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# NOTES

## FACTORS AFFECTING ACREAGE UNDER SUGARCANE IN INDIA*

During the period of planned developmental effort there has been a rapid growth in sugarcane acreage in many States in India. The importance of price and yield for changes in areas under crops has been the subject matter of several research investigations.[1] It is useful to identify and measure the impact of relevant economic variables on acreage under sugarcane.

*Object and Scope*

The object of this paper is to study the influence of the following factors on acreage under sugarcane : (*i*) the installed capacity of sugar industry; (*ii*) the relative mill price of sugarcane; (*iii*) the relative price of *gur*; and (*iv*) the relative yield of sugarcane. The analysis has been carried out both at the all-India level and State level for the period 1950-51—1962-63 for which the appropriate data were readily available. Seven important sugarcane growing States, namely, Andhra, Madras, Mysore, Maharashtra, Uttar Pradesh, Bihar and Punjab were chosen for this analysis. The total sugarcane production of these States constituted more than 90 per cent of the all-India production.

*Methodology*

Linear growth rates of sugarcane acreage and installed capacity are calculated to see how far the trend values of cane acreage are related to the trend values of installed capacity of sugar industry. The hypothetical model to estimate the effect of the individual variables is of the following form.

$$A_t = L_0 + L_1 C_t + L_2 \frac{(P_1^t)}{(P_2^{t-1})} + L_3 P_{t-1} + L_4 Y_{t-1} + U$$

where,

$A_t$ = The sugarcane acreage at time t (in lakh acres).

$C_t$ = Installed capacity of sugar industry in terms of annual sugar production at time t (in lakh tons).[2]

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* The author is grateful to Shri B. D. Dhawan and Shri D. U. Sastry for their valuable suggestions in the preparation of this paper.

1. Dharm Narain: The Impact of Price Movements on Areas under Selected Crops in India 1900 to 1939, Cambridge University Press, London, 1965; Raj Krishna, "Farm Supply Response in India-Pakistan," *Economic Journal*, Vol. LXXII, No. 291, September, 1963, and "Some Production Functions for the Punjab," *Indian Journal of Agricultural Economics*, Vol. XIX, Nos. 3 & 4, July-December, 1964; C. H. Hanumantha Rao: Agricultural Production Functions, Costs and Returns in India, Asia Publishing House, Bombay, 1965; D. Romesh, "A Dynamic Model Analysis of Foodgrains Production and Price" and "Long and Short Run Elasticities of Acreage under Crops," *Agricultural Situation in India*, Vol. XIX, No. 4, July, 1964 and Vol. XX, No. 5, August, 1965 respectively; V. M. Jakhade and N. A. Mujumdar, "Response of Agricultural Producers to Prices—The Case of Jute and Rice in India," *Indian Journal of Agricultural Economics*, Vol. XIX, Nos. 3 & 4, July-December, 1964; Also see contributions by several participants in the Conference issue of *Indian Journal of Agricultural Economics*, Vol. XX, No. 1, January-March, 1965.

2. Installed sugar production capacity has been computed in the following way :
$C_t$ = Cane crushing capacity per day × per cent sugar recovery × average number of working days.

$$\frac{(P_1^t)}{(P_2^{t-1})} = \frac{\text{The current year mill price of cane}}{\text{The price of a major competing crop in the previous year}}.$$

$$P_{t-1} = \frac{\text{The farm harvest price of } gur \text{ at time (t—1)}}{\text{The farm harvest price of a major competing crop at time (t—1)}}.$$

$$Y_{t-1} = \frac{\text{The yield of sugarcane at time (t—1)}}{\text{The yield of a major competing crop at time (t—1)}}.$$

$U$ = The error term.

All the explanatory variables were not, however, simultaneously included in the model as one or more of the last three variables were found to be insignificant in preliminary analysis. The estimates of the parameters may be biased due to serial correlation in the residuals.

Since the Central Government used to announce the minimum mill price of cane one year in advance of the sowing season, it is appropriate to consider the relative mill price of cane in the above defined form to study the effect of mill price of cane on cane acreage. Only one major competing crop was considered at the State level as well as at the all-India level. The weighted indices of price and yield of a number of competing crops calculated on the basis of arbitrary weights, cast doubt for their representativeness in serving our purpose. Relative yield and relative price series based on one major competing crop is expected to show a better picture as to how the acreage changes are influenced by the corresponding changes in price of *gur* and yield of cane. The competing crops considered are rice in case of Madras, Mysore, Bihar, Andhra and all-India, wheat in case of Punjab and Uttar Pradesh and cotton in case of Maharashtra Producers generally had to sell away their production immediately after harvest to meet their cash requirements and therefore farm harvest prices had a direct bearing on the decision of the producer to allot his land resources among different competing crops.

