Vol XXII
No. 3

ISSN 0019-5014

JULY-
SEPTEMBER
1967

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS

INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

BOOK REVIEWS

The Impact of Price Movements on Areas under Selected Crops in India 1900—1939, Dharm Narain, Cambridge University Press, London, 1965. Pp. ix + 234. 45s.

To the growing volume of the literature on producers' response to price stimulus, Dharm Narain's study is a well authenticated and thought-provoking contribution. This study, which was approved by the University of Delhi for the award of the Ph.D. degree, is divided into two parts. The first part contains a rigorous exposition of almost all important aspects of the hypothesis concerning producers' behaviour in response to price changes in the context of peasant agriculture. The complex and intricate theoretical issues involved in assessing the role of the basic economic principle of profit motive in the decision making process of the Indian farmer have been discussed thoroughly in the first two chapters which form one of the most important contributions of this study.

Any research worker who has attempted a time-series analysis of Indian agricultural data knows the pitfalls that abound. This is all the more so for the period as long and as far away as 1900 to 1939. Dharm Narain is all too aware of the limitations and inadequacies of the data on prices, acreage, yields, etc., which he has subjected to statistical analysis. These limitations and the adjustments made in the original data have been clarified in Chapter 3.

The second part of the study is devoted to a graphical comparison of year-to-year variations in acreages under six crops—cotton, jute, groundnut, sugarcane, rice and wheat—with those in their prices and proceeds per acre. Prices of competing crops and data on rainfall have also been juxtaposed. While the graphical method of analyzing the complex relationship between prices and acreage has the merit of simplicity, it lacks precision. It is also not possible to quantify the significance of the influence of different variables, which an econometric approach (albeit with a number of simplifying assumptions) could have attempted. In the absence of such an approach, the author's conclusions are often couched in vague phraseology, such as, 'price bears in an unusually large degree on the variations of Madras cotton area' (p. 44). Dharm Narain has, no doubt, acknowledged this limitation of the present study in the Preface and it will be of great interest to await the results of the econometric projection of the present work.

One other point which strikes the reader is that the author has used different variables and weighed varying considerations in analyzing acreage variations of different crops but with little attempt to rationalize these differences. As the economic and institutional parameters for different crops differ, it is reasonable to have certain differences in the variables selected and also their treatment. However, one keeps wondering whether considerations given prominence in the treatment of one crop or for one region were altogether unimportant for other crops or regions.

These few points apart, the author's scholarly treatment of a very fascinating area of Indian agriculture has earned the study an assured place in the literature

on this subject. All research workers interested in this field will gain valuable insight by a systematic appraisal of the issues, problems and results presented by the author in this book.

B. P. DUTIA

Methods for Land Economics Research, edited by W. L. Gibson, Jr., R. J. Hildreth and Gene Wunderlich, University of Nebraska Press, Lincoln, U.S.A., 1966. Pp. xv+242. $6.50.

This volume is a collection of twelve papers, and is the outcome of a Symposium on Research Methods in land economics held at Virginia Polytechnic Institute in 1965. The first paper reviews methodological orientations in land economics in the U.S.A. since 1900 and pleads for shifts in orientation "from description to analysis, from ordinal to cardinal measurement and identification, from normative to positive characterization of data, and from applied to basic studies including the development of analytical tools and concepts." This is the only paper in the book which focuses attention exclusively on methods of research in land economics. The succeeding four papers are topics in 'philosophy of inquiry', *viz.*, problem identification, formulation of hypothesis, classification and choice of empirical techniques respectively. The last seven papers explain the various statistical and mathematical techniques used in solving problems or testing hypotheses. The topics discussed cover a wide range, from the more familiar and widely used such as correlation and regression analysis to the more advanced and less widely used techniques of Operations Research.

The subject matter of four papers on the philosophy of inquiry is a familiar field to students of research methodology. It is perhaps difficult to be original in this area. Illustrations with specific references to either on-going or completed research studies on land economics could have added immensely to the value of the book. Nothing is more rewarding to the beginner in research than to learn from the experience of his senior in the same area of research. In addition to general discourses on research methodology, a good description of the process of research as applied to any particular problem of land economics could have been quite helpful.

