

# Agricultural Production and Marketable Surplus - A Study on Marketing of Paddy

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## **Abstract**

This paper makes an attempt to study the magnitude of marketable surplus, determinants of marketed surplus, marketing channels and distress sale of marketed surplus of paddy across the different villages and farm sizes under study. The marketed surplus or marketable surplus as measured in this study is that part of farm output which is put to sale by the farmer irrespective of his home or other requirements. Altogether 474 farm households constituting three categories of farm size (small, medium and large) drawn from three different villages with varied canal irrigation status of three different blocks of Bargarh district of Odisha state have been considered for the study. The results derived from the analysis reveals that mostly the marketable surplus is positively influenced by the size of output and nature of market for selling it. The informal marketing channel is more active in the area and formal (regulated market) are mostly beneficial to higher farm sizes. Hence Distress sale takes place despite several policies of the government. Hence, a revamped strategy for paddy marketing is suggested.

## **1.1 Introduction**

The importance of marketed surplus for an agrarian economy like India is well recognized. The analysis of marketed surplus involves various related aspects such as production, farm size, marketing channels, relative price, nature of crops, family size and their consumption habits, credit interlinkages, information and infrastructural issues etc. across various farm sizes and villages with varied level of agricultural development under study.

### **Marketable Surplus:**

Often the term “Marketable surplus” and “Marketed surplus” are used as synonyms; though theoretically there exist certain distinctions between marketed and marketable surplus.

The marketable surplus generally refers to the quantity which is the excess or residual left with the producer-farmer after meeting his genuine requirements for family

consumption, farm needs for seeds and feed for cattle, wage payment to labourers in kind, gift to friends and relatives, kind payment to artisans, mechanic, carpenters, contractual obligations to the landlords (as rent) and the wastage undergone in the process of post-harvest operations such as storage, transportation etc.

If producer-farmer's consumption habits/needs or mode of payment to labour/landlords changes over time, the marketable surplus would also change accordingly. The marketable surplus pertaining to a period can thus be computed as the difference between Gross production and total requirements of the farmers during the same period (including retention & consumption requirement). It is observed that in case of some marginal and small farmers, the quantity actually retained is less than the quantity actually required for consumption owing to the constraints of the size of holding and production. They make up the deficit with the help of borrowings, market purchase, gifts or receipt from kind wages etc. Hence, instead of quantity retained for family consumption, the quantity required for consumption is taken into consideration for estimation of marketable surplus. However, the quantum of marketable surplus is influenced by the factors operating both in the pre production and post production stages.

It is often argued that Marketed surplus as compared to marketable surplus is a practical concept. Marketed surplus refers to that quantity of produce actually marketed by the farmer producer. It means marketed surplus is that quantity of the produce which is actually sold by the farmer in the market irrespective of his requirements for family consumption, farm needs, feeds, payment in kind, storage and others. Thus, marketed surplus includes 'distress sale' by farmers (majority small and marginal) owing to cash needs for discharging their immediate liabilities and for purchasing of all necessities for the family. Marketed surplus can be less, equal or even more than the marketable surplus and each of these situations has its economic and social implications. The marketed surplus is less than the marketable surplus when farmer has financial capacity and go for storage of some of his surplus produces in expectation of securing higher prices.

Common experience shows that the amount of marketable surplus differs from region to region or even in the same region, from crop to crop. Marketable surplus may not be always positive. It may be equal, less or even higher than the marketed surplus. In distress sale situation, marketable surplus might be lower than marketed surplus. When there is no distress sale, the marketable surplus and marketed surplus might be equal.

Marketable surplus will be higher than the marketed surplus when the farmers' especially larger ones with better retention capacity retain some of marketable surplus in anticipation of higher prices in future.

The increase in production of agriculture commodities is a pre-requisite for increasing marketable and marketed surplus. However, surplus does not rise automatically as a result of an increase in productivity. The Rice based farm household survey conducted by some experts showed that farm product price, yield of crops and seed technology used were found to be vital determinant of marketed/marketable surplus. Marketed surplus is most responsive to price besides the market infrastructure and marketing system.

For the purpose of the present study the amount of paddy sold to the market by the farmer irrespective of his other considerations is termed as marketable surplus and analyzed accordingly.

## 1.2 Objectives

The objectives of the study are to:

- Highlight the existing formal (regulated) paddy marketing system prevailing in the area under study
- Estimate the marketable surplus and its marketing through various marketing channels across the farm sizes and villages
- Analyze the relative income loss in various channels across the farm sizes and villages by estimating PS and ME
- Assess the factors affecting Marketable Surplus of paddy across the farm sizes and villages

