Marketed Surplus of Paddy in Punjab

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ABSTRACT

The estimation of market surplus in agriculture sector is helpful for sound farming, effective procurement and public distribution policies for evolving suitable strategies for export and import and for the development of appropriate market structure. From marketing point of view, the surplus is more important than the total production, because arrangements for marketing of surplus quantity are to be made instead of the total production. The level of economic development is determined by the growth rate of marketable surplus. Marketable and marketed surplus are two types of producer's surplus. Marketable surplus is that part of the produce which is left with the farmer after meeting his requirement for family consumption, farm needs for seeds, feed for cattle, payment to labour in kind or any other requirement. The marketed surplus is the actual amount of agricultural produce that is brought to the market for purpose of sale after what is retained by the producer for their consumption. To verify the validity of relationship between marketed surplus, production and area under the rice crop, a sample of 240 farmers from Ludhiana and Patiala districts of Punjab was drawn. This study shows that overall marketed surplus of paddy in Punjab was found to be 98.72 per cent of total production. This was mainly due to the fact that rice is not the staple food for the Punjabis and the crop is produced mainly for the market. Marketed surplus is observed to be more than 97 per cent of the production in all five categories of the selected farm sizes. To verify whether there exists an elastic relation between production, operational area and marketed surplus of rice, the log linear relationship has been fitted. The ordinary least square method has been used to estimate the parametric values of all variables. In the case of rice crop, all the two coefficients *i.e.*, production and operational area are observed to be statistically significant as well as positively related with the marketed surplus.

Key Words : Paddy, Marketed, Marketable, Surplus, Production, Operational Area, Punjab

INTRODUCTION

The agricultural and particularly the food grain surpluses are necessary for accelerating the overall economic development of the economy and for meeting the food requirements of ever increasing population. The estimation of market surplus is also helpful for sound farming, effective procurement and public distribution policies for evolving suitable strategies for export and import and for the development of appropriate market structure. From marketing point of view, the surplus is more important than the total production, because arrangements for marketing of surplus quantity are to be made instead of the total production. The agricultural development is analyzed by the rate at which agricultural production increases. However, the level of economic development is determined by the growth rate of marketable surplus. The total produce of all crops is not meant for sale because some of the quantities of all crops are also retained for purpose of seed, home consumption, gifts to friends and relatives and some quantities are lose due to spoilage, etc. Thus, the two concepts, *i.e.* "marketable surplus" and "marketed surplus" have been used to determine the quantity of agricultural produce that is available for marketing and the quantity actually marketed in the market.

The producer's surplus is of two types:

Marketable surplus :

Marketable surplus is that part of the produce which is left with the farmer after meeting his requirement for family consumption, farm needs for seeds, feed for cattle, payment to labour in kind or any other requirement. Marketable surplus is the residual which is left with the producer after he meets his family consumption requirement, farm needs and payment-in-kind to casual and permanent labour, artisans and others (Johl *et al.,* 1973). It is the output that is net of seed, payments-in-kind and consumption at source (Patnaik, 1975; Nadkarni, 1980). Area, type of crop, size of holding, size of family, price of crop output, level of production, seed and feed requirements and consumption habits are some of the important factors determining the quantity of the marketable surplus.

Marketed surplus:

The marketed surplus is the actual amount of agricultural produce that is brought to the market for purpose of sale after what is retained by the producer for their consumption. It is the quantity of the agricultural produce that the producer actually sells in the market irrespective of his needs for requirement for home consumption and other requirements (Johl et al., 1973).

Computation of marketable and marketed surplus:
Marketable Surplus:

It is computed by following formula:

MS= A-B

where MS is Marketable Surplus; A stands for net availability of the given crop in the year of reference; and B stands for the following items in the same year:

i. Consumption by the farm family,
ii. Consumption by permanent labour engaged on the farm,
iii. Consumption by the temporary labour occasionally employed on the farm,
iv. Quantity retained for seed,
v. Quantity retained as feed for farm animals,
vi. Quantity retained for barter,
vii. Payments in kind:
 a. To permanent labour,
 b. To temporary labour,
 c. For machinery and equipment,
 d. For customary payments,
 e. To land owners as rent,
 f. To land owners as share of produce,
 g. For re-payment of loan,
 h. Land revenue,
 i. Irrigation charges and
 j. Other.
viii. Physical losses:
 a. In threshing and winnowing,
 b. In transport from threshing floor to storage, and
 c. In storage at producer's level.

