# A Study on Participation of Farmers in Government e-Procurement of Paddy in West Bengal, India: Application of Double Hurdle Model

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**Abstract**

*The decentralized procurement system of paddy from the farmers in India the was introduced by government of India in the year 1997-98. The Government of West Bengal (GoWB) had implemented electronic paddy procurement (e-procurement) system in 2015-16 and included multiple stakeholders like, state co-operatives, women self-help groups and the state essential commodities corporation to procure paddy across districts. The primary aim for the present study is to assess participation of the farmers in government e-procurement system. Applying double hurdle model this paper finds that knowledge of the farmers about government procurement system, status of registration of the farmers in the government channel, distance of the household from mundi are some of the significant factors in first hurdle of selection of market channel . Holding of KCC, total cultivable land and existence of gola (warehouse) are some significant factors in the second hurdle of quantity sale decision.*

***Key Words:*** *Paddy procurement, e-procurement Double Hurdle Model, Participation and Quantity equation, West Bengal, India*

## 1. Introduction

The decentralized procurement system of paddy from the farmers in India was introduced by government of India in the year 1997-98. The Scheme of Decentralised procurement (DCP) refers to the manner of procurement of food grains to the central (federal) government stock, through the state agencies, rather than through the central (Federal) agency of Food Corporation of India (FCI). The food grains are procured at the Minimum Support Price (MSP) declared by the Central Government for ensuring a cost covering price for the producing farmers and to effect distribution of these food grains at affordable prices to the needy and under-privileged through the public distribution system (PDS) of the country so as to ensure food security. Under the DCP scheme, the State Government itself undertakes direct purchase of paddy on behalf of Government of India. Purchase centers are opened by the State Governments and their agencies as per their requirements. Under this scheme, the State Governments themselves procure grains for the Central pool, store and distribute these food grains for Targeted Public Distribution System (TPDS) and other welfare schemes (e.g. mid-day meal, supply of food grains to Scheduled Cast /tribe/other backward

class hostels etc.), based on the allocation made by the Union or Central Government. The surplus of food grains procured by DCP States, in excess of their requirement is handed over to FCI for the Central Pool stocks and deficit, if any, is met by FCI directly. The Central Government undertakes to meet the expenditure incurred by the State Governments on the procurement operations as per approved costing based on certain principles. The Central Government also monitors the quality of food grains procured under the scheme and reviews the arrangements made to ensure that procurement operations are carried out smoothly.

Alam et al (2014) discussed on the rice procurement system Bangladesh and suggested possible alternatives in supporting farmer's income. Alam et al (2021) attempted to find the determinants of the farm-level stocks of rice and effectiveness of rice procurement program in Bangladesh. Ali et al (2012) evaluated the effectiveness of minimum support price (MSP) policy for paddy in India with a case study of Punjab. Anyosisye (2014) studied the impact of price incentives on production and procurement of paddy in the state of Punjab in India. Bogahawatte (1985) made a micro-level study to find the effect of policy changes on paddy marketingin Sri Lanka. Bora et al (2018) conducted an empirical study on paddy prices and marketing agencies in India to analysethe effectiveness of public procurement. Cariappa et al (2020) studied on the choice of paddy marketing channel based on the evidence from Indian farming households. Chowdhury studied on farmers' participation in the paddy markets in Bangladesh. Darekar&Redd (2017) forecasted prices of common paddy in IndiaDhand et al (2008) assessed the impact of computerization of paddy procurement and public distribution system in the state of Chhattisgarh in India. Gohain& Singh (2018) analysed problems and constraints faced by farmers in marketing of agricultural produce in Punjab. Kumar et al (2017) evaluated marketing cost, margin and producer's share in consumer's rupee in Marketing channels of paddy. Madhappa (2000) assessed efficiency of paddy marketing system in the state of Tamil Nadu. Narayanamoorthy (2021) studied on the nexus between procurement of foodgrains and farm Income Nexus. Parshuramkar et al (2014) evaluated on economics of marketing of paddy in the state of Maharastra in India. Prakash (2015) studied on monopoly procurement system of paddy in the district of in the state of Tamil Nadu in India. Ramesh &Vijayan (2012) made a study on Marketing Cost of Paddy in Cuddalore District of Tamil Nadu, India. Samaratunga et al (2013) made an assessment on *the system of public procurement in South Asia*. Sarma (2016) studied on paddy marketing in Kamrup District of Assam in India .Sharanappa&Siddappa (2014) analysed paddy marketing through APMC's in the Raichur District in India. Sheila (2016) studied on Marketing of Paddy in Madurai District in India. Subbarao (1978) studied on Price behavior of Rice and Public Procurement in the state of Andhra Pradesh in India. Wijesooriya et al (2017) assessed issues of *Government Intervention in Paddy Marketing.*