## 1.3 Data base and Methodology

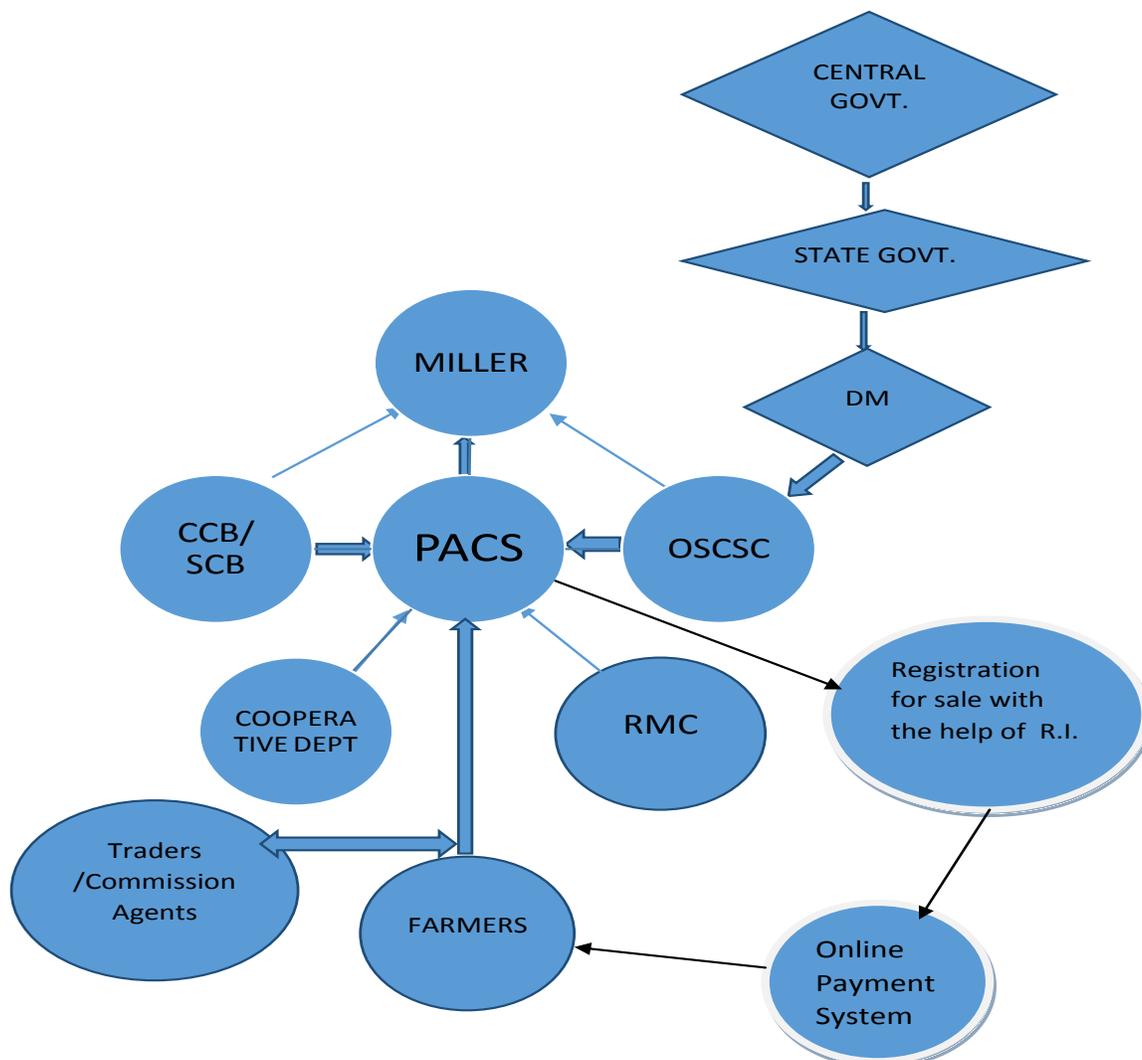
The data base constitutes the primary data collected across various farm sizes of three villages with varied irrigation status drawn from three different blocks of Bargarh district of Odisha during the year 2017-18. Altogether 474 farm households have been considered for this analysis. The classification of farm sizes in each of the villages have been made as Small (upto 5.00 acres), Medium (5.01 acres to 10 acres) and Large (10.01 acres and above) based on operational land holdings. The marketable surplus is viewed as the quantity of output sold in the market by the farmers even though a conceptual difference exists between the marketed and marketable surplus as discussed above. The Prevailing system of market and marketing channels (both formal and informal) for paddy has been considered. There are three marketing Channels such as Channel-III (formal i.e. regulated market system mostly assigned to PACS), Channel-II (informal i.e.

intermediaries deployed on behalf of Rice Millers) and Channel-I (informal i.e. traders, money lenders or commission agents mostly related to inter-locked credit market linked with output). The Cost of Marketing includes cost of transportation, loading and unloading, cost for storage, and cost for packaging etc.. The cost of inputs used includes the cost of fertilizer, pesticide, human labour, bullock and machine labour etc. The Minimum Support Price {MSP} has been considered to estimate the PS (producers share in consumer's price). The actual price prevailing in Channel-I and II during year or seasons in the area under study has been considered for estimating the money value of marketable surplus under different channels. Similarly, the actual price received from Channel-III has been considered even though Channel-III is supposed to offer MSP but due to the deduction of certain amount of paddy per bag on the ground of grading, standardization and quality of paddy the price received is often less than MSP. There are various factors affecting the marketable surplus of paddy across farm sizes and villages and hence to obtain the observed behavior of different farm sizes (to overcome the problem of less number of data in certain cases) in the area under study the aggregate figure of different farm sizes have been considered for example, the Sum of small farms of V-I, V-II and V-III constitutes Small Farm size and likewise the Medium and Large Sizes have been made and Linear Regression (OLS) Model along with Chow-test to test the significant difference between/among the regression lines have been used to assess the effect of various factors on marketable surplus as discussed subsequently.

