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THE GREEN REVOLUTION—PARTICIPATION BY SMALL *versus* LARGE FARMERS

Many writers have in recent times expressed their fears about the High-Yielding Varieties (HYV) programme as being responsible for widening the gap between the small and large farmers. This phenomenon has been explained by the fact that the large farmers possessed the necessary resources to adopt the new technology and capacity to bear risks and uncertainties involved in shifting to new varieties and methods of cultivation in contrast to small farmers who suffer from inadequacy of resources and restraints like low capacity to bear risks. "In so far as the success of HYV programme depends on the ready and adequate availability of credit, access to know-how, markets, etc., and in so far as these are positively related to size of holding, the HYV may benefit richer farmers to a greater extent than the poorer ones."[1] However, there are some who contend that basically, the new strategy is neutral to the scale of farming, as large holdings are not needed in the interest of higher production.[2]

Viewed from this background, the recent papers by P. K. Mukherjee[3] and B. Sen[4] throw more light on the problem by detailed and objective analysis with the help of data split up by size-group of operational holdings. Mukherjee has used data from the Programme Evaluation Organisation's surveys on HYV programme relating to paddy (Tamil Nadu), jowar (Maharashtra) and wheat (Punjab), while Sen has used National Sample Survey data from the Sixteenth and Seventeenth Rounds. In this paper, the participation of small *versus* large farmers in the HYV paddy programme is analysed with the help of a number of field studies conducted by the Agro-Economic Research Centre in selected districts of South India between the years 1966-67 and 1968-69.[5] These enquiries, although confined to individual districts, are of intensive nature, covering about 100 farmers in each district spread over four villages from two 'good' blocks, (at the rate of 2 villages per block) ; the blocks and villages were purposively chosen on the basis of coverage of HYV programme. From each of the selected villages, separate lists of participant (growing HYV paddy during the season under study) and non-participant (not growing HYV paddy) farmers were prepared. For each village, the participant farmers were arranged in ascending order of their size of operational holding. The list was divided into six equal groups of farmers and three

1. Rapporteur's Report on Economic Aspects of High-Yielding Varieties Programme, *Indian Journal of Agricultural Economics*, Vol. XXIII, No. 4, October-December, 1968.

2. See M. L. Dantwala, "Towards an Efficient and Just Land System," *Yojana*, Vol. XIII, No. 23, November 30, 1969 and others.

3. P. K. Mukherjee, "The HYV Programme—Variables that Matter," *Economic and Political Weekly*, Vol. V, No. 13, March 28, 1970.

4. B. Sen, "Opportunities in the Green Revolution," *Economic and Political Weekly*, Vol. V, No. 13, March 28, 1970.

5. The selected districts together with the variety of paddy under study are :
   (1) Thanjavur (Tamil Nadu), *Kharif*, 1967-68, ADT-27/Paddy.
   (2) Thanjavur (Tamil Nadu), *Kharif*, 1968-69, ADT-27/Paddy.
   (3) Thanjavur (Tamil Nadu), *Rabi*, 1968-69, CO-25/Paddy.
   (4) Chingleput (Tamil Nadu), *Kharif*, 1968-69, IR-8/Paddy.
   (5) West Godavari (Andhra Pradesh), *Kharif*, 1967-68, IR-8/Paddy.
   (6) West Godavari (Andhra Pradesh), *Rabi*, 1967-68, IR-8/Paddy.
   (7) Krishna (Andhra Pradesh), *Kharif*, 1966-67, T.N.-1/Paddy.
   (8) Ernakulam (Kerala), *Kharif*, 1966-67, Tainan-3/Paddy.

farmers were chosen at random from each group making a total of 18 participants from each village and 72 participants from all the four selected villages in each district. (In two districts Krishna, and Ernakulam, only 60 participants were canvassed at the rate of 15 from each village, the method of selection being the same as the one described above.) Likewise, the list of non-participants was divided into seven equal groups and one non-participant farmer was chosen at random from each group making a total of 28 non-participants from each district. The above sample design has two limitations : (*i*) the purposive character of selection of blocks and villages, and (*ii*) the absence of uniform sampling fraction between the sample of participants and non-participants. The purposive selection of first and second stage units has resulted in the choice of relatively more prosperous and advanced areas of the district. The absence of uniform sampling fraction has led to relatively over-representation of participants and very much under-representation of non-participants among the sampled cultivators. Although, these two limitations do not materially affect our analysis here, one should take note of these limitations while making general inferences for much larger areas than those covered here.