Government of West Bengal (GoWB) had implemented electronic paddy procurement (e-procurement) system and included multiple stakeholders like, state co-operatives, women self-help groups and the state essential commodities corporation to procure paddy across districts. The e-procurement system has been initiated in 2015-16 on pilot basis and in full phase in 2016-17. As a result of this reform in paddy procurement system, there was slight improvement in volume of procurement of paddy after 2015-16, but the significant improvement has not yet been observed. Limited storage facility and lack of other infrastructures could be one of key factors behind this low procurement in West Bengal. Again, it is also important to note that the primary aim of this e-procurement system is to bring transparency in payment system to the farmers and better price realization by the farmers. The process of paddy procurement in West Bengal is as follows. The Department of Food and Supply acts as the nodal and it maintains liaison with Food Corporation of India for procurement of paddy as well as distribution of rice using its infrastructure. In addition, the Department of Panchayat& Rural Development, Department of Agriculture and Cooperation,

extends collaborative support for procurement of paddy through its grass root level cooperatives, farmer's producers' organisations and institutions of self-help groups. The infrastructure of *Kishan Mandi* under Agriculture Marketing Department is also utilised for the purpose of paddy procurement by the Department of food and Supply, government of West Bengal. The Food Corporation of India (FCI), the nodal central agency of Government of India, along with other State Agencies undertakes procurement of paddy under minimum support price scheme. In consultation with the State Government, FCI establishes many purchases centres at various Mandis (marketing outlet) and key points to facilitate procurement of food grains including paddy. The number of centres and their locations are decided by the State Governments concerned.

To understand progress of e-procurement system we have collected data from department of food and civil supply, GoWB and presented in the Table 1. The Table 1 presents data during the year 2017-18 and 2019-20. It is observed that, there is significant improvement in participation of farmers in this e-procurement system. Total number registered farmers with this system was 4.65 lakhs in the year 2017-18 which has increased by 6 times (i.e. 23.6 lakhs) until 14$^{th}$ December 2019. Total paddy procured has been increased by 6 LT in the year 2018-19 as compared to 2017-18. However, no. of cooperatives and SHGs in this procurement system has been declined whereas direct purchase camps have been increased between 2017-18 and 2018-19.

**Table 1: Paddy procurement in West Bengal in KMS 2017-18, 2018-19, 2019-20**

| Sl. No. | Particulars | 2017-18 | 2018-19 | 2019-20* |
|---|---|---|---|---|
| 1 | No. of farmers Registered with the government (Lakh persons) | 4.65 | 12.90 | 23.61 |
| 2 | Value of procured paddy (Rs. Cr.) | 4985.36 | 6857.83 | 91.74 |
| 3 | Procurement Quantity (LMT) | 32.20 | 38.94 | 0.50 |
| 4 | Paddy Dispatched to Rice Mill (LT) | 32.18 | 39.56 | 0.50 |
| 5 | No of CPC | 328 | 411 | 345 |
| 6 | No. of Cooperative Societies | 1355 | 1267 | 729 |
| 7 | No. of SHG | 585 | 565 | 116 |
| 8 | No of DPC | 31 | 78 | 24 |

*Source: Department of Food and Supply, Govt. of West Bengal; *Up to 14$^{th}$December, 2019*

Again, if we see procurement of rice across states in India, we find that the states like Andhra Pradesh (10.4%), Telangana (11.2%), Punjab (24.5%), Odisha (9.5%) and West Bengal (8.4%) together contributed around 65% of total procurement of paddy in India in the year 2018-19 (See Table 2).