#### **1. 4 Paddy Procurement System in the study area**

Marketing of paddy is one of the vital problems in the area under study. The market was initially deregulated and mostly handled by private traders and rice miller with insignificant participation of government supported bodies for paddy procurement directly from the farmers which resulted in distress sale of paddy. Thus subsequently, reforms in agricultural marketing took place and the market was open to both the private and government agencies for paddy procurement directly from the farmers. But after the amendment of the APMC Act in 2007 consequent upon the agricultural marketing reforms in India as well as in Odisha the private agencies were not allowed for paddy procurement in the state of Odisha. As a result of which the market for paddy procurement became completely regulated and government/ government supported (such as cooperatives and others) agencies have been procuring the paddy since then. To disseminate the benefits of agricultural marketing with an initiative to reach to the door steps of farmers for paddy procurement at remunerative price, besides the government/ apex level agri- marketing cooperatives, the Primary Agricultural Cooperative Societies (PACs) have been engaged as commission agent of Odisha State Civil Supply Corporation (OSCSC) in the state of Odisha since the year 2009 and hence also in the area under study. Because PACs has a wide network covering 96% farm households as its members in almost all villages of the State. But it is observed that still more than 40% of total farmers irrespective of the irrigation status of the villages under study are mostly depending on the private trader for selling their paddy. This may be due to the active output linked credit market (inter-locked credit market) or delay in receiving

payment from PACs or ineffective/inefficient marketing system of PACs/other government bodies and apex marketing cooperatives. Further, many of the PACs are suffering from the problem of infrastructural deficit coupled with lack of professionalism and shortage of manpower. However, despite all odds the PACs are performing well in this context and they may be considered as one of the remunerative and efficient marketing channels provided more autonomy is conferred to them for performing this task. But it is observed as depicted in figure -1 that in the process of paddy marketing PACs are succumbed to the problem of higher span of control (i.e. monitoring/governing the paddy marketing process of PACs by multiple agencies/departments) which may hinder the PACs to perform the paddy procurement process efficiently to maximize the gain of its farmers member. Figure-1 shows that OSCSC provides the assignment as commission agent for paddy procurement to PACS, Central/State Cooperative Bank (CCB/SCB) provides funds to PACS for paddy procurement, RMC provides market yard, listing, standardizing and grading support to PACs for paddy procurement, Cooperative Department controls and monitors the paddy procurement process of PACS, OSCSC supervise the assigned target and process of paddy procurement of PACS, the farmers as identified by Revenue Inspector are to be registered by PACS for selling their paddy as per the guidelines of OSCSC / State Government, selling of paddy to the concern Millers as per the guidelines of Civil Supply Department/ District administration/ State Govt., made payment through CCB/ other assigned banks as decided by Govt. to the farmers through on- line mode to the respective bank account of the farmers and finally the member farmers withdraw the payment received by withdrawal form/ Cheque /ATM card from their Bank account. This indicates how cumbersome, lengthy and time taking the mechanism from selling of paddy to receipt of payment by the farmers. This may be one of the reasons why the farmers (mainly small farmers followed even by large and medium farm sizes) are opting for informal channels (such as petty traders/ agents of millers) for selling their paddy instead of directly to PACS even though the paddy may be sold to the same PACS by the traders/ informal agents. This may be a cause of distress sale of paddy besides the other major causes like inter-locked credit (i.e. output linked informal credit) and lapses of token (targeted amount and time allotted to farmer concerned). This is how the farmers are losing instead of gaining. On the other hands, due to this lengthy and ill-defined control mechanism the PACs is also losing its customer base/ confidence and proportionate leakages in its commission income as well as in its credit business. Thus, a small span of effective control/mentoring mechanism with more autonomy to PACs in this process can be suggested. It will be appreciated if PACs can be developed as good as a Strategic Business Unit (SBU) in the field of paddy marketing so that PACs as well as its Members can immensely be benefited.



**Fig. 1.4 Paddy Procurement System**

**Note:**

- 1) Present paddy marketing system in the study area
- 2) Traders / Petty Commission Agents are not a part of the regulated market model adopted by the government in the state but shown as an intervening agent to the process.

**1.5 Marketable Surplus of Paddy and Marketing Channels**

The Marketable Surplus of paddy (meaning thereby quantity of output sold) across the villages and farm sizes has been shown in Table-1.5.1. The number of Marketing Channels of Paddy and percentage of output sold through the channels under study by

different farm sizes in various villages (with varied irrigation status) has been depicted in table-1.5.2.

### 1.5.1 Marketable Surplus

The table 1.5.1 shows that the marketable surplus as a percentage of output per acre/farm varies directly with the farm sizes irrespective of the irrigation status of the villages under study. It means the percentage of marketable surplus to output is found increasing with the increasing in farm sizes in all the villages under study. Further, the share of marketable surplus in output is relatively found much lower for small farms in V-II and V-III which may be due to the effect of inadequate irrigation and higher proportion of retention for consumption along with the size effect. However, the degree of variation in the share of marketable surplus to output is found more for all sizes of farms in V-I compared to that of V-II and V-III.

The cost of production (input cost) as a percentage of marketable surpluses is found directly related to the farm size irrespective of the villages under study as observed from the table. This may be due the size effect and affordability of the use of inputs by higher categories of farm sizes than that of small. It is not only indicating the technical efficiency (cost effectiveness) of small farms but also the probability of relatively higher net marketable surplus of small farms.

The marketing cost is also found increases with the increase in farm sizes. This may be due the distance of regulated market from the village concerned and lack of warehousing facility as majority of big and medium farms relative to small farm sold relatively higher proportion of their marketable surplus to regulated market and try to dispose of their product soon after harvesting and hence due to lack of proper market infrastructure they may spent some amount toward the safety of their products till it is auctioned. Thus the marketing cost due to transportation and temporary safe storage of their bulk products is comparatively higher for big and medium farms than that of small farm size in entire area under study.