*Sources of Data*

The acreage and yield data on sugarcane have been obtained from the Report of Sugar Enquiry Commission, 1965, Ministry of Food and Agriculture, Government of India. The data on installed capacity of sugar industry have been obtained from B. D. Dhawan (Institute of Economic Growth). The average mill price of cane received by the farmers was not available. The minimum price of cane at factory gate delivery was taken from the Report of Sugar Enquiry Commission, 1965. The State average farm harvest prices of *gur* and competing crops were obtained from various relevant issues of (1) Agricultural Prices in India, and (2) *Agricultural Situation in India.* In the absence of farm harvest prices of *gur* for Uttar Pradesh, wholesale prices for the year (November-October) at Hapur were taken. The wholesale prices of the competing crop, *i.e.*, wheat, at Hapur were taken in calculating the price ratios for the State. It has been assumed that the farm harvest price series of Andhra region upto 1956-57 is representative for

Andhra Pradesh. Similarly, for Maharashtra, the Bombay State data before 1956-57 were taken. In case of Mysore farm harvest prices of *gur* for the years 1949-50 and 1954-55 and rice for the year 1949-50 were not known. The price of *gur* for 1954-55 was estimated by means of Newton Formula for interpolation and the analysis was carried out for twelve years. The price of cleaned rice has been taken to be $1\frac{1}{2}$ times that of paddy wherever it is not available.[3] Yield data for competing crops were obtained from (1) Estimates of Area and Production of Principal Crops in India, Ministry of Food and Agriculture, Government of India, and (2) *Agricultural Situation in India.* All-India farm harvest prices of *gur* and rice have been taken as the simple average of these State averages.

*Results and Discussions*

The parameters of the models were estimated by the method of ordinary least squares and the facts relevant to the interpretation of the results and the inferences suggested by them are discussed below :

TABLE I—$A_t' = a + bt$; $A_t'$ = INDEX OF AREA WITH 1950-51 = 100 (1950-51—1963-64)

| State | a | b | $r^2$ | Linear growth rates of installed capacity during 1950-51—1963-64(%) |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Tropical Region | | | | |
| Andhra Pradesh .. | 76.60 | 4.63* (1.07) | 0.60 | 9.31* |
| Mysore .. .. | 81.92 | 7.31* (0.68) | 0.91 | 18.90* |
| Maharashtra .. | 71.15 | 9.54* (1.30) | 0.32 | 20.37* |
| Madras .. .. | 62.57 | 6.22* (1.25) | 0.68 | 17.42* |
| Sub-Tropical Region | | | | |
| Uttar Pradesh .. | 95.04 | 2.42* (0.80) | 0.43 | 2.39* |
| Bihar .. .. | 83.30 | 1.50** (0.78) | 0.24 | 0.52* |
| Punjab .. .. | 94.13 | 5.72* (0.88) | 0.78 | 16.33* |
| All-India .. .. | 90.17 | 3.53* (0.71) | 0.67 | 5.91* |

* Significant at 5 per cent level.
** Significant at 10 per cent level.
*Note* : Figures in brackets are the standard errors of regression coefficients.

3. See Rice in India, compiled by R.L.H. Ghose, M.B. Ghatge and V. Subrahmanyan, Indian Council of Agricultural Research, New Delhi, 1960. The price approximation has been done on the basis of their weight approximation.

In all the States there is significant upward linear trend in sugarcane area series. The growth rates of sugarcane area of all the States in the sub-tropical belt would have been relatively lower than those that are in the tropical belt if and only if the growth rate of Punjab were lower than that of Andhra Pradesh. These growth rates bear perfect positive rank correlation with the corresponding growth rates of installed capacity given in column 5 of Table I. The regional and inter-State differences in growth rates of cane acreage might have arisen mainly due to the fact that the licensing of additional capacity of sugar industry during this period was not proportional to the existing capacity of these States in the beginning of the First Five-Year Plan. Of all the States, Mysore achieved most stable growth rate ($r^2 = .91$) and Bihar was comparatively most unstable in its performance ($r^2 = .24$). This instability was perhaps due to lack of assured irrigation facilities. In Bihar about 73 per cent of the cane sowing acreage depended on rainfall. Particularly in North Bihar sugarcane was grown usually under rain-fed conditions.

Let us now estimate the relationship between installed capacity and acreage under sugarcane.