Some Broad Characteristics of Participant Farmers

It is often suggested that since land, output, marketable surplus, cash, income, etc., are very unevenly distributed in favour of large farmers and since they have greater and easy access to knowledge, extension services, subsidized credit, etc., the facilities under the HYV programme would be availed of in a larger measure by them than by the small farmers. Table I gives some particulars of participant and non-participant farmers, which enable us to make the following rough and ready observations just by running through the rows and columns of figures. The average size of holding of the participants is larger than that of the non-participants in all the eight districts (counting each round of the same district as one) without exception indicating that size of holding is an important factor determining the farmers' participation in HYV programme. In four out of eight districts, there has been a greater proportion of leased-in lands among the non-participants, but the differences are not significant enough to warrant any firm conclusion on the effect of tenancy on the farmers' participation. The proportion of area irrigated is higher among the participant farmers in canal irrigated districts and lower in areas with lift irrigation but the differences are not significant to make any firm generalizations. Invariably, the literacy level of a participant farmer has been found to be higher than that of a non-participant. The figures in the last row bring out clearly the importance of investment on capital assets like pump-sets, oil-engines, sprayers and other equipments and improved implements. The participation of small farmers in the programme can be appreciably improved by the provision of adequate credit facilities for acquiring capital assets.

The Position of Tenants

We do not have much ready and detailed information on the position of tenants *vis-a-vis* owners as far as their participation in the programme is concerned. There were not sufficient number of tenants in the selected districts excepting Thanjavur, which is well-known for its tenancy problems. For the purpose of this paper, we have culled out particulars for the selected participant cultivators of

TABLE I—CERTAIN PARTICULARS OF FARMERS PARTICIPATING IN HYV PROGRAMME FOR PADDY IN SELECTED DISTRICTS OF SOUTH INDIA

Particulars	Thanjavur *Kharif* 1967-68 ADT-27		Thanjavur *Kharif* 1968-69 ADT-27		Thanjavur *Rabi* 1968-69 CO-25		West Godavari *Kharif* 1967-68 IR-8		West Godavari *Rabi* 1967-68 IR-8		Krishna *Kharif* 1966-67 T. N.-1		Chingleput *Kharif* 1968-69 IR-8		Ernakulam *Kharif* 1966-67 Tainan-3	
	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP	P	NP
1. No. of selected farmers	82	7†	100	All the cultivators in the selected villages have raised HYV paddy and so none of them could be treated as non-participants.	72	28	72	28	72	28	60	40	69	28	60	40
2. Average size of holding (acres) ..	4.21	1.88	6.63		5.62	4.08	14.57	8.68	16.56	7.95	23.59	12.86	11.97	11.96	8.59	3.39
3. Proportion of area owned (per cent)	73	71	62		73	73	81	74	95	86	82	91	88	100	90	72
4. Proportion of area irrigated (per cent)	100	83	90		95	87	100	100	99	100	100	100	84	90	38	42
5. Per acre cash expenditure* (Rs.)	194	170	225		231	181	325	187	382	245	202	88	444	289	365	219
6. Per acre borrowings * (Rs.) ..	144	80	72		69	51	129	46	73	25	95	21	63	16	61	22
7. Proportion of borrowings to cash expenditure (per cent)	74	64	32		30	28	40	25	19	10	47	24	14	5	17	10
8. Proportion of borrowings from co-operatives and Government (per cent)	77	Nil	98		N.A	N.A.	N.A.	N.A.	93	73	N.A.	N.A.	76	40	100	97
9. Proportion of farmers who had attained a literary status of secondary and above (per cent) ..	N.A.	N.A.	32		25	29	35	21	40	19	44	25	58	68	63	43
10. Proportion of farmers who had attained a literary status of matriculation and above (per cent) ..	N.A.	N.A.	20		16	3	20	4	16	4	27	15	9	18	30	18
11. Per acre value of improved implements and equipments like pumpsets owned (Rs.)	N.A.	N.A.	N.A.		143	36	149	53	118	1	65	4	389	308	151	41

Note : P and NP stand respectively for participants and non-participants.
† Enough non-participants could not be covered due to wide adoption of HYV in the selected villages.
* The per acre figures relate to HYV paddy in the case of participants and local paddy in the case of non-participants.
N.A. = Not available.