### 1.5.2 Channels of Paddy Marketing

The channels of marketing are important determinants for ensuring remunerative prices of the marketable surpluses and efficiency in marketing. The paddy marketing channels (informal and formal) presently prevailing in the state/districts/villages under study are considered for the study. The channels are categorized into three such as:

**Channel-I:Farmersto traders / commission agents /brokers of village market.** The interlocked market is very much observed in this channel. This channel is easily accessible but some farms are forced to sale (distress sale) their produces at much below the MSP due to interlink nature i.e. informal credit (cash/kind) and output marketing

**Channel-II: Farmers to agents/brokers of rice millers in village market.** This channel is as good as open market for the farmers as it is rarely interlocked nor regulated by government. This channel is easily accessible and also the price of the produces is slightly higher than Channel-I but less than MSP.

**Channel-III: Farmers to Cooperatives / regulated markets.** The operational modalities of this channel are guided by government norms and decisions. The accessibility to this channel is relatively difficult by many farms (mainly by small farms) as it involves many official formalities and delay in receiving payments (even though it is as per MSP) against the products sold compared to that of channel-I &II. Further the receipt of MSP by farmers depends on the grading and standardization of their produces.

The table-1.5.2 reveals that the percentage of households and proportion output sold in Channel-I and Channel-II is inversely related to Farm sizes. It means the higher percentage of Small farms selling higher proportion of their marketable surplus of paddy in Channel-I and Channel-II. But the percentage of households and proportion output sold in Channel-III is found directly related to Farm sizes. It means the higher percentage of Big and Medium farms compared to that of small farms are selling higher proportion of their marketable surplus of paddy in Channel-III. This indicates the concentration of advantages drawn from the regulated market process is accrued to higher farm sizes.

## 1.6 Producers' Share and Marketing Efficiency

The PS (Producers' share in consumer rupees) and ME (Marketing Efficiency) have been estimated to assess the remunerative behaviour and efficiency of each of the channels across various farm sizes and villages considered for the study. The formula to measure Producers' share in consumer rupees and Marketing Efficiency are as follows:

The PS can be defined as the ratio of the price received by the farmer to the price paid by the customer (here MSP is considered as consumer price) expressed as the percentage.

$$P_s = (P_{rf}/P_{pc}) \times 100$$

Where,

$P_s$  = Producers' share

$P_{rf}$  = Price received by farmers

$P_{pc}$  = Price paid by consumers

The ME is measured as the ratio of total value of goods marketed to the marketing cost. This ratio is directly related to the efficiency. The Shephard's formulation of the ratio (used by Katcha, 1990) has been used to measure the marketing efficiency in this case.

Index of Marketing efficiency(ME)=

$$\left[ \frac{\text{Value of goods sold (at consumers' price)}}{\text{Total marketing cost}} - 1 \right]$$

The table-1.6 reveals that the Producers' share in consumers' rupees and marketing efficiency in Channel-I and Channel-II is found relatively higher for small farms as compared to that of other size groups (medium and large) of farms in the area under study. This can be attributed to higher dependency of small size group of farms on the interlocked market i.e. mainly channel-I. The rate paddy is much below the MSP in this channel but whatever rate this channel offers it is relatively higher for small farms as because the buyers (traders/commission agents) were most concerned about recovering their debt with exorbitant rate of interest amicably which will enhance their gain if recovered fully so they would not hesitate to offer some higher price to them which will conversely encourage the small farms to maintain the same type of credit-output linkage with them. After fulfilling their commitment through Channel-I certain proportion their residual surplus mainly sold to Channel-II where the rate of paddy offered is comparatively higher than that of Channel-I and also unlike Channel-I, there is no pre-requisite commitment while trading with Channel-II. Further both of these channels are easily accessible to small farms and available at their door steps with least marketing cost. So the marketing efficiency of small farms under these two channels is found relatively higher as marketing cost is least.

Further, the Producers' share in consumers' rupees is found inversely and marketing efficiency is directly related to farm sizes in Channel-III as depicted in the table. It means the Producers' share in consumers' rupees is found higher for small farms compared to other farm sizes (except V-III where it is same for all size groups of farms) which may be due to the better grading and standardization of the products of small farm as the quantity of surplus sold through Channel-III is very small the quality aspects were better taken care of by them and hence more remunerative. But the marketing efficiency of small farms is found less than that of large and medium size group of farms in the area under study as because the marketing cost for small

farms is normally found higher in selling their small quantity of surplus output in Channel-III. Further, the small farms are less accessible to Channel-III may be due to less quantity of residual surplus, higher transaction cost, more formalities and delay in receiving payments against their products etc. Thus in Channel-III the marketing efficiency lies with big and medium farms as shown in the table 1.6.

### 1.7 Proportion of income loss and Distress Sale

The proportion of income loss estimated from the price difference between the various channels in area under study and the proportion of distress sale of paddy are represented by Table-1.7

