

# Marketable Surplus and Size-Classes of Holdings

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*The marketable surplus of any subsistence crop depends on the availability of cultivated land under the crop. Besides this, among the factors that permit the farmer to increase his marketable surplus the most important one is his family size. If the family size is big, the marketable surplus will be relatively lower, even for the big-sized farms. Per capita availability of cultivated land among the larger farms is certainly higher compared to the smaller ones, but per capita availability of land under a specific crop need not be higher in the larger size groups than the smaller farms. The phenomenon of marketable surplus should be examined not in terms of size-classes of holdings but with the acreage of individual crops separately against each size-class.*

THIS paper seeks to present some quantitative results pertaining to the interrelations between marketable surplus and size-classes of holdings. The paper is divided into four parts. Part I reviews a few authors who have attempted to examine the relations between marketable surplus and farm size. Part II discusses the nature of data used and methodology followed in this paper. Part III presents some fresh results on the basis of a method of our own. Part IV provides possible explanations of the phenomena in the light of the results obtained in our study.

## I

### Review of Studies

It may be mentioned at the very outset that there are two different concepts in this subject—'marketable surplus' and 'marketed surplus'. The marketable surplus refers to the amount net of seeds, payments in kind, and consumption at source, whereas the marketed surplus refers to the amount actually taken to the market. The empirical literature on this subject does not often make this distinction clear; the terms are used as interchangeable.

Dharm Narain's study [1961] on marketable surplus may be regarded as a pioneering one. He followed the definition of marketable surplus referred to above and found that marketable surplus as a proportion of output decreases with the increase in farm size upto the size-class of 10-15 acres after which it increases steadily. According to Narain, the holdings below 15 acres contribute about 54.4 per cent of the total marketable surplus, a part of which may be called a distress surplus. He considered all agricultural produce for the year 1950-51 and the rural economy of India as a whole.

Utsa Patnaik [1975], using the same concept of marketable surplus, observed that the proportion of output available for marketing is fairly low on the smallest holdings, and increases with farm size, the range being from 20 per cent on the smallest to 63 per cent on the largest. Patnaik also considered the all-India data covering all agricultural produce for the year 1960-61 and for 1950-51. The findings of the All-India Rural Debt

and Investment Survey 1961-62 by the Reserve Bank of India (RBI) are more or less the same in Patnaik's study, though the classification adopted by RBI is based on value of assets which does not perfectly correspond with size-classification of holdings.

Following the definition somewhat different from the definition of marketable surplus discussed above, Raj Krishna [1965] undertook an analysis on marketable surplus function for a subsistence crop (rice or wheat) from available Indian cross-section data. According to Raj Krishna, all disposals other than family consumption are to be treated as the marketable surplus. Disposals other than consumption and sale, i.e., retentions for seeds, payments in kind, etc. have not been included in his analysis due to lack of data.

With this definition of marketable surplus, he carried out a number of experiments with data relating to villages in different regions of India and the main subsistence crop, wheat or rice. The results of his analysis revealed that in most cases there exists a strong linear, and in some cases a strong non-linear, relation between the quantity produced and the quantity sold by different peasant families. From these findings, Raj Krishna concluded that "very poor villages with very low dispersion of income (or output or holding-size) are more likely to be characterised by a non-linear marketable surplus function than other villages".

Another attempt at the measurement of marketable surplus has been made by Asoke Hati [1976]. He used the component of net purchase by the farmers as the way of distinction between the marketed and marketable surplus. He defined marketable surplus as the difference between the quantity actually marketed and the quantity repurchased by the farmers during the same agricultural year. He carried out the exercise pertaining to a sample of 150 cultivating households distributed over 15 villages of the Hooghly district of West Bengal for paddy during the agricultural years 1970-73. He fitted two non-linear equations and grafted them into one. The result was revealing when it was presented graphically. The graph presented by Hati shows that there are three

phases of movement of marketable surplus by farm size groups. The first phase representing the farm size 0.66 hectare or less is at or below the zero line, i.e., these households are forced to sell their produce only out of distress. So far as the holdings between 0.66 and 1.98 hectares are concerned, the curve flattens at about 5 per cent of marketable surplus, the effect of farm size on the marketable surplus function is practically nil. For holdings above 1.98 hectares, the proportion of marketable surplus increases with the increase in farm size.

There is another micro level study done by M V Nadkarni [1980] in a millet region of Maharashtra. The study is based on farm management data from Ahmednagar district for the years 1969-70 to 1971-72. The study relates to foodgrains as a whole and three important crops separately—jowar, bajra, and wheat.

Nadkarni used three concepts in his study: (i) gross marketed surplus, which refers to the quantity actually marketed; (ii) net marketed surplus, which is the gross marketed surplus minus repurchases of foodgrains; (iii) marketable surplus, which is defined as net available output minus consumption at source. Consumption refers to the actual quantities as recorded and not to any notional quantities.