Thanjavur district in respect of two important variables, namely, per acre yield and per acre fertilizer input for HYV paddy. The average values for these two variables are as shown below:

	Thanjavur, *Khariff*, 1968-69			Thanjavur, *Rabi*, 1968-69		
	Pure owners	Pure tenants	Percentage of col. (2) to col. (1)	Pure owners	Pure tenants	Percentage of col. (5) to col. (4)
	(1)	(2)	(3)	(4)	(5)	(6)
Average per acre fertilizer input value (Rs.)	63	57	90.5	83	76	91.6
Average paddy yield per acre (kgs.)	1,467	1,325	90.3	1,433	1,278	89.2

If the above figures are any guide, the tenants of Thanjavur district do not seem to lag *much* behind the owners either in the application of fertilizers, an important and expensive element of the new agricultural strategy, or in productivity of HYV paddy. It is not the intention here to belittle the importance of incentives in the form of ownership and security of tenure to the tenants in raising farm production. What is intended here is only to suggest that the problems of tenancy have not affected significantly the participation of tenants of Thanjavur in the HYV programme. As Dantwala has pointed out, "Green Revolution has fared much better in areas which are not particularly known for progressive land legislation."[6] Of course, if the tenants of Thanjavur could be provided with ownership and/or more favourable and secured tenancy rights, we could expect further increases in production, since the small sized tenants' holdings are better suited to the labour intensive new varieties.

Small Farmers Catch Up

It may be pertinent to question whether the small farmers continue to lag behind the large farmers forever in their participation in the HYV programme. To answer the question satisfactorily, we have collected relevant data from the cropping pattern of the selected farmers for two successive years and presented them in Table III.[7] A reading of the figures for each of the five districts clearly leaves an unmistakable impression that the small farmers (cultivating less than 5 acres) do not lag *very much* behind the large farmers, although, initially their rate of participation had been much lower for a variety of reasons. Reading the figures, first by rows and then by columns, we notice that the proportion of area under the HYV paddy on small farms has been rising, thereby reducing appreciably the differences in the proportions of HVY paddy area to the total

6. M. L. Dantwala, *op. cit.*

7. Before we start analysing the figures, an explanation for the presence of only five districts (instead of eight as elsewhere) in the table may be offered here. The study was conducted in *kharif*, 1966, first year of the programme, in both Krishna and Ernakulam districts and, therefore, no HYV paddy was grown by any farmer in the *kharif* season of the previous year. For West Godavari, *kharif*, 1967-68 and Chingleput, *kharif*, 1968-69, comparable data were not available for two successive seasons for the same group of farmers, since IR-8 was tried during *kharif* for the first time in 1967 and in 1968, respectively in these two districts. Again, all the participant farmers of Thanjavur had placed their entire *kuruvai* (*kharif*) paddy area under HYV, *both* in 1967-68 and 1968-69, and, therefore, it does not find a place in the table. The table gives data for Thanjavur, *rabi*, 1967-68 and Chingleput, *rabi*, 1968-69 (although no studies were conducted for these seasons in these two districts) with the help of data on crop pattern that could be collected before the completion of field work in these districts with respect to the preceding *kharif* season.

paddy area between small and large farms. "It is logical to assume that, in the initial years of the programme, it will be the more innovative and enterprising groups who will come forward. By and by, others will join in.[8]