Marketed Surplus:

It is computed by following formula:

MS= A-B

where MS is Marketed Surplus; A stands for production; and B includes all the items mentioned above apart from viii (c) *i.e.* Physical losses in storage at producer's level.

For Accounting purpose we have,

Marketable Surplus = Net availability of the Crop in the year-Retention including all seed, feed and wastage-Purchases, Distress Sales and Repurchases therein.

Marketed Surplus = Net availability of the Crop in the year-Retention included seed, feed and wastage losses at producer level- Purchases+ Distress Sales (Newman, 1977).

Factors determining marketed surplus:

Srinivasan (1961) analyzed the following factors on which marketed surplus depend:

1. Whether the crop in question are food crops or industrial crops
2. The greatest single factor in the determination of marketed surplus is the retention for personal and family consumption
3. Feeding of permanent and casual labourer – payment in kind for certain operations in harvesting
4. Crop Retained for feed of live-stock
5. Retention for seed – dependent on variety to be sown, area sown under particular crop, method of sowing. Local conditions and whether the crop is sown pure or mixed with other crops
6. Standard of living – coarse grains or cereals; customs-dietary patterns; change in food habits; price and substitution
7. Transport facilities – role in marketing of a crop

8. Monetization
9. Size of holding, marketed surplus increases with size
10. Price consciousness combined with capacity to withhold produce; off farm income
11. Production of other crops including cereals
12. Need for cash by producers, including access to cooperative credit
13. Production for domestic use or for sale
14. Availability of marketing facilities
15. Total quantity produced
16. Substitution due to rise in income, or rise in prices
17. Role of government policies
18. Practice of cultivators
19. Financial position of producers
20. Condition of storage.

Total production losses at different stages of handling are high. By minimizing the losses at different stages, marketed surplus and financial benefits to producers can be enhanced (Alagh, 2014). Cheap and efficient transport facilities, establishment of modern retail outlets, strengthening the co-operative marketing institutions, innovations in packing and storage technology should be provided for crops which are perishable in nature and their marketed surplus is high (Aparna *et al.*, 2011).

Relationship between marketable surplus and marketed surplus:

– Marketed surplus is more than marketable surplus when the farmer retains a smaller quantity of the crop than the actual requirements for family and farm needs. It is specially true for small and marginal farmers whose need for cash is immediate *i.e.* Distress Sales (Sadhu and Singh, 2002).

– In case of large farmers having better retention capacity or in case of fall in relative price to a competing crop leading to substitution, there is retention of the crop and marketed surplus may be less than the marketable surplus.

– In case of perishable commodities and for the average farmer, marketed surplus is equal to the marketable surplus in the long run (Acharya and Agarwal, 2004).

Since part of amount actually taken to the market is directly associated with acreage planted under the crop, marketed surplus will tend to show a linear positive relationship with the crop producing unit size. The share of the marketed surplus in production is expected to increase at an increasing rate with an increase in the size of the crop producing unit. The marketed surplus of paddy at All-India level is low and is estimated at about 60 per cent of the total production in the country. The low proportion of marketed surplus shows that rice being the stable food for majority of the producers in most of the states, a large quantity of its production is consumed right at the farms. However, in the state of Punjab, the marketed surplus of paddy was much higher (more than 95 %) mainly due to low consumption of rice at the farms and higher production per unit area.

Objectives:

The specific objectives are outlined hereunder:

– To find production and marketed surplus of paddy in Punjab.

– To find elastic relation between marketed surplus and production of paddy in Punjab.

– To find elastic relation between marketed surplus and operational area of paddy in Punjab.