The group of papers on mathematical and statistical techniques may be found to be elementary by students of econometrics. The uninitiated, however, will get a lucid and concise account of even the latest advances in techniques of analysis. Even here the papers could have been more meaningful and purposive had they been illustrated with specific problems of research. Earl R. Swanson has done well in explaining the application of Markov chains to the analysis of farm size in his paper 'Operations Research Technique'. Others could have followed his example in illustrating the use of techniques with reference to specific problems of research in land economics.

The volume, admittedly, is not in line with its title. But as a textbook for courses on research methodology it is a useful addition. It has the further merit of introducing the uninitiated into the latest mathematical and statistical techni-

ques in a lucid, concise and intelligible form. The bibliography at the end of each paper will be found helpful to those who are interested in recent advances in the techniques.

G. PARTHASARATHY

Some Aspects of Co-operative Farming in India with Special Reference to the Punjab, S. K. Goyal, Institute of Economic Growth, Delhi, Studies in Economic Growth, No. 9, Asia Publishing House, Bombay, 1966. Pp. viii + 210. Rs. 25.00.

One does not like to be harsh but there really was little point in publishing in the year 1966 this work completed somewhere around 1960 without the benefit of a revision by the author. Delayed publication has made large parts of the book look stale. But, as the sequel will show, this is only the least of its drawbacks.

Even if Goyal were to come out in 1960, he couldn't have escaped the charge of being generally unventuresome and rather superficial in respect of his general treatment of the subject. For instance, in chapter V he studies the experience abroad and deals specifically with the Co-operatives in China, Poland, Israel and the U.S.S.R.; but, "To comment on the degree of their success," he says, "will amount to entering into a very risky field." (p. 101.) This timidity has characterized his later chapter on 'Economic Considerations' (Chapter VIII) also. After listing a number of advantages of co-operative farming, Goyal admits :

> "However, the solution will throw up many problems of its own. For instance, how can we give the incentive for hard work in a co-operative farm where the benefits or the losses were shared? Are we to measure the labour input ? Shall we secure harmony between the members of different economic status, castes and groups? What proportion of the produce is to be given for the ownership contribution?"

As everyone knows, these are the really vital questions. But the author is unwilling to take the 'risk' of grappling with them.

One would have thought that the results of the survey of Co-operative Joint Farming Societies in the Punjab would still be valuable. But this is by no means so. The author has left quite a few conundrums which made this reviewer feel extremely ill-at-ease.

(1) Table VII on p. 130 and remarks on this table on p. 132 tell us that 28 out of 111 Joint Farming Societies had *leased in* their land either from Government or local landlords. If land has been leased in, this obviously means that there was no question of *pooling of owned assets* and the societies in question, according to the established nomenclature in our country, would be *Collective* Farming Societies and not *Joint* Farming Societies. Or does it mean that these 28 societies had leased in *part* of their total holding? The author does not tell us.

(2) The author tells us in Table 1 on p. 122 that out of 252 Co-operative Farming Societies in the six districts of Punjab, 154 are 'registered' as joint, but

only 111 or 44 per cent are 'actually working.' (In his statistical enthusiasm he 'projects' this percentage to estimate the number of Joint Farming Societies in the whole of Punjab !) Then, out of these 111 societies he selected 20 for detailed investigation and found that *half* of them were either under liquidation or had never taken up joint cultivation at all! How did the author then decide in the first place that the 111 societies were 'actually working'? Perhaps that is what the Co-operative Department told him. (Once again we are left to guess.) But then after discovering that only half of his 'actually working' societies really deserve that description, he should have turned round and questioned the validity of the description of the 111 societies as 'actually working.' For some unknown reason, this he does not do. Or, perhaps the reason is not far to seek. His 'preliminary' survey is entirely based on the records of these societies available at the Department Offices. Admission of the fact that quite a large percentage of these 111 societies could either be defunct or non-joint would have meant abandoning laboriously collected information, which, at any academic cost, must go into the 'thesis'!

(3) Then we begin to read about the case studies of the ten 'actually working' societies, secure in our mind that no further jolts are in the offing. The author describes the membership, the resources, the motivation, etc., of these societies. By the time we are half through, the author very casually flings at us the following information :

> "During informal discussions with co-operators, we were told that the *formation of a co-operative, in most of the cases, did not make any change in the unit of management. The change was only on paper.*" (Emphasis supplied).

And then he goes on to discuss the other characteristics of these Joint(?) societies, as if nothing has happened! This care-free manner would be the envy of many.