**Table 2: State-wise Rice Procurement in KMS 2014-15 to 2018-19 (LMT)**

| | **States** | **2014-15** | **2015-16** | **2016-17** | **2017-18** | **2018-19** | **% Share as on 2018-19** |
|---|---|---|---|---|---|---|---|
| 1 | Andhra Pradesh | 35.96 | 43.36 | 37.24 | 40.00 | 48.06 | 10.4% |
| 2 | Telangana | 35.04 | 15.79 | 35.97 | 36.18 | 51.86 | 11.2% |
| 3 | Assam | 0.15 | 0.42 | 0.47 | 0.35 | 1.03 | 0.2% |
| 4 | Bihar | 16.14 | 12.23 | 12.34 | 7.93 | 9.49 | 2.1% |
| 5 | Chandigarh | 0.10 | 0.16 | 0.13 | 0.14 | 0.13 | 0.0% |
| 6 | Chhattisgarh | 34.23 | 34.42 | 40.22 | 32.55 | 39.71 | 8.6% |
| 7 | Gujarat | 0.00 | 0.01 | 0.01 | 0.01 | 0.09 | 0.0% |
| 8 | Haryana | 20.15 | 28.61 | 35.83 | 39.92 | 39.41 | 8.5% |
| 9 | Jammu & Kashmir | 0.00 | 0.07 | 0.08 | 0.13 | 0.09 | 0.0% |
| 10 | Jharkhand | 0.02 | 2.06 | 1.39 | 1.43 | 1.21 | 0.3% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | Karnataka | 0.88 | 0.55 | 0.00 | 0.00 | 0.59 | 0.1% |
| 12 | Kerala | 3.74 | 3.82 | 3.08 | 3.29 | 4.65 | 1.0% |
| 13 | Madhya Pradesh | 8.07 | 8.49 | 13.14 | 10.96 | 13.95 | 3.0% |
| 14 | Maharashtra | 1.99 | 2.30 | 3.09 | 1.79 | 5.80 | 1.3% |
| 15 | Odisha | 34.87 | 33.69 | 36.30 | 32.87 | 43.83 | 9.5% |
| 16 | Punjab | 77.86 | 93.50 | 110.52 | 118.33 | 113.34 | 24.5% |
| 17 | Tripura | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.0% |
| 18 | Tamil Nadu | 10.51 | 11.92 | 1.44 | 10.11 | 12.94 | 2.8% |
| 19 | Uttar Pradesh | 16.98 | 29.10 | 23.54 | 28.75 | 32.33 | 7.0% |
| 20 | Uttarakhand | 4.65 | 5.98 | 7.06 | 0.38 | 4.62 | 1.0% |
| 21 | West Bengal | **20.32** | **15.68** | **19.23** | **32.18** | **38.94** | **8.4%** |
| | All India Total | 321.66 | 342.16 | 381.08 | 397.30 | 462.14 | 100% |

*Source: Department of Food and Public Distribution, GOI, Annual Report 2018-19*

*https://dfpd.gov.in/annual-report.htm*

It is also observed from the Table 2 that the state West Bengal contributes only 8.4% of national procurement of paddy in India. It has been found that the state West Bengal is largest producer of rice in India. The three years average (between the year 2015-16 and 2017-18) rice production data shows that almost 15 million tons of rice has been produced by the state West Bengal which is 14% of national production of rice in India. Therefore, despite being largest producer of rice in India, West Bengal lags government procurement of paddy. All these show wide variation of procurement of paddy across states in India. This means that farming households are not selling in the government channel. In this background we have undertaken the present study to the determinants of participation as well as amount of paddy sold in the Government channel.

## 2. Research Methodology and Study Area

The primary aim for this study is to carry out an evidence-based assessment of the farmers in participation of the government procurement system in West Bengal. We have collected data form farmers participating in both government and private channels of paddy procurement. To do that, two districts in the state of West Bengal have been selected for this study and they are namely, Dakshin Dinajpur and Nadia. Total 289 sample farmers have been selected across all the blocks of the selected districts with structured individual questionnaire survey. Among the sample farmers 205 are participants (those who have sold paddy to Government Procurement system) and 84 are non-participants in the government procurement. Participants farmers have been selected based on expert consultation in the blocks and villages, whereas non-participants are selected as a neighbour to the participants' farmers who sale their produce through private traders. On the other hand, there is a maximum limit of selling paddy through the government paddy procurement system. It has also been found that some participant farmers are selling their paddy through private traders. However, we have selected only non-participants farmers for this analysis. After selecting farmers for the primary survey, we have collected both quantitative and qualitative information related to paddy procurement system. While quantitative data help us to analyse various economic indicators, the qualitative data help us to assess satisfaction of the farmers by selling paddy through government procurement systems and associated constraints.

