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3. D. Bhattacharya : The Role of Technological Progress in Indian Economic Development World Press, Calcutta, 1972.
4. J. Bieri, A. De Janvry and A. Schmitz, "Agricultural Technology and the Distribution of Welfare Gains," *American Journal of Agricultural Economics*, Vol. 54, No. 5, December, 1972, pp. 801-808.
5. D.P. Chawdhari : Education and Agricultural Productivity in India, Ph.D. Dissertation, University of Delhi, 1968.
6. R.E. Evenson and D. Jha, "The Contribution of Agricultural Research System to Agricultural Production in India," *Indian Journal of Agricultural Economics*, Vol. XXVIII, No. 4, October-December, 1973, pp. 212-230.
7. Y. Hayami and V.W. Ruttan : Agricultural Development : An International Perspective, Johns Hopkins Press, Baltimore and London, 1971.
8. J.G. Kendrick : Productivity Trends in the United States, Princeton University Press, 1961.
9. C. Kennedy and A. P. Thirlwall, "Surveys in Applied Economics : Technical Progress," *The Economic Journal*, Vol. 82, No. 325, March, 1972, pp. 11-72.
10. Raj Krishna, "The Growth of Aggregate Agricultural Output in the Punjab," *Indian Economic Journal*, Vol. XII, No. 1, July-September, 1964, pp. 53-59.
11. W. Ladejinsky, "Green Revolution in Bihar : A Field Trip," *Economic and Political Weekly*, Vol. IV, No. 39, September 27, 1969.
12. R. Mohan, and R.E. Evenson : The Intensive Agricultural District Programme in India : A New Evaluation, 1974 (mimeo.).
13. Rakesh Mohan, D. Jha and R.E. Evenson, "The Indian Agricultural Research System," *Economic and Political Weekly*, Vol. VIII, No. 13, March 31, 1973.
14. M.I. Nadiri, "Some Approaches to the Theory and Measurement of Total Factor Productivity," *Journal of Economic Literature*, Vol. VIII, No. 4, December, 1970, pp. 1137-1177.
15. C.H. Hanumantha Rao : Technological Change and the Distribution of Gains in Indian Agriculture, Institute of Economic Growth, Delhi, 1974 (mimeo.).
16. K. Satyanarayana : Impact of New Farm Technology on the Economy of Cultivator Households in Punjab, Ph.D. Dissertation, Post-Graduate School, Indian Agricultural Research Institute, New Delhi, 1973 (unpublished).
17. A. Schmitz and D. Seckler, "Mechanised Agriculture and Social Welfare : The Case of the Tomato Harvester," *American Journal of Agricultural Economics*, Vol. 52, No. 4, November, 1970, pp. 509-577.
18. Tara Shukla, "The Rate of Technological Change in Indian Agriculture during the period 1920-21 to 1960-61," *Indian Journal of Agricultural Economics*, Vol. XXI, No. 1, January-March, 1966, pp. 182-188.
19. S.S. Sidhu, "Economics of Technical Change in Wheat Production in the Indian Punjab," *American Journal of Agricultural Economics*, Vol. 56, No. 2, May, 1974, pp. 217-226.
20. R.M. Solow, "Technical Change and the Aggregate Production Function," *The Review of Economics and Statistics*, Vol. 39, No. 3, August, 1957, pp. 312-320.

AN OPERATIONAL APPROACH TO AGRICULTURAL GROWTH AND EQUITY

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Growth and development are often used synonymously in economic discussions and this usage is entirely acceptable. But where both the words exist, there is point in drawing a distinction between them. Implicit in usage, and explicit in what follows, economic growth means more output, and economic development implies both more output and changes in the technical and institutional arrangements by which it is produced (17).* The process

* Numbers in brackets refer to the list of references at the end of this article.

of economic growth can be described in various ways; it can be related to change in production techniques, or to change in attitudes to saving and investment or a gain to the opening up of new opportunities of trade and expansion (1). The agricultural growth resulted from the implementation of the new strategy for agricultural development in India has brought to the surface the urgent need for removing inter-regional/inter-personal disparities in income and productivity (3, 6, 15).