This, surely, is the limit. In the end, the reviewer does know what value to attach to the otherwise moderately interesting conclusions of the survey. For he is not sure whether they relate to only Joint Farming Societies proper or Joint, Collective and (formal or informal) Tenant Farming Co-operative Societies, some of which are defunct and some of which are working!

S. H. DESHPANDE

Arid Lands—A Geographical Appraisal, edited by E. S. Hills, Methuen & Co., Ltd., London and UNESCO, Paris, 1966. Pp. xviii + 461. $15.00.

This volume has been planned with a view to presenting a general conspectus of the vast area of dry country—covering one-third of the land area—in the world. The seventeen contributors to this volume are scientists who have already gained reputation in their fields of study for finding solutions to the problems of arid and semi-arid regions. Dr. E. S. Hills, the editor of this volume, has himself shaped the

course of investigations as a distinguished member of the Scientific Advisory Committee on Arid Lands Research and has contributed papers on human problems, geomorphology, industrialisation and research in arid lands for this volume.

The first chapter on "Arid Lands and Human Problems" starts with the statement, "Apart from the frigid Arctic and Antarctic regions, the arid lands are least well known" and this volume provides a glimpse of the realities of life in arid lands. The industrial development, growth of technical knowledge, development of atomic energy for industrial growth, discovery of minerals and oils have substantialy contributed to opening up of these lands and improving the condition of habitation of the people.

The nature of problems of arid regions have been indicated in the second chapter of the book. Large climatic risks are involved in the production of crops and raising of animals. The population patterns, sources of livelihood, heterogeneity of resources, major types of water supply are the other subjects discussed. The equilibrium amongst water, soil and vegetation is delicate, which is very essential to obtain optimum production from the land.

The subject of meteorology has been reviewed from the aspects of climatic causes of arid lands, which influence the general circulation of the atmosphere, radiation, air temperature, precipitation, hot winds, etc., and changes in microclimatic conditions due to effect of human interference. The seeding of clouds for increasing precipitation, evaporation control in reservoir by use of Cetyl alcohol in the arid environment are other aspects treated in this chapter.

The landscape patterns of arid lands are very complex. But by and large, the geomorphic processes induced by the climatic conditions give the deserts their geomorphic unity. The results of researches conducted in the fields of tectonics, vulcanicity, fluvial action and wind agency in shaping landscape have been succinctly described. The origin of sand and formation of sand dunes have been briefly discussed.

The next chapter deals with the subject of water supply, use and management of this resource. It describes the hydrological cycle, deals with groundwater in relation to geological formation, rapid run off and evaporation with denudation of vegetation, ephemeral nature of surface streams, control of surface water and utilization of underground water by sinking wells, establishing artesian wells, and arranging sub-surface supply by setting up of *karez*, *qanat* or *foggara* system of water conveyance. It is surmised that artesian water in northern Africa in the Sahara region may be fossil water as recharge from rainfall is very small.

The soils of arid lands are either of alluvial or aeolian origin. Besides, rocky deserts, with bare rock surfaces and deep coarse sediments in depressions constitute a well recognized desert assemblage. In the formation of soils, biological factors have played a very insignificant role. Several soils have high content of soluble salts of gypsum. These salts in some locations have been transported by winds blowing from the sea to the land. The two principal limitations in the use of irrigation on soils of arid lands are rise of salinity and rapid rise of water table. Their

reclamation offers difficulty as natural drainage in such areas almost does not exist. The general fertility level of these soils is low.

In the chapter on "Deserts in the Past," the history of the present deserts based on climatic changes in various geological periods, study of fossils and pollen grains, sediments in river terraces, plains and sand dunes, and archaeological evidence has been traced. Typical examples of old and new deserts with their descriptions have been given.

The ecological basis of the adaptation of vegetation to hot arid climate and the life forms occurring in various arid lands form the subject matter of the chapter on "Plant Life in Deserts." These life forms consist of ephemerals, succulent perennials and non-succulent perennials. Besides, xerophytism, desert vegetation and desert eco-system are other subjects discussed in some detail. The physiological ecology of desert animals is discussed in another chapter.