Share of Small Farmers in the Programme

Table II gives details on the extent of participation by different groups of farmers. In terms of numbers (column 3), the small farmers predominate significantly over the large farmers, particularly in Thanjavur and Ernakulam districts. This may not be unexpected in a region with a preponderance of small farmers. Their contribution to the programme in terms of acreage under the HYV paddy (column 8) is also quite significant excepting in the coastal Andhra districts of West Godavari and Krishna, where a large percentage of the acreage under the HYV paddy has been contributed by large farmers. Of course, the small farmers have already a sizable share in the total cultivated land in thickly populated areas like Ernakulam and Thanjavur. But, a simultaneous reading of columns 7 and 8 is rewarding. Without exception, in all the eight districts (same district counted as many times as the number of enquiries), the share of small farmers in the total HYV acreage has been more than their corresponding share in the total cultivated acreage. This is also true of the next size-group, 5-10 acres. Thus, the HYV programme may be considered as an important tool to improve and transform the economic conditions of small farmers. A more accurate picture is provided by figures in column 9, because the land under paddy cultivation is more relevant for a study on the farmers' participation in the HYV paddy programme than the total area of the holding. With the exception of Thanjavur, the switch over from the traditional varieties to the new varieties has been more widespread among small farmers than among large farmers. From the foregoing analysis what emerges is that the *relative* gains from the new technology has been more in the case of small farmers.[9] As Sen has pointed out with the help of aggregate data at national level and corroborated by figures in column 5 of Table II relating to individual farmers at micro level, relatively more area per farm is irrigated among small farmers than among large farmers. The small farmers are better placed to cultivate the lands more intensively (column 6). Further, the new technology is labour intensive and, therefore, favourable to the small farmer; it affords greater opportunities to gainfully employ his and his family's surplus labour in farm production and, thereby, provides an avenue to convert his idle labour into increased earnings. The small farmer can take better and proper care of his new crops, which are highly demanding in terms of personal care and management, as compared to a large farmer, who is handicapped in a number of ways. Apart from the physical limitations placed on the extent of his personal care, he has to depend (and pay high wages) on hired agricultural labour, which is becoming not only increasingly organized during crucial periods of plant growth but also non-available in sufficient number and in time in many of the

8. P. K. Mukherjee, *op. cit.*

9. This is in contrast with the *absolute* gains, which will naturally accrue in greater measure to large farmers as in most of the development programmes. For a similar finding, using data from another region, refer to B. K. Chowdhury, "Disparity in Income in the Context of HYV," *Economic and Political Weekly*, Vol. V, No. 39, September 26, 1970, p. A-91.

10. For a detailed study of the labour problem in the context of HYVP, refer to C. Muthiah, "The Agricultural Labour Problem in Thanjavur and the New Agricultural Strategy," *Indian Journal of Agricultural Economics*, Vol. XXV, No. 3, July-September, 1970.

TABLE II—CERTAIN CHARACTERISTICS OF HYV FARMERS BY SIZE-GROUPS OF HOLDINGS

Size-group (acres)	Selected farmers		Proportion of area owned (per cent)	Proportion of area irrigated (per cent)	Proportion of area sown more than once (per cent)	Proportion of cultivated area in each group to the total (per cent)	Proportion of HYV area in each group to the total (per cent)	Proportion of HYV paddy to all paddy in each group (per cent)
	No.	Per cent						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Thanjavur, *Kharif* 1967, ADT-27/Paddy								
1. Less than 5	57	69	66	100	84	39	42	92
2. 5—10	18	22	70	100	71	34	29	88
3. 10—15	4	5	74	100	69	14	13	98
4. 15—20	3	4	100	100	89	13	16	100
5. 20—25	—	—	—	—	—	—	—	—
6. 25—35	—	—	—	—	—	—	—	—
7. 35 and above	—	—	—	—	—	—	—	—
Total/Overall average	82	100	71	100	74	100	100	92
2. Thanjavur, *Kharif*, 1968, ADT-27/Paddy								
1. Less than 5	47	47	51	98	88	18	22	99
2. 5—10	39	39	51	96	75	37	37	100
3. 10—15	5	5	83	89	68	9	8	100
4. 15—20	2	2	100	90	84	5	5	100
5. 20—25	2	2	100	70	70	6	6	100
6. 25—35	5	5	61	79	68	25	22	100
Total	100	100	62	90	75	100	100	100
3. Thanjavur, *Rabi*, 1968-69, CO-25/Paddy								
1. Less than 5	41	57	44	100	95	31	36	89
2. 5—10	20	28	72	94	90	32	31	77
3. 10—15	8	11	100	91	85	23	16	53
4. 15—20	2	3	100	100	97	9	11	89
5. 20—25	1	1	100	80	80	5	6	100
Total	72	100	73	95	91	100	100	78