The geographical location of the study area is shown in Figure 2. Table 3 describes distribution of sample farmers across different Blocks of the selected districts. We have collected data

**Figure 2: Geographical location of the studied area of West Bengal**

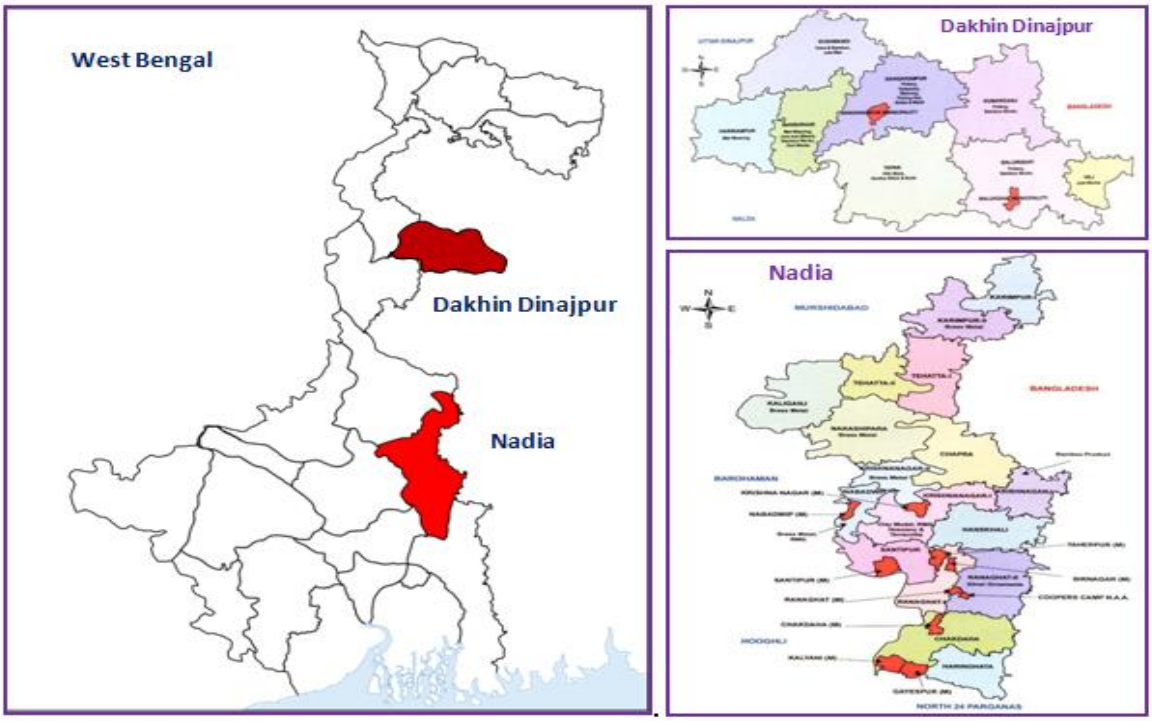


**Table 3: Distribution of Sampled farmers in the district of Nadia and DakshinDinajpur**

| Nadia | | | | |
|---|---|---|---|---|
| | Name of Blocks | Participant Farmer | Non-Participant Farmer | Total |
| 1 | Chakdaha | 9 | 1 | 10 |
| 2 | Chapra | 4 | 8 | 12 |
| 3 | Hanskhali | 4 | 9 | 13 |
| 4 | Haringhata | 5 | 8 | 13 |
| 5 | Kaliganj | 3 | 7 | 10 |
| 6 | Kalyani | 6 | 4 | 10 |
| 7 | Krishnaganj | 7 | 5 | 12 |
| 8 | Krishnanagar-I | 7 | 3 | 10 |
| 9 | Krishnanagar-II | 13 | 0 | 13 |
| 10 | Nabadwip | 6 | 4 | 10 |
| 11 | Nakashipara | 7 | 5 | 12 |
| 12 | Ranaghat II | 13 | 1 | 14 |
| 13 | Ranaghat-I | 9 | 4 | 13 |
| 14 | Santipur | 13 | 1 | 14 |
| 15 | Tehatta-I | 12 | 0 | 12 |
| 16 | Tehatta-II | 11 | 0 | 11 |