TABLE II—$A_t = L_0^1 + L_1^1 C_t + U'$ (1950-51—1962-63)

| State | $L_0^1$ | $L_1^1$ | $r^2$ | Average sugar yield per acre during 1955-56—1962-63† (tons) |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Tropical Region | | | | |
| Andhra Pradesh .. | 1.169 | 0.548* (0.162) | 0.509 | 2 93 |
| Madras .. .. | 0.551 | 0.995* (0.165) | 0.767 | 2.83 |
| Mysore .. .. .. | 0.704 | 0.921* (0.049) | 0.970 | 2.87 |
| Maharashtra .. .. | 1.189 | 0.481* (0.082) | 0.759 | 3.44 |
| Sub-Tropical Region | | | | |
| Uttar Pradesh .. .. | —6.728 | 3.751* (1.085) | 0.521 | 1.45 |
| Bihar .. .. .. | —17.551 | 6.150* (2.139) | 0.544 | 1.28 |
| Punjab .. .. .. | 2.910 | 3.061* (0.414) | 0.832 | 1.24 |
| All-India .. .. .. | 13.453 | 1.748* (0.305) | 0.749 | 1.68 |

†Yield of sugarcane adjusted for quality of cane.
* Significant at 5 per cent level.
*Note* : Figures in brackets are the standard errors of regression coefficients.

The States in the tropical region yielded coefficients for the installed capacity variable smaller than unity while the States in the sub-tropical region yielded coefficients greater than three. The corresponding coefficient for all-India lies in between these two. The interpretation is that a unit change in installed capacity

brings on an average 1.748 units change in all-India cane acreage. For a unit change in installed capacity the States in the sub-tropical belt register at least a three fold change in sugarcane area as compared to those that are in the tropical belt.

The above differences in the coefficients of installed capacity variable cannot be taken as a measure of difference in farmers' response to installed capacity. The main reason can better be understood if we consider the average sugar yield per acre of these States. For example, a farmer in Bihar and a farmer in Maharashtra, although they want to supply cane for the production of same quantity of sugar, must allot acreage differently depending upon the yield per acre and the quality of cane. It has been observed that the rank correlation between the coefficients of installed capacity variable and the corresponding sugar yield per acre of the States given in column 5 is —0.93 which is statistically significant. The differences in coefficients of installed capacity variable are therefore largely influenced by the differences in average sugar yield per acre among the States. There was practically no change in installed sugar capacity in these States and all-India during 1950-51—1954-55 and therefore only the average yield for the period 1955-56 —1962-63 has been considered for making inter-State comparisons among the coefficients of installed capacity variable. The good linear relationship between acreage and capacity is indicative of the regulation of cane supplies to sugar factories.

By means of 't' test it has been found that the mean yield of sugar per acre in Andhra Pradesh-Maharashtra and Madras-Mysore are not significantly different. Both the insignificance of the mean yields and the closeness of the corresponding coefficients of installed capacity variable given in Table II, suggest for testing the equality of farmers' response to installed capacity. By means of following analysis it is found that sugarcane acreage response to installed capacity of sugar industry was not significantly different in Andhra and Maharashtra.

TABLE III—ANALYSIS OF VARIANCE FOR TESTING EQUALITY OF $L^1$, COEFFICIENTS IN THE ABOVE REGRESSION†

| | | | | | |
|---|---|---|---|---|---|
| Andhra-Maharashtra | Residual due to | D.F. | S.S. | M.S. | F. |
| | Deviation from the hypothesis | 1 | 0.0072 | 0.0072 | 15.44* (22.1) |
| | Separate regressions | 22 | 2.4460 | 0.1112 | |
| | Common regression | 23 | 2.4532 | | |

†. See Advanced Statistical Methods in Biometric Research, C. Radhakrishna Rao, John Wiley & Sons, Inc., New York, 1952, pp.113.
* Significant at 5 per cent level.

The same analysis disputes the hypothesis in case of Madras-Mysore.

Inclusion of the relative mill price variable in the previous model brought no improvement in multiple correlation except in case of Bihar (see Table IV). Greater coefficients for installed capacity variables have been obtained for all the States except Bihar. This means that stable relative mill price improves the acreage response to installed capacity. Except in case of Maharashtra the sign of

the coefficient of relative price variable is in conformity with the *a priori* hypothesis. Only in case of Bihar this coefficient is significant. This means that installed capacity remaining constant, a unit change in relative mill price brings about 12.691 units change in sugarcane acreage. The minimum mill price was attractive to the producer[4] and practically there was complete utilization of capacity in all the States except Bihar.[5] The interesting fact revealed by these results is that a mere