If one accepts these definitions, then Hati's work should be considered to be dealing with the net marketed surplus as against the marketable surplus.

Now considering the standard definition of marketable surplus used by Nadkarni, his findings do not go against the findings of Hati.<sup>1</sup> Thus, Nadkarni finds that marketable surplus is negative for jowar and bajra and for total foodgrains in the smallest two size-classes of below 2 hectares and 2 to 4 hectares and in the case of jowar even for the next size-classes of 4 to 6 hectares. However, in the case of wheat the marketable surplus is positive for all the size-classes. This finding has tempted Nadkarni to suggest that the small farmers are obliged to sell superior grain (in this case, wheat) for purchasing relatively inferior ones (jowar, bajra, etc) for consumption.

## II Methodology and Data

It may be mentioned that the earlier research on this aspect of market supply suffers from some limitations partly due to the concepts that have been followed and partly due to the nature of the data used in the calculation of marketable surplus. Most of the work for instance have been done without clarifying the concepts of marketed surplus and marketable surplus. In some cases marketable surplus has been defined in such a fashion that it in fact implies net marketed surplus. For example, Asoke Hati, as discussed earlier, emphasised the concept of netting to the very definition of marketable surplus. But without considering the components of retentions such as seeds, payments in kind, consumption at source, etc, only netting out of repurchases from the gross sale do not imply marketable surplus in the strict sense of the term. Similarly, without considering the retention components other than family consumption, as defined by Raj Krishna, cannot be treated as marketable surplus. This implies once again, the concept of net marketed surplus. Thus, net marketed surplus can be defined in various ways and may be used to understand the various aspects of marketed surplus. Each estimate relating to each aspect of marketed surplus has its own utility concerning different policy questions. But these estimates cannot be equated with the estimate of marketable surplus. Estimates of marketable surplus seem to be necessary from the point of view of the sectoral distribution of foodgrains or for the formation of procurement policy by the government for which estimates of gross or net marketed surplus have no direct relevance.

Most of the studies on marketable surplus are based on Farm Management Survey (FMS) data of different regions in India. Dharm Narain is among the few who has used not only FMS data, but also the data

from other sources, such as National Sample Survey data, data on All-India Rural Credit Survey, Agricultural Labour Enquiry Reports, etc, to build up estimates of marketable surplus for different farm size groups. His definition is quite consistent but the results suffer from some major limitations as discussed by Rudra [1982]. This has arisen due to the nature of the data and assumptions involved in the methods of his estimation.

We know that farm management reports mainly provide data on output of crops and cost of cultivation of various types by farm size groups. The different components of retentions from gross output as well as consumption of cereals at source are not generally provided by the Farm Management Studies. Exception is, however, noticed in the case of West Bengal (Hooghly district) farm management reports for the years 1970-71 to 1972-73, where the data on various components of retentions other than family consumption from gross output are available. Thus, for the purpose of estimation of marketable surplus and to examine the relationship between farm size and marketable surplus, West Bengal data seem to be very useful although one has to find data for

estimating family consumption of cereals from other sources. For this purpose, most of the previous studies depended on data on consumption gathered by the NSS. But it is well known that NSS provides data on the items of private consumption by decile groups which do not exactly correspond to the farm size groups provided by FMS reports. If one intends to relate the private consumption figures of NSS with the size-classes of holdings of FMS, some assumptions are naturally involved which are very often not quite consistent with each other. This is exactly the problem faced by Dharm Narain as well as Utsa Patnaik while estimating the marketable surplus in agriculture by farm size groups.

However, in the absence of field level data on private consumption by farm size groups, one has no option but to use the data from consumption enquiry of the NSS with certain consistent and meaningful assumptions. Among those who used the family consumption as one of the components of retentions, are those who have used per capita consumption of cereals as a valid means for measuring consumption requirement of cereals of the family. But it may be noted that the data provided by the NSS indicate

TABLE 1B: DISTRIBUTION OF MARKETABLE SURPLUS PER PERSON AND MARKETABLE SURPLUS PER HECTARE BY SIZE GROUP OF HOLDINGS IN WEST BENGAL: 1970-73  
(Qntl per annum)

Size Group (1)	Marketable Surplus Per Person			Marketable Surplus Per Hectare		
	Norm I (2)	Norm II (3)	Norm II (4)	Norm I (5)	Norm II (6)	Norm II (7)
0.01 - 0.50	-0.66	-1.36	-0.79	-15.74	-32.29	-18.68
0.51 - 1.00	0.23	-0.47	0.11	2.02	-4.17	0.96
1.01 - 1.50	1.05	0.96	0.96	2.04	2.04	5.83
1.51 - 2.00	0.95	0.25	0.82	5.73	1.54	4.94
2.01 - 3.00	1.07	0.41	0.96	6.16	2.34	5.51
3.01 - 4.00	1.21	0.50	1.11	6.51	2.70	5.96
4.01 - 6.00	2.12	1.41	2.03	9.05	6.23	8.97
6.01 and above	6.04	5.35	5.94	11.79	10.45	11.60
All classes	0.57	-0.13	0.45	4.22	-0.93	3.37

