

ECONOMICS
of
**A MULTIPLE-PURPOSE
RIVER DAM**

*Report of an Inquiry
into
The Economic Benefits of the Hirakud Dam*

by

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FOREWORD

This publication contains the report of a survey undertaken by the Institute at the instance of the Government of Orissa. The survey was directed towards assessing, as comprehensively as possible, benefits that are likely to accrue to the State from the construction of the dam and related works on the Mahanadi at Hirakud. The report gives, in the first instance, a description of economic conditions in the two regions, the Sambalpur Zone and the Delta Zone, which are expected to receive benefits from the Hirakud Dam and attempts estimation of total income of the area affected by Hirakud irrigation. There follow projections of future crop patterns and estimates of agricultural production after irrigation; these are compared with corresponding data for the period before irrigation. Attention is next paid to possible extent of flood control and benefits accruing from effective flood control and to generation of hydro-electric power and economic developments that may follow upon its availability. Finally, certain calculations of overall benefits and costs of the project are made on the basis of concepts and practices evolved in the U.S. and an estimate is presented of prospects of financial returns.

The first part of the report is of interest because of the presentation of details of the economic situation relating to large and important regions of the country and the discussion of problems involved in the planning and conduct of an economic survey in regions with somewhat limited administrative and revenue data. The second part holds interest on account of the attempts at projections and estimations in many directions that had to be made. I desire to discuss in this Foreword the question of the proper direction and use of such work and this may be best attempted by comparing it with an earlier investigation of the Institute in this field.

The earlier investigation on the subject of benefits of irrigation undertaken by the Institute, tackled the problem of assessing benefits that were seen to accrue after a system of canals had been completed and been in operation for some years. That investigation arose out of a resolution passed by the Central Board of Irrigation and was initiated by the Government of Bombay. The report of the investigation was submitted to Government in 1942 and was published by the Institute in 1947. It came under general notice when irrigation projects began to be discussed actively and undertaken on a large scale after Independence. In a number of essential respects, the problems faced by the present investigation were different from those faced in the earlier one. In both cases, the objective was to assess the difference between two situations. In the earlier investigation an existing situation which incorporated within itself effects of the operation, for over 20 years, of a system of irrigation was compared with a hypothetical situation which might have existed in the tract, other things

being equal, in the absence of the system of irrigation. In the present investigation, the appropriate comparison is between the situation that might come to exist some years after the completion of irrigation and the situation that might be conceived to exist in the region, in the absence of the irrigation project. In the earlier investigation the objective was to assess benefits which might be taken to be accruing currently because of some effort in the past. In the present investigation the objective is to assess benefits which might accrue in the future because of construction of the irrigation system currently undertaken.

It would appear that the former project was not only easier to carry out but that the comparisons involved in it had a firmer base. In the first instance, at least one of the two situations compared, belonged to the concrete present. In constructing the hypothetical picture also, there was little element of pure projection because a concrete existing situation was, for the most part, assumed as the basis of the hypothetical picture. The underlying assumption made, in this instance, was that the existing situation in some nearby tracts which did not enjoy irrigation facilities provided adequate data for portraying the hypothetical situation of the tract at present under irrigation, if it also had not benefited from the system of irrigation. The earlier investigation, therefore, posed problems chiefly of choice of regions or locations for comparison and of designing and conduct of surveys, analysis of their results and of total estimations on the basis of those results. These problems were undoubtedly difficult and were posed in a field in which little work had been previously attempted. Even so these were essentially matters of application or adjustment of accepted methodology, of evolving suitable hypotheses and of methods of analysis in the particular situations. In the project, of which this publication forms the report, the comparison, in the first instance, is less sure; the assumption that the existing situation can be projected unchanged into the future is itself open to question. At the same time, there is no basis for judging the direction in which and the extent to which changes might occur in the existing situation even in the absence of irrigation. The projection of future conditions with irrigation is beset with even greater difficulties. An attempt was made in this project to find out answers to problems of projection by resort to a sort of analogy to the method adopted in the earlier investigation. This was of finding comparable areas in which likely future changes in the irrigated areas could be studied as actualities in the present. However, the problem of finding areas for comparison in this sense was bound to prove difficult. Because of the configuration of land surface and the dependence, in the main, on gravity flow for supply of water from canals it is possible to find, not too distant from most irrigated areas, locations not too dissimilar in other aspects. The projection regarding a future irrigated stage can, however, be based on actual conditions only in an area with an existing plentiful supply of water available all the year round such as can only be obtained from fairly large works. While

it is possible in most areas to find some locations where tank or well irrigation is available, such areas are not only limited in extent but also seldom enjoy ample twelve-month irrigation facilities. The result is that development in them cannot yield sufficiently reliable evidence regarding possible effects of massive irrigation and such vital matters as the post-irrigation cropping patterns and even measure of costs and yields of crops in relation to such areas have to be accepted with great caution in framing the picture of the irrigated future. If present conditions do not supply sufficient data for projections even of agricultural conditions they could obviously give little guidance in relation to development of trade, transport, industry, etc. As a result, a very large number of assumptions in a variety of contexts have to be made before building up an integrated picture of the future economy of the irrigated tract for making calculations of future benefits.