METHODOLOGY

The study is based on the primary data collected for the year 2015-16. To verify the validity of relationship between marketed surplus, production and operational area under the rice crop, a sample of 240 farmers from Ludhiana and Patiala was drawn. Ludhiana and Patiala districts were selected randomly from the top five rice growing districts of Punjab. Only those farmers are chosen who mainly grow rice crop. For the calculation of the marketed surplus, 240 farmers were classified into five farm size categories *i.e.* marginal (up to 1 hectare), small (1-2 hectares), semi medium (2-4 hectares), medium (4-10 hectares) and large (>10 hectares) on the basis of national classification. The log linear relationship has been fitted between marketed surplus and production; operational area and marketed surplus, to verify an elastic relationship between them. The parametric values were calculated with the help of technique of ordinary least square method. The data have been presented in tabular form using simple averages and percentages.

RESULTS AND DISCUSSION

Various micro level (farm) studies conducted by Punjab Agricultural University, Ludhiana and elsewhere in the state reveal that marketable surplus of rice in the state varies from 90 per cent to 96 per cent of the total

production. Also, there was not much difference in this proportion amongst the various sizes of farm operators. This was mainly due to the fact that rice is not the staple food for the Punjabis and the crop is produced mainly for the market. Thus, even the small farmers producing rice also contribute significantly towards the marketed surplus in the state.

Table 1 shows that sample size of farmers in Ludhiana district was 120. The overall average area under paddy in Ludhiana district was 9.41 acres. The overall yield was 31.78 qtl/acre in Ludhiana district of Punjab. The average production of paddy in Ludhiana district was 297.68 quintals per farm.

Table 2 shows that sample size of farmers in Patiala district was 120. The overall average area under paddy in Patiala district was 8.58 acres. The overall yield was 27.08 qtl/acre in Patiala district. The average production

of paddy in Patiala district was 224.55 quintals. The data clearly show that the average yield and total production of paddy crop was higher in Ludhiana district as compared to the Patiala district. Thus, per farm output of paddy was much less in Patiala compared to the Ludhiana district.

Table 3 shows that sample size of farmers in Punjab was 240. The overall average area under paddy in Punjab was 8.99 acres. The overall yield was 29.72 qtl/acre in Punjab. The average production of paddy in Punjab was 261.75 quintals during the period of study *i.e.* 2015-16.

Table 4, 5 and 6 shows production and marketed surplus of paddy in Ludhiana district, production and marketed surplus of paddy in Patiala district and production and marketed surplus of paddy in Punjab, respectively. Every farmer participated in the marketing system of paddy in Punjab. As paddy is mainly grown for the market in the State, there were not much inter-

Table 1 : Production and Productivity of paddy in Ludhiana district of Punjab

Category of farm size	Sample size (No.)	Average area under Paddy (Acre)	Yield (Qtl/acre)	Average Production (Qtl)
Marginal	19	1.78	31.80	56.60
Small	22	3.43	31.81	109.11
Semi-medium	37	7.05	31.93	225.11
Medium	34	14.52	31.79	461.59
Large	8	33.24	30.92	1027.7
Overall	120	9.41	31.78	297.68

Source: Field Survey, 2015-16

Table 2 : Production and Productivity of paddy in Patiala district of Punjab

Category of farm size	Sample size (No.)	Average area under Paddy (Acre)	Yield (Qtl/acre)	Average Production (Qtl)
Marginal	18	1.54	29.91	46.06
Small	23	3.42	27.09	92.65
Semi-medium	37	7.07	27.07	191.38
Medium	34	13.64	26.48	361.19
Large	8	24.79	23.32	578.10
Overall	120	8.58	27.08	224.55

Source: Field Survey, 2015-16

Table 3 : Production and productivity of paddy in Punjab

Category of farm size	Sample Size (No.)	Average Area under Paddy (Acre)	Yield (Qtl/acre)	Average Production (Qtl)
Marginal	37	1.66	30.86	51.23
Small	45	3.43	29.45	101.01
Semi-medium	74	7.06	30.41	214.69
Medium	68	14.08	29.14	410.29
Large	16	29.02	27.12	787.02
Overall	240	8.99	29.72	261.75

Source: Field Survey, 2015-16

farm differences in so far as marketed surplus were concerned. Table 4 shows that overall average production of paddy in Ludhiana district was 297.68 qtl and overall marketed surplus of paddy was 293.21 qtl in 2015-16 and farmers of all farm sizes in Ludhiana district of Punjab contributed 98.50 per cent to the marketed surplus of paddy. The marketed surplus of paddy ranged from 97.51 per cent to 99.10 per cent for different categories of selected farm in Ludhiana district of Punjab. Table 5 shows that overall average production of paddy in Patiala district of Punjab was 224.55 qtl and overall marketed surplus of paddy was 222.17 qtl in 2015-16 and farmers of all farm sizes in Patiala district contributed 98.94 per cent to the marketed surplus of paddy. The marketed surplus of paddy ranged from 98.51 per cent to 99.51 per cent for different categories of selected farms in Patiala district of Punjab.