TABLE 1A: DISTRIBUTION OF OUTPUT (RICE), RETENTIONS (SEEDS AND OTHER PAYMENTS), CONSUMPTION REQUIREMENT, SALE AND MARKETABLE SURPLUS BY SIZE GROUP OF HOLDINGS IN WEST BENGAL: 1970-73  
(Qntl per annum)

Size Group (in Hectare) (1)	Output of Rice (2)	Retention Out of Seeds and Payments (3)	Rice Avail- able for Consump- tion and Sale (4)	Rice Requirement Output for Family Consumption			Output Already Sold in the Market (8)	Marketable Surplus		
				Norm*	Norm**	Norm***		Norm I	Norm II	Norm III
				I	II	III		(9)	(10)	(11)
0.01 - 0.50	186.16	5.35	180.81	400.72	631.91	441.83	14.24	-219.89	-451.10	-261.02
0.51 - 1.00	395.72	34.59	361.13	304.01	479.40	334.03	46.16	57.13	-118.27	27.11
1.01 - 1.50	299.13	7.65	291.48	157.67	248.64	169.01	33.81	133.80	42.84	122.46
1.51 - 2.00	205.89	4.13	201.76	112.78	177.84	125.10	35.82	88.97	23.92	76.65
2.01 - 3.00	599.49	11.18	598.31	313.03	493.63	342.02	85.67	275.28	104.68	246.29
3.01 - 4.00	276.57	5.55	271.02	136.33	214.98	147.72	60.73	134.69	56.04	123.30
4.01 - 6.00	493.33	5.67	487.66	16.06	25.33	17.30	15.07	27.60	18.33	26.36
6.01 and above	246.21	14.91	231.30	38.18	60.21	41.25	89.70	193.12	171.09	190.05
All classes	2258.50	89.03	2179.47	1478.78	2331.94	1618.26	378.20	690.70	-152.47	551.20

Note: \* Norm I represents 52 per cent calorie requirement.  
 \*\* Norm II represents 82 per cent calorie requirement.  
 \*\*\* Norm III represents average consumption of rice.

the per capita availability of the goods against each expenditure class and *not* the requirement figures. Most of the studies have failed to make this distinction.

In view of these difficulties with the NSS data, we would like to avoid mechanical application of such data, and yet fix the consumption requirement norms of different farm size groups in some meaningful way. To achieve that we have used the following principles:

- i) As far as the medical norm is concerned, 52 per cent of the total calorie requirement per person per day should come from the major food crop grown in the region. As far as West Bengal is concerned, the major food crop of the people is rice and thus rice should provide 52 per cent of the total calorie requirement per person per day. This is also true for other rice-growing regions of India.
- ii) As empirical experience shows that the rural people mostly depend on the major food crop of the region to meet almost all the food needs of their families, this 52 per cent calorie requirement norm can be extended up to 82 per cent for the people living in the rural areas of the rice-growing regions.
- iii) As far as the consumption enquiry of the NSS is concerned,<sup>2</sup> average quantity of rice consumed per person per month during 1970-71 by the rural people of three states in India, viz, Andhra Pradesh, Tamil Nadu and West Bengal is 8.96 kg, 9.21 kg and 11.09 kg respectively. Considering these figures as requirement norms for the three states in India, it is possible to estimate the quantity of rice required for each farm size group per year for each state separately. Obviously, these estimates are at variance with the family size of each farm size group for each state.

Again, for estimating the quantity of rice required for consumption by adopting the first two principles discussed above, we considered 2800 as the minimum calorie requirement norm per adult male per day. For every female and child the corresponding figures are 2200 and 1800 respectively. We have applied these norms in the family composition figures available in the FMS reports against farm size groups. It has thus been possible

to estimate the requirement of calorie for each size group separately for each state under study. Again, considering the calorie requirement norms for each member of the family against each farm size group, the requirement of rice per year for each farm size group has been computed.<sup>3</sup>

The following measure of marketable surplus has been taken in our analysis. Let  $Q_{ci}$  be the quantity of rice available for consumption and sale by the *i*th class of holdings and  $d_{ij}$  ( $j=1, 2, 3$ , i.e. the three norms of family consumption described above) be the quantity required for consumption of the *i*th class of holdings. Then a measure of marketable surplus would be:

$$\begin{aligned} \text{i) } M_{1i} &= Q_{ci} - d_{1i} \\ \text{ii) } M_{2i} &= Q_{ci} - d_{2i} \\ \text{iii) } M_{3i} &= Q_{ci} - d_{3i} \end{aligned}$$

We may now turn to discuss the nature of data<sup>4</sup> that we have used and methods of analysis that we have followed in our analysis.