The subject of "Man in Arid Lands" has been divided into two parts. The first relates to "Endemic Cultures" and the second to "Patterns of Occupance." The availability of water has been the chief factor in both these aspects. Irrigation cultures developed in ancient times in the Nile Valley, Indus Basin, Mesopotamia and northern China. Some of the cultures in the desert regions were associated with trading systems and nomadism. The present modern cultures are associated more with exploitation of minerals and oil and extensive grazing provided on large open spaces. The points of settlements were oases, flood basins, valley terraces, etc. The semi-arid areas have developed very fast in recent years with modern living houses, water and gas supply. The technical know-how is changing the face of semi-arid ancient settlements by bringing commerce and industry close to them. The transport industry has vitally affected nomadic economy.

Irrigation is the basis of agricultural prosperity in arid lands of the world. This subject has been treated from the aspects of suitability of soils, irrigability classes of land, rise in water table and fluctuations in levels of sub-soil water and their influence on crop production, and agricultural practices adopted in these regions. The regulation of irrigation to maintain the production level of lands has been properly emphasized.

Nomadic as well as sedentary artisans contribute to production of goods of small scale industry in the arid regions. These may be products for domestic use, articles of export and of artistic nature. Artisan castes have specialised in these industries. In modern times several of these small scale industries are rapidly expanding for which there is expanding market, such as salt manufacture in Sahara and Rajasthan, but others are languishing behind. In conclusion, it has been stated, "There is no doubt that the future of the artisan and his work in the arid zone has surprises in store, and it is probable that there will be some 'fireworks' before the inevitable decline."

The large industry in dry lands has developed because of availability of raw materials, low land values and ready availability of labour. The mining industries in various arid lands have been listed and the future plans of their expansion for human benefit have been described.

The use of arid and semi-arid lands and their potentialities for future development have been reviewed in another chapter. The three independent variables in land are geomorphology, geology and climate and the dependent variables are soil, water (surface and underground) and vegetation. With this understanding of land and the man in relation to it, and "by application of the modern principles and techniques . . . . . it is possible to do much for the management and improvement of arid and semi-arid lands." The factor of humidity gradient plays a significant part in land use. This has been illustrated by examples. It is most essential to conserve the vegetation and manage it efficiently for sustained production from animal and crop husbandry. Significantly, emphasis has been laid on integrated land use in such regions.

Scientific research in the improvement of livestock has proceeded at a very fast rate in modern times and production of wool, beef and milk has been substantially raised by selection and introduction of exotics. Breeding with exotic species has upgraded the stock. The veterinary services have substantially reduced animal losses. The improvement of range lands has contributed much to provide adequate nutrition for the livestock.

Other chapters in the volume deal with such subjects as "The Individual in the Desert," "Social Life in the Arid Zones," "Deserts as Producing Regions Today" and "Research and the Future of Arid Lands."

By and large, this volume contains a good deal of information on arid lands, which has been cogently brought together. This will not only stimulate research but lead to the development of these once backward regions of the world and make it worthwhile for the desert populations to lead a comfortable life in the near future. For the Agricultural Economists its significance lies in providing a broad understanding of the socio-economic problems of these regions and how these are being tackled in a planned manner. This book is a useful addition to the literature on the subject.

P. C. RAHEJA

Capital Formation in Indian Agriculture, Tara Shukla, Vora & Co., Publishers Private Ltd., Bombay, 1965. Pp. xiv + 261. Rs. 20.00.

The efforts at planned development of the economy and the recognition of the crucial importance of agriculture in overall economic development have, of late, done much to excite the interest of competent researchers in the field of agricultural economics. Tara Shukla's study on Capital Formation in Indian Agriculture—an area about which we knew so little—is a notable example of such work which has appeared in recent years.

She has attempted the measurement of the stock of durable physical capital in agriculture and the rate at which it has tended to grow over the period 1920-21 to 1960-61. Her major finding is that durable physical capital has grown, though slowly, at about the same pace as the supply of labour in agriculture. The result : capital-labour ratio shows a near constancy over the period. In fact, capital-output

ratio too reveals a near constancy. To explain the relative constancy of capital-labour ratio and indeed the slow growth of the capital stock, she shows how the growth of labour supply in under-developed economies determines the pace of capital growth, stimulating it but just enough to catch up with the growth of labour supply and then putting a halt to its further expansion once the pre-change capital-labour ratio is restored. The explanation crucially rests on the high complementarity (or low substitutability) between labour capital and a strong 'scale-effect' flowing from a reduction in the cost of producing food consequent upon the cheapening of labour in conjunction with an increase in the demand for food. The exogenous increase in labour supply thus depresses the marginal productivity of labour relatively to that of capital and, by making investment in durable physical capital relatively more attractive, brings about the increase in capital stock. In the absence of technological change, however, the stimulus to expansion does not last beyond the point where the pre-change ratio between their marginal productivities is restored.