(*Contd.*)

TABLE II—CERTAIN CHARACTERISTICS OF HYV FARMERS BY SIZE-GROUPS OF HOLDINGS—(*Contd.*)

Size-group (acres)	Selected farmers		Proportion of area owned (per cent)	Proportion of area irrigated (per cent)	Proportion of area sown more than once (per cent)	Proportion of cultivated area in each group to the total (per cent)	Proportion of HYV area in each group to the total (per cent)	Proportion of HYV paddy to all paddy in each group (per cent)
	No.	Per cent						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4. West Godavari (A.P.), *Kharif*, 1967, IR-8/Paddy								
1. Less than 5	13	19	66	100	76	4	13	46
2. 5—10	19	26	84	100	58	11	21	36
3. 10—15	11	15	83	100	71	12	13	20
4. 15—20	6	8	77	100	65	10	7	15
5. 20—25	10	14	80	100	76	20	18	15
6. 25—35	11	15	81	100	73	29	22	15
7. 35 and above	2	3	86	100	84	14	6	6
Total	72	100	81	100	72	100	100	17
5. West Godavari (A.P.), *Rabi*, 1967-68, IR-8/Paddy								
1. Less than 5	12	16	96	100	82	3	6	70
2. 5—10	17	24	79	94	85	11	13	43
3. 10—15	13	18	93	100	87	14	10	56
4. 15—20	6	8	92	100	73	7	15	75
5. 20—25	9	12	91	100	90	18	11	23
6. 25—35	4	6	100	100	100	11	9	32
7. 35 and above	11	16	100	100	68	36	36	37
Total	72	100	95	99	79	100	100	41
6. Krishna (A.P.), *Kharif*, 1966, T.N.-1/Paddy								
1. Less than 5	5	8	100	100	100	1	5	45
2. 5—10	11	18	89	100	92	5	13	24
3. 10—15	8	13	75	100	79	7	10	15
4. 15—20	8	14	88	100	83	10	14	13
5. 20—25	7	12	92	100	88	11	11	10
6. 25—35	9	15	68	98	79	18	11	6
7. 35 and above	12	20	83	100	74	48	36	8
Total	60	100	82	100	79	100	100	10

(*Contd.*)

TABLE II—CERTAIN CHARACTERISTICS OF HYV FARMERS BY SIZE-GROUPS OF HOLDINGS—(*Concld.*)

Size-group (acres)	Selected farmers		Proportion of area owned (per cent)	Proportion of area irrigated (per cent)	Proportion of area sown more than once (per cent)	Proportion of cultivated area in each group to the total (per cent)	Proportion of HYV area in each group to the total (per cent)	Proportion of HYV paddy to all paddy in each group (per cent)
	No.	Per cent						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7. Chingleput, *Kharif*, 1968, IR-8/Paddy								
1. Less than 5	16	23	100	98	92	6	12	60
2. 5—10	22	32	85	98	83	16	23	44
3. 10—15	8	12	90	92	85	11	21	58
4. 15—20	8	12	82	91	68	16	4	11
5. 20—25	5	7	81	94	72	12	9	28
6. 25—35	5	7	100	68	65	16	14	40
7. 35 and above	5	7	85	66	34	23	17	61
Total	69	100	88	84	65	100	100	41
8. Ernakulam, *Kharif*, 1966, Tainan-3/Paddy								
1. Less than 5	30	50	83	59	44	18	35	36
2. 5—10	17	28	87	52	38	21	23	23
3. 10—15	7	12	93	36	37	15	14	25
4. 15 and above	6	10	92	24	19	46	28	37
Total	60	100	90	38	30	100	100	31

TABLE III—PARTICIPATION OF SAME GROUP OF FARMERS IN TWO SUCCESSIVE YEARS**

(Proportion of HYV Paddy Area to Total Paddy Area in Percentages)