TABLE IV—$A_t = L_0'' + L_1'' C_t + L_2'' \frac{(P_1^t)}{(P_2^{t-1})} + U''$

| State | $L_0''$ | $L_1''$ | $L_2''$ | $R^2$ | N |
|---|---|---|---|---|---|
| Tropical Region | | | | | |
| Andhra Pradesh .. .. | 1.073 | 0.570* (0.210) | 0.635 (0.515) | 0.510 | 13 |
| Madras .. .. .. | 0.254 | 1.085* (0.201) | 2.426 (3.046) | 0.782 | 13 |
| Mysore .. .. .. | 0.689 | 0.928* (0.083) | 0.108 (0.958) | 0.970 | 12 |
| Maharashtra .. .. .. | 1.095 | 0.481* (0.062) | —2.072 (27.831) | 0.759 | 13 |
| Sub-Tropical Region | | | | | |
| Uttar Pradesh .. .. | —15.636 | 3.993* (1.064) | 68.606 (51.312) | 0.593 | 13 |
| Bihar .. .. .. | —17.363 | 5.783* (1.482) | 12.691** (6.511) | 0.676 | 13 |
| Punjab .. .. .. | 1.295 | 3.207* (0.426) | 13.951 (12.221) | 0.852 | 13 |
| All-India .. .. .. | 5.090 | 1.920* (0.418) | 63.528 (95.028) | 0.755 | 13 |

* Significant at 5 per cent level.
** Significant at 10 per cent level.
*Note* : Figures in brackets are the standard errors of regression coefficients.

change in relative mill price will not bring any change in acreage provided there is no change in installed capacity that has been completely utilized. The significance of relative price coefficient in case of Bihar indicates that even if installed capacity had remained constant, a unit change in relative mill price would have brought more acreage under sugarcane and hence greater supplies to sugar factories for the improvement in capacity-utilization.

The next step is to drop the relative mill price variable and then to include the variables of relative price of *gur* and relative yield of cane. There is some improvement in multiple correlation in case of Mysore, Uttar Pradesh and Bihar.

4. See Indian Sugar, February, 1965, p. 712 ; also see Table VI in this paper.
5. See Dharm Narain and B.D. Dhawan: Productivity Trends in the Indian Sugar Industry, Institute of Economic Growth, Delhi-7, Appendix Table 10 (mimeo.).

TABLE V—$A_t = L_0 + L_1C_t + L_3 P'_{t-1} + L_4 Y_{t-1} + U$

(1950-51 — 1962-63)

| State | $L_0$ | $L_1$ | $L_3$ | $L_4$ | $R^2$ | N |
|---|---|---|---|---|---|---|
| Tropical Region | | | | | | |
| Andhra Pradesh | 1.567 | 0.451** (0.240) | —0.127 (0.250) | —0.002 (0.123) | 0.528 | 13 |
| Madras .. .. | 1.138 | 0.849* (0.376) | 0.218 (0.318) | —0.011 (0.018) | 0.779 | 13 |
| Mysore .. .. | 1.001 | 0.901* (0.036) | —0.203* (0.054) | 0.002 (0.002) | 0.989 | 12 |
| Maharashtra .. | 0.924 | 0.485* (0.093) | 0.300 (1.372) | 0.0001 (0.0007) | 0.761 | 13 |
| Sub-Tropical Region | | | | | | |
| Uttar Pradesh | —28.421 | 4.550* (1.122) | —2.106 (2.589) | 0.356** (0.190) | 0.660 | 13 |
| Bihar .. .. | —18.628 | 5.839* (1.543) | 1.966** (0.976) | 0.011 (0.011) | 0.689 | 13 |
| Punjab .. .. | 1.955 | 3.011* (0.517) | 0.145 (0.573) | 0.026 (0.040) | 0.842 | 13 |
| All-India .. .. | —2.481 | 1.831* (0.432) | —2.725 (8.259) | 0.333 (0.301) | 0.780 | 13 |

* Significant at 5 per cent level.
** Significant at 10 per cent level.
*Note* : Figures in brackets are standard errors of regression coefficients.

The coefficient of relative price variable is negative and significant at five per cent level in case of Mysore (—0.203), and it is positive and significant at ten per cent level in case of Bihar (1.966). These results could be studied in contrast with the results of Table VI.

TABLE VI

| State | Value of output per rupee of input | | Col. (3) / Col. (2) × 100 |
|---|---|---|---|
| | Sugarcane | Competing crops | |
| (1) | (2) | (3) | (4) |
| Uttar Pradesh .. .. .. .. | 3.2 | 1.5 | 47 |
| Punjab .. .. .. .. | 3.6 | 3.1 | 86 |
| Bihar : North Monghyr .. .. .. | 3.9 | 1.5 | 38 |
| Central Monghyr .. .. | — | 2.0 | 51 |
| Mysore .. .. .. .. | 3.6 | 3.5 | 97 |
| Andhra Pradesh .. .. .. .. | 3.2 | 2.2 | 69 |

(The results are on the basis of cash and kind only).
*Source* : Report of the Sugar Enquiry Commission, Ministry of Food and Agriculture, Government of India, 1965, p. 44.

