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BOOK REVIEWS

A Study in Bihar Agriculture, S. R. Bose, A. N. Sinha Institute of Social Studies, Patna, Bihar, 1967. Pp. 61.

Bihar's economy comprises of a number of contrasting features with the result that though the soil, particularly in the alluvial plains of North and South Bihar, is generally very fertile and the Chotanagpur plateau is immensely rich in forests and mineral resources, Bihar ranks among the backward States. It is a case of poverty in the midst of plenty. It is not easy to unravel the complex of causes. However, because of the prominence of agriculture in the State, a study of agriculture in the State is necessary to understand the causes of its backwardness. This is what Bose has tried to do. He has attempted to analyse a few of the salient features of the agricultural situation in the State. With the help of data he has highlighted the stagnant nature of agriculture in the State which he ascribes to the overwhelming dependence of population on agriculture leading to low output per worker and low productive efficiency. He estimates that the State has 70 per cent more cultivators, 120 per cent more agricultural labourers and 62 per cent more cattle power per acre of net sown area as compared with the all-India average. In fact, the densities of cultivators, agricultural labourers and draught animal in Bihar are the highest in India, except Assam.

The problem in Bihar is really acute. Recurring scarcities and the scramble for food have become a regular feature of the economy. In spite of substantial increase in food production, actual import of cereals into the State doubled between 1956-57 and 1961-62, from about 3 lakh tonnes to about 6.5 lakh tonnes. That something needs to be done, and done urgently, was amply demonstrated during 1966-67 when lakhs of people in the State were on the verge of starvation.

Bose suggests two remedies, namely, population control and shift of population away from agriculture. But these are long term solutions aiming at raising the productivity per worker. The immediate requirement is to raise the yield per acre and raise it substantially. The experience of States like Punjab and Madras has shown that it can be done. The potentiality is there, only it is to be exploited.

The presentation in the brochure is not very systematic. The analysis is sketchy and the concepts used are also not very refined.

A. R.

Pricing Efficiency in the Indian Wheat Market, Ralph W. Cummings, Jr., Impex India, New Delhi, 1967. Pp. 203. Rs. 20.00.

The role of private sector in foodgrains trade has been the subject of animated discussions for quite some time in India. The two successive drought years (1965-66 and 1966-67) attended by unprecedented rise in food prices and the recent decline in food prices (coming in the wake of a bumper harvest) provide a somewhat contrasting but most interesting backdrop to the analysis of food policy in India. However, discussions on food policy are generally coloured by sentiments rather than being substantiated by empirical evidence. Cummings, Jr. has made

a pioneering effort in giving an empirical bias to the discussion on Indian food policy. The study, conducted in 1963-64, was directed to establish the norms and evaluate the effectiveness of the private wholesale wheat market (within the context of these norms) in promoting economic development in India.

The book is divided into five chapters. The first chapter is devoted to outlining the role of agriculture in economic development. Attention is also devoted to specifying the role of the marketing system in economic development. Chapter II provides a general description of marketing environment for wheat in India. The third chapter presents a depth analysis of wheat marketing in Khanna (Punjab) market. Chapter IV is a statistical study of the pricing efficiency of the Indian wheat marketing system. The final chapter, besides summarising the main conclusions emerging from the study, is devoted to outlining a frame for foodgrains price policy in India.

The study of the marketing environment for wheat in India highlights the degree of uncertainty faced by private trade due to the fluctuating pattern (both within the season and over the years) of demand for and supply of wheat. Direct participation by Government in wheat trade adds yet another imponderable in the market pattern. The analysis of wheat marketing pattern in Khanna market brought out a number of interesting points. In spite of the small number of *pucca arhatyas* (wholesale commission agents) in the market, the author found no evidence of collusion among them. As to the working of the Khanna Co-operative Marketing Society formed in 1957, the author states "The co-operative in Khanna poses more of a threat of competition to *kutchra arhatyas* than actual competition." (p. 59.) The author found a close relationship between prices of wheat in Khanna and Delhi markets, the differential seldom exceeding transport costs for any length of time. This suggests a high degree of spatial integration of markets. The analysis of profitability of stock build up by private trade is most revealing. It is stated, "Net returns for individual holding periods in different years varied from a loss of 5.47 per cent for six-month holding (December 1962) to positive return of 50.87 per cent for eight-month holding (February 1964). However, except for December 1963, the large positive returns reflected small changes in stocks, and with the exception of six-month holding period (influenced by December 1963), the weighted average returns for the other holding periods tested (seven through nine months) were less than interest costs." (p. 79.) (Mrs.) Uma Lely also came to a somewhat similar conclusion on the economics of stock-build up operations by private trade in jowar in Maharashtra (unpublished study). Inferences like these certainly cast the private trader into a shade different than that of an "exploiter."