The table-1.7 reveals that the proportion income loss due to the difference between the prevailing rate of paddy in Channel-I & II than that of the difference between the price of paddy per bag between Channel-I & III and Channel-II & III in all the villages and entire samples (except V-III where the price difference between Channel-II & III is less and hence income loss is less compared to others) as shown in the table. The proportion of income loss due to difference in the prices of the products sold in various channels is found less for small farms compared to other farm sizes as per the advantages of each of the channels availed by the small farms as mentioned in the preceding discussion. However, the magnitude of income loss due to the price difference between Channel-I & III is found higher in all the villages and for all farm sizes. This indicates that even though the loss proportion is relatively slightly less for small farms, it is not an indication that the small farms are gainer rather they are looser as only a small quantity of well graded and standardized surplus of paddy is sold in Channel-III but higher proportion of its products sold in Channel-I (where due to regular and higher dependent seller of Channel-I they used to get some more price for their produces). Thus, the amount of income loss of small farmers in the entire area under study matter much keeping in view their less quantity of marketable surplus of which higher proportion is sold to Channel-I (Interlocked market). Thus, the percentage of distress sale of paddy by small farms is found higher compared to big and medium farms in all the villages (with higher percentage of distress sale of paddy by small farms in V-III, the rain fed village) under study as depicted in the table. The approximate loss of income per bag of paddy due to distress sale is same for all farm sizes of a village. However, the loss is found higher in V-III (rain fed village) compared to that of V-I (irrigated village) and V-II (semi-irrigated village) as shown in the table. On an average, for the entire sample case the loss is found around Rs. 93/- per bag of paddy which possess challenges against the existing regulated

market mechanism of the state to overcome the problems of distress sale in which all farm sizes in general and small farm size in particular are suffering adversely.

### 1.8 Factors Affecting Marketable Surplus

There are various factors affecting marketable surplus of paddy. Thus in this chapter in order to assess the effect of certain factors as specified below across the villages and Farm sizes the linear (OLS) regression analysis has been used and to test the significance difference between the regression lines estimated for various villages and farm sizes under study Chow-Test (F value) has been conducted. The results of regression analysis and Chow-Test have been represented in Table-1.8.

**The Linear Regression model (OLS)** has been used to assess the factors affecting Marketable Surplus across different villages such as V-I, V-II and V-III and farm sizes such as Small, Medium and Big farms separately. The regression equation is follows.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{12} X_{12} + u_i$$

Where  $\alpha$  is the intercept and  $\beta_1 \dots \beta_{12}$  are the partial regression coefficients

$u_i$  is the stochastic disturbance terms

$Y$  = Marketable Surplus of Rice (paddy) per acre of GCA (in Rupees)

$X_1$  = production of rice (paddy) per acre of GCA (in Rupees)

$X_2$  = Household size (Nos.),

$X_3$  = Credit (credit from all sources) per acre (in Rupees)

$X_4$  = Area leased in to Net area operated (in Percentage)

$X_5$  = Area under HYV to GCA (in Percentage)

$X_6$  = Quality of land (Dummy if Low land=1, otherwise= 0 ),

$X_7$  = Use of Bullock & Machine labour per acre (in Rupees)

$X_8$  = Use of Fertilizer per acre (in Rupees)

$X_9$  = Use of Pesticide per acre (in Rupees)

$X_{10}$  = Use of Human labour per acre (in Rupees)

$X_{11}$  = Education (No. of years of Schooling)

$X_{12}$  = Proportion of Marketable Surplus sold to Regulated Market (in Percentage)

The result of the OLS estimate of the multiple regression is recorded in the table-1.8.

The regression results for the above stated function was worked out for various farm sizes (small, medium and large) and villages (V)-I, II and III and compared with the pooled data (All-V). To observe the behaviour of a particular size group and village to understand whether it is significantly different from other size groups and villages or not popularly used “Chow test” was undertaken and ‘F’ value was found out from the test. If the ‘F’ computed from Chow test exceeds the critical F value at the chosen level of  $\alpha$ , reject the hypotheses that the regressions of small, medium and large are the same, that is, there exists significant difference in the regression lines of different farm sizes or villages (whichever the case is).

Given the assumptions of the **Chow test** procedure, it can be shown as follows:

$$F = \frac{S_6/K}{S_5/(N_1 + N_2 + N_3 - 3K)}$$

Follows the ‘F’ distribution with  $df = (K, N_1 + N_2 + N_3 - 3K)$ .

For instance, where, K = number of parameter estimated (i.e. 13) and  $N_1, N_2$  &  $N_3$  are no. of observations of the various groups (small, medium and large farms respectively).

$S_6 = S_1 - S_5$ , where  $S_1$  = Residual sum of square (RSS) for pooled data,  $S_2, S_3$  and  $S_4$  are the RSS for small, medium and large groups respectively.  $df$  is degree of freedom

The regression analysis reveals that there exist significant difference between/ among the regression lines estimated for the villages and farm sizes as revealed by Chow-test (F value) shown in the table. Thus factors affecting the marketable surplus of paddy may be analyzed across the villages and farm sizes.

It is observed from the regression results shown in the table that  $X_1$  = production of rice (paddy) per acre of GCA has a positive and significant relationship with the marketable surplus of paddy per acre across the villages and farm sizes. It means irrespective of the irrigation status of the villages and size of farms under study the marketable surplus increases with the increase in productivity (production per acre) of rice (paddy). Whereas  $X_2$  = Household size has a negative and significant relationship with the marketable surplus of paddy per acre across the villages and farm sizes. It means irrespective of the irrigation status of the villages and size of farms under study the marketable surplus per acre decreases with the increase in Household size. Because bigger the size of family, higher will be the quantity of retention of paddy for household consumption and hence lower will be the marketable surplus. Further,  $X_3$  = Credit (credit from all sources) per acre is found negative and