| | | | | |
|---|---|---|---|---|
| | Total | 129 | 60 | 189 |
| DakshinDinajpur | | | | |
| 1 | Balurghat | 11 | 1 | 12 |
| 2 | Banshihari | 5 | 6 | 11 |
| 3 | Gangrampur | 13 | 0 | 13 |
| 4 | Harirampur | 6 | 8 | 14 |
| 5 | Hilli | 13 | 1 | 14 |
| 6 | Kumarganj | 9 | 3 | 12 |
| 7 | Kushmundi | 10 | 2 | 12 |
| 8 | Tapan | 9 | 3 | 12 |
| | Total | 76 | 24 | 100 |
| | Total sample | **205** | **84** | **289** |

## Methodology

Farming households take decisions on selection of marketing channel to sell paddy. Decision of marketing of householdsoccurs at two stages – first stage is decision of participation, and the second stage is the decisionofquantity oramountof paddy. Doublehurdle Modelisfound suitable for identifying determinants in different stages (Cragg (1971), Cameron (2005), García (2013), Jones (1989)). Cragg model(1971) is an extension of Tobin's model for limited dependent variable. Tobit model (1958)was developed by Tobin to analyse censored dependent variables.Tobin's model may be written as follows:

$$y_i = y_i^* \quad if\ y_i^* > 0$$
$$= 0, otherwise$$

Where $y_i^*\ is$ the latent dependent variable.

The latent dependent variable may be described by the regression equation

$$y_i = x_i\,\beta + u_i\,, where\ u \sim N(0, \sigma_u^2)$$

A two part extension to Tobin's model was put forward by Cragg(1971).Here the the presence of two latent variables have been addressed through two regression equations i.e. participation decision and actual amount of selling dection.

The latent variables are represented by two regression equations as follows:

$$y_{i1}^* = w_i\,\alpha + \epsilon_1$$

$$y_{i2}^* = x_i\,\beta + \epsilon_2$$

The Cragg model is represented as:

$$y_i^* = x_i\,\beta + \epsilon \qquad if\ y_{i1}^* > 0\ and\ y_{i2}^* > 0$$
$$= 0, otherwise$$

Where $y_{i1}^*$is endogenous variable representing an individual lorhousehold participation decision; $y_{i2}^*$is latent endogenous variable representing amount of selling of paddy. $y_i^*$is the observed dependent variable; $w_i$is the set of individual characteristics explaining participation decision; $x_i$ is the set of variables explaining the amount of paddy sold; $\epsilon_1 \epsilon_2\ and\ \epsilon$ are the independent, homoscedastic, normally distributed error terms.

## 3. Findings of the Study

Table 4 lists the variables taken for the analysis. Table 5 presents the summary statistics of the variables. Table 6 presents the logistic regression results when modelling the effects of

socio-economic determinants (Xi) of benefited households from government paddy procurement system (Yi). This analysis has been done at unit level data based on 289 households in West Bengal.

From the logistic regression results given in Table 6, we see those different factors are responsible for taking benefit of government procurement system. Distance from home to paddy procurement canter and also the knowledge about government procurement facility are found very important factors in determining the decision of household for participation in the government procurement system.

The binary logistic regression model has been estimated based on the data of 289 households. The classification table (Table 6) shows us the sensitivity of prediction, that is, the percentage of occurrences correctly predicted 92.2%. We also see specificity of the prediction, which is the percentage of non occurrences correctly, predicted 83.5%. Overall our predictions were correct 1579 out of 1940, for an overall success rate 89.6%.