If the objective is greater distributive justice through increases, since growth and social justice are two sided in income and agricultural productivity, there is need for a deliberate dual purpose strategy of growth to diffuse the benefits : first, to augment the productive capacity and economic strength and second, to ensure that the benefits of extension and development are not cornered by conferred on people (25).

Where giant strides are necessary, what has been offered here may seem meagre indeed. This paper discusses an agricultural strategy under eight heads : (*i*) agricultural regionalisation, (*ii*) knowledge of the region, (*iii*) identification of problems and solutions, (*iv*) input rationing and Pareto optimality, (*v*) inter-regional resource and product specialisation, (*vi*) land reforms, (*vii*) public finance in agriculture, and (*viii*) plan formulation and implementation. It is hoped that this paper will provide a basis for thinking about a tool of analysis, a method of approaching agricultural policy for agricultural growth and equity.

I. AGRICULTURAL REGIONALISATION*

Since a plan implemented with equal efforts does not yield similar results everywhere, any plan for agricultural development of a country needs to be made up of seperate plans for different agricultural regions within the country. Regional macro-economics implicitly assumes homogeneity because it aims at predicting short and long run variations in regional economic activity in terms of interaction of certain parametric variables. These variables cannot be used successfully for prediction unless they have similar constant values over the region as a whole or unless they change in a regular foreseeable way. These conditions would not hold if the overall regional values were the averages of very wide variations within different parts of the region (26). Thus, for understanding the differences in physical conditions and resource development potential in different parts of the country, it is necessary to divide the country into areas having similar conditions and development potential (15, 27). While doing so, due consideration must be given to the agro-climatic, socio-economic, physical, political factors.

II. KNOWLEDGE OF THE REGION

The first step towards getting agriculture moving is to achieve a clear and full understanding of what agriculture is (23). Since planning has to

*For comparative review of work done on Indian agricultural regionalisation, see Kanungo and Sarma (15).

be pragmatic and problem solving activity, so no apology should be made for inadequate data or for making proud assumptions about agriculture (8). The selection of appropriate measures to direct and encourage farmers along the desired development path must be based on detailed and intimate knowledge of the economic, technological, psycho-sociological and cultural framework of the region under planning (12, 30). Therefore, information needed for developmental planning would include data on natural and human resources, livestock, land use, crop production, factor proportions, production functions, income, employment, credit, markets and prices, transport and communication, social beliefs, values, attitudes, etc.

III. IDENTIFICATION OF PROBLEMS AND SOLUTIONS

There are three major functions of a development plan : (*i*) institutional structure that will establish the human and natural conditions, (*ii*) economic estimate of the size of investment required, and (*iii*) establishing organizational framework capable of implementing various stages of the plan (32). After collecting detailed array of data about the region/s, the development plan must analyse the problems and provide methods and procedures to fulfil the established goals. Several sophisticated analytical techniques are now available for regional development planning (11, 14, 19, 26). One or the other or a combination of the techniques available for area planning can be used to identify the specific problem/s of a region and that may help suggest solutions.

Mosher categorised relevant factors, absence of which may pose severe farm problems, into "essentials" and "accelerators" of agricultural development. The agricultural problems may be classified and grouped in different manners (7, 20, 33) but the complexity of local conditions make each region unique and hence no general statement is possible.

IV. INPUT RATIONING AND PARETO OPTIMALITY

Public policy requires some framework or set of criteria serving as a foundation on which both growth and equity are based and can be judged. One analytical framework providing a set of concepts for suggesting and evaluating policy in overall societal or community context is that of welfare economics (10). The analysis which follows defines the economic reorganization which will increase aggregate output or community welfare :

$$\frac{\partial qij}{\partial qik} = \frac{\partial qhi}{\partial qhk}$$

where i, h may be two crops, farms or regions;
and j, k are two resources.