For West Bengal, data on output of paddy in physical terms produced by different size-classes of holdings and the quantity of output used as seeds, kind payments, etc. are available in the FMS reports. Deducting the total amount of retentions from the total amount of paddy output, we can get the amount of paddy available for family consumption and sale for different farm size groups. In this connection, it may be noted that FMS reports provide data on paddy (as against rice) production in the case of West Bengal and Andhra Pradesh, but on rice in the case of Tamil Nadu. Thus to make these figures comparable in rice terms, we have used a conversion factor where 100 kg of paddy is treated as equal to 62 kg of rice.

Data on retentions with respect to seed and other payments by farm size groups are directly available from FMS reports in the case of West Bengal. But for the other two states, detailed information on different components of retentions by farm size groups are not available. In these cases, we have estimated the figures either on the basis of West Bengal data or on the basis of the pooled data available in the FMS reports under study.<sup>5</sup>

Most of the results that we shall discuss below are based on tests of significance for the regression coefficients of linear regression fits in two variables in the following forms:

$$\begin{aligned} Y &= \sigma_1 + \beta_1 X_i \\ \text{and } \frac{Y}{X_i} &= \sigma_2 + \beta_2 X_i \end{aligned}$$

where  $Y$  represents the per capita marketable surplus,  $X_i$  ( $i=1, 2, 3$ ) represents the average farm size, per capita farm size, and per capita land cultivated under a specific crop.

It may be noted that our analysis is based on grouped data taken from Farm Management Survey reports. Naturally, our observations are not subjected to assume direct linear form such as  $Y_i = \sigma + \beta X_i$ , where  $Y_i$  represents the per capita marketable surplus and  $X_i$  represents the per capita landholding of the same households. For this reason, we have used the same linear form but interpreted it in three different ways.

Thus, we have considered three independent variables, viz, average farm size of each landholding class ( $X_1$ ), per capita operational holding in size-classes ( $X_2$ ), and per

TABLE 2B: DISTRIBUTION OF MARKETABLE SURPLUS PER PERSON AND MARKETABLE SURPLUS PER HECTARE BY SIZE GROUP OF HOLDINGS IN ANDHRA PRADESH: 1968-69

Size Group (1)	Marketable Surplus Per Person (2) (3) (4)			Marketable Surplus Per Hectare (5) (6) (7)		
	Norm I	Norm II	Norm III	Norm I	Norm II	Norm III
Below 1.62	-0.54	-1.25	-0.38	-11.11	-25.83	-7.77
1.63 - 3.23	-0.23	-0.89	-0.09	-3.02	-12.22	-1.25
3.24 - 6.07	0.75	0.04	0.89	5.05	0.29	6.04
6.08 - 11.33	0.30	-0.40	0.45	2.57	-3.35	3.72
11.34 and above	2.13	1.38	2.34	8.47	5.52	9.31
All classes	0.63	-0.10	0.78	4.39	-0.73	5.51

TABLE 2A: DISTRIBUTION OF OUTPUT (RICE), RETENTIONS (SEEDS AND OTHER PAYMENTS), CONSUMPTION REQUIREMENT AND MARKETABLE SURPLUS BY SIZE GROUP OF HOLDINGS IN ANDHRA PRADESH: 1968-69

Size Group (in Hectare)	Output of Rice	Retentions Out of Seeds and Other Payments	Rice Avail- able for Consumption and Sale	Rice Required for Family Consumption			Marketable Surplus		
				Norm I	Norm II	Norm III	Norm I	Norm II	Norm III
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Below 1.62	41.61	1.72	39.89	70.66	111.42	61.40	-30.78	-71.54	-21.52
1.63 - 3.23	106.16	3.50	102.66	126.83	200.00	112.62	-24.16	-97.67	-9.95
3.24 - 6.07	333.36	8.30	325.06	201.68	318.04	177.41	123.38	7.02	147.65
6.08 - 11.33	347.06	8.19	338.87	270.95	427.27	239.65	67.92	-88.40	98.22
11.34 and above	461.47	14.19	447.28	168.53	265.76	141.00	278.74	181.51	306.27
All classes	1289.66	35.90	1253.76	838.65	1322.49	732.08	415.10	-69.08	520.67

capita land cultivated for the crop considered (paddy/rice) in each size-class ( $X_1$ ). As far as  $X_2$  is concerned, we have accounted for the number of farming households in each size-class of holdings and also the number of family members belonging to each size-class and modified the above mentioned form as follows:

$y_i = a + \beta \frac{X_1}{n_i}$ , where  $y_i$  be the per capita marketable surplus,  $X_1$  be the farm size of the  $i$ th farming household and  $n_i$  be the family size for the same household. That is,  $y_i n_i = a n_i + \beta X_1$

$$\text{or, } \sum y_i n_i = a \sum n_i + \beta \sum X_1$$

Here  $\sum y_i n_i$  represents the total marketable surplus of the  $i$ th household.