Simply put, her thesis thus is that it is the exogenous growth of labour supply rather than technological change which has stimulated the growth of capital stock in Indian agriculture. And this fact at once explains why the growth of capital stock has been enough to keep pace with labour supply and yet has been slow enough not to outstrip it. These are essentially two facets of the same phenomenon : lack of technological change. The same technological stagnation which has made for a high complementarity between labour and capital at a low level of production performance, has acted as a brake on that process which could lend dynamism to growth and impart to it a self-sustaining character. When labour becomes more plentiful in relation to land and capital, it is not only sound market economics but also sound subsistence economics that it should devote itself to producing that capital which, by restraining the drop in its marginal productivity, would help ensure its gainful employment. It is not that labour cannot be a substitute of some, at any rate, of the traditional capital. It is that it can do so only at a very low level of marginal productivity which makes it meaningful to talk of and highlight their complementary relationship.

There is thus a great deal in the complementarity between labour and capital which Tara Shukla emphasizes and upon which her explanation of the constancy of capital-labour ratio crucially rests, but her empirical evidence for this complementarity smacks of circularity. The evidence consists of the positive association she finds between the growth of labour and capital but that is something which the constancy of capital-labour ratio implies. A close association between the two does not, of course, require them to vary in the same proportion but if they do, the association between their variations would be close. Thus the association between labour and capital, which, here, is only an expression of their moving in step, cannot and, therefore, should not be cited as evidence of that complementarity which is supposed to explain why they do move in step.

Turning to the mechanism whereby the growth of labour stimulates the growth of capital stock, Tara Shukla's explanation does not carry the same persuasion in respect of public investment, for example, in irrigation works as it does in the case of private investment decisions taken by individual producers. The author of a study of public investment in India shows that such investment, particularly during

the inter-war years, reveals a cyclical pattern which, depending as it did on the availability of public savings, was influenced by the fluctuations in economic activity* (rather than the return to capital relative to labour).

Tara Shukla finding that not only capital-labour ratio shows a relative constancy but that capital-output ratio too behaves likewise, sees in this latter a reflection of lack of technological change. When, in the absence of technological change, capital and labour increase in about the same proportion but land lags behind, one would expect output to increase less than in proportion to the increase in capital and labour, even as Tara Shukla herself recognizes. The result would then be an increase rather than a constancy in capital-output ratio and that is what one finds till 1950-51. If the tendency to diminishing returns is mild, that is because of the land-substituting character of investment in capital, which too Tara Shukla recognizes. She seems, however, guilty of misplacing the emphasis when, rightly reading in the decline of capital-output ratio in the 1950's a reflection of technological change, she takes the backward step of ascribing the relative constancy of capital-output ratio to lack of technological change when in fact it should be ascribed to only the land-substituting character of investment.

None of these observations, however, seriously detract from the value of her work which is an important contribution to our knowledge of the behaviour of Indian agricultural economy.

DHARM NARAIN

* M. J. K. Thavaraj : Trends in Public Investment in India, 1898-1938 (unpublished Ph.D. Thesis of the University of Delhi), Chapter III.

REVIEWS IN BRIEF

Review of Co-operative Agricultural Marketing, Processing, Supplies and Storage in India, Co-operative Year 1965-66, National Co-operative Development Corporation, New Delhi, 1967. Pp. 178.

This volume which is the second in the series of annual review, traces the developments in the field of co-operative agricultural marketing, processing, supplies and storage in India, relating to the co-operative year 1965-66. Besides, it also presents an overall picture of the co-operative movement during the Third Plan period. It is divided into 16 chapters. The first four chapters of the volume deal respectively with the structure, finances, personnel and business practices of the marketing/processing societies. The progress of marketing and processing of specific commodities such as foodgrains, sugarcane and other commercial crops and of apex marketing societies and the National Agricultural Co-operative Marketing Federation are reviewed separately. This volume contains two new chapters on (*i*) co-operative marketing in Intensive Agricultural District Programme areas and (*ii*) State aid. It is based on advanced statistics collected by the Corporation from the States.