The above equation will help in allocating resources among different producing segments. These producing segments may include different crops within a farm, regions, and different farms. Within this framework, resources are allocated most efficiently when these conditions hold true : (*a*) Resources

must be allocated within each farm in a manner that the marginal value productivities of the resource service are equal, (*b*) resources must be distributed between farms/regions so that marginal value productivities are equal, (*c*) resources must be distributed between producing and farming areas to allow attainment of equal value productivity, and (*d*) resources must be allocated over time such that their discounted value products are equal (9, 10). Hence, it may be concluded that the marginal value productivity of resources used at one farm, in a region at any location at a time must be equal to that of another farm, of another region/location/time period.

In the context of continued shortages of high-yielding variety (HYV) seeds, fertilizers, agricultural chemicals, etc., from the individual farm point of view it may be desirable to let the resources concentrate in fewer hands and areas, but from the aggregate production point of view it will result in low output and increased income inequality between farms or regions because in agriculture diminishing returns start much earlier than in non-agricultural productions (21, 29). Hence there is need for evolving some sort of a rationing system for agricultural inputs operating on the principle of Pareto optimality to minimize glaring income inequalities and maximize farm production in the country.

V. INTER-REGIONAL RESOURCE AND PRODUCT SPECIALISATION

Regional planning involves the development of resources not of regions as isolated fragments but as parts of a complete nation-wide pattern. A region, thus delineated, is an area homogeneous in respect of a particular set of conditions with unique advantages of developing some kind of production specialisation. Therefore, the basic principle of planning should be an effort to bring about the fullest development of natural resources through production specialisation in region/s for which they are specially suited. The kind of relationships that define the degree of resource specialisation and geographic location of production, are largely the same on an individual farm as on a regional or international basis. The physical or technological phenomena which cause production pattern to differ in terms of either (*i*) intensity of production, (*ii*) combination of different crops or livestock products, or (*iii*) producing regions, are climate, soils and biological (9).

Thus, the difficulties in producing adequate quantities of a commodity on specialised pattern in a region may be elucidated as : (*a*) basic ecological limitations which increase the cost of agricultural production, (*b*) lack of capital, technical knowledge and experience, and (*c*) lack of incentives to farmers to adopt more productive systems and techniques.

VI. LAND REFORMS

Gunnar Myrdal has concluded that there is no conflict between the goals of growth and social justice. Instead, radical egalitarian reforms are necessary for sustained growth and development (24). There is no reason to assume that both goals, *i.e.*, distributive justice and increase in general productivity, could not be served if both type of programmes—developed land reform

and new services and technical support to agriculture—were undertaken (22). Indian agriculture is characterized by high incidence of tenancy and landlessness, wide degree of fragmentation and a very high skewed ownership distribution of holdings which have direct bearing on agricultural production and income (4, 5, 18). Almost all items of new farm technology are divisible and can be adopted on the farms without developing stresses on the size of farm, to modernize traditional agriculture (28). But as regards the farm productivity is concerned, it has inverse relationship with the size of farm (16). Hence, land redistribution can be carried without short run damages and with remarkable long run gains. The ceiling should be applied for the appropriation of land for redistribution to promote the existing tenants to ownership, and the settlement of the landless. Also, a floor limit should be fixed below which the holdings should not be allowed to be divided so that none of the farms is economically unviable.

The outcome of land reform is strongly affected by administrative arrangements for their implementation. Arrangements for developing administrative function to local non-career officials produced significantly better results for peasant welfare than arrangements using professional administrators whether in a centralised or decentralised bureaucratic system (21). The effective implementation with no evasions, of the land reforms, *viz.*, consolidation of holdings, security of tenure, along with ceiling and floor limit of the holdings will not only introduce socialism in agriculture but will also make agriculture more efficient.

VII. PUBLIC FINANCE IN AGRICULTURE

In a developing country, agricultural development and industrialisation are inter-dependent and inter-connected. In other words, industrial backing is necessary for helping agricultural production and therefore public funds should be invested where it has the greatest impact. An important question in the context of public investment for developing basic infra-structure in the rural areas, is how to get help from the rural sector in financing rural development projects. This draws attention on the point how the surpluses (as they are generated) in the rural sector are to be drawn upon. Substantial aggregate capacity for capital contribution lies with the farmers whose income is well above the average (6). Hence, from income equality point of view and long run gains in the productivity of land, it is possible to devise a suitable scheme of taxation of land holdings.