Size-group (acres)	Thanjavur						West Godavari		Chingleput	
	Kharif		*Rabi*		*Rabi*		*Rabi*		*Rabi*	
	1966-67	1967-68	1966-67	1967-68	1967-68	1968-69	1966-67	1967-68*	1967-68	1968-69
Less than 5	61	92	9	23	49	89	10	32	23	21
5 — 10	53	88	20	21	28	77	31	43	18	31
10 — 15	78	98	7	28	19	53	35	58	—	33
15 — 20	77	100	57	46	43	89	46	55	16	26
20 — 25	—	—	—	—	63	100	56	48	10	43
25 — 35	—	—	—	—	—	—	37	59	24	22
35 and above	—	—	—	—	—	—	16	11	25	40
Overall	62	93	18	26	36	78	37	48	19	32

** See footnote 7 for the absence of data here for other districts covered under the study.

* The figures here have been obtained from the cropping pattern of farmers canvassed for *kharif* 1967-68 season and, therefore, differ from those reported under column 9 against district No. 5 in Table II.

paddy growing districts of South India.[10] The financial resources of large farmers, although large as compared to the small farmers in absolute terms, are not so large (sometimes even small) in relative terms, *i.e.*, when expressed on a per acre basis. This gains particular significance when viewed from the requirement of higher cash expenses on large farms necessitated by heavier wage payments, which often costs more than any other input including fertilizers.

Credit Situation

It has been felt that the small farmer is at a disadvantage as far as the financial resources are concerned; not only his own resources are not sufficient to meet the increased cash needs arising from the cultivation of new varieties, but he also does not have ready and easy access to credit institutions like co-operatives, Government *taccavi* and commercial banks. With this brief statement of the problem, we may study the short-term credit position of the selected farmers presented in Table I and Table IV. The figures in Table I show that the increased cash expenditure on HYV paddy (row 5) was met through higher level of borrowings (row 6) by the participant farmers. Much of the enhanced credit requirement of the participants was supplied by the co-operatives and Government agencies at a subsidized rate of interest. The non-participants, who are small farmers, could only meet a much smaller proportion (row 8) of their credit requirements at low rates of interest from the institutional agencies. Among the participants, the borrowings per acre of HYV paddy (column 7 of Table IV) have been found to be consistently higher among small farmers than among large farmers excepting in Thanjavur which has a large proportion of tenants who are not favoured by the village co-operatives. The growing of HYV paddy seems to have helped the small farmers to increasingly (column 9) avail of the credit being provided by the co-operatives at low rates of interest unlike the non-participant small farmers who got relatively much less from institutional agencies.[11] Of course, the large and medium farmers have benefited more from the liberal credit facilities made available by the co-operatives (column 8) than the small farmers. It is true that the tenants continue to face many difficulties and hardships in securing short-term credit while long-term credit for investments on capital assets like wells, pumpsets, etc., is not available with ease to the small farmers, both owners and tenants, in adequate quantities and in appropriate time. Therefore, the credit institutions like land development banks and commercial banks should be required to extend long and medium-term loans more liberally to the small farmers than at present by taking into consideration their repaying capacity and additional income generated by the proposed investments rather than insisting too much on security for the loan, which they can hardly offer. In fact, what is a large or small farm is related to the technology. The HYV programme reduces the size of a viable farm. It is important that some feasible but financially sound solution is found to the vexed problem of non-availability of short-term credit to tenants, which remains unsolved for decades in spite of various suggestions by one committee after another.

. There is no gainsaying that these findings based on a few districts must not generate a feeling of complacency regarding the desirability of institutional changes. This paper may be aptly concluded with the following quotation. "Now that the

11. The low level of borrowings from the co-operatives reported from Chingleput was necessitated by successive droughts in the district leading to default in repayment of previous loans causing the stoppage of issue of fresh loans by the co-operatives.

