Vol XXXVII
No. 4

ISSN 0019-5014

OCTOBER-
DECEMBER
1982

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS

INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

INDIAN AGRICULTURAL ECONOMICS—SOME TASKS AHEAD*

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It is a privilege to be invited to inaugurate this Conference of the Indian Society of Agricultural Economics. Prof. Dantwala had once mentioned to me that the Green Revolution in India came about in spite of Indian economists. While he was probably half serious, I suspect that detailed scrutiny will only verify the veracity of his statement. And yet, I propose to develop in the brief time at my disposal the view that the economist's reasoning, with all its limitations, is of considerable importance at the present phase of development of Indian agriculture and that the Indian Society of Agricultural Economics has very wisely chosen to discuss issues like prospects for pulses, oilseeds and coarse grains production, the use of economic incentives, of which subsidies are but a part as instruments for increasing production and income, and the scope of agricultural exports.

The pattern of growth in the Green Revolution areas has been well documented. Controlled water supply was a pre-condition. There was a fast increase in cropped area which came about mainly through multiple cropping. Irrigation played a leading role, but so did the photo insensitivity properties of the new seeds, which permitted shorter duration crops to grow. Coverage of the entire irrigated area with the new seeds and a very dramatic increaze in fertiliser application were only a matter of time arising from the diffusion of the new technology. Output growth in the crops and areas covered was dramatic by any standards.

Some of the problems that we are now facing are perhaps of a different nature. The performance during the last decade has been impressive, the task is not only to keep up the momentum, but to accelerate it under, I believe, intrinsically more difficult conditions. The dramatic results of the new technology in the most favoured areas are behind us. Growth in other areas becomes a more humdrum task. A combination of many factors needs to be looked into and varies from region to region. Such growth, though not dramatic, is important in itself, and is a more complex phenomenon. A single instance is illustrative. In Punjab, from 1968-69 to 1980-81, irrigated area under wheat increased from 80 per cent to over 90 per cent, yield per hectare from 2.1 to 2.7 tonnes and fertilizer application to over a 100 kg. per hectare. This is the dramatic first story. The total output of wheat in Punjab today is around 8 million tonnes and the additional output since 1968-69 is around 3.5 million tonnes. But the additional output of wheat in the same period in Uttar Pradesh is of the order of 7 million tonnes. More interestingly, the percentage of additional production of wheat which originated from the districts of Eastern U.P., conventionally classified as an agriculturally backward

* Inaugural Address delivered at the 42nd Annual Conference of the Indian Society of Agricultural Economics held under the auspices of the G. B. Pant University of Agriculture and Technology, Pantnagar, District Nainital, Uttar Pradesh on November 5, 1982.

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area and subject to severe institutional constraints, was around half of the additional output in the State as a whole. Led by a growth in tubewell irrigation, yield per hectare in this region, however, went up only from 1.09 quintal per hectare to 1.43 quintal per hectare in the seventies. This is a second story, not dramatic, but still important.

It was correct to argue that the conventional skills of economists are of very little use in engineering a dramatic technological breakthrough. I would go as far to say that it is only an economist who is also a wiseman, who can at least play a supportive role, at the stage a major breakthrough becomes available, in bringing it about and in fashioning it for the social good. But the more one looks to the eighties the more one sees the problem of sustaining productivity levels and keeping up moderate rates of change in the high technology belts of agriculture, but of very quickly expanding in the areal context, perhaps not dramatic technology led yield changes, but sustained and ordered processes of moderate growth. In those areas which have as yet not had any major benefits and have shown a poor performance, unless very major technological breakthroughs at present unforeseen become possible or institutional and organizational systems act in a dramatically different manner, this seems the only way of meeting the requirements of the national economy. In these processes, economists play an important role. The theoretical kit inherited by them gives them a useful background for handling a complex task. The analysis at the margin of devising proper schemes of incentives and economic policies and of balancing individual initiative, with community effort, so that potential production gains are garnered, without excessive reliance on purely administrative and control measures, which though sometimes necessary, are not always socially productive on a continuous basis is a challenge. But theory by itself is not enough. Because in this big country of ours conditions vary and the policy mix required to support the process of technological change in agriculture will perforce have to differ. This is indeed a challenging task and groups like the present one can play an important role in outlining the specific approaches required to the problems. A few examples may help.

Inefficient distribution and use of irrigation water has been documented in a number of studies. The economic aspect of the problem is well known. A low price of water or pro rata pricing based on coverage of land leads to an individual farmer maximizing total output through water use, but inefficient aggregate allocation of scarce water. The farmer would tend to use water to the point of zero marginal product. Volumetric pricing and control is the obvious answer. A more important, though not generally recognized problem, is the bottlenecks created by the design of irrigation projects. The projects are designed and executed to meet planned crop water requirements at the field level, but the assumed distribution efficiencies from head works to the field are generally twice those achieved. This then means that the distribution system becomes a bottleneck even if water is available. This kind of situation could perhaps be allowed to continue at earlier phases of development. But the new technologies have time bound requirements of