Some authors proposed progressive taxation of land holdings rising steeply with their estimated 'potential yields' (18, 20). Since government has constantly been unable to meet the 'potential demand' of farmers for inputs like credit, fertilizers, electricity, diesel, etc., the attainment of the so-called potential yields will remain far from reality and as such it cannot be a justifiable basis of agricultural taxation. The Raj Committee has recommended a very reasonable formula that tax on agricultural holdings (AHT)

should be based on the rateable value of operational holdings and on a family basis and further suggested that it (AHT) should have a reasonable degree of progression, take account of the differences in the productivity of land, reflect change in productivity and price over a period of time and be uniform in different parts of the country (13).

VIII. PLAN FORMULATION AND IMPLEMENTATION

A rational economic plan should have five characteristics : (*i*) Co-ordination—each component of the plan must be properly connected to others, (*ii*) Consistent—plan for each item must conform to the plan of another item, (*iii*) Convincingness—although, future prospect involves a great deal of randomness, but a plan should be as close to reality as possible, (*iv*) Completeness—all items in the model taken together must cover the whole economy, and (*v*) realisticness—it should be checked whether or not it represents the realistic relationship of the variables.

A. *Farmer's Participation :* Whatever motives are followed or interests served, human action in agricultural policy in a democratic set-up, is subject to four main constraints: technical, economic, social and political (2). Hence, for evolving a most suitable agricultural policy, the planning team should consist of the natural scientists and technologists, economists, sociologists and political scientists as well as the subject matter specialists and farmers' representatives whose participation will make plan more adaptive to local situations. Involvement of local people in planning will also help create the conducive environment for implementation as farmers can be brought to feel that the plan is in some sense "ours" instead of being "theirs."

B. *Calendar of Action :* To revolutionize agricultural economy there is continuous need for more and more fundamental and adaptive agricultural research with a sound communication strategy which can effectively and quickly disseminate the latest technology to the farming community and influence the individual farmer to adopt it (31). In addition to this, farmers should also be stimulated by providing efficient distribution system and incentive-oriented price and credit policy.

The dimension of problem of organizing a timely and adequate supply of inputs—financial, material and technical, have increased manifolds with the introduction of the new farm technology (6, 31). To have impact on every farm, detailed programme of action, with the time factor indicated should be laid down for each village and be implemented correctly as well. The calendar of action should show what are the various actions to be taken at particular levels and periods so that the required amounts of inputs are in the hands of the farmers well in time.

REFERENCES

1. J. J. Anjaria : Problems of Economic Development, Presidential Address, All-India Economic Conference, Annamalainagar, December, 1959.

2. Rudolf Bicanic : Turning Points in Economic Development, Mouton & Co., N.V. Publishers, The Hague, 1972.

3. V. M. Dandekar, Rapporteur's Report on Regional Variations in Agricultural Development and Productivity, *Indian Journal of Agricultural Economics*, Vol. XIX, No. 1, January-March, 1964, pp. 253-266.

4. M. L. Dantwala, "Agrarian Structure and Economic Development" (Presidential Address), *Indian Journal of Agricultural Economics*, Vol. XVI, No. 1, January-March, 1961, pp. 10-25.

5. M.L. Dantwala and W.B. Donde, "The Uneconomic Cultivator," Indian Journal of Agricultural Economics, 1940-64—Selected Readings, Indian Society of Agricultural Economics, Bombay, 1966, pp. 9-48.

6. D.K. Desai, Rapporteur's Report on Pattern of Income Distribution, Savings and Expenditure in Rural Areas, *Indian Journal of Agricultural Economics*, Vol. XXV, No. 3, July-September, 1970, pp. 67-74.

7. F.A.O. : Towards a Strategy for Agricultural Development, FFHC Basic Study No. 21, Food and Agriculture Organization of the United Nations, Rome, 1969, pp. 1-49.

8. J. Price Gittinger : Planning for Agricultural Development : The Iranian Experience, Centre for Development Planning, National Planning Association, Washington D.C., 1965, pp. 3-20.

