Adoption Performance of Electronic National Agricultural Markets (e-NAM) in Punjab

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Abstract

The Electronic National Agricultural Market (e-NAM) has been in practice for the last four years in the country which was launched on 14th April 2016. The state of Punjab lagged in terms of adoption of this portal and started engaging farmers in 2018. In this paper, an attempt has been made to evaluate the adoption performance of the state. It was found from the field survey that there was a difference in the prices received by the adopters and non-adopters of e-NAM for all the crops covered under the study. The results of t-test showed that this difference in prices was statistically significant in the case of potato (Hoshiarpur) and basmati (Sangrur) whereas the difference in prices of cotton received by the adopters and non-adopter farmers of e-NAM was statistically insignificant. The results of binomial logit regression model revealed that the variable price was found to be negatively significant (p<0.05) with the values of -0.014, -0.018 and odds ratios of 0.987 and 0.982 in the case of Hoshiarpur and Sangrur respectively which signify that with one unit increase in the price, the odds of adopting e-NAM system will decrease by 0.014 and-0.018 times in Hoshiarpur and Sangrur respectively and vice versa. The remaining factors such as age, education, operational holding and distance covered from farm to market were found to be non-significant.

Keywords: e-NAM, logit regression, t-test

JEL Classification: L10, M31

Introduction

The Electronic National Agricultural Market (e-NAM), a common online market platform for agricultural commodities on 'one nation one market' basis was launched on 14th April, 2016. The main objectives of the e-NAM include integrating the markets at the state level by providing a common online market platform, to facilitate domestic trade in agricultural commodities. This is likely to streamline marketing and transaction procedures and will facilitate uniformity across markets. This in turn along with better marketing opportunities will promote transparent sale transactions and better real-time price discoveries through online access to farmers/sellers and buyers/markets (Mehta et al 2019).

The initial coverage was restricted to just 21 markets across eight states allowing trading in 24 commodities on a pilot basis (ET Bureau, 2020). Since then the number of these markets is rising. So far 585 markets by March 2020, (http://www.e-NAM.gov.in) across 16 states and two union territories are covered. During the recent lockdown when mandis were not fully operational, 200 new mandis were added to the national digital agricultural trading platform. This took the tally of e-NAM enabled mandis to 785 and further to 1000. The present study was conducted in the state of Punjab which is situated in the north-west part of India with the geographical area of 5.03 million hectares out of which the net area sown is 4.12 million hectares (Anonymous 2019). Punjab opted late for this scheme and hence the number of farmers registered under this portal is less than in other states. Also, online trade-in Punjab is restricted to a few markets. But at the same time, the number of commodities traded has risen to 150 including food grains/cereals, oilseeds, fruits, vegetables, spices, and some miscellaneous goods

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(GoI 2020). Attributed to the late adoption of e-NAM in Punjab, this study is to appraise the adoption of the portal in the selected markets of the state. The constraints and prospects of e-NAM were also studied in Punjab.

Data Sources and Methodology

The present study is based on both primary as well as secondary data. The secondary data were taken from the Statistical Abstract of Punjab and the primary data from the selected farmers by visiting the selected markets through a well-structured and pre-tested schedule.

The multi-stage sampling procedure was used for the collection of primary data. In the first stage, one district each from the three agro-climatic zones of Punjab was chosen which means the selection of the districts was based on their underlying diversity in cropping patterns. In this way, Hoshiarpur district from zone-I i.e. sub-mountainous zone, Sangrur district from Zone-II i.e. central plain zone and Rampura Phul from zone-III i.e. south-west zone of Punjab were chosen for the study.

At the second stage, one e-NAM market was selected randomly from each of the selected districts. From each selected market, a list of registered farmers (adopters) and non-registered farmers (non-adopters) was prepared. In the third stage, a sample of 30 farmers comprising 20 adopters and 10 non-adopters were interviewed for the crop year 2019-20. Thus, the primary data comprise a total sample of 90 farmers containing a total of 60 adopters and 30 non-adopters. The selected e-NAM markets were Hoshiarpur for potato, Sangrur for basmati paddy, and Rampura Phul for cotton. Along with tabular analysis and simple t-test, the binomial logistic regression model was also employed to determine the factors affecting the choice of market channel (e-NAM or non-e-NAM).