Some of the salient features of the developments covered in this volume are as follows. Of the total number of 3,234, primary co-operative agricultural marketing societies at the end of June, 1966, 2,321 were State-partnered marketing societies. The total membership of these societies stood at 21.42 lakhs at the end of June, 1965, consisting of 1.29 lakh co-operative societies, 19.25 lakh individual cultivators and 0.88 lakh nominal members. During the year, considerable stress was laid on measures for strengthening the share capital of primary marketing societies. Of the total paid-up share capital of primary marketing societies amounting to Rs. 16.21 crores at the end of June, 1965, Rs. 10.20 crores were contributed by the State Governments. The value of agricultural produce marketed by co-operatives increased from Rs. 300.40 crores during 1964-65 to Rs. 360.41 crores in 1965-66. Foodgrains and sugarcane accounted for the bulk of the increase in the value of co-operative marketing of agricultural produce, the value of foodgrains and sugarcane marketed being Rs. 136.75 crores and Rs. 147.12 crores respectively. The primary marketing societies sold agricultural produce worth Rs. 84.72 crores on commission basis during 1964-65 and purchased agricultural produce valued at Rs. 30.28 crores. They also issued pledge loans to the extent of Rs. 15.24 crores. Significant progress has also been reported by co-operatives in the marketing of agricultural produce in the I.A.D.P. areas. The number and membership of primary marketing societies increased from 204 and 1.35 lakhs before the introduction of the package programme (1959-60) to 262 and 1.95 lakhs respectively in 1965-66. During the corresponding period, the value of agricultural produce marketed by them increased from Rs. 2.89 crores to Rs. 12.1 crores, showing an increase of 319 per cent during the period, as against an increase of 106 per cent during the corresponding period for the country as a whole. The number of central marketing societies was 159 during the period under review. There were 19 apex or State co-operative marketing societies with a total membership of 5,556 and with a paid-up share capital of Rs. 279.44 lakhs. They handled agricultural produce worth Rs. 69.59 crores.

One of the significant developments in the field of co-operative agricultural processing in recent years was that co-operatives entered the field of secondary/ tertiary stages of processing. Out of 1,524 processing units, 30 were secondary processing units. Various measures have been formulated for effective linking of co-operative credit with co-operative marketing. As regards distribution of agricultural supplies, co-operatives distributed chemical fertilizers, improved seeds, agricultural implements, pesticides and others, collectively valued at Rs. 121.08 crores during 1965-66. Of the total number of 14,969 godowns assisted by State Governments, 9,610 were completed. The total storage capacity owned by all co-operatives increased from 7.5 lakh tonnes in 1960-61 to about 2 million tonnes at the end of 1965-66. The National Agricultural Co-operative Marketing Federation, which is the federal organisation of apex co-operative marketing societies at the State level, co-ordinates and promotes the marketing and trading activities of its members in agricultural and other commodities as also undertakes and promotes, either of its own or on behalf of its member institutions or the Government, inter-State and international trade in agricultural commodities. It had a membership of 23 including 17 State marketing federations and 5 federations of marketing co-operatives in the Union Territories and the National Co-operative Development Corporation. Its paid-up share capital amounted to Rs. 8.08 lakhs and it earned a profit of Rs. 2.56 lakhs during 1965-66.

Cropping Pattern in Madhya Pradesh, National Council of Applied Economic Research, New Delhi, 1967. Pp. x + 124. Rs. 18.00.

Being the second on the theme of cropping pattern in the States undertaken by the National Council of Applied Economic Research, this study examines in depth the possibility of a more remunerative cropping pattern in Madhya Pradesh. The introductory chapter sets out the scope of the study. The present position of Madhya Pradesh vis-a-vis other States with regard to the return per unit of cultivated area, the types of crops grown, the techniques of cultivation, etc., is dealt with in the second chapter. The various factors influencing the existing cropping pattern of the State are discussed in the next chapter. These include the soil characteristics, rainfall-irrigation, size of holdings, draught power, capital requirements and other conditions. In the subsequent chapter, an attempt is made to estimate the increase in agricultural output and the changes in the returns received by the farmers in the State as a result of changes in the cropping pattern during the period 1951-52 to 1964-65. The study also examines in the succeeding two chapters the possibility of a more remunerative cropping pattern, districtwise for the State, and the estimated additional benefits that are likely to accrue as a result. A general summary of the study is presented in the last chapter.