Now, assuming  $m_k$  be the number of farming households in the  $k$ th farm size group, we have,

$$\begin{aligned} Y_1 + Y_2 + \dots + Y_k \\ m_k \\ = \frac{a(n_1 + n_2 + \dots + n_k)}{m_k} \\ + \frac{\beta(X_1 + X_2 + \dots + X_k)}{m_k} \end{aligned}$$

$$\text{or, } \bar{Y}_k = a \bar{n}_k + \beta \bar{X}_k$$

$$\text{or, } \frac{\bar{Y}_k}{\bar{n}_k} = a + \beta \frac{\bar{X}_k}{\bar{n}_k}$$

(dividing both sides by  $\bar{n}_k$ )

$$\text{or, } \bar{Y}_k = a + \beta \bar{X}_k$$

Thus, for the second determining variable ( $X_2$ ), we have used average per capita operational holding as independent variable, where average per capita marketable surplus ( $\bar{y}_k$ ) of the corresponding group as the dependent one.

A statistical point we would like to make here is about the problem of heteroscedasticity arising from such kind of grouped data. To avoid the problem of heteroscedasticity, we have used the weighted least square method. Thus, instead of taking the form  $Y_k = a + \beta X_k$ , we have regressed  $Y_k \bar{m}_k$  on  $X_k \bar{m}_k$ , where  $m_k$  represents the number of

farms in the  $k$ th farm size group. Thus, the equation would be

$$Y_k \bar{m}_k = a \bar{m}_k + \beta X_k \bar{m}_k$$

we have presented the results in Table 5. Another testing using the same linear form, but interpreting  $Y$  as the per capita

marketable surplus per hectare (i.e.,  $\frac{Y}{X_1}$ ) has

been carried out (Table 6) to have a proper appreciation of the results presented in Table 5.

We have also carried out rank correlation tests between the variables described above in order to avoid assumptions made in the regression analysis and yet examine the validity of the relationships in terms of both the methods. The results of rank correlation tests have been presented in Table 4. We may now turn to a discussion of these results.

### III

#### The Results

We shall start by taking a look at the results presented in Tables 1A and 1B for the region of West Bengal. It is seen that except for smaller farm size groups, marketable surplus per hectare of all other groups are positive for all the norms considered and it increases with the increase in farm size groups. Marketable surplus shown in per capita terms also provide similar relationship. Further, Table 1A shows that the quantity of rice sold in the market by the different size-classes of holdings are always positive. This implies that the smaller size-classes of holdings which have a negative marketable surplus sell the commodity out of distress.

Coming now to the data presented in Tables 2A and 2B for the region of Andhra Pradesh, it is seen that marketable surplus per hectare increases with the increase in farm size groups except for the smaller ones for which marketable surplus is negative. A similar pattern is discerned in the case of per capita marketable surplus figures except for the third norm for which it is seen that marketable surplus is negative for the larger size holdings as well. Incidence of negative marketable surplus is so strong that overall per capita marketable surplus in this region seems to be negative. Thus, incidence of negative marketable surplus in this region cannot be fully equated with the phenomenon of distress sale. Larger farms possibly sell the commodity not out of their distress but to meet up their cash needs for purchasing superior food commodities through selling out rice.

Data on Tamil Nadu presented in Tables 3A and 3B give some interesting results. Whatever the family consumption norms we adopt, marketable surplus is found to be positive in all the cases for all the size groups. As a matter of fact, in the case of Tamil Nadu, per hectare marketable surplus decreases with the increase in farm size and there is no incidence of negative marketable surplus for any size-classes of holdings.

Thus, the data analysed separately for the three regions of India give three distinct pictures of marketable surplus. In the case of West Bengal, distress sale of rice among the smaller farms is pervasive; in the case of Andhra Pradesh, the phenomenon of distress sale as well as negative marketable surplus

TABLE 3B: DISTRIBUTION OF MARKETABLE SURPLUS PER PERSON AND MARKETABLE SURPLUS PER HECTARE BY SIZE GROUP OF HOLDINGS FOR TAMIL NADU

(Qntl per annum)

Size Group	Marketable Surplus Per Person			Marketable Surplus Per Hectare		
	Norm I (2)	Norm II (3)	Norm III (4)	Norm I (5)	Norm II (6)	Norm III (7)
0.01 - 2.03	2.43	1.74	2.54	23.13	16.49	24.13
2.04 - 3.34	7.12	6.39	7.30	29.13	26.12	29.83
3.35 - 5.66	9.62	8.89	9.78	29.71	27.46	30.21
5.67 - 10.52	14.80	14.07	14.95	31.10	29.57	31.42
10.53 and above	8.82	8.10	8.95	28.20	25.91	28.63
All classes	8.75	8.02	8.89	29.33	26.91	29.82