Market arrivals:

Table 6 shows that the farmers of marginal farm size group contributed 99.31 per cent of their total production to the marketed surplus of paddy. The farmers of small and semi-medium farm size contributed 98.34 and 98.99 per cent of their respective production to the total marketed surplus, respectively. The share in case of medium and large farm size farmers was 98.95 and 98.01 per cent, respectively in Punjab.

Table 6 clearly shows that overall marketed surplus of paddy in Punjab was found to be 98.72 per cent of production in 2015-16. This was mainly due to the fact that rice is not the staple food for the Punjabis and the crop is produced mainly for the market. Since rice is a commercial crop in Punjab and almost all the rice production is available for sale except small quantities are retained for self-consumption. Marketed surplus is

Table 4 : Production and Marketed Surplus of paddy in Ludhiana district			
Category of farm size	Average Production (Qtl)	Marketed Surplus (Qtl)	Percent Arrivals (% share in Prod)
Marginal	56.06	56.09	99.10
Small	109.11	107.05	98.11
Semi-medium	225.11	222.10	99.02
Medium	461.59	455.77	98.74
Large	1027.78	1002.19	97.51
Overall	297.68	293.21	98.50

Source: Field Survey, 2015-16

Table 5 : Production and Marketed surplus of paddy in Patiala district			
Category of farm size	Average Production (Qtl)	Marketed Surplus (Qtl)	Percent Arrivals (% share in Prod)
Marginal	46.06	45.83	99.51
Small	92.65	91.32	98.56
Semi-medium	191.38	189.39	98.96
Medium	361.19	358.16	99.16
Large	578.10	569.49	98.51
Overall	224.55	222.17	98.94

Source: Field Survey, 2015-16

Table 6 : Production and Marketed surplus of paddy in Punjab			
Category of farm size	Average Production (Qtl)	Marketed Surplus (Qtl)	Per cent Arrivals (% share in Prod)
Marginal	51.23	50.88	99.31
Small	101.01	99.33	98.34
Semi-medium	214.69	212.52	98.99
Medium	410.29	405.98	98.95
Large	787.02	771.36	98.01
Overall	261.75	258.40	98.72

Source: Field Survey, 2015-16

observed to be more than 97 per cent of the production in all the five categories of the farmers. The behavioural aspects of production and marketing of rice follow the generally accepted and observed features of commercial crop, which is mainly produced for the market.

However, the extent of marketed surplus observed to be varied from farmer to farmer. It depends upon the size of the holdings, per hectare yield/productivity of rice and variability in consumption pattern. It has been found that marketed surplus has a positive relation with the size of the holdings, *i.e.*, marketed surplus increases with the increase in the size of holdings. Our results confirm the hypothesis that with the increase in the size of the farm, the marketed surplus as a per cent of total production showed a tendency to increase.

Marketed surplus and production : Regression analysis:

To verify whether there exists an elastic relation between production and marketed surplus, the following log linear relationship has been fitted between production and marketed surplus:

Log (marketed surplus) = a + b log (production) + error term ——— (i)

Here 'b' shows the elasticity parameter. This functional relation was computed for rice crop using 240 observations. The parametric values were calculated with the help of technique of ordinary least square method.

The estimated value of 'b' coefficient for rice crop was positive, statistical significant and carry magnitude unity (1.00) (Table 7). Thus, there exists a positive and statistically significant relationship production and marketed surplus. In other words, when the level of rice production increases, there is a tendency of marketed surplus of rice to increase in the same proportion.