The percentage of output value per rupee of input of competing crops to sugarcane was 38-51 in Bihar and 97 in Mysore. Even if the farmer disposed of his production for manufacture of *gur*, sugarcane cultivation was more profitable than competing crops in Bihar. Although the coefficient of relative price variable is very small in case of Mysore, its significance has some real meaning. Relative profitability of cane cultivation was very small in case of Mysore. If the cane production was particularly meant for the manufacture of *gur*, the producer had to incur loss as far as the relative price of *gur* was concerned. Sugarcane being a sturdy crop limits price influence in the farmer's decision to allot his land resources under one of the competing crops. This coefficient is not significant in other States and further it possess negative sign in case of Andhra Pradesh and Uttar Pradesh. The sign of the coefficient of Uttar Pradesh is influencing the sign of all-India.

Only in Uttar Pradesh, the coefficient of relative yield variable is significant at 10 per cent level. Although no significant linear trend is discernible in the relative yield series of Uttar Pradesh, the acreage response to relative yield is statistically significant. The year to year fluctuations in relative yield series had a significant effect on sugarcane acreage. The trends in cane yield in the States of Mysore, Maharashtra, Punjab, Bihar and all-India appears to have no significant impact on acreage changes. The coefficient of relative yield variable takes expected sign in all the States except in case of Andhra Pradesh and Madras.

Having found separately the importance of relative mill and *gur* price variables in case of Bihar, regression was run by including both the variables simultaneously with installed capacity.

$$A_t = \underset{}{-17.720} + \underset{(1.516)}{5.755^*}\ C_t + \underset{(8.085)}{8.645}\ \frac{(P_1^t)}{(P_2^{t-1})} + \underset{(1.089)}{0.953}\ P_{1-1}$$

$$R^2 = 0.702$$

Both the price variables turn out to be insignificant due to inter-correlation between them (0.58).

*Conclusions*

1. The State-wise installed sugar capacity of sugar industry had a direct bearing for positive changes in acreage under sugarcane. Indirectly this means that the mill price was attractive to the producer and there was significant regulation in cane supply to sugar factories at the State level. The quantitative impact of installed sugar capacity on acreage under sugarcane appears to be the same in Andhra and Maharashtra.

2. In Bihar a change in relative mill price of cane has brought about a change in sugarcane acreage which affects capacity-utilization of sugar industry. Also changes in acreage under sugarcane were positively associated with the price of *gur* as the price of *gur* was more profitable than the price of its competing crop, rice. In Mysore, farmers had responded negatively to relative price movements of *gur* during

this period. No valid inferences in regard to price movements could be drawn in case of other States on the basis of this analysis.

3. This analysis shows that in Uttar Pradesh acreage changes were positively associated with the relative yield. No such relationship had been observed in case of other States.

Y. SATYANARAYANA*

## A CASE STUDY OF REPAYMENT OF CROP LOANS AND CAUSES OF THEIR NON-REPAYMENT IN MAHARASHTRA STATE

During the last three Five-Year Plans, various facilities and loans are extended to the farmers in the National Extension Service, Community Development Block, Intensive Agricultural Development Project, Intensive Agricultural Area Programme and other allied schemes for giving them incentives to increase agricultural production. These facilities are offered to the farmers to make them production-oriented. But in spite of these facilities made available to them either in cash or kind, it is found that they are unable to repay the loan. An attempt is made in this note to enquire into the position of repayment and the causes of non-repayment of crop loans.

Investigation into the position of repayment of crop loans and causes of non-repayment of crop loans was undertaken in the Panvel taluka of Kolaba district in Maharashtra State. Out of the total of 43 societies, 16 societies—8 each from small size and big size (depending upon the number of members at 200 and above 200)—were selected randomly. While selecting members, two groups were formed. The first group consisted of defaulters who have not paid crop loan during 1964-65 and the second consisted of non-defaulters who paid crop loan during the said period. Out of the total number of defaulters and non-defaulters from each randomly selected society, 50 per cent defaulters and 50 per cent non-defaulters were randomly selected. From each society eight members composed of defaulters and non-defaulters were selected. Thus, in all, 128 cultivators—64 defaulters and 64 non-defaulters—were interviewed and data were collected by canvassing a questionnaire. While tabulating the data collected from 128 cultivators, it was found that data relating to 8 cultivators were unrealiable and hence they were excluded from the analysis. Thus the total sample was reduced to 120 cultivators. In addition to this sample, Chairmen and Secretaries of the selected societies were also interviewed and the information supplied by them was recorded in a separate questionnaire.

It was considered as to whether education and age of the head of the family as a member of society is related to the repaying capacity for crop loan but the result of the Chi-square test was found to be non-significant. The same test when applied to the holding-size of the member of the society was found to be significant which indicated that repaying capacity does depend upon the holding-size as could be seen from Table I.