Results and Discussion

Cropping pattern of the selected farmers

The cropping pattern of selected adopters and non-adopters of e-NAM (Table 1) highlighted that wheat crop was cultivated by all the farmers. Paddy was also grown in all the districts but only 22 farmers comprising adopters and non-adopters being 15 and seven respectively out of 30 in Hoshiarpur had grown

paddy. Since the districts were selected from the three agro-climatic zones and Rampura Phul from cotton belt had all the farmers (100%, both adopters and non-adopters) who were growing cotton. From the Kandi zone, in Hoshiarpur cent per cent of the adopters and non-adopters were found growing (100%) potatoes. Further, in the central plain zone, basmati was being grown by all the 20 adopters and 10 non-adopters in Sangrur. The other crops were maize, pea, potato, fodder, etc. which formed the cropping pattern of the selected farmers. Sugarcane was also found in all the districts but the proportion was the highest in Hoshiarpur and Sangrur (40% each). Maize, pea and potato were grown in Hoshiarpur only. Sangrur covered basmati crop and Rampura Phul covered all of the cotton crop. The other crops mainly constituted the fodder crops.

Sale pattern of the selected farmers

The crops like cotton, potato and basmati were the preferred crops for sale under e-NAM by the farmers in all the selected districts. The entire produce (100%) cotton was sold through e-NAM in Rampura Phul market (Table 2). The wheat and paddy crops are procured at the minimum support price (MSP) by the public procurement agencies. The commission agents (CAs) play an important role in the procurement of wheat and paddy in the peak period lasting just 45 to 50 days and a meagre amount is sold within the village. The scenario was similar for the rest of the districts where the major part of wheat and paddy (more than 80 %) was sold through CAs keeping a very small amount (0.05 to 15.8 %) for family-consumption and farm gate sale. Potato in Hoshiarpur (100 %) and basmati in Sangrur (96.6 %) were sold through e-NAM.

The sale pattern of non-adopters of e-NAM shows that commission agents were the major purchasing centers for all the crops. There was almost an equal amount kept for family-consumption of wheat which was 6.2 per cent in Hoshiarpur, 5.1 per cent in Sangrur and 5.8 per cent in Rampura Phul. In Sangrur, basmati (4.4 per cent) was also kept for family-consumption. The quantity of wheat sold in the village itself was 3.2 per cent in Hoshiarpur, 6.1 per cent in Sangrur and 1.8 per cent in Rampura Phul. In Sangrur, farm sale of basmati was 5.2 per cent and in Rampura Phul 2.8 per cent of paddy was sold in the village (Table 3).

There was the difference in the prices received by the adopters and non-adopters of e-NAM for all the

Table 1. Distribution of crops grown by the adopters and non-adopters of e-NAM

Districts	Crops	Adopters		Non-adopters		Overall	
		Number	%age	Number	%age	Number	%age
Hoshiarpur	Wheat	20	33.3	10	36.7	30	100.0
	Paddy	15	26.8	7	28.0	22	73.3
	Maize	10	100.0	7	100.0	17	56.7
	Sugarcane	4	40.0	1	100.0	5	16.7
	Pea	8	100.0	4	100.0	12	40.0
	Potato	20	95.0	10	90.9	30	100.0
	Basmati	1	100.0	-	-	1	3.3
	Others	13	27.1	5	23.8	18	60.0
Sangrur	Wheat	20	33.3	10	33.3	30	100.0
	Paddy	20	35.7	9	36.0	29	96.7
	Sugarcane	4	40.0	-	-	4	13.3
	Potato	1	5.0	1	9.1	2	6.7
	Others	15	31.3	8	38.1	23	76.7
Rampura Phul	Wheat	20	33.3	10	30.0	30	100.0
	Paddy	20	33.3	10	36.0	30	100.0
	Sugarcane	2	20.0	-	-	2	6.7
	Cotton	20	100.0	10	100.0	30	100.0
	Others	20	41.7	8	38.1	28	93.3

selected crops. The adopters received Rs 1163 per qtl for potatoes in Hoshiarpur and the non-adopters received Rs 959 per qtl. Similarly, in case of basmati, the price received by both adopters and non-adopters was Rs 2483 per qtl and Rs 2225 per qtl respectively. In case of cotton, the adopters received Rs 4675 per qtl and the non-adopter received Rs 4507 per qtl. The results of t-test (Table 4) showed that this difference in prices was statistically significant in case of potato (Hoshiarpur) and basmati (Sangrur) whereas the difference in prices of cotton received by the adopters and non-adopter farmers of e-NAM was statistically insignificant which clearly meant that there was no difference in the prices of cotton received by the adopters and non-adopters of e-NAM in Rampura Phul. Similar results were reported in the study conducted in Karnataka (Reddy 2018) which may be attributed to the fact that the system of e-NAM has been initiated in Punjab for the last two years only. So, to have an impact of such a system there has to be a period of at least four-five years. In general, it can be inferred that there was better price realization by the adopters of e-NAM in case of potato and basmati.