Utility of effort based on such data and such assumptions must be judged in relation to the use to which the results may be put. In this context also, a comparison with the use of results of the earlier investigation may have significance. An investigation of the results of past irrigation projects serves the purpose, mainly, of indicating the total actual benefits from the work of irrigation and the varying manner in which they are currently derived and throwing light on such matters as methods and adequacy of use, of potentialities remaining to be exploited and of possible variations in systems of management of production, distribution, taxation, etc. Further, an adequate number of surveys relating to assessment of performance of older projects may give valuable indications as to situations in which irrigation works have a small or large beneficent effect on the economy, the problems they create and the difficulties they solve. On the basis of results of such surveys, one may even go on to prepare broad indicators or yardsticks relating to possible total effects of given types of projected works in the future.

In the undertaking and construction of a new work of irrigation, two stages may be assumed. Firstly, the stage at which on the basis of a set of broad criteria, the fundamental decision regarding undertaking the project or not undertaking it is arrived at. The decision to undertake a project in an area or a region is determined to a large extent on broad considerations of policy of investment, regional development, etc. The exploitation of irrigation opportunities in different regions may be justified on widely different grounds and it is unlikely that a very detailed projection, such as attempted in this publication, can have relevance to the stage of making the initial decision regarding undertaking the project. It is, in fact, doubtful how far such detailed projections could be attempted without the scheme for the project having been worked out in full technical detail to a point to which this is never carried till after it has been decided to undertake the project. Therefore, elaborate economic investigations are

likely to be undertaken only after considerable progress has been made in relation to the project at the technical level.

The second of the two stages referred to above concerns the programme of activities to be initiated and undertaken either during construction of the project or soon after completion of its construction, for ensuring an early, sound and full use of the possibilities of economic development opened by the construction of the irrigation system. A projection of the economic picture of the future in detail can have great value in this context. Such projection could bring to light forcefully the major problems, technical and socio-economic, that might arise in attempting economic development of the area in the future and could form the basis of a concrete programme of multi-sided action. However, such a view of the use of the projection brings into prominence a very important factor of which the authorities of the Institute were aware even before the undertaking of this survey and importance of which has been greatly emphasized by experience obtained during its conduct. This is that the quality of such economic projections is dependent to an uncomfortably high degree on the adequacy and quality of varied technical data supplied by others to the economist, about the validity and reliability of which he has little knowledge or competence to judge. In making the projections, assumptions have to be made relating to, for example, the extent of water resources available, the area they will command, the uses to which they could be put, the crop patterns which are feasible, the varieties that could be exploited or developed, the organization of land holdings, and the tenancy and other structures, the credit, trading and processing systems that might be established, the pace and direction of the development of socio-economic overheads, etc. All these involve important decisions of government policy, activities and orientations of institutions and systems, and full knowledge of actual or projected work in fields of engineering, agronomy, public health, etc. Moreover, when those who supply information relating to other fields are themselves not involved in the business of making the projections or using the results of projections, the extent and quality of the information supplied are bound to suffer. An important instance of the helplessness of the economist in such contexts is afforded by the reflections contained (pages 164 to 166) in this publication on flood control. The projection and the calculations are made on the basis that flood control will be complete. It is clear from their remarks that the authors, on the basis of evidence of other experts, felt doubtful about the validity of this assumption but could, at the same time, do nothing about modifying it. The economist, working by himself, feels handicapped not only in relation to data obtained from other types of experts but is also unable to proceed surely in the socio-economic field because of lack of sufficient guidance on matters of policy of government and its programme of action. He may, indeed, raise issues and make suggestions about advance action, informally and confidentially, during the course of his work. However, unless some government agency is directly

involved in the work, it is highly unlikely that such communications will receive much attention.

What I want, in effect, to emphasize is that work such as that undertaken by the Institute in relation to this project is neither of great academic importance nor of much practical use. As a result, especially of the experience of this survey, I am convinced that the only way of dealing with problems of future operation and estimation is to set up teams of experts to evolve concrete programmes of development. As soon as any large work of irrigation goes under construction, joint teams of engineers, agronomists, economists and other experts should be put into the field to prepare expeditiously, integrated and properly phased programmes of all-sided development of the area under command to be achieved within the least possible time. This will enable experts in each department to locate problems they have still to tackle before development can be fully achieved, for administrators to become aware of institutional and other arrangements they have to provide and for ministers and politicians to be aware of provisions for funds and legislative and regulatory enactments which have to be looked into before development begins or is completed. In such a concrete programme, the economist will have a valuable role to play, because he will be subjecting all alternatives in the programme to his processes of analysis and measurement and would be suggesting optimum arrangements and combinations from his point of view. The work will require the exercise of his technique at the highest level but it will be carried out with some assurance that the work would bear concrete fruit.

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