significantly related to marketable surplus in V-II, Small farms, Big farms and All-V (entire sample). This may be attributed to the diversion of farm credit from the purpose of production to other purposes (may be for consumption and others). It is found that  $X_4$  = Area leased in to Net area operated (in Percentage) is positive and significantly related to marketable surplus of paddy across the villages and farm sizes (it is positive but not significant for medium farms). It indicates that tenancy has a positive impact on marketable surplus. It is observed that  $X_5$  = Area under HYV to GCA (in Percentage) is negative and significantly related to marketable surplus for V-II, Big farms and All-V but significantly positive relationship with marketable surplus for V-III and Medium farms. It is negatively related (not significant) for V-I and Small farms. The negative relationship may be attributed to lack of irrigation facility, inadequate use of technology, excess use of HYV seed or excess use of fertilizers/pesticide. The factor like  $X_6$  = Quality of land is found positive and significantly related to marketable surplus in V-II and All-V. In other cases it is found positive but not significant. So except certain few and specific cases the quality of land has less impact on the marketable surplus. It is found that  $X_7$  = Use of Bullock & Machine labour per acre has positive and significant relationship with marketable surplus for V-III, Small farms and All-V but it is positive and significant for Medium farms. The negative relationship may be due to the excess use of it whereas the positive relation may be due to the judicious use of it. The marketable surplus is positively related to  $X_8$  = Use of Fertilizer per acre across the villages and farm sizes but it is found positive and significant for V-II, V-III, All-V and Big farms. However, it can be said that higher the use of fertilizers, higher will be the productivity and hence higher will be the marketable surplus. Similarly, the  $X_9$  = Use of Pesticide per acre is found positive and significantly related to marketable surplus in V-I, V-II and All-V but found significantly negative for Small farms which may be due the injudicious use of pesticide attributed to the lack of affordability of small farms to use it on time. The marketable surplus is negative and significantly related to  $X_{10}$  = Use of Human labour per acre for V-II, All-V, Small farms, Medium Farms and Big Farms. This may be attributed to higher retention of paddy for payment of wages to human labour for various farming operations which causes less marketable surplus. The marketable surplus has positive and significant relationship with  $X_{11}$  = Education in V-II and All-V. It indicates that except some specific cases education has no impact on marketable surplus irrespective of the nature of villages and farm sizes rather in certain cases it is negative even though not significant. The marketable surplus is positive and significantly related to  $X_{12}$  = Proportion of Marketable Surplus sold to Regulated Market for V-I, V-II, All-V, Small farms, Medium farms and Big Farms (it is only positive but not significant for V-III). It indicates that expectation to sell the paddy in regulate market with remunerative price (i.e. MSP) as observed from the their past

behavior i.e. the Proportion of paddy sold to Regulated Market encourages them to have more marketable surplus either by increasing paddy productivity or decreasing retention of paddy for consumption and other purposes.

### 1.9 Conclusion

The analysis made on the market and marketing surplus of paddy results in the following findings:

The regulated or government driven market for paddy procurement is complex conferring less autonomy to the procurement agencies as the span of control is multiple and multidimensional. Thus not only the procurement process is getting hindered by such excessive formalities of regulations but also discouraging the small farmers in particular and other farm sizes in general due to improper service rendered by them such as procurement of paddy and making payment for it on time to the farmers, making the farmers of all size group more accessible to it, providing market and marketing infrastructure along with marketing linked credit and other facilities till the marketable surplus of the farmers completely sold out. Thus the availability of marketing linked facilities and easy accessibility for all types of farmers with an assurance of remunerative price (MSP) for their products can make the regulated market and marketing framework more vibrant beneficial both to the consumers and producers.

The marketable surplus as a percentage of output per acre/ farm varies directly with the farm sizes irrespective of the irrigation status of the villages under study. However, the degree of variation in the share of marketable surplus to output is found more in irrigated village i.e. V-I compared to that of V-II and V-III. The cost of inputs used in production as a percentage of marketable surpluses is found directly related to farm sizes in all the villages under study. It indicates the technical efficiency (cost effectiveness) of small farms and hence probability of relatively higher net marketable surplus of small farms. The marketing cost is also found directly related to the farm size which indicates relatively higher dependency of small farms on village traders (informal market) where marketing cost is quite minimum or even nil as they use to pick it up from the Threshing point of the farmers,

The percentage of Small farms and the marketable surplus of paddy sold in Channel-I and Channel-II are found higher compared to that of Big and Medium farms who sold higher proportion of their marketable surplus of paddy in Channel-III. This indicates higher farm sizes are drawing more advantages from the regulated market system. The Producers' share in consumers' rupees and marketing efficiency in Channel-I and Channel-II is found relatively higher for small farms than that of medium and big farms in the villages under study.

The Producers' share in consumers' rupees is found inversely related to farm sizes and marketing efficiency is directly related to farm sizes in Channel-III

. The proportion of income loss due to difference in the prices of the products sold in various channels is found less for small farms compared to other farm sizes.. However, the magnitude of income loss due to the price difference between Channel-I & III is found higher in all the villages and for all farm sizes. The percentage of distress sale of paddy by small farms is found higher compared to big and medium farms in all the villages (with higher percentage of distress sale of paddy by small farms in V-III, the rain fed village). The approximate loss of income per bag of paddy due to distress sale is found higher in V-III (rain fed village) compared to that of V-I (irrigated village) and V-II (semi-irrigated village). On an average, for the entire sample case the loss is found around Rs. 93/- per bag of paddy which possess challenges against the existing regulated market mechanism of the state to overcome the problems of distress sale in which all farm sizes in general and small farm size in particular are suffering adversely.

The factors most commonly and significantly affecting Marketable surplus of paddy per acre are  $X_1$  = production of rice (paddy) per acre of GCA,  $X_2$  = Household size and  $X_{12}$  = Proportion of Marketable Surplus sold to Regulated Market, where  $X_1$  and  $X_{12}$  are positively but  $X_2$  is negatively related to Marketable surplus of paddy for irrespective of the nature of villages and sizes of farms.