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TABLE I—RELATION BETWEEN SIZE OF HOLDING AND REPAYING CAPACITY

| Sr. No. | Size of holding (acres) | Defaulters | Non-defaulters | Total | Result |
|---|---|---|---|---|---|
| 1. | Small (0-2) .. | 24 (63%) | 14 (37%) | 38 | Chi-square test is significant at 5 %. |
| 2. | Medium (2.01 to 6) | 29 (51.79%) | 27 (48.21%) | 56 | |
| 3. | Large (above 6.01) | 7 (27%) | 19 (73%) | 26 | |
| | Total | 60 | 60 | 120 | |

It may be noted that defaulters constituted only 27 per cent in large holdings as against 63 per cent from small holdings. This shows that larger is the size of holding, greater will be the capacity for repaying loan and *vice-versa*. Medium size of holding had almost equal number of defaulters and non-defaulters (50 per cent) approximately.

TABLE II—AVERAGE NUMBER OF FAMILY MEMBERS, AVERAGE INCOME FROM AGRICULTURE, SUBSIDIARY OCCUPATIONS AND NON-AGRICULTURE

| Sr. No. | Size of holding | Average number of members per family | | | Total annual income in Rs. per family from | | |
|---|---|---|---|---|---|---|---|
| | | Below 14 yrs. | Above 14 yrs. | Total | Agri-culture | Subsidi-ary occupa-tions and Non-agri-culture | Total |
| *I Defaulters* | | | | | | | |
| 1 | Small .. .. | 2.56 (43%) | 3.39 (57%) | 5.95 | 328 (71.8%) | 129 (28.2%) | 457 |
| 2 | Medium .. .. | 3.10 (40%) | 4.63 (60%) | 7.73 | 1,342 (92%) | 112 (8%) | 1,454 |
| 3 | Large .. .. | 2.72 (34%) | 5.28 (66%) | 8.00 | 2,274 (93%) | 179 (7%) | 2,453 |
| *II Non-defaulters* | | | | | | | |
| 1 | Small .. .. | 2.10 (40%) | 3.15 (60%) | 5.25 | 1,021 (91.5%) | 95 (8.5%) | 1,116 |
| 2 | Medium .. .. | 2.55 (38%) | 4.15 (62%) | 6.70 | 1,308 (97.7%) | 31 (2.3%) | 1,339 |
| 3 | Large .. .. | 3.16 (38%) | 5.10 (62%) | 8.26 | 2,464 (98.2%) | 46 (1.80%) | 2,510 |

Table II gives data regarding the average number of members and the average annual income per family for both the defaulter and non-defaulter groups classified under three size-groups of holdings. The table shows that the average number of members per family increased with an increase in the size of holding. The number of members per family whose age is above 14 years was more in the defaulter group than in the non-defaulter group in all the three size-groups. It may be noted that the total annual income earned per family in the defaulter group was, on an average, relatively less than that in the non-defaulter group in the case of the small and large size-groups of holding while it was more in the case of medium sized defaulter group as compared to the corresponding non-defaulter group.

The main occupation of the selected cultivators is agriculture. A comparison of annual income per family derived from agriculture between the defaulter and non-defaulter groups shows that the annual income of the small cultivator family was the lowest in the case of the former group and it was only less than one-third of the income of the corresponding non-defaulter group. The relatively low income earned from agriculture by the defaulter group appears to be one of the causes for the non-repayment of their loans.

While framing the questionnaire, a doubt arose in our minds whether the selected cultivators would be able to furnish correct and reliable information regarding the position of their crop loans for the last three years (1962-63 to 1964-65). In view of the prevalence of illiteracy in the Konkan tract, it was felt that the cultivators would not give correct information about their crop loans for the last three years. Hence it was decided to collect data on crop loans from the 16 selected societies, as they would be more reliable. Keeping this view in mind, average position of crop loan was worked out from the selected societies of which record was available from the Co-operative Supervising Union, Panvel. The relevant data are given in Table III.

TABLE III—POSITION OF CROP LOAN

| Year | Average number of members per society | | | | Loan in Rs. per society | | | |
|---|---|---|---|---|---|---|---|---|
| | Demanding loan | Receiving loan | Returning loan fully | Defaulters | Total loan demanded | Total loan sanctioned | Total loan returned | Total loan outstanding. |
| 1962-63 .. | 205 | 180 (87.8%) | 80 | 100 | 1,25,379 (613) | 47,095 (262) (43%) | 32,665 (407) (69%) | 14,531 (145)* |
| 1963-64 .. | 234 | 197 (84%) | 109 | 88 | 1,10,350 (472) | 69,849 (355) (75%) | 41,792 (388) (60%) | 28,057 (319)* |
| 1964-65 .. | 235 | 220 (93.6%) | 130 | 90 | 1,08,136 (460) | 70,353 (320) (70%) | 24,664 (190) (35%) | 45,629 (507)* |
| Average .. | | 88% | | | | 63% | 55% | |

*N.B.* : Figures in brackets indicate loan per member.
Figures marked with asterisk indicate loan outstanding per defaulter.