water and so peak delivery capabilities in the field become a binding constraint. The desire to increase cropping intensity makes the problem more severe. The economic analysis of alternative investment profiles in greater sophistication in irrigation management and distribution systems of new projects and of modernization schemes, in the context of scarce capital funds, becomes a fascinating problem of capital theory and project analysis. Add the related problem of organization for water delivery and the need to combine both inter-regional (say within a command) and to the extent possible inter-class equity issues, and the economist's skill is fully at stake. Very little work of this specific type has been done although the problems have by now been well documented. The Narmada Project in Gujarat is a good example of such analysis on an *ex ante* basis. On a national scale the problem is more complex. The potential irrigation technologies available to us pose a spectrum of choice. This is a real socio-economic choice problem because sophistication is bought with higher costs. Some costs are inevitable, because uncontrolled water application can lead to soil degradation which has of necessity to be avoided. However, if this is taken care of, there are still problems of selection of investment packages in relation to levels of agricultural development and socio-economic parameters, like the need for employment and income generation in under-developed agricultural regions.

Take a related issue. We really have very little insight into the reasons which led to the growth of some regions and stagnation in others. Production function kind of approaches describe outcomes, but not the reasons which trigger them off. Very often perverse institutional conditions are described as constraints. To begin with there is of course the purely factual question needing study, namely, has agricultural growth taken place under different institutional conditions or not. It is of course true that some major agricultural problems being faced today, *e.g.*, more efficient water use or application of new technologies in dry regions, lead to answers which lie in the institutional plane. The uncertainties in dry region technologies require pooling of risks. Schemes for use of scarce water generally involve *externalities* to an individual farmer. But as S. Chakravarty has shown,* property and its rights are not an either/or proposition. Asset bases of land can be modified with access to various land augmenting inputs. Pooling of rights can be partial and for a purpose required for additional production, *e.g.*, harvesting water in a water shed in a dry region. These are all issues in which the interface between individual initiative and the social good will need to be reconciled and feasible solutions found and implemented in different local situations.

In the context described, there is an obvious state of inter-relationship between the themes being discussed at this Conference. If the dramatic land augmenting nature of the early phase of the Green Revolution is behind us, the factors that determine the allocation of area between different crops are still important. Gross cropped area which grew at a rate of 0.8 per cent

* Mahalanobis Prize Lecture.

compound annual in the sixties, only grew at 0.4 per cent compound annual in the seventies. While cyclical changes will always dominate short-term policy requirements, what are the underlying equilibrium conditions that we are after and what are the processes that must underlie them? This is particularly so since in many crops, the technological breakthroughs in productivity are not at all dramatic and show up in relation to profitability, particularly if instability in yield is taken into account in relation to higher input requirements. Where do economic incentives matter in this context? Do they play a leading role, or a supportive role essentially to shifts in the production function which are brought about basically by agricultural research and its extension? If in spite of the improved performance in many crops the balance between demand and supply is going to remain marginal, what are the appropriate policies towards export, which need long-term planning and the corollary towards imports which may be required on account of the needs of adjustment? Particularly for exports even if the quantities involved are small in our domestic context (remember it is not easy to make the small country assumption for India in world trade) exercises done in the FAO on substitution and complementarity in multi-country agricultural models show that the benefit potential depends on communication of market signals to production agents in the field and in agro-processing and trade. The FAO Report on Agriculture: Toward 2000, in which I participated, shows that these benefits can be as large as 10 per cent or over of agricultural incomes, including first stage processing, and this order of benefits is worth striving for. At home Dr. M. S. Swaminathan has been making the same point. These are all conventional questions that an economist is well-trained for and yet it is surprising that both in the area of policy for domestic production, in commodity policies and adjustment to the rest of the world, the work done is only a beginning and many questions yet remain to be answered.

Perhaps we are being pessimistic. The history of economic ideas shows that since the days of Adam Smith, economists have always worried about the world of declining rates of profit. It was only in the twenties of this century that no less an economist than Alvin Hansen confidently asserted that technnological changes had ended with the discovery of the automobile, population growth was flattening and so the prospects for high growth did not exist. Events proved him wrong. I am sure that the long-term prospects for technologically determined higher rates of agricultural growth is indeed bright. It is sometimes argued that the potential defined in technological terms of agricultural output, particularly in the regions where a large part of the balance groundwater reserves lie, remains to be realised as a slack. There is of course some validity in this argument. But in a more generic sense experience teaches us that it is a technological paradigm. The real question is how to get from the existing levels to the desired state. And there it is quite obvious that agriculture in India today is not a bargain sector. The social price of output at the margin will have to be paid and capital intensity for incremental output is as high as in competing non-agricultural sectors. I

would be very happy if in the remaining part of this decade I am proved wrong and easy economic options exist and are realised, but it is always wise to be prudent and current trends suggest that there may be a lot to be said for looking at the medium-term growth potential of the Indian agricultural economy with the skills of an economist.

I have spoken too long and too generally. But then it is very seldom that one gets such a distinguished company to speculate with on the basis of one's own limited experience and work. Hence the lapse, an apology and many thanks for listening to me with patience. It gives me great pleasure to inaugurate this Conference and I personally look forward to the results of its deliberations and its recommendations.