Thus to conclude, it can be said that the marketable surplus, factors affecting marketable surplus, market, process of procurement, ensuring remunerative price of products on time, and making the accessibility to the formal market very easy for all farmers are the issues of prime concern for paddy marketing in the area under study as well as in the state., which requires proper care to be taken by the government through effective policy measures for the welfare of small farmers in particular and farming community in general.

**Table-1.5.1**  
**Marketable Surplus of paddy across farm sizes and villages**

Village / farm Size	Production per acre (in Rs.)	Production per farm (in Rs.)	Marketable surplus per acre (in Rs.)	Marketable surplus per farm (in Rs.)	surplus (quantity sold) as % of output per acre/farm ( in bags / Rs)	No. of households	% of households	used in production as a % of Marketable surplus per acre	Marketing cost per bag
<b>V-I</b>									
S	21424.45	146272.86	15444.86	105447.96	72.09	84.00	43.75	65.84	4.71
M	21964.45	300110.48	18707.63	255611.02	85.17	52.00	27.08	68.34	5.99
L	22697.17	756910.13	21020.68	701002.29	92.61	56.00	29.17	66.10	7.16

AL							100.0		
L	22300.38	366039.75	19484.54	319820.47	87.37	192.00	0	66.55	6.55
<b>V-II</b>									
S	17045.12	43177.67	5931.42	15025.12	34.80	86.00	61.87	69.81	4.96
M	18319.75	182480.00	14544.97	144880.00	79.40	24.00	17.27	72.70	5.94
L	17830.19	312397.24	15292.74	267939.31	85.77	29.00	20.86	75.56	6.71
AL							100.0		
L	17774.24	123397.99	12994.19	90212.37	73.11	139.00	0	73.00	6.32
<b>V-III</b>									
S	12277.77	45959.27	4017.67	15039.33	32.72	82.00	57.34	89.00	3.34
M	13469.92	98101.70	8624.96	62815.75	64.03	53.00	37.06	92.00	4.64
L	14155.52	171635.63	10317.06	125094.38	72.88	8.00	5.59	94.82	7.47
AL							100.0		
L	13090.87	72315.63	7042.49	38903.60	53.80	143.00	0	92.00	4.86
<b>All-V</b>									
S	17999.51	78447.86	10364.21	45170.69	57.58	252.00	53.16	74.88	4.59
M	18857.00	195229.88	15048.47	155799.44	79.80	129.00	27.22	77.68	5.75
L	21361.96	567952.39	19423.73	516420.68	90.93	93.00	19.62	78.83	7.09
AL							100.0		
L	19927.42	206272.34	16204.81	167738.96	81.32	474.00	0	77.18	6.39

**Note:** One Bag of Paddy= 75 kg

S- Small, M-Medium and L-Large farm sizes

Village-I,II& III (V-I, V-II & V-III), All-Villages- All-V

**Table-1.5.2**

**Proportion of output sold through various Marketing Channels across farm sizes and villages**

Villages /Farm sizes	Channel-I		Channel-II		Channel-III	
	No. of households Sold their product	Proportion of output sold (in %)	No. of households Sold their product	Proportion of output sold (in %)	No. of households Sold their product	Proportion of output sold (in %)
<b>V-I</b>						
S	70.00	48.22	44.00	21.00	28.00	30.61
M	44.00	25.69	28.00	24.55	32.00	49.76
L	47.00	19.65	26.00	11.08	50.00	69.27
ALL	161.00	25.08	98.00	15.43	110.00	59.47
<b>V-II</b>						
S	28.00	51.47	3.00	15.82	16.00	32.71
M	16.00	37.05	7.00	13.97	13.00	48.98

L	22.00	26.59	7.00	11.59	21.00	61.82
ALL	66.00	32.05	17.00	12.69	50.00	55.26
<b>V-III</b>						
S	56.00	79.39	7.00	14.94	2.00	5.67
M	50.00	54.52	18.00	18.08	20.00	27.40
B	5.00	20.77	1.00	4.72	7.00	74.50
ALL	111.00	53.96	26.00	14.98	29.00	31.06
<b>All-V</b>						
S	154.00	55.14	54.00	19.66	46.00	25.07
M	110.00	35.47	53.00	22.36	65.00	42.17
L	74.00	19.70	34.00	10.76	78.00	69.53
ALL	338.00	29.60	141.00	15.36	189.00	55.02

**Table-1.6**  
**PS and ME across various Channels, farm sizes and villages**

	Channel-I		Channel-II		channel-III	
	PS	ME	PS	ME	PS	ME
<b>V-I</b>						
S	83.60	89.73	90.71	41.89	94.19	67.91
M	82.74	36.29	86.64	36.32	93.33	86.29
L	80.69	22.06	87.90	13.17	92.53	99.77
ALL	82.29	31.89	88.34	20.72	92.80	93.80
<b>V-II</b>						
S	82.44	89.55	90.82	29.67	94.13	68.80
M	80.88	51.96	90.04	21.23	93.30	85.56
L	80.46	32.29	89.08	15.06	92.80	95.20
ALL	81.08	42.05	89.71	17.85	93.00	90.55
<b>V-III</b>						
S	82.86	205.77	91.43	41.95	93.33	16.83
M	81.34	99.26	91.43	36.38	93.33	60.95
L	81.43	22.78	91.43	5.07	93.33	103.72
ALL	81.84	94.34	91.43	28.57	93.33	66.05
<b>All-V</b>						
S	83.16	99.07	90.73	40.38	94.15	63.91
M	82.01	47.69	87.95	33.62	93.33	82.70
L	80.73	23.65	87.95	13.28	92.58	99.15
ALL	82.25	36.88	88.84	20.70	92.85	91.78