TABLE 3A: DISTRIBUTION OF OUPUT (RICE), RETENTIONS (SEEDS AND OTHER PAYMENTS), CONSUMPTION REQUIREMENT AND MARKETABLE SURPLUS BY SIZE GROUP OF HOLDINGS IN TAMIL NADU: 1970-71

(Qntl per annum)

Size Group	Output of Rice	Retention Out of Seed and Other Payments	Rice Available for Consumption and Sale	Rice Required for Family Consumption			Marketable Surplus		
				Norm I	Norm II	Norm III	Norm I	Norm II	Norm III
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0.01 - 2.03	292.10	5.68	286.42	95.16	150.05	86.85	191.26	136.37	199.57
2.04 - 3.34	719.52	13.89	705.63	107.28	169.17	92.84	598.35	536.46	612.79
3.35 - 5.66	919.36	21.27	898.09	104.42	164.66	91.18	793.67	733.43	806.91
5.67 - 10.02	1499.01	31.05	1467.96	115.12	181.54	101.04	1352.84	1286.42	1366.92
10.03 and above	912.97	17.02	895.95	110.41	174.10	98.45	785.54	721.85	797.50
All classes	4342.96	88.91	4254.05	532.39	839.52	407.36	3721.66	3414.53	3783.69

in the region is prominent; and in the case of Tamil Nadu perhaps the phenomenon of distress sale is absent and the small farmers seem to be the primary source of marketable surplus of rice in this region. One thing that we may conclude is that implications of marketable surplus functions for any substitute crop vary from one region to another, and it is misleading to treat these as if they are the same everywhere.

We shall now present some results of application of rank correlation tests to hypotheses regarding the increasing tendency with regard to size of marketable surplus per hectare of rice as well as other factors which may be useful to explain the behaviour of marketable surplus per hectare.

It is found from col (2) of Table 4 that one cannot discover any tendency of marketable surplus per hectare increasing with farm size in the case of Tamil Nadu. In this case, the rank correlation coefficient is negative and non-significant. But for the other two regions, i.e. for West Bengal and Andhra Pradesh, the rank correlation coefficients are significant and positive. Thus, for rice, marketable surplus per hectare increases with the increase in farm size only for two regions as against three. The same pattern is discerned for the different measures of marketable surplus presented in cols (3) to (6) in the same table and we need not any further paraphrase the table.

It is, however, interesting to note from the same table that, when it comes to per capita landholding under the specific crop, there are strong indications that per capita marketable surplus goes up with the increase in cropped area. Thus, taking the results together, we have to draw the conclusion that marketable surplus per hectare increasing with farm size, holds true for some regions of India, but not true for all the regions. On the other hand, marketable surplus per person increasing with the cropped area does hold true for subsistence crop for all the regions under study and this may be treated as an important criterion for determining the volume of marketable surplus in the rice-growing regions of India.

We now turn to results pertaining to the tests of significance for the regression coefficient of simple linear regression fits in two variables described below to confirm the findings of our study in all possible ways. We have presented three sets of linear equations for each region under study in Table 5. For all the equations,  $y$  represents the per capita marketable surplus and  $X_1$ ,  $X_2$ ,  $X_3$  for three different equations represents average farm size, per capita farm size and per capita land cultivated under paddy/rice respectively. The results are striking; for all the regions under study, the regression coefficients for the third equation are turning out as significant. Regression coefficients for the other two equations are also significant but correlation coefficient is considerably higher in the case of  $X_3$  than  $X_1$  and  $X_2$ . These findings bear very close resemblance to the findings of rank correlation tests presented in Table 4.

TABLE 4: RANK CORRELATION COEFFICIENT BETWEEN MARKETABLE SURPLUS AND SOME INDICATORS OF FARM ECONOMY

State and Agricultural Year	Rank Correlation Coefficient Between					
	Marketable Surplus Per Hectare and Farm Size	Marketable Surplus Per Capita and Farm Size	Marketable Surplus Per Hectare and Output Per Hectare	Marketable Surplus Per Capita and Output Per Hectare	Marketable Surplus Per Capita and Per Capita Land-holding	Marketable Surplus Per Capita and Per Capita Land-holding under Rice
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh 1968-69	0.90**	0.90**	0.00	0.00	0.90**	1.00*
Tamil Nadu 1970-71	-0.70	0.70	0.00	-0.60	0.70	1.00*
West Bengal 1970-73	0.93*	0.98*	0.69**	0.64**	0.95*	0.93*

Notes: Tests have been carried out by following the figures of marketable surplus based on 52 per cent consumption norm.

\* 1 per cent significant in the positive tail area.

\*\* 5 per cent significant in the positive tail area.