On a wider geographical plane, the author found that when wheat movement was not subjected to restrictions, the principal wheat markets in India were closely inter-connected with each other. Movement restrictions, as could be expected, disturbed the equilibrium.

The major limitation of the study, as recognized by the author himself, has been a substantial degree of variability in the data on prices even in normal years. A great deal of bias is introduced in reported prices during periods of movement restrictions. Another shortcoming of the study has been the lack of emphasis

by the author on isolating the impact of speculative and real factors on variability in prices—both intra-seasonal and over the years. In periods of shortages private trader's operations are largely governed by speculative motives. Interference by government under such circumstances becomes inevitable. The author's suggestion to minimize price fluctuations through forward price supports and buffer stock operations (p. 132) have already been accepted as an integral part of government's food policy. What lacks, however, is action.

Cummings, Jr. has rendered a valuable service to the profession of agricultural economics by providing a framework for agricultural prices analysis with its implications on national policies. It is for the profession to take up the challenge of expanding the scope of such researches so as to provide empirical bias to the debate on agricultural policy in the country.

JAI KRISHNA

Application of Programming Techniques to Indian Farming Conditions, S. S. Johl and A. S. Kahlon, Department of Economics and Sociology, Punjab Agricultural University, Ludhiana, 1967. Pp. 98.

This publication is a good attempt to show that the linear programming technique can be applied in varying Indian farming situations. Although this is not the first attempt of its kind, it is praiseworthy for the varieties of farming situations to which the programming technique is applied.

The general conclusion which the present publication indicates supports the conclusion of Desai¹ that there exists a substantial potentiality of increasing farm income and production by reallocation of resources. This will be clear from the comparisons given by the authors between the existing plan and optimum plan on pages 37 and 61. However, it is not clear from these comparisons whether for the existing plan as well as the optimum plan, the resource position of the farm was kept the same. In Desai's publication it was explicitly stated that the resource position for the actual (existing) plan and the optimum plan was the same.

If the objective of the authors was "to test the applicability of these programming techniques in the Indian agricultural situation and suggest suitable modifications so that the programming models fit in with the actual economic situations and environment," the present publication has shown that it is possible to apply the linear programming technique to practical problems. However, as the publication is from the Punjab Agricultural University, one would expect that it would be a very useful reference book for the agricultural students who want to learn about the application of the linear programming technique to Indian farming conditions. From the point of view of a presentation for the use of students, the publication is very disappointing.

In part I, where the theoretical model is explained, there are many technical flaws. On page 4, in the first para the objective function refers to both maxim-

1. D. K. Desai : *Increasing Income and Production in Indian Farming*, The Indian Society of Agricultural Economics, Bombay, 1963.

zation of profits and minimization of costs, whereas in the very next para while explaining the framework of the technique only the maximization of profit is mentioned as an objective. The framework is not completely explained as the most important element of input-output matrix is missing in the narration.

In explaining the assumptions of linear programming (p. 5), the authors in their over-enthusiasm to show the practical application have unnecessarily complicated the concept of linearity by illustrating different categories of wheat. This categorization has nothing to do with the concept of linearity. The sub-categories of 20 md., 25 md., 30 md., and 35 md., are the activities which are to be used for explaining the concept of linearity. This is not explained by stating that these are yields per acre. The activity of 20 md. per acre of wheat means that if we want to grow 40 md. of wheat, we would need two acres. Thus there is a linear relationship between land and yield or input and output.

In explaining the procedure of planning (p. 8), the authors have not explained as to what are the activities and what kind of data would be needed for relating these activities to resource constraints. The authors have tried to show what kinds of schedules be used to obtain the data required for the application of the linear programming technique. On page 8 they refer to Appendix I which should be in reality Appendix II (there are many such printing mistakes in the publication). On page 9, they refer to Table I which does not exist in the text. They state that "for this matrix, input of fixed resources can also be worked out from section III A and III B." The sections III A and III B in Appendix II refer to variable costs. It is not understood how inputs of fixed resources can be worked out from these sections.

