement in the system, a higher proportion of farmers about more than 80 percent of the farmers were aware about the system (Table 2). Electronic recording of the entry of commodities at the entry gate is crucial to know the actual arrivals in the market. About three-fourth of the farmers were aware about this arrangement and about 45 per cent of the farmer knows it is mandatory. But, there is a bleak in performance of the following parameters like, grading (33 %), online payment (22 %) and traders' participation from different APMC market. Impact of e tendering on farmers on various aspects/ benefits from e-tendering system has been presented (Table 2). The table shows that 76 per cent of the farmers feel that the introduction of electronic tender system has made the operations of the market more transparent helping in better price realization (56 %). In addition to transparency in operations and price

Table 1: Details of crop markets and sample crop selected for the study

Division	APMC	Crops	Remark
Bangalore	Tiptur	Copra	Single commodity market
Mysore	Mysore	Ragi	Only market in Karnataka which functioning throughout the year
Bangalore	Yeshwantpur	Onion	Biggest market for onion in Karnataka

discovery, quick completion of sale proceeds and payment settlement is very important for farmers. Three-fourth of farmers feels that the system has helped in faster completion of tendering process and the trade transaction leading to faster payment settlement.

Traders’ awareness about electronic tender system and impact:

The level of awareness of traders/ commission agents and their participation levels in e-tendering are shown in the Table 3. The table reports high degree of awareness about the initiative amongst the functionaries under consideration. However, they were not found to be fully aware about the complete procedure and its implications for the trade. This shows the great scope for vigorous training of traders and commission agents. About 93 per cent of the traders aware of this new initiative. Nearly 61 per cent of the traders is themselves participating in the process to quote prices with nearly fifty percent of the trader relying on assistants for the purpose. Agricultural trade is a multi activities time consuming process, one of the major area of benefit

envisaged under the e-initiatives was saving of time by quick completion of the trade transaction and settlement of payments. Nearly 50 per cent of the time saved for transaction of the business compare to earlier method. Traders opined that e tendering system increases the competition (81 %), reduce price manipulation (62 %) and reduces the transaction cost and helpful in maintaining records, filing mandi returns etc.

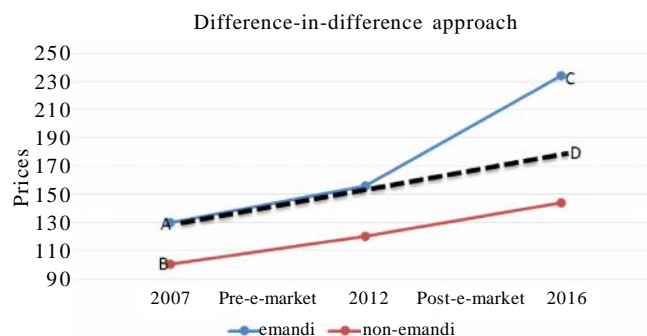


Fig. 1 : Difference in difference analysis for copra and onion prices

Table 2: Awareness and impact of e-tendering on farmers		(n=90)	
Awareness		Impact	
Components	Total (%)	Components	Total (%)
Implementation of E-tendering system	85	More transparency in operation	76
Computerized entry at the Mandi gate	62	Better price realization	56
Computerized entry at the Gate is mandatory	45	Less time required for completing the transaction	73
Grading of the produce is mandatory	33	Faster payment of sale proceeds	62
Online payment is compulsory	22	More competition	82
Outside traders participation	16	Sufficient awareness programme	68

Table 3: Awareness and impact traders		(n=30)	
Awareness		Impact	
Components	Total (%)	Components	Total (%)
Awareness about the initiative	93	Time saving in comparison to traditional system	86
Knowledge about e-tendering	86	Transparency in the operation	93
Self participation	61	More competition	81
Assistance help	46	Reduce price manipulation	62
Time saving platform	83	Transaction cost has come down	86
Time saved (%)	50	Helpful in maintaining records, filing mandi returns	93

Table 4: Results of difference in difference analysis for copra and onion prices					
Independent variables	Copra		Onion		
	Co-efficients	t value	Copra	Onion	
Constant	4795	4.79	1341	10.83	
Interaction between time and intervention (β_3)	292	1.70	113	0.53	
Adj. R ²	.56		.42		

Impact on farm prices:

Results of difference in difference method (Table 4) reveals co-efficient for interaction term, which reflects the effect of intervention on prices of copra and onion, turned out to be insignificant. Hence we fail to reject the null hypothesis that there is no impact of e-trading on prices of commodities. There is a significantly higher prices realized in e-mandi compare to non e-mandi prices. In copra Rs. 292 and in onion Rs. 113 higher prices received in e-mandi enabled market compared to non e-mandi market. Similar investigations were also carried out by Acharya (2006); Bakos (1998) and Chengappa *et al.* (2012) and Somashekar (2012).

Conclusion:

Electronic initiatives in APMC markets in Karnataka ensures fair and transparent price discovery mechanism along with remunerative prices to the farmers will help in addressing unscrupulous practices prevailing in agricultural marketing system. The tendering of agricultural commodity was shifted from manual to electronic platform in the state of Karnataka. Significant improvement in commodity prices in e-mandi due to higher competition and efficiency compare to prices of non e-mandi. But, some of the components like participation of traders from different APMC market, lack of proper grading system and online payment system is not upto satisfactory level, which hinders the farmers to realize better prices for their produce.

Policy recommendation:

- Infrastructure facilities was not sufficient to

address peak season arrivals

- Grading and standardization facilities are minuscule and outside trade traders participation is weak
- Encouraging cent percent online payment without fail
- Increasing the awareness about the e-mandi to benefit the farmers
- Credit facilities needs to revamped

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