9. Earl O. Heady : Economics of Agricultural Production and Resource Use, Prentice Hall of India (P) Ltd., New Delhi, 1964, Chapters 22 and 24.

10. Earl O. Heady : Agricultural Policy Under Economic Development, Iowa State University Press, Ames, Iowa, 1965, Chapter 8.

11. Earl O. Heady (Ed.) : Economic Models and Quantitative Methods for Decisions and Planning in Agriculture, The Iowa State University Press, Ames, Iowa, 1971.

12. Benjamin Higgins : Economic Development—Principles, Problems and Policies, Central Book Depot, Allahabad, 1966, pp. 729.

13. Government of India : Report of the Committee on Taxation of Agricultural Wealth and Income, Ministry of Finance, New Delhi, October, 1972, pp. 23-63.

14. Walter Isard : Methods of Regional Analysis: An Introduction to Regional Science, The M.I.T. Press, Massachusetts, 1960.

15. K. Kanungo and J.S. Sarma, "Regional Agricultural Development Planning in India," *Agricultural Situation in India*, Vol. XXVIII, No. 5, August, 73, pp. 315-334.

16. A.M. Khusro, "Returns to Scale in Agriculture," *Indian Journal of Agricultural Economics*, Vol. XIX, Nos. 3 and 4, July-December, 1964, pp. 51-80.

17. C.P. Kindleberger : Economic Development, McGraw Hill Book Co. Inc., New York, International Student Edition, 1965, p. 3.

18. Raj Krishna, *et. al.*, "Economic Policy for Agricultural Development," in A.M. Khusro (Ed.) : Readings in Agricultural Development, Allied Publishers, Bombay, 1968 pp. 585-607.

19. Charles L. Leven, John B. Legler and Perry Shapiro : An Analytical Framework for Regional Development Policy, The M.I.T. Press, Massachusetts, 1970.

20. Max F. Millikan and David Hapgood : No Easy Harvest—The Dilemma of Agriculture in Underdeveloped Countries, Little Brown and Co., Boston, 1967, Chapter 7.

21. B. S. Minhas and T. N. Srinivasan, "New Agricultural Strategy Analysed," *Yojana*, Annual Number, January, 1966, pp. 20-24.

22. J. D. Montgomery : Allocation of Authority in Land Reform Programs : A Comparative Study of Administrative Process and Outputs, Agricultural Development Council, Inc., New York, RTN Reprint, May, 1974, p. 12.

23. A.T. Mosher : Getting Agriculture Moving—Essentials for Development and Modernisation, Agricultural Development Council, Inc., New York, 1966, pp. 63-169.

24. Gunnar Myrdal, "Conflict of Goals," *The Economic Times*, Annual 1972, pp. 43-45.

25. D.K. Rangnekar, "Challenge of Change," *The Economic Times*, Annual 1972, pp. 15-23.

26. Harry W. Richardson : Elements of Regional Economics, Penguin Books Ltd., Middlesex, England, 1969.

27. P. S. Sharma, "Regional Approach to Agricultural Development in India—Some Preliminary Results," *Indian Journal of Agricultural Economics*, Vol. XIX, No. 1, January-March, 1964, pp. 176-192.

28. T.W. Schultz : Transforming Traditional Agriculture, Lyall Book Depot, Ludhiana, 1970, Chapter 8.

29. Harpal Singh, "Intensive Agricultural Approach to Agricultural Development," *Indian Journal of Agricultural Economics*, Vol. XXI, No. 4, October-December, 1966, pp. 141-153.

30. Katar Singh, "Integrated Area Development Planning—Purposes and Procedures," *Indian Journal of Agricultural Economics*, Vol. XXVIII, No. 4, October-December, 1973, pp. 2-7.

31. C. Subramaniam : A New Strategy in Agriculture, Indian Council of Agricultural Research, New Delhi, 1972, pp. 3-52.

32. Raanan Weitz : From Peasant to Farmer—A Revolutionary Strategy for Development, Columbia University Press, New York, 1971, p. 194.

33. Clifton R. Wharton, Jr. : Research on Agricultural Development in Southeast Asia, Agricultural Development Council, Inc., New York, 1965, pp. 7-26.