TABLE IV—PARTICULARS OF BORROWINGS BY HYV FARMERS BY SIZE-GROUPS OF HOLDINGS

Size-group (acres)	Proportion of borrowing farmers (per cent)	Per acre fertilizer input (Rs.)	Total cash expenditure per acre (Rs.)	Of which borrowed (per cent)	Average borrowings (Rs.)		Per farmer average borrowing from co-operatives and Government (Rs.)	Proportion of borrowings from co-operatives and Government to total borrowings (per cent)
					Per farmer	Per acre of HYV paddy		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Thanjavur, *Kharif*, 1967, ADT-27/Paddy								
1. Less than 5 ..	89	85	182	77	258	141	193	75
2. 5—10	94	80	194	78	616	151	480	78
3. 10—15	100	103	207	85	1,422	176	1,209	85
4. 15—20	100	75	213	53	1,557	114	1,090	70
Overall	91	85	194	74	441	144	340	77
2. Thanjavur, *Kharif*, 1968, ADT-27/Paddy								
1. Less than 5 ..	23	59	189	25	101	47	101	100
2. 5—10	64	74	221	36	347	78	347	100
3. 10—15	20	68	226	8	130	17	130	100
4. 15—20	100	75	269	52	1,628	139	1,628	100
5. 20—25	50	111	309	39	1,625	120	1,625	100
6. 25—35	80	80	234	81	1,630	81	1,630	100
Overall	43	71	225	32	336	73	336	100
3. Thanjavur, *Rabi*, 1968-69, CO-25/Paddy								
1. Less than 5 ..	25	76	206	27	156	57	156	100
2. 5—10	44	76	225	23	251	53	251	100
3. 10—15	50	79	258	26	400	67	400	100
4. 15—20	100	84	271	46	1,726	123	1,726	100
5. 20—25	100	87	290	50	2,024	145	2,024	100
Overall	45	78	231	30	292	69	292	100

(*Contd.*)

TABLE IV—PARTICULARS OF BORROWINGS BY HYV FARMERS BY SIZE-GROUPS OF HOLDINGS—(*Contd.*)

Size-group (acres)	Proportion of borrowing farmers (per cent)	Per acre fertilizer input (Rs.)	Total cash expenditure per acre (Rs.)	Of which borrowed (per cent)	Average borrowings (Rs.)		Per farmer average borrowing from co-operatives and Government (Rs.)	Proportion of borrowings from co-operatives and Government to total borrowings (per cent)
					Per farmer	Per acre of HYV paddy		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			4. West Godavari, *Kharif*, 1967, IR-8/Paddy					
1. Less than 5 ..	69	97	321	59	405	188	405	100
2. 5—10	68	116	348	69	604	205	604	100
3. 10—15	73	122	364	47	541	173	541	100
4. 15—20	68	118	318	48	500	151	500	100
5. 20—25	20	80	281	17	155	49	155	100
6. 25—35	46	122	320	27	477	87	477	100
7. 35 and above ..	—	146	320	—	—	—	—	100
Overall	57	111	324	40	451	129	451	100
			5. West Godavari, 1967-68, *IR-8/Paddy*					
1. Less than 5 ..	92	187	403	73	535	292	482	90
2. 5—10	65	150	355	39	383	140	356	93
3. 10—15	39	141	354	15	303	53	291	96
4. 15—20	67	241	446	12	445	52	445	100
5. 20—25	56	156	365	22	335	80	278	83
6. 25—35	25	224	412	17	563	70	563	100
7. 35 and above ..	46	178	375	7	318	28	318	100
Overall	58	178	382	19	393	73	365	93
			6. Krishna, *Kharif*, 1966, T.N.-1/Paddy					
1. Less than 5 ..	60	59	216	79	260	170	260	100
2. 5—10	55	65	228	52	225	117	225	100
3. 10—15	75	100	267	66	346	178	346	100
4. 15—20	61	69	216	72	488	155	488	100
5. 20—25	29	53	181	20	93	36	93	100
6. 25—35	89	78	243	69	638	169	638	100
7. 35 and above ..	33	61	167	17	171	29	171	100
Overall	57	67	202	47	315	95	315	100

(*Contd.*)

TABLE IV—PARTICULARS OF BORROWINGS BY HYV FARMERS BY SIZE-GROUPS OF HOLDINGS—(*Concld.*)