TABLE 5: ESTIMATED REGRESSION EQUATIONS WHERE MARKETABLE SURPLUS (Y) WAS REGRESSED ON FARM SIZE ( $X_1$ ), PER CAPITA FARM SIZE ( $X_2$ ), AND PER CAPITA LAND CULTIVATED UNDER PADDY RICE ( $X_3$ ) SEPARATELY FOR THREE DIFFERENT REGIONS

State and Agricultural Year	Estimated Equation	Standard Error of $\hat{\beta}$	r
(1)	(2)	(3)	(4)
Andhra Pradesh: 1968-69	i) $Y = -0.61 + 0.17 \cdot X_1$	0.03	0.87
	ii) $Y = 0.50 + 1.27 \cdot X_2$	0.23	0.87
	iii) $Y = -1.27 + 13.42 \cdot X_3$	1.98	0.98
Tamil Nadu: 1970-71	i) $Y = 5.51 + 0.5 \cdot X_1$	0.07	0.57
	ii) $Y = 4.82 + 3.92 \cdot X_2$	0.56	0.63
	iii) $Y = -0.92 + 32.48 \cdot X_3$	0.22	0.98
West Bengal: 1970-73	i) $Y = -0.63 + 0.79 \cdot X_1$	0.02	0.92
	ii) $Y = -1.02 + 10.56 \cdot X_2$	0.20	0.99
	iii) $Y = -1.26 + 13.78 \cdot X_3$	0.27	1.00

Note:  $\hat{\beta}$  is significant at 5 per cent level.

TABLE 6: ESTIMATED REGRESSION EQUATIONS WHERE PER CAPITA MARKETABLE SURPLUS PER HECTARE ( $Y/X$ ) WAS REGRESSED ON FARM SIZE ( $X_1$ ), PER CAPITA FARM SIZE ( $X_2$ ), AND PER CAPITA LAND CULTIVATED UNDER PADDY/RICE ( $X_3$ ) SEPARATELY FOR THREE DIFFERENT REGIONS

State and Agricultural Year	Estimated Equation	Standard Error of $\hat{\beta}$	r
(1)	(2)	(3)	(4)
Andhra Pradesh: 1968-69	i) $\frac{Y}{X_1} = -0.35 + 0.04 \cdot X_1$	0.10	0.62
	ii) $\frac{Y}{X_2} = -1.75 + 1.78 \cdot X_2$	0.52	0.66
	iii) $\frac{Y}{X_3} = -10.48 + 84.20 \cdot X_3$	24.61	0.86
Tamil Nadu: 1970-71	i) $\frac{Y}{X_1} = 2.82 - 0.15 \cdot X_1$	0.03	0.93
	ii) $\frac{Y}{X_2} = 15.00 - 4.48 \cdot X_2$	1.32	0.89
	iii) $\frac{Y}{X_3} = -22.02 + 21.27 \cdot X_3$	0.58	0.82
West Bengal: 1970-73	i) $\frac{Y}{X_1} = 0.52 + 0.24 \cdot X_1$	0.18	0.48
	ii) $\frac{Y}{X_2} = -3.46 + 24.94 \cdot X_2$	7.97	0.60
	iii) $\frac{Y}{X_3} = -4.79 + 43.65 \cdot X_3$	18.56	0.69

Note:  $\hat{\beta}$  is significant at 5 per cent level.

Yet another testing, using the same linear forms, but interpreting Y as the per capita marketable surplus per hectare, we get more or less the similar results discussed above (Table 6). That is, by and large, per capita marketable surplus of rice per hectare has a strong dependence on per capita land cultivated under paddy/rice.

We may now conclude that for any subsistence crop such as paddy, wheat, etc, the marketable surplus of each crop depends on the per capita availability of acreage under each crop and *not* the net or gross cultivated area for the all crops as a whole.

## IV

### Explanations

Our foregoing analysis suggests that marketable surplus of any subsistence crop depends on the availability of cultivated land under the crop. Besides this, among the factors that permits the farmer to increase his marketable surplus the most important one, of course, is his family size. If family size is big, the quantity of food crops to be consumed by the family members will be relatively higher and in that case marketable surplus will be relatively lower even in the big-sized farms. It is indeed surprising that earlier authors hold that marketable surplus goes up with the increase in farm size either for subsistence crop or for all the crops as a whole. As such, there is no basis whatsoever for establishing such kind of relationship.

Per capita availability of cultivated land among the Jarger farms is certainly higher compared to the smaller ones, but per capita availability of land under a specific crop need not be higher in the larger size groups than the smaller farms. For example, larger farms very often can make a choice to allocate a greater amount of land for such crops which give relatively much return with respect to price and yield. Thus, they prefer to choose such commercial crops, viz. potato, jute, cotton, etc, with greater intensity for higher return. Small farmers, on the other hand, have no such kind of choice for the very nature of their holdings and therefore try to cultivate the whole amount of land for the main subsistence crop only like rice or wheat to meet their consumption needs. As such, even after all the efforts a small farmer is not always able to meet his minimum consumption needs from his small piece of land. A part of the main crop is very often sold in the market to meet his minimum cash needs.

