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# THE INDIAN JOURNAL OF AGRICULTURAL ECONOMICS

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X PROCEEDINGS  
of the  
TWELFTH CONFERENCE  
held at Gwalior, November 1951

## SUBJECTS

1. Problems