Madhya Pradesh ranked lowest among all the States in India in the proportion of the cropped area that is irrigated. Out of the total cultivated area of 18.4 million hectares in the State in 1963-64, only 1 million hectares or 5.55 per cent were irrigated. The intensity of cropping was very low, being only 111.41. In the technique of cultivation also, the State is backward as compared to many other States. For example, the intake of chemical fertilizers per hectare in the State in 1963-64 was only 0.58 kg. Because of the low proportion of irrigated area and the backwardness in the cultivation practices, the productivity of the land, as

reflected in the yield per hectare, has been comparatively low in the State, being only 711 kgs. per hectare for rice, 621 kgs. per hectare for wheat, and 557 kgs. per hectare for gram for the average year 1962-63. Of the total cultivated area, food crops accounted for 83.88 per cent and commercial crops for only 15.81 per cent. The price level of agricultural commodities in the State has also been relatively low. Because of these drawbacks, the per hectare return for the gross cultivated area in the State was as low as Rs. 307 in the average year 1962-63 while it was Rs. 882 in Kerala, Rs. 737 in West Bengal and Rs. 726 in Madras. Ranked in order on this basis, the State occupied the 13th position among the States in India. The study reveals the possibility of a change in the cropping pattern of the State under the existing physical conditions on as much as 4.7 million hectares. This includes improvement of crop structure on about 4 million hectares and additionally bringing under cultivation about 0.7 million hectares of cultivable wastes and other fallow land. These changes are expected to raise the intensity of cropping to 121.27. With further irrigation and availability of other facilities, it has been suggested that the cropping pattern can be improved on as much as 8.4 million hectares, thereby increasing the intensity of cropping to 129.07. The changes suggested in many cases are concentrated in a few of the districts and this makes the implementation easier. The effect of the changes suggested in this study will increase the return per hectare under the existing physical conditions by about 25 per cent from the present level of Rs. 307 to Rs. 395.58 gross and from Rs. 172.83 to Rs. 215.83 net. With additional facilities, the return per hectare is expected to increase by about 53 per cent to Rs. 486.26 gross and Rs. 264.87 net. The suggested changes are expected to alter the nature of the cropping pattern from the existing excessively subsistence crop-oriented type to a more commercial one. It is estimated that the alternative cropping patterns are likely to increase agricultural production by about 1.04 million tonnes of cereals and 0.72 million tonnes of oilseeds under the existing physical conditions and by about 5.7 million tons of cereals and 0.47 million tonnes of oilseeds when additional facilities are provided.

Estimates of State Income (1950-51, 1955-56 and 1960-61 at 1960-61 Prices), National Council of Applied Economic Research, New Delhi, 1967. Pp. x + 71. Rs. 9.00.

This study presents estimates of the States income as well as the resultant national income in real terms for three quinquennial years from 1950-51 covering the first decade of planning in India. Chapters 2 to 4 of the report deal with the sources of material used and the methodology of estimation of income originating in the agricultural and allied sectors, extractive and manufacturing industry sector and trade and other service sectors. The summary of results of this study are presented in the last chapter. The Statewise estimates of net domestic product by broad sectors for the three years are given in the appendix. The estimates of States income are based on the 'income originating' concept and not on the 'income accruing' concept. For the years 1950-51 and 1955-56, estimates of States income at constant prices have been obtained directly for most of the commodity producing sectors; for the other sectors, estimates have been derived from those of 1960-61 which has been adopted as the base year, using suitable deflators.

The main findings of this study are as follows. India's national income, in real terms, increased by 38.1 per cent in the first decade of planning—the increase in national income being 15 per cent during the First Plan and 20.1 per cent during the Second Plan—as against the official estimate of the income growth of 44 per cent during the same period. The per capita income increased from Rs. 295 in 1950-51 to Rs. 308 in 1955-56 and further to Rs. 335 in 1960-61, the increase in the per capita income being 13.6 per cent over the decade. The annual rate of increase was less than one per cent during the First Plan but increased to 1.8 per cent during the Second Plan. It is pointed out that a slight beginning in the structural change in the economy may be discernible in so far as income from the agricultural sector declined from 54.4 per cent to 52.3 per cent during the decade with a simultaneous increase in the manufacturing sector from 13.7 per cent to 15.7 per cent.