Thus, empirical reality permits us to examine the phenomenon of marketable surplus not in terms of size-classes of holdings but with the acreage of individual crops separately against each size-class. This exercise should not be treated as merely one of academic interest, the exercise should be of fundamental significance from the point of view of economic and price policies and hence of politics.

## Notes

- 1 However the negative results revealed by Hati are based on non-linear functional form, whereas, the same result has come out in Nadkarni's study on the basis of linear functional form.
- 2 We used the data on Consumer Expenditure of the NSS Report of 27th round (vide references), which covers roughly the same period as considered in our study.
- 3 It is known to us that consumption of 1 kg of rice gives 3,450 calorie and thus following the calorie requirement norms for each member of the family against each farm-size group, the requirement of rice per year for each farm-size group can be obtained.
- 4 For West Bengal we have used data from the Studies in Economics of Farm Management (Hooghly district) (vide references) for the three years 1970-71 to 1972-73. For Andhra Pradesh (Cuddapah district), and Tamil Nadu (Coimbatore) the data were collected for the years 1968-69 and 1970-71 (vide references) respectively. For Andhra Pradesh the data covered 148 villages in Cuddapah district, 96 of which cultivated paddy (irrigated). Area under unirrigated paddy is nominal (only 2.26 hectare, cultivated by the size-class 3.24-6.07 hectares). We have considered only irrigated paddy in our study.
- 5 For Andhra Pradesh, on an average, 1.55 per cent of the total output are used as seeds for all the size-classes as a whole. For West Bengal the corresponding figure is 3.1 per cent of total output, whereas 1 per cent of total output is retained for other purposes (e.g. payment made in kind and for miscellaneous purposes). Considering the proportion of retentions in case of seeds, the same proposition can be used to obtain figures of retentions under other payments in kind for which data are not available in case of Andhra Pradesh. The similar technique has been applied for Tamil Nadu also to have figures of retentions.

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## NOTICE

It is hereby notified for the information of the Public that Reliance Petrochemicals Limited propose to make an application to the Central Government in the Department of Company Affairs, New Delhi under sub-section (2) of Section 22 of the Monopolies and Restrictive Trade Practices Act, 1969 for approval to the establishment of a new undertaking, viz. division. Brief particulars of the proposal are as under—

1 Name & address of the Applicant: Reliance Petrochemicals Limited, Village Mogra, Bhaina P.O. Surat-Hazira Road, Dist. Surat. Pin 394 510, Gujarat State.

2 Capital Structure of the Applicant: Organisation Authorised Capital Rs 1,000 million. Issued & subscribed Rs 273 million.

3 Management structure of the Applicant: Organisation indicating the names of the Directors including the Managing/Whole Time Directors & Manager, if any. Reliance Petrochemicals Limited a body corporate managed by the Board of Directors consisting of: (a) Shri. Dhruvrao H. Ambani, Chairman; (b) Shri. Mukesh D. Ambani, Director(s); Shri. Anil D. Ambani, Director (s); Shri. Atul Shankar Dasgupta, Director (s); Shri. K. P. Pai, Director (s); Dr. R. Rajagopalan, Director (s); Shri. Suresh A. Shroff, Director (s); Shri. Yogendra P. Triwadi, Director.

4 Indicate whether the proposal relates to the establishment of a new undertaking or a new unit/division. New Unit.

5 Location of the new undertaking/division/unit: Hazira, Taluka—Choryasi, District Surat, Gujarat State.

6 Capital Structure of the Proposed undertaking: The proposed undertaking will be a unit of the applicant organisation and therefore will not have a separate capital structure.

7 In case the proposal relates to the production/storage, supply, distribution, marketing or control of any goods, articles indicate: (i) Name of the goods/articles; (ii) Proposed Licenced Capacity; (iii) Estimated Annual Turnover. Not Applicable.

8 In case the proposal relates to the provision of any services, state the volume of activity in terms of usual practice, such as, sales, income, turnover etc. The proposal relates to construction of about 6 Km. Jetty along with the allied break water facilities, pipelines, On-shore terminal, etc. suitable for handling 2,00,00,000 MT per annum of ethylene and chemical intermediates required for Hazira Complex.

9 Cost of the Project: Rs 1220 Million.

10 Scheme of Finance: indicating the amounts to be raised from each source: (a) Promoter's Contribution—Rs 244 Million; (b) Fully Convertible Debentures—Rs 976 Million.

Any person interested in the matter may make a representation in quadruplicate to the Secretary, Department of Company Affairs, Government of India, Shastri Bhavan, New Delhi, within 14 days from the date of publication of this notice, intimating his views on the proposal and indicating the nature of his interest therein.

FOR RELIANCE PETROCHEMICALS LTD  
DILIP PANDYA  
(ASST. SECRETARY)

Date: 21-12-68

Regd. Office: Village Mogra, Bhaina P.O. Surat-Hazira Road, Dist. Surat. Pin 394 510, Gujarat State.