**Table 4: List of Variables**

| Variable | Description |
|---|---|
| Participation | The household participates in government procurement system (Yes=1, No=0) |
| Knowledge | Whether the household possess the knowledge about government system of procurement of paddy (Yes=1, No=0) |
| Registered | Whether the household is registered with Government portal for selling paddy on-line (Yes=1, No=0) |
| Distance | Distance of Government Procurement Centre from Home (K.M.) |
| jfamily | If the household is joint family type(Yes=1, No=0) |
| Coopmem | Member of Cooperative(Yes=1, No=0) |
| concreteho~e | If the household lives in a concrete ( or brick-built) house(Yes=1, No=0) |
| Nonscheduled | If the household is Non Scheduled i.e general category(Yes=1, No=0) |
| KCC | If the household has KCC ( Kishan Credit Card)(Yes=1, No=0) |
| tcland | Total cultivable land of the household |
| golahome | Whether the household has private storehouse facility of gola at home (Yes=1, No=0) |
| Agehead | Age (Yrs.) of the Head of the household |
| Educationhead | Education (Yrs.) of the Head of the household |
| Landrent | Land on Rent (Acre) |

## Table 5: Summary Statistics of the variables

**Descriptive Statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| participation | 289 | .661 | .474 | 0 | 1 |
| quantityquintalsold | 289 | 14.464 | 19.146 | 0 | 150 |
| knowledge | 289 | .685 | .465 | 0 | 1 |
| registeed | 289 | .585 | .494 | 0 | 1 |
| distance | 289 | 6.098 | 5.651 | .1 | 25 |
| landrent | 289 | .571 | 1.543 | -.98 | 17.15 |
| coopmem | 289 | .426 | .495 | 0 | 1 |
| kcc | 289 | .619 | .486 | 0 | 1 |
| agehead | 289 | 51.782 | 11.649 | 22 | 86 |
| educationhead | 289 | 6.381 | 4.662 | 0 | 17 |
| hindu | 289 | .592 | .492 | 0 | 1 |
| nonscheduled | 289 | .792 | .406 | 0 | 1 |
| tcland | 289 | 2.243 | 2.128 | 0 | 17.15 |
| ownland | 289 | 1.672 | 1.485 | 0 | 9 |
| mgnregacard | 289 | .851 | .356 | 0 | 1 |
| golahome | 289 | .394 | .49 | 0 | 1 |
| jfamily | 289 | .301 | .46 | 0 | 1 |
| concretehouse | 289 | .813 | .39 | 0 | 1 |
| fsize | 289 | 4.779 | 1.931 | 2 | 16 |
| quantity | 289 | 14.471 | 19.144 | 0 | 150 |
| district | 289 | .654 | .477 | 0 | 1 |
| aghead2 | 289 | 2816.599 | 1238.536 | 484 | 7396 |

## Table 6: Regression Results of the Double Hurdle Model

Number of obs = 289
Wald chi2(12) = 88.99
Log likelihood = -898.83695 Prob > chi2 = 0.0000

| | Coef. | Std.Err. | z | P>z | [95%Conf. | Interval] |
|---|---|---|---|---|---|---|
| Tier1 | | | | | | |
| knowledge | 0.700 | 0.228 | 3.070 | 0.002 | 0.253 | 1.147 |
| registeed | 1.260 | 0.218 | 5.780 | 0.000 | 0.833 | 1.686 |
| distance | -0.048 | 0.017 | -2.830 | 0.005 | -0.081 | -0.015 |
| jfamily | 0.609 | 0.231 | 2.630 | 0.008 | 0.156 | 1.063 |
| concretehouse | -0.421 | 0.258 | -1.630 | 0.103 | -0.926 | 0.085 |
| nonscheduled | -0.005 | 0.238 | -0.020 | 0.982 | -0.473 | 0.462 |
| kcc | 0.097 | 0.201 | 0.480 | 0.631 | -0.298 | 0.491 |
| tcland | -0.065 | 0.066 | -0.990 | 0.324 | -0.194 | 0.064 |
| golahome | 0.341 | 0.207 | 1.650 | 0.099 | -0.064 | 0.746 |
| landrent | 0.164 | 0.097 | 1.690 | 0.091 | -0.026 | 0.355 |
| agehead | -0.129 | 0.063 | -2.040 | 0.041 | -0.253 | -0.005 |
| aghead2 | 0.001 | 0.001 | 1.780 | 0.075 | -0.000 | 0.002 |
| _cons | 3.548 | 1.660 | 2.140 | 0.033 | 0.295 | 6.801 |
| Tier2 | | | | | | |
| knowledge | -2.121 | 10.144 | -0.210 | 0.834 | -22.003 | 17.761 |
| registeed | 15.879 | 9.841 | 1.610 | 0.107 | -3.409 | 35.168 |
| distance | 0.342 | 0.709 | 0.480 | 0.629 | -1.047 | 1.731 |
| jfamily | 0.410 | 7.514 | 0.050 | 0.956 | -14.317 | 15.137 |
| concretehouse | 7.141 | 9.981 | 0.720 | 0.474 | -12.422 | 26.704 |
| nonscheduled | 15.083 | 10.479 | 1.440 | 0.150 | -5.456 | 35.622 |
| kcc | 16.469 | 8.289 | 1.990 | 0.047 | 0.223 | 32.716 |
| tcland | 14.310 | 2.560 | 5.590 | 0.000 | 9.293 | 19.326 |
| golahome | 26.374 | 8.025 | 3.290 | 0.001 | 10.646 | 42.102 |
| landrent | -9.389 | 2.457 | -3.820 | 0.000 | -14.204 | -4.575 |