1. Table III indicates that during the last three years, the number of members demanding loan, receiving loan and returning loan per society had increased. The number of defaulters had also increased.

2. The total loan demanded had declined while the total loan sanctioned, returned and outstanding had increased year after year except the loan returned in the year 1964-65.

3. The average loan demanded per member showed a tendency to decrease year after year, while the loan sanctioned per member on an average increased from Rs. 262 in 1962-63 to Rs. 355 in the year 1963-64 but it declined to Rs. 320 in 1964-65.

4. The amount of loan returned per member also decreased year after year, as a result the amount outstanding per member increased.

5. Out of the members demanding loan, on an average, 88 per cent of the members received loan and the loan sanctioned to them constituted 63 per cent of the amount demanded by them.

6. The percentage of recovery of loan decreased year by year from 69 in 1962-63 to 60 in 1963-64 and further declined to 35 in the year 1964-65.

An analysis of the causes for non-repayment of crop loan by the 60 defaulters (Table IV) showed that the majority of defaulters were unable to repay the loan due

TABLE IV—CAUSES FOR NON-REPAYMENT OF CROP LOANS

| Sr. No. | Name of the cause | Number of defaulters reported | Percentage to the total number of defaulters |
|---|---|---|---|
| 1. | Annual income is low due to poor yields .. | 30 | 50 |
| 2. | Domestic expenditure is high .. .. .. .. | 15 | 25 |
| 3. | Family size is big .. .. .. .. .. | 12 | 20 |
| 4. | Willing to pay a part of the loan .. .. .. | 3 | 5 |
| | Total .. | 60 | 100 |

to poor returns from agriculture. They were forced to default payment because of their high domestic expenditure necessitated by their big family size. Besides, only 5 per cent of the defaulters were willing to pay a part of the loan.

The Chairmen and Secretaries of the selected societies were asked to give reasons for the low or high percentage of repayment of crop loans during the year in respect of their societies and the reasons given by them are as follows :

1. Out of the 14 societies (as two societies did not respond), five societies reported that due to good crop season, yields were good and this enabled the cultivators to repay crop loan and hence the percentage of defaulters was less. Thus the percentage of defaulters depends upon the crop season, being good or bad.

2. Two societies reported that 50 per cent of their members expressed the doubt whether they would get loan or not for the next year and this psychology or habit made them to pay or not to pay.

3. Two societies reported that due to bad season and poor financial conditions of the cultivators, crop loan recovery was very low.

4. Two societies reported that due to *khar* land there was low yield of crops and hence the cultivators' income was very less and this made them defaulters.

5. Two societies reported that 50 per cent of their members were not interested in paying loan.

6. One society reported that in view of the big families and heavy domestic expenditure incurred by their members, the percentage of crop loan recovery was very low.

In order to rectify these bottlenecks and to ventilate the grievances of the cultivators for non-repayment of crop loans, following suggestions were offered by the various societies.

1. Three societies reported that every year before 15th May or at least in the first week of June, crop loan should be made available to the cultivators.

2. Four societies informed that the loan along with fertilizers should be distributed well in advance, *i.e.*, first week of June every year (before monsoon sets in).

3. Three societies stated that some members should be given loan as per the decision of the Managing Committee of the Society even though these members have outstanding loan.

4. One society reported that free fertilizers should be given to the cultivators well in advance.

5. One society informed that if the crop season is bad or worst, crop loan distributed should be reduced in proportion to the valuation of crop as per crop season and the loss may be borne by the Government.

Thus it can be concluded that the farmer is unable to repay the loan mainly because of adverse crop season and heavy expenditure incurred for maintaining a big family.

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## CHANGES IN LAND-USE PATTERN IN INDIA—A COMMENT

In his article on "Changes in Land-Use Pattern in India," R. Giri* has made an attempt to study the changes in the land-use pattern in the country during the period of the first two five-year plans and the first three years of the Third Plan and the associated factors motivating changes in land-use pattern. Data presented in the article show that between 1950-51 and 1963-64 the total geographical area of the country, according to village papers, increased by 15.8 million hectares (mh.). The author has ascribed this increase mainly to an improvement in the "reported area" figure for Forests. Only a "small part" of the change in reported area is attributed to the re-measurement of the other categories of land by cadastral survey methods. This may well be. But to say this on the basis of a two-point comparison on an all-India basis does not appear to be the best thing to do. Of the 15.8 mh. rise in reported area between 1950-51 and 1963-64, 15.3 mh. appear to be due to change in forest area, only a small part remaining to be explained in terms of re-survey results. But taking any other pair of years would not have given the same results. Thus, the change from 1950-51 to 1951-52 was twice as much in forest area as in the total geographical area, 8.4 mh. against 3.5 mh. In 1953-54 forest area declined while geographical area increased. Years 1958-59 and 1961-62 can also be cited in this regard.