Note: PS=Producers share in consumers' rupees and ME=Marketing Efficiency Index

**Table-1.7**  
**Proportion of income loss between channels and Distress Sale across farm sizes and villages**

	proportion of income loss per bag between channels-I &II	proportion of income loss per bag between channels-I &III	proportion of income loss per bag between channels-II &III	Percentage of Distress Sale (in bags)	Average amount of income loss (approx.) due to distress sale per bag (in Rs.)
<b>V-I</b>					
S	8.51	19.62	10.24	69.22	87.00
M	4.71	20.86	15.42	50.24	87.00
L	8.93	23.93	13.77	30.73	87.00
ALL	7.35	21.52	13.20	40.50	87.00
<b>V-II</b>					
S	10.17	21.30	10.11	67.29	96.00
M	11.32	23.63	11.07	51.02	96.00
B	10.71	24.29	12.26	38.18	96.00
ALL	10.65	23.33	11.46	44.74	96.00
<b>V-III</b>					
S	10.34	20.69	9.38	94.33	111.00
M	12.41	22.95	9.38	72.60	111.00
L	12.28	22.81	9.38	25.50	111.00
ALL	11.72	22.19	9.38	68.94	111.00
<b>All-V</b>					
S	9.11	20.26	10.22	74.80	93.00
M	7.25	21.94	13.70	57.83	93.00
L	8.94	23.87	13.70	30.47	93.00
ALL	8.01	21.58	12.56	44.96	93.00

**Table-1.8**  
**Factors Affecting the Marketable Surplus across villages and Farm Sizes**  
**(Regression Results)**

Dependent Variable: Marketable Surplus of paddy per acre of GCA (in Rs.)							
	Village - I	Village - II	Village - III	Small	Medium	Large	All - Village
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
		t	t	t	t	t	t
(Constant)	-6689.3* (-9.53)	-1828.4 (-1.24)	-5651.8 * (-12.66)	-6048.5 * (-15.31)	-3195.5* (-5.97)	-1988.21 * (-8.97)	-5471.2 * (-16.82)
X <sub>1</sub>	1.50* (16.32)	0.64 *** (1.81)	1.13 * (14.76)	1.46 * (18.73)	1.12 * (16.16)	1.30 * (30.50)	1.14 * (17.88)
X <sub>2</sub>	-54.14* (-4.18)	-91.90 *** (-1.93)	-66.20 * (-3.17)	-83.77 ** (-2.44)	-86.97 * (-6.20)	-47.61 * (-6.39)	-35.55 ** (-2.25)
X <sub>3</sub>	-0.36 (-0.34)	-0.08 ** (-2.11)	0.06 (0.59)	-0.06 ** (-2.47)	-0.03 (-0.56)	-0.15 ** (-2.79)	-0.09 * (-4.60)
X <sub>4</sub>	365.16* (2.85)	2118.41 * (5.52)	210.04 *** (1.86)	1216.9 * (5.33)	41.69 (0.42)	327.17 * (3.16)	1224.6 * (7.93)
X <sub>5</sub>	-3.37 (-0.30)	-19.14 * (-3.33)	7.18 ** (2.26)	-2.81 (-0.85)	9.65 ** (2.28)	-11.44 ** (-2.29)	-12.71 ** (-2.84)
X <sub>6</sub>	75.36 (0.92)	698.44 * (3.42)	78.57 (1.32)	178.24 (1.38)	54.71 (1.25)	-48.11 (-0.97)	345.27 * (3.63)
X <sub>7</sub>	0.25 (0.33)	-2.13 (-1.46)	2.09 ** (2.48)	4.77 * (7.38)	-0.10 * (-0.12)	-0.63 (-1.95)	3.51 * (6.08)
X <sub>8</sub>	0.26 (0.28)	3.26 ** (2.86)	2.60 * (8.37)	0.32 (0.37)	0.59 (0.93)	1.47 * (4.04)	3.02 * (11.19)
X <sub>9</sub>	5.61* (4.47)	7.30 * (4.43)	2.29 (1.09)	-3.40 * (-3.75)	-0.40 (-0.72)	0.90 (1.48)	1.56 ** (2.28)
X <sub>10</sub>	-0.12 (-0.89)	-0.86 * (-3.04)	0.004 (0.01)	-0.77 * (-4.45)	-0.26 ** (-2.04)	-0.25 ** (-2.42)	-0.54 * (-3.21)
X <sub>11</sub>	-5.01 (-0.44)	54.20 *** (1.83)	-8.56 (-0.93)	7.81 (0.50)	2.96 (0.49)	-0.28 (-0.06)	23.56 *** (1.92)
X <sub>12</sub>	5.25* (5.02)	9.16 * (3.38)	0.58 (0.57)	8.26 * (4.29)	1.98 ** (2.89)	1.97 ** (2.39)	7.67 * (4.91)
<b>F</b>	120.06*	62.74 *	155.24 *	180.61 *	584.15*	761.08 *	195.13 *
<b>R<sup>2</sup></b>	0.83	0.74	0.92	0.84	0.91	0.92	0.83
<b>N</b>	192	139	143	252	129	93	474
<b>Chow Test</b> <b>F<sub>13, 453</sub></b>	31.7 *			21.1 *			

**NB.** Robust standard Error is estimated for this regression model.

Figures in the parenthesis indicate 't' statistics

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