To identify the factors influencing the farmers to adopt e-NAM portal and for selling the crops through the e-NAM system, a binomial logit regression model was used in which endogenous variable such as farmers' decision to adopt e-NAM channel was regressed on the exogenous variables like age, education, total operational land holding, price of the crop of the respondents and distance covered from the farm to the selling point. The variable price was found to be negatively significant ($p < 0.05$) with the values of -0.014, -0.018 and odds ratios of 0.987 and 0.982 in case of Hoshiarpur and Sangrur respectively which signifies that with one unit increase in the price, the odds of adopting the e-NAM system will decrease by 0.014 and -0.018 times in Hoshiarpur and Sangrur respectively and vice versa. The remaining factors such as age, education, operational holding and distance covered from farm to the market were found to be non-significant (Table 5).

Problems faced by the adopters of e-NAM in Punjab

An effort was also made to quantify the intensity of

Table 2. Sale pattern of the adopters of e-NAM

(Quantity in qtls, price Rs/q)

Crops	Production	Family consumption	Sale in the village	Price	Sale in the regulated market	Price	Sale through e-NAM	Price
Hoshiarpur								
Wheat	203.92	32.13 (15.8)	6.58 (3.2)	1840	165.21 (81.0)	1840	-	-
Paddy	271.75	0.13 (0.05)	6.05 (2.2)	1835	265.57 (97.7)	1835	-	-
Maize	199.5	-	-	-	199.5 (100.0)	1760	-	-
Pea	186.94	-	-	-	186.94 (100.0)	2247.5	-	-
Potato	587.5	-	-	-	-	-	587.5 (100.0)	1163
Sangrur								
Wheat	297.87	12.83 (4.3)	8 (2.7)	1840	277.04 (93.0)	1840	-	-
Paddy	273.29	-	6.25 (2.3)	1835	267.04 (97.7)	1835	-	-
Basmati	89.91	3.08 (3.4)	-	-	-	-	86.83 (96.6)	2483
Rampura Phul								
Wheat	321.33	11.17 (3.5)	10.95 (3.4)	1840	299.21 (93.1)	1840	-	-
Paddy	305.17	-	7.14 (2.3)	1835	298.03 (97.7)	1835	-	-
Cotton	35.7	-	-	-	-	-	35.7 (100.0)	4675

the problems faced by the farmers in the adoption of the e-NAM system which revealed that the internet facility (for computers or smartphones) was considered to be a severe problem as revealed by the majority of farmers (95 %) for which they had to incur an over and above extra cost. The overall electronic system was insufficient. Farmers also reported that the e-NAM system be a lengthy procedure to register and sell the produce and this was reported with medium intensity by 22 farmers. Similar results were reported by Kalamkar (2017) which stated that in Gujarat the farmers reported that e-auction took a lot of time whereas the other auction got completed quickly. The working of e-NAM portal was reported to be dissatisfying with the medium intensity by 17 farmers. Similar results were revealed in a study conducted in Haryana (Sekhar and Bhatt

2018) that the problems listed by the majority of the farmers were lack of guidance or help desk followed by poor net connectivity, power failures, inadequate number of computers and inadequate cleaning and sorting facilities, etc. Reddy (2016) highlighted in a study conducted in Karnataka that there should be some improvement in broadband connections. Farmers wanted to have storage and transportation facilities to be provided to them and this was reported with low to severe intensity by a more or less equal number of farmers. Due to the set timings of e-NAM bidding, the farmers found it difficult to sell the produce whenever they needed money and this was reported with medium and low intensity of 19 and 15 farmers. The traders were seemed to be creating hindrances in the adoption of e-NAM and this was reported with medium, high,

Table 3. Sale pattern of the non-adopters of e-NAM

(Quantity in qtls, price Rs/q)

Crops	Production	Self-consumption	Sale at the village purchase centre	Price	Sale in the regulated market	Price
Hoshiarpur						
Wheat	172.95	10.8 (6.2)	5.45 (3.2)	1840	156.7 (90.6)	1840
Paddy	229.39	-	-	-	229.39 (100.0)	1835
Maize	203.06	-	-	-	203.06 (100.0)	1760
Pea	152.75	-	-	-	152.75 (100.0)	2225
Potato	734.32	-	-	-	734.32 (100.0)	959
Sangrur						
Wheat	252.35	12.8 (5.1)	15.5 (6.1)	1840	224.05 (88.8)	1840
Potato	625.0	-	-		625 (100.0)	1040
Basmati	58.25	2.55 (4.4)	3 (5.2)	2200	52.7 (90.4)	2225
Rampura Phul						
Wheat	241.03	14 (5.8)	4.44 (1.8)	1840	222.59 (92.4)	1840
Paddy	238.51	-	6.67 (2.8)	1835	231.84 (97.2)	1835
Cotton	37.1	-	-	-	37.1 (100.0)	4507

Table 4. Results of t-test applied on the prices received by the selected farmers