This is at the all-India level. At the level of the States, the figures for Gujarat, for example, show a different trend. Throughout this period, as forest area declined, geographical area showed an increase. (The data are not presented here). Similarly in Andhra Pradesh, forest area increased without any corresponding change in the geographical area in 1962-63.

The author finds the small rise in the area under 'current fallow' (0.4 mh. over 13 years) a disturbing feature. Current fallow is due to a variety of circumstances, rotational requirements, particularly on inferior or what is sometimes called sub-marginal land, being one of them. The considerable expansion of net sown area, as the author suggests, possibly has been due to large tracts of inferior land being brought into cultivation. The rise in current fallow would then be a natural consequence. The important thing to note is whether current fallow as a proportion of net cropped area has increased or decreased. From this point of view, the data do not appear to warrant pessimism.

In assessing the contribution of irrigation to extension of cultivation, the author assumes "two-thirds of the increase in the net irrigated area..... to be originating from the area already sown and the remaining one-third from the newly reclaimed and sown land." There appears to be no basis whatsoever for such an assumption. (The reason given for such an assumption—"The net sown area in India is generally two-third of the total arable land"—is no reason at all.) Indeed, there are innumerable instances where expansion of cultivation to new land was made possible without irrigation and there are also instances where expansion of irrigation only helped to expand multiple cropping of old land.

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The calculations based on this unjustified assumption lead to statements like those in the last but one para on page 28 of the article (highlighting the increasing role of irrigation in extension of cultivation) which are just about as good as the assumption itself.

D. S. P. RAO
AND
P. V. S. RAO†

## CHANGES IN LAND-USE PATTERN IN INDIA—A REPLY

The purpose of this note is to clarify the comments made by D.S.P. Rao and P.V.S. Rao on my article on "Changes in Land-Use Pattern in India" published in this Journal.

Variations in "Reporting Area" in different States have arisen broadly as a result of four factors. Firstly, some of the areas which were not 'reporting' have become 'reporting' as a result of their cadastral survey, *de novo* or revisional, and/or 'institution of the reporting agency.' Secondly, the village records have been corrected and brought up-to-date in some areas. Thirdly, some ex-proprietory forests which were not covered, have been brought under the purview of 'reporting area.' Fourthly, the demarcation and survey of forests, *de novo* or revisional, and correction in the forest records have led to variation in forest area and consequently in the 'reporting area.' While the first and third factors have invariably led to increase in 'reporting area,' the other two factors have caused increase in 'reporting area' in some tracts, while decline in others. After cancellation of positive and negative values in different States, the picture that emerges at the all-India level shows that the net increase in 'reporting area' in the country as a whole has taken place mostly as a result of extension of reporting to forests which were not covered earlier and recalculation of forest area as a result of demarcation and survey of forests and reconciliation of the differences in the forest area according to village papers and that according to forest records.

Different States may reveal different trends. In Gujarat, forest area declines, yet 'reporting area' increases perhaps as a result of cadastral survey and institution of reporting agency in tracts not covered thus far. In some parts of other States, correction in village papers might have led to a downward revision in 'reporting area.' In Andhra Pradesh, the increase in the forest area may, among other things, be due to reclassification as 'forest' of some area which was previously classed otherwise.

Besides changes in 'reporting area,' transfer of area from one land-use category to another in the process of adoption of standard concepts and definitions and classification of land-use categories, is another factor which has led to changes in their areas arising purely out of statistical improvements. These two types of changes may or may not be operative simultaneously, and if operating simultaneously, they may be in the same or different directions. A year-to-year comparison of forest area by village papers, or for that matter, of any other land-use category, may not thus be always meaningful because of the confounding of these

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changes and uncertainties at the primary stage in classifying areas under different land-use categories in the transitional period when new concepts and definitions were being introduced. A comparison after the lapse of the period of frequent classificatory changes appears more valid.

As regards increase in current fallow, "the need for keeping a larger extent of current fallow as a natural corollary of extension of cultivation to all kinds of arable land including land of low productivity" is realised, but reduction in this area is also possible if such extension of cultivation is "supplemented by fertility-sustaining measures like application of fertilizers, land development and soil conservation." Rise in current fallow may be disturbing to the extent the fertility-raising measures were lacking.

The break-up of the increase in irrigated area between old sown area and new sown area in 2:1 ratio is based on the assumption that the share in new irrigation of newly sown area might not exceed the proportion of uncultivated land in the total arable land. The conclusion in my article is that the extension of cultivation was possible mostly through "land development, soil conservation and land reclamation measures without irrigation. For moisture, this area had to depend on rainfall and such land development and crop rotation measures which helped retention of adequate moisture for cultivation." What D.S.P. Rao and P.V.S. Rao want to make in this respect does not appear at variance with this conclusion.

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