Size-group (acres)	Proportion of borrowing farmers (per cent)	Per acre fertilizer input (Rs.)	Total cash expenditure per acre (Rs.)	Of which borrowed (per cent)	Average borrowings (Rs.)		Per farmer average borrowing from co-operatives and Government (Rs.)	Proportion of borrowings from co-operatives and Government to total borrowings (per cent)
					Per farmer	Per acre of HYV paddy		
(1) ..	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7. Chingleput, *Kharif*, 1968, IR-8/Paddy								
1. Less than 5 ..	25	104	450	18	94	81	44	47
2. 5—10	50	109	411	27	262	116	233	89
3. 10—15	38	116	369	20	184	75	101	55
4. 15—20	38	194	547	12	173	68	173	100
5. 20—25	20	118	434	3	150	11	150	100
6. 25—35	—	165	506	—	—	—	—	—
7. 35 and above ..	—	176	469	—	—	—	—	—
Overall	32	130	444	14	158	63	120	76
8. Ernakulam, *Kharif*, 1966, Tainan-3/Paddy								
1. Less than 5 ..	47	127	374	24	208	90	208	100
2. 5—10	47	135	390	25	449	97	449	100
3. 10—15	57	126	342	13	467	45	467	100
4. 15 and above ..	83	142	347	1	1,212	5	1,212	100
Overall	52	133	365	17	407	61	407	100

Green Revolution has vastly improved the profit-potential of Indian agriculture, the economic feasibility of transfer of gains to the disadvantaged groups in agriculture has improved *pari passu*. It has also augmented the temptation for the big farmer to get more securely entrenched and for the wealthy and the influential to enter the field. This must not be allowed to happen at the cost of the vulnerable sectors in agriculture."[12]

C. MUTHIAH*

REPORT ON SEMINARS

(ORGANIZED BY THE INDIAN SOCIETY OF AGRICULTURAL ECONOMICS BETWEEN MARCH 1970 AND FEBRUARY 1971)

The Indian Society of Agricultural Economics organized three Seminars between March 1970 and February 1971 on three different themes. The reports on the Seminars will be brought out in due course. The following note attempts to give an outline regarding the objectives, participation and major conclusions arising out of discussions at each Seminar.

1. Seminar on "Demand and Supply Projections for Agricultural Commodities"

The Indian Society of Agricultural Economics organized a Seminar on "Demand and Supply Projections for Agricultural Commodities" at the Punjab Agricultural University, Ludhiana from 29th to 31st March 1970.[1] The objectives of the Seminar were (1) to critically review recent research work on 'Demand and Supply Projections,' and to assess the merits and limitations of different methodology and assumptions; (2) to identify gaps in relevant data and other research requirements; and (3) to indicate further line of research. In all, eleven papers were read at the Seminar and 21 persons including agricultural economists, administrators and a few foreign experts participated in the Seminar. The Seminar discussed the relative merits of different approaches used in the supply projection analysis, *viz.*, yardstick approach, production potential approach, material balance approach, production function approach and programming approach. In the current context of rapidly changing technology, it was suggested that short-term projections would be more dependable than long-term projections. Discussing the problem of aggregation for supply and demand projections, the usefulness of a dynamic behavioural model was emphasized. With a view to making further improvement on estimates and projections of supply, the Seminar emphasized the need to generate more reliable data—time-series and cross-section—on inputs and outputs, types of farms and farming areas, etc. The question of approaches to the estimation of potential production and the choice of appropriate set of tools was discussed. On the nature and the kind of models, it was observed that though the most logical and most detailed models should obviously be preferred, looking to the availability of data and the computation facilities, a beginning with simpler models was justified. It was recognized that the demand and supply projections could not be studied in isolation. Related programmes such as

12. M. L. Dantwala: From Stagnation to Growth, Presidential Address delivered at the 53rd Annual Conference of the Indian Economic Association, December, 1970, p. 20.

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1. Immediately following the above-said Seminar, the Society held a Refresher Course on "Methodology of Projections of Demand and Supply of Agricultural Commodities" at the Institute of Economic Growth, Delhi from 25th May to 13th June, 1970.