Districts	Particulars	N	Mean difference	t value	Sig
Hoshiarpur	Price of potato (Adopters of e-NAM)	20	204.00**	3.713	0.001
	Price of potato (Non-adopters of e-NAM)	10			
Sangrur	Price of basmati (Adopters of e-NAM)	20	257.75**	6.400	0.000
	Price of basmati (Non-adopters of e-NAM)	10			
Rampura Phul	Price of cotton (Adopters of e-NAM)	20	168.33NS	0.496	0.624
	Price of cotton (Non-adopters of e-NAM)	10			

[NS] *non-significant*
***Significant at 5 per cent level*

Table 5. Binary logistic results of e-NAM system compared to non-e-NAM system in different markets of Punjab

Variables	Hoshiarpur		Sangrur		Rampura Phul	
	β	Odds ratio	β	Odds ratio	β	Odds ratio
Age	0.119	1.126	0.071	1.074	0.076	1.079
Education	-0.005	0.995	-0.043	0.958	0.001	1.001
Operational holding	-0.083	0.92	0.065	1.068	-0.046	0.955
Price	**-0.014****	**0.987**	**-0.018****	**0.982**	0	1
Distance	-0.146	0.864	0.103	1.109	0.108	1.114

***Significant at 5 per cent level*

Table 6. Intensity of problems faced by the adopters of e-NAM in Punjab

(Number)

Problems	No	Low	Medium	High	Severe	Total
e-auction a lengthy procedure	5	3	22	13	17	55
More trust on traditional system of selling	12	7	17	11	13	48
Storage/warehousing problem	3	16	13	11	17	57
Transportation problem	10	15	12	10	13	50
Erratic working of e-NAM portal	12	5	17	15	11	48
Produce cannot be sold whenever money is needed	11	15	19	7	8	49
Adequate infrastructure: labs/manpower/computers/broadband	3	5	8	8	36	57
Difficulty in managing peak load	4	11	23	13	9	56

low and severe intensity of 23, 13, 11 and 9 farmers. Hence, there is a need to address these problems to make e-NAM a success (Table 6).

Suggestions of the respondents to improve the system of e-NAM

An attempt was also made to take into account the suggestions given by the farmers. Less awareness about the e-NAM programme by the farmers was reported by almost all the farmers in all the districts of Punjab. It was observed during the study that there was a lack of grading parameters in almost all the markets and it was a time-consuming affair at the time of glut in the market which elongates their stay in the market. Moreover, in Hoshiarpur market, no grading facility was being provided to the farmers and they either did it by themselves or they had to get it done from elsewhere at their own expenses. The farmers who were registered in the e-NAM market and had adopted e-NAM for all of their produce wanted to have a separate space in the market for quick handling of their produce. The farmers wanted to have free access to Wi-Fi in the market so that they did not have to incur an extra cost for having internet services which they had to incur to log in to the e-NAM account on their mobile phones. The training to the farmers for operating the system was also felt to be mandatory. Some farmers were in favour of subsidy on the transportation of produce sold through e-NAM. The farmers preferred the subsidized transportation facility to take their produce to the far-off places which may encourage them to sell the produce through e-NAM.

Conclusion and Policy Implications

The responses of the adopter farmers regarding the benefits of e-NAM were quantified which showed that the majority of the farmers were benefitted from remunerative prices and they also found the e-NAM system to be transparent as every step of trading is digitally recorded. The farmers enjoyed the liberty to sell the produce anywhere at a comparable higher price. The majority of the farmers expressed their views that e-NAM was better in terms of price realization which was the most lucrative aspect amongst all others. The

farmers also felt encouraged to take care of quality specifications. To make e-markets a success, it is also important to divert farmers' trading from private traders to e-markets to increase arrivals and better price discovery. But at the same time, there should be some provision such as awareness camps for the farmers so that the number of adopters and the quantum of produce could be increased in these markets. This will help in breaking the long-term relationship among farmers-trader-commission agents. If this happens, there would be a need for providing commodity-linked credit and storage facilities to the farmers which were otherwise provided by the commission agents or traders. Some specific suggestions from the study were (i) there should be a separate gate entry for farmers trading through e-NAM, (ii) increasing awareness among farmers in campaign mode, (iii) uninterrupted and low-cost internet connectivity in markets, (iv) access to computers and mobile phone devises and (v) to provide skill up-gradation to the market functionaries. If this system of separating commission agents and farmers works out, it is quite possible that the information generated through e-markets can be disseminated through all information bulletins and TV channels in general and Doordarshan in particular and scrolling, so that it will be used as a benchmark price for other non-e-markets. In order to make e-NAM more inclusive, some separate arrangements for assaying should be made especially at the time of glut through cooperatives or FPO's. There is a need to provide a transportation facility otherwise the transaction cost of bringing the produce to the market may overweigh the benefits for the farmers. The provision of a free internet facility for the farmers can also go a long way in the adoption of this system.

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