Among the 14 States for which net domestic product has been estimated separately, Maharashtra, Madras, Madhya Pradesh and Bihar recorded a rate of growth in real output by 58.7 per cent, 57.1 per cent, 54.5 per cent and 47.3 per cent respectively during the decade, which was higher than the national average of 38.3 per cent. At the other extreme, the rate of growth in real output was only 25.8 per cent in Uttar Pradesh and 27.5 per cent in Orissa during the same period. Madras recorded the highest increase in its real per capita income by 40.5 per cent in the ten-year period by keeping the population growth within bounds—11.8 per cent during the period, the lowest among the States in India. During the same period, Maharashtra, Madhya Pradesh and Bihar recorded an increase in the per capita income which was higher than the national average (13.7 per cent) by 28.4 per cent, 24.4 per cent and 22.9 per cent respectively. In the remaining States, the rate of economic growth was not satisfactory; in West Bengal and Assam, the per capita income declined over the decade. It is further shown that there has been no major reduction in the inter-State disparity in the per capita income over the period, although the range of difference between the maximum and minimum has gradually narrowed.

Getting Agriculture Moving : Essentials for Development and Modernization, A. T. Mosher, The Agricultural Development Council, Inc., New York, Frederick A. Praeger, New York, U.S.A., 1966. Pp. 190.

Training Manual for Group Study of Getting Agriculture Moving : Essentials for Development and Modernization, Edited by A. T. Mosher, The Agricultural Development Council, Inc., New York, U.S.A., 1966. Pp. 128.

Selected Readings to Accompany Getting Agriculture Moving : Essentials for Development and Modernization, *Volumes I and II*, Edited by Raymond E. Borton, The Agricultural Development Council, Inc., New York, U.S.A., 1966. Pp. x + viii + 1125.

The first book is intended as a manual on agricultural development for use in in-service training of personnel of all agencies of agricultural development in Asia, Africa and Latin America. It deals with the needs and problems at early stages of agricultural development and examines a variety of inter-related factors affecting agricultural development. The book is divided into four parts and 15 chapters. The first part reviews the elements of agriculture, *viz.*, the production

process, the farmer, the farm and the farm business and brings out the implications of each of these elements for agricultural development. The essentials for agricultural development are considered in the second part. These are markets for farm products, constantly changing technology, local availability of farm supplies and equipment, production incentives for farmers and transport facilities. Part III discusses the accelerators of agricultural development, *viz.*, education, production credit, group action by farmers, improving and expanding agricultural land and national planning for development. The last part sets out the essential requirements in many specialized tasks that must be performed for improving agricultural productivity, and describes the special features of agricultural development.

The *Training Manual* is designed to provide a guide to the use of the book "Getting Agriculture Moving" in the systematic study of the subject of agricultural development by a group of trainees. Section A of this Manual suggests objectives, questions for discussion and selected readings for trainees to study in connection with the topics of each chapter of the main book. Section B provides the trainer with a rapid review of hints and suggestions for designing and managing a training course. It discusses a number of problems that should be dealt with in preparing for an in-service training course, such as deciding about the selection of trainees, selecting the meeting place, determining the curriculum, the duration of the training course, determining the strength of the training staff, preparing the time-tables for the course, etc.

The *Selected Readings* are presented in two volumes and contain 136 readings on different aspects of agricultural development in different countries for the use of agricultural officials and technicians in the developing countries. These readings are most useful as discussion materials, to stimulate group thinking about the local problems of agricultural development in each country.

Wheat, B. P. Pal, Indian Council of Agricultural Research, New Delhi, 1966. Pp. xviii + 370. Rs. 18.50.

This volume, being fourth in the series of cereal crops, traces the history of the wheat crop from pre-historic times to the present day and contains detailed and extensive information on various aspects of the crop—systematics, morphology, cytogenetics, genetics, breeding, agronomy and grain quality. Beside these, the fundamental aspects of the physiology of wheat are considered in detail. The volume also deals with the diseases of the crop and insect pests attacking wheat, soils in relation to wheat, the response of wheat to agronomic experiments, and agricultural machinery and implements used for wheat culture in India. The various aspects of marketing of wheat in India are examined in the last chapter. A brief summary of some recent and important advances in the field of wheat research in India prepared by M. S. Swaminathan is given in the addendum to the volume. Detailed references to the topics considered in the volume are given at the end of each chapter. The volume is profusely illustrated. This valuable compilation on wheat will prove useful to students of agriculture and agricultural sciences.