| | | | | | | |
|---|---|---|---|---|---|---|
| agehead | -4.024 | 1.887 | -2.130 | 0.033 | -7.722 | -0.327 |
| aghead2 | 0.037 | 0.017 | 2.130 | 0.033 | 0.003 | 0.070 |
| _cons | 13.118 | 45.584 | 0.290 | 0.774 | -76.225 | 102.460 |
| sigma | | | | | | |
| _cons | 26.834 | 3.457 | 7.760 | 0.000 | 20.059 | 33.609 |

Source: Primary Survey

Coefficients of knowledge in Table 6 are statistically significant in participation equation and insignificant in quantity equation. Result of participation equation indicates that knowledge is significant determining factor for decision in selling of paddy through government channel. Positive significant coefficient of 'knowledge' in participation equation represents an increasing probability to choose government channel with the knowledge about the government channel its insignificant coefficient in quantity equation indicates that if households sell in government channel, the knowledge has no significant impact on the quantity sold. This indicates that awareness about the government system of selling is an important factor in participating in government channel. The variable 'registered' provides insightful information regarding participation in public procurement by households. The high positive coefficient of 'registered' in participation equation indicates that if the household is registered with Government system to sell in government channel, it highly increases its probability to participate. Negative coefficient of distance in participation equation indicates that participation in e-selling decreases with the distance of the household from *mandi*. Among the participants, distance is an insignificant factor in the amount of sale. The regression results reveal that if the household is of joint family type i.e. many member live in the same house, the participation in the e-selling increases. It suggests that increased number of members probably helps in participation. However, joint family is not found significant in the amount of selling for participating farmers. Though no highly significant, the households with concrete houses are not interested in selling in government channel.

The results indicate that KCC has no significant role in participation decision; though KCC significantly determines the amount. The variable 'landrent' has positive coefficient in participation equation and negative significant impact in quantity equation. This means that farmers farming on rented land have higher probability in selling to the government and out of the participants those types of farmers sell less. Negative coefficient of age of the household in participation equation indicate that an increase in average age of the head of household reduces probability of sale. The quantity equation suggests that if the household chooses for e-selling, its amount decreases at decreasing rate as average age of household rises.

## 4. Conclusion

The present study attempts to find the determinants of farmers' participation in the public e-procurement system. The results of the study suggest that if the procurement centres are increased and the farmers' awareness in the procurement system are taken care of, more farmers are likey to participate in the government paddy procurement system. The paper addresses both choice of channel of selling of and quantity sold by the farmer households in government channel. Focusing on hurdles in the decision of choice of market channel determining factors offuel selection and actualamountof fuel consumption of households in ruralIndia. Applying Cragg (1971) this paper finds that knowledge about government procurement system, status of registration of the farmers in the government channel, distance of the household from mundi, nature of the family in terms of supportive role of family

members, nature of the farming status ( owner cultivator or rental), age of the head of the household are significant factors in first hurdle of selection of market channel . Holding of KCC, total cultivable land, existence of gola in the home, tenancy status, age of the head of the household are significant factors in the second hurdle of quantity sale decision.

The results reflect significant socio-economic variables in first hurdle of channel selection are different from second hurdle amount of paddy sold. Results of double hurdle model are significantly better than other comparable models (Tobit or Heckman). The subsistence farmers need to be encouraged to participate in public procurement system for better return. Constant or intercept term in the participation equation is still highly significant which might be for omission of some variables from this study.

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