On page 10, in explaining the peculiarities of the "problem matrix" under the Indian farming conditions, the authors state, "irrigation capacity is particularly limiting to farm production in hotter months of April to early July." This may be true for Ludhiana area for which the authors have the practical experience but in other parts of India irrigation capacity would be a constraint in other seasons also.

On page 11, the authors have given land classification on the basis of suitability for different crops. It is not understood why the authors had to combine different classes of land for constructing realistic land resource constraints. This seems to have been done because of the enthusiasm of the authors to show the "practical" aspects of the problem. Otherwise Table I.1 can be easily constructed from the data of land classification given on page 11. There is no necessity of combining various kinds of land. We have given the revised Table I.1 below :

Land classification	Available land	Revised Table I.1										
		W _r	W _k	G ₁	M _r	M _r	AC _r	AC _r	C	S	G _x	
		P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	
A _r	5.00	1	1	—	1	—	—	1	—	1	—
B _r	0.90	1	1	—	—	—	—	1	—	—	—
C _r	2.50	1	1	1	—	—	—	1	—	—	—
A _k	5.00	1	—	—	1	1	1	1	1	—	—
B _k	1.50	1	—	—	—	1	1	1	—	—	—
C _k	2.25	—	—	—	—	—	—	—	—	—	1

P₁ to P₁₀ refer to the same activities as given in Table I.1.

Perhaps this is more practical and realistic. It has been stated on page 11 that $A_T=5.00$ is not suitable for gram whereas in Table I.1 (p. 18) the restriction of wheat land irrigated which includes A_T type of land is considered suitable for gram irrigated (P_3). This is contrary to the stated facts. We have avoided such contradiction in the revised Table I.1.

On page 12, under the topic "Solution of A Problem," the authors have not mentioned anywhere that they are describing the simplex method of solving the linear programming problem.

On page 14, while explaining the example, the authors state that in the IInd iteration under P_2 column the incoming row (P_9) indicates .128 acre of sugarcane as alternate input. "This means, in order to grow one acre of wheat (P_2), 64 man-hours of November-March labour will be obtained through decreased acreage under sugarcane by .128 acres." (p. 14.) In Table I.2 the figure is printed as .008 instead of .128 which is a mistake.

While explaining the example, the authors have not cared to indicate which activities are denoted by P_1 to P_{10} or which restrictions are indicated by P_{11} to P_{23} . The reader is obliged to decodify these notations by referring to Table I.1 and the notations given against the resources under the topic "Marginal Value Productivity of Fixed Resources."

In part II, the authors have given four examples of linear programming under the heading "Practical Application." In the first example of "A Synthetic Farm Situation," it is not understood as to what use has been made of the data on the tenancy classification of land. The figures given under the irrigated and unirrigated categories of land in the table for tenancy classification do not tally with the land categories classified according to suitability of crops. For example, the total land fit for unirrigated fodder and groundnut in *kharif* is 7.70 acres whereas the total unirrigated land is 7.74 acres. Again, the figure for net available land for commercial crop enterprise against the fodder and groundnut land unirrigated row is not correct. It should be 6.56 instead of 6.29 acres.

The authors have not explained the notations P_1 to P_{23} in Table II.3. They have also not explained whether rotations R_1 to R_9 are two-year rotations or single year rotations. From the notations it appears that R_1 to R_8 refer to a two-year rotation each ; but R_9 seems to denote only a single year rotation. It is assumed that input-output data of the two-year rotations must have been adjusted to one-year period. This is not made clear by the authors.

In the example of "A Vegetable Farming Situation," the tenancy classification of land is completely redundant. The authors do not explain that the figures of returns to fixed farm resources given under the optimum plan in Table II.16 are different from those of Z_j-C_j in Table II.15 because the former includes returns from non-vegetable crops such as berseem and rice.

In the example of "A Mixed Farming Situation (Crops and Dairy Animals)," in addition to the usual crop activities an activity of dairy (one-buffalo) is included in the problem. In the formulation of the problem instead of showing the rela-

tionship of crops giving fodder to the dairy activity and the dairy activity supplying farmyard manure to crops, the dairy activity is shown to consume land resources and does not add anything to farmyard manure restriction.

The authors have then tried to show how the optimum plan would change if the dairy activity (two, five or ten buffaloes) is included in the plan. As the authors have shown the net resource availability of the farm situation with dairy as a fixed enterprise at levels of two, five and ten buffaloes (Table II.20, p. 79), it was not at all necessary to show the input-output matrices in Tables II.21 (two buffaloes), II.22 (five buffaloes), and II.23 (10 buffaloes) as the input-output matrix would not change with the changes in resource restrictions. The solutions given in Tables II.24, II.25 and II.26 could have been given in a single table.

