Research Article

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Determinant and Quantifying Producer Surplus of Paddy in Varanasi District

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ABSTRACT

This study aims to portray the producer surplus and determinants of paddy in the district of Varanasi by using 90 samples comprise of less than one hectare, one to two hectare and above two hectare with the help of analytical tool linear and Cobb-Douglas production function. Result reveals that yield per hectare of paddy decreases with increasing size of farm and Absolute quantity of sale decreases with the size of family. Forced sale (distress sale) is a common feature on all the size group of farms because positive difference between marketable and marketed surplus Volume of production on marketable surplus is positively significant at one percent On large size group these factors volume of production, estimated consumption and the size of household membership which are significant at one per cent, two per cent and five per cent levels respectively. Linear function is fit very well compared to Cobb-Douglas function.

Key word: *Producer Surplus, determinant of marketable and marketed surplus, linear production function*

INTRODUCTION

Famous saying in Thirukkural written by Thiruvalluvar "they alone live who live by agriculture; all others lead a cringing dependent life" (couplet: 1033) statement clearly dictate the marketable surplus as the quantity sold out during the year and the quantity kept apart for later disposal. It is estimated by deducting from the total production, the genuine requirement of the cultivators family i.e. consumption, seed, feed and wages in kind payment to artisan, etc. while calculate should consider the stock of pervious year left over. On the other hand, the marketed surplus was estimated as the quantity actually sold by the producers during the year reference. So that marketed surplus only the portion of the gross production which is actually marketed and is placed at the disposal of the non-producer by the producer. Marketable and marketable surplus plays an important role in the economy. Quantification and finding of factor determining these surpluses is more useful in the prediction of demand and supply of any food commodity.

This study aims to quantify the amount of marketable and marketed surplus and to find the factor that determining these surpluses.

MATERIAL AND METHODS

The district Varanasi has been selected purposively for study as rank second in food grain production and Arajiline block was selected because of the fact that paddy is major crop, well equipped irrigation facility & infrastructure and major share in the markets of Rajatalab and Bishwehwar ganj market. Within the block five villages were selected based on the gross sown area and 30 farmers in each category (less than one hectare, one to two hectare and more than two hectare) thus 90 farmers totally surveyed for the study. Both Linear and Cobb-Douglas production function used for finding factor determining producer surplus.

RESULT AND DISCUSSION

Marketable surplus was influenced by many factors such as volume of production, size of family, land holding and etc.

Table 1: Marketable surplus based on volume of production

Particulars	Less than one ha	1- 2 ha	Above 2 ha	Total Farm
Area under Paddy (ha)	0.31	0.47	1.69	0.69
Per hectare production (quintals)	34.18	34.02	25.30	16.03
Per form Production (quintals)	10.70	16.03	42.76	17.97

It is clear from the table.1. that the yield per hectare of paddy decreases with increasing size of farm. However, it varies from 34.18, 34.02, 25.30 quintals (per hectare) for less than one hectare, one to two hectare and above two hectare, respectively. A farm producing of small quantities may not be in a position to for sale as the production will be hardly sufficient for their family consumption.

Table 2: Marketed surplus based on size of farm

Particulars	Less than one ha	1- 2 ha	Above 2 ha	Total Farm
Total production	10.73	16.03	42.76	19.97
Marketed surplus	5.16	9.33	26.67	11.57
Percentage of sale to total production	48.06	58.19	62.37	57.93
Percentage of sale to total sale	19.31	26.88	53.80	100.00

Table.2. indicate that as the size of farms increased, the percentage of sale to total production also increased. Below 1.00 hectare farms disposed of only 48 per cent of the total production. One to two hectares and above two hectare of farms sold 58 per cent and 63 percent of total production respectively. Thus it's evident that the major portion of marketed surplus was contributed by above two hectare farms followed by one to two hectare farms and less than one hectare farm.

Table 3: Marketed surplus based on size of household

Particulars	Size of household and membership			All household
	Small	Medium	Large	
Less than one ha				
Production	11.94	10.27	11.00	10.73
Sale	8.19 (69)	4.44 (43)	3.00 (27)	5.16 (48)
one to two hectare				
Production	12.67	17.53	14.50	16.03
Sale	10.00 (79)	11.92 (68)	4.73 (33)	9.33 (58)
above two hectare				
Production	28.33	333.75	40.80	42.76
Sale	20.52 (72)	32.76 (65)	23.65 (58)	26.67 (62)
All farms				
Production	15.37	19.02	24.88	19.97
Sale	11.02 (72)	11.37 (60)	12.32 (50)	11.57 (58)

Note: Figures in parentheses show percentage to the marketed surplus in the respective size group The relationship is apparent from table 3 which shows production, sale and percentage to total production of paddy by size of household. As the size of household increases, the volume of marketed surplus in terms of percentage to total production decrease on the farms under group of below 1.00 hectare, it may be observed in the table that the absolute quantity of sale decreases with the size of family and its quite reverse to the all farms trend, while on the other size group of farms there is no specific trends of marketed surplus with the size of household.