Is there any relationship between the marketed surplus and the size of the operational area? To estimate the effect of this variable, the following log linear relationship between the size of operational area and marketed surplus has been fitted:

Log (marketed surplus) = a + b log (operational area) + error term ——— (ii)

The ordinary least square method has been used to estimate the parametric values of this equation (Table 7). The coefficient was positive and statistically significant between marketed surplus and operational area in the case of rice crop. However, the relationship was less elastic (the value of coefficient being 0.835 *i.e.* less than unity). This implies that as the size of the operational holdings increases, the marketed surplus of rice increases but do not increase in same proportion. In other words, marketed surplus of rice increases less than increase in the operational area. To sum up, it is clear that in the case of rice crop, all the two coefficients *i.e.*, of production and operational area are observed to be statistically significant as well as positively related with the marketed surplus.

Conclusions and policy implicataions:

The two concepts, *i.e.* "marketable surplus" and "marketed surplus" have been used to determine the quantity of agricultural produce that is available for marketing and the quantity actually marketed in the market. The producer's surplus is of two types *i.e.* marketable surplus and marketed surplus. Marketable surplus is that part of the produce which is left with the farmer after meeting his requirement for family consumption, farm needs for seeds, feed for cattle, payment to labour in kind or any other requirement. The marketed surplus is the actual amount of agricultural produce that is brought to the market for purpose of sale after what is retained by the producer for their consumption. It is the quantity of the agricultural produce that the producer actually sells in the market irrespective of his needs for requirement for home consumption and other requirements.

For Accounting purpose we have,

Marketable Surplus=Net availability of the Crop in the year-Retention including all seed, feed and wastage-Purchases, Distress Sales and Repurchases therein.

Table 7 : Degree of Elasticity of Marketed Surplus of Rice in respect to Production and Operational Area in Punjab, 2015-16		
		(Selected Equations)
Variables	Rice	
	1	2
Production	1.00*	
	(.000)	
Operational Area		0.835*
		(.050)
Constant	-.007	2.933
R^2	1.000	.586
Degree of Freedom	239	239

Source: Sample Survey, 2015-16

Note: Figures in parentheses are the standard Errors of the respective parameters.

* Significant at 5 per cent level of significance.

Marketed Surplus=Net availability of the Crop in the year-Retention included seed, feed and wastage losses at producer level- Purchases+ Distress Sales.

However, in the long run, both marketable and marketed surplus tend to be equal.

To verify the validity of relationship between marketed surplus, production and operational area under the rice crop, a sample of 240 farmers from Ludhiana and Patiala was drawn. Only those farmers are chosen who mainly grow rice crop. For the calculation of the marketed surplus, 240 farmers were classified into five farm size categories *i.e.* marginal (up to 1 hectare), small (1-2 hectares), semi medium (2-4 hectares), medium (4-10 hectares) and large (>10 hectares) on the basis of national classification. The log linear relationship has been fitted between marketed surplus and production; operational area and marketed surplus, to verify an elastic relationship between them. The parametric values were calculated with the help of technique of ordinary least square method.

The marketed surplus of paddy at All-India level is low and is estimated at about 60 per cent of the total production in the country. The low proportion of marketed surplus shows that rice being the stable food for majority of the producers in most of the states, a large quantity of its production is consumed right at the farms. However, in the state of Punjab, the marketed surplus of paddy is much higher mainly due to low consumption of rice at the farms and higher production per unit area. Every farmer participates in the marketing system of paddy in Punjab. Paddy is mainly grown for the market and there are not much inter-farm differences in so far as marketed surplus is concerned. During 2015-16, the farmers of marginal farm size group contributed 99.31 per cent of their total production to the marketed surplus of paddy. The farmers of small and semi-medium farm size contributed 98.34 and 98.99 per cent of their respective production to the total marketed surplus, respectively. The share in case of medium and large farm size farmers was 98.95 and 98.01 per cent, respectively in Punjab. The overall marketed surplus of paddy in Punjab was found to be 98.72 per cent of total production in 2015-16.

This study shows that there exists a positive and statistically significant relationship production and marketed surplus. In other words, when the level of rice production increases, there is a tendency of marketed surplus of rice to increase in the same proportion. When the size of the operational holdings increases, the marketed surplus of rice increases but do not increase in same proportion. In other words, marketed surplus of rice increases less than increase in the operational area. To sum up, it is clear that in the case of rice crop, all the two coefficients *i.e.*, of production and operational area are observed to be statistically significant as well as positively related with the marketed surplus.

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