In the example of "Cost Minimization Problem of Feeding Dairy Buffaloes in the Punjab," again the authors have not explained the notations given in Annexure-I. For example, in the write-up the authors have used the notations C_1 to C_6 for the restrictions whereas in Annexure-I, they have used the notations D_1 , D_3 , D_5 , A_1 , A_2 , A_3 and A_4 for the restrictions. The reader has to decodify these notations from the columns of activities given in the Annexure-I. The authors have not explained the use of artificial activities in this problem.

Apart from the technical flaws in the publication, there are many printing mistakes. The publication does not seem to have been well edited.

The most important drawback of this publication is that the authors have completely ignored the review of literature on this topic and have not given any references. A bibliography on the subject would have helped the reader and particularly the students a great deal.

The authors, however, should be congratulated for their effort in bringing together the results of the practical farm management research work which is being conducted at the Punjab Agricultural University. This is an important addition to the very scanty literature on application of linear programming to Indian farming conditions. It is hoped that their effort would encourage the farm management research workers to do a better job.

D. K. DESAI

Glimpses of Co-operative Farming in India, H. Laxminarayan and Kissen Kanungo, Agricultural Economics Research Centre, University of Delhi, Asia Publishing House, Bombay, 1967. Pp. vii+144. Rs. 15.00.

In the ten-or-so years since the field investigation underlying this book was conducted, both the authors have seen rather rapid advances in their respective careers (as witness the blurb). A slightly unfortunate consequence of this otherwise happy development, however, has been that as the authors returned to their work after a long lapse of time, the preparation of the book suffered over-much from a lack of even elementary care.

The Preface does not tell us the year in which the investigation was made; it merely says, "sometime back." The fact that the investigation took place in 1956-57 is only incidentally (and as if grudgingly) mentioned on p. 39. In Chapter I, the authors say that the results of the 'intensive' investigation are given in 'Part II' of the book. The book, however, has no 'Parts.' (Luckily, the material is present.)

The survey includes some Co-operative Farming Societies in Punjab and some in Uttar Pradesh. There is one 'preliminary' survey of 140 societies, one 'intermediate' survey for a smaller number of these and one 'intensive' survey for a still smaller number.

How many societies were selected for the 'intermediate' survey? For an answer you have a wide option to choose from 25? (yes, p. 3), 22? (yes, p. 16), 19? (yes, p. 9), 18? (yes, p. 10). This must be seen to be believed!

Statement No. 6 on p. 137 gives the number of Co-operative Farming Societies in Punjab and Uttar Pradesh for each year from 1949 to 1957. For the last year the figure for Punjab is 124 and for Uttar Pradesh 16. The total is exactly 140, *i.e.*, the same number which the authors selected for 'preliminary' investigation. Now, two questions arise in the context of this statement.

The coverage in the preliminary survey should really have been 185 (147 in Punjab and 38 in Uttar Pradesh). (See p. 2.) Non-response of 45 societies made the authors confine their study to only 140. Why should they then say that only 140 societies (and not 185) existed in 1957?

Secondly, the said 185 societies have been *estimated* by the authors to be of the Co-operative 'Joint' Farming type because the official Punjab data mixed up 'better farming,' 'tenant farming' and 'joint farming' societies and gave a figure of 451 societies of all kinds for 1956-57. It is good that the authors sifted and weighed this chaotic data as best they could and made an estimate of the real 'joint' societies. So far, so good. But if Punjab data are all mixed up for 1956-57 they are in all probability mixed up for all the previous years too. If they are not, the authors should tell us so. If they are, did the authors do the sifting for all the earlier years also? In brief, it is not possible to know what statement No. 6 exactly means.

The uneasiness that one feels at this performance must, however, be overcome and attention paid to the results of the research. And in this context it is enough to say that the story of co-operative farming in Punjab and Uttar Pradesh, as revealed by the authors, shows the same characteristics as have been noticed elsewhere in many similar studies. The motivation of 'co-operators,' invariably, is either avoidance of land reform legislation or profiting from Government financial assistance. Where such is not the case the societies are found to be the result of conditions laid down by Government while giving land to displaced persons, etc. The authors, therefore, conclude that most of the existing societies in the two States are not genuine and make suggestions for fostering only genuine co-operatives so that Government money is not wasted on these caricatures of co-operative farming.