Table 4: difference between marketed and Marketable surplus of paddy

Particulars	Less than one ha	1- 2 ha	Above 2 ha	Total Farm
Marketable surplus(quintals)	3.58 (100)	7.73 (100)	25.90 (100)	10.31 (100)
Marketed surplus (quintals)	5.16 (134)	9.33 (120)	26.67 (103)	11.57 (112)
Difference (quintals)	1.31 (34)	1.60 (20.70)	0.68 (2.62)	1.26 (12)

Note: Figures in parentheses show percentage to the marketed surplus in the respective size group. Table 4 reveals that the forced sale (distress sale) is a common feature on tall the size group of farms. This is evident by the positive difference between marketable and marketed surplus. In other words the marketed surplus is more than the marketable surplus in every size group of farms. The decreasing trend of the differences in percentage term reveals that as the size of farm increases the difference between marketed and marketable surplus in percentage to the marketable surplus decreases.

Marketing channel for paddy in Varanasi district

Functional analysis:
Linear Production Function
$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4$
Cobb-Douglas Production Function
$Y = a X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4}$
Whereas,
Y= marketable Surplus

The common and mostly adopted channel for the purchase and sale of paddy in the study area observed were;

(i) Producer → commission agent → miller → wholesaler → retailer → consumer
   In this channel, commission agent work on behalf of the produces, get offers and sell rice to the millers.
(ii) Producer → itinerant trader → miller → wholesaler → retailer→ consumer
   In this merchant replaces commission agent.
(iii) Producer → miller → wholesaler → retailer → consumer
   Here miller directly purchases from the producer and through wholesaler.
(iv) Producer → consumer
(v) Producer → Primary wholesaler → retailer → consumer

X_1= Proportion of area under paddy to the net area sown,
X_2= Volume of production of paddy,
X_3= Estimated family consumption during the year, and
X_4= Size of family in adult units.

Table 5: Regression coefficient and other parameters for the marketable surplus by size of group (Linear Production function)

Function and group size	Degree of freedom	a	Regression co-efficient				R^2
			b_1	b_2	b_1	b_1	
Below 1 ha	34	-1.64 (1.58)	1.36 (1.97)	0.89* (1.58)	0.06 (1.05)	0.56 (1.36)	0.92
One to two hectare	25	-0.86 (1.38)	-2.01 (4.56)	0.87* (0.06)	-0.74* (0.26)	0.04 (0.24)	0.97
Above two hectare	16	-1.33 (1.76)	-0.10 (6.82)	0.80* (0.02)	-1.17** (0.41)	0.45 (0.40)	0.99

* Significant at 1 per cent level, ** Significant at 2 per cent level

Figures in parentheses show the standard Error.

As per the table 5 which involves the results obtained through the use of linear function, the effects of volume of production on marketable surplus is positive and is significant at one percent level on all the size groups of farms. There is no other factor having significant effects on the volume of marketable surplus on a farm under the size group of below one hectare. However, on the other two size groups of the effect of estimated consumption is negative and significant at one per cent and two per cent levels of significance in second and third size groups respectively. The figures in table 6 which are the results of Cobb-Douglas production function depict that there is no factor (considered in the study) having any significant effect on the volume of marketable surplus on medium size group of farm. But, on the small size groups the level of production is the only affecting factors which have significant effect. On large size group these factors are volume of production, estimated consumption and the size of household membership which are significant at one per cent, two per cent and five per cent levels respectively.

Table 5: Regression coefficient and other parameters for the marketable surplus by size of group (Cobb-Douglas Production function)

Function and group size	Degree of freedom	a	Regression co-efficient				R^2
			b_1	b_2	b_1	b_1	
Below 1 ha	34	-0.001 (1.41)	-1.65 (1.21)	4.72* (1.25)	-4.92 (3.74)	1.49 (4.89)	0.59
One to two hectare	25	0.37 (1.16)	0.95 (2.36)	3.71 (2.44)	-3.48* (3.66)	-0.29 (4.65)	0.60
Above two hectare	16	0.48 (0.11)	0.41 (0.22)	1.36* (0.15)	-1.68** (0.61)	1.37*** (0.63)	0.94

* Significant at 1 per cent level, ** Significant at 2 per cent level
Figures in parentheses show the standard Error.

A comparison of R^2 value in both the table depict that on all the size groups of farms the linear function find the best because of the higher values of R^2.

CONCLUSION

It is clear that the yield per hectare of paddy decreases with increasing size of farm. Size of farms increased the percentage of sale to total production also increased. It's evident that the major portion of marketed surplus was contributed by above two hectare farms followed by one to two hectare farms and less than one hectare farm. Absolute quantity of sale decreases with the size of family and it's quite reverse to the all farms trend, while on the other size group of farms there is no specific trends of marketed surplus with the size of household. Forced sale (distress sale) is a common feature on all the size group of farms.

Five common channels for the purchase and sale of paddy are observed. Volume of production on marketable surplus is positively significant at one percent level on all the size groups of farms. Cobb-Douglas production function results depict that there is no factor (considered in the study) having any significant effect on the volume of marketable surplus on medium size group of farm. But, on the small size groups the level of production is the only affecting factors which have significant effect. On large size group these factors are volume of production, estimated consumption and the size of household membership which are significant at one per cent, two per cent and five per cent levels respectively. A comparison of R^2 value in both the table depict that on all the size groups of farms the linear function find the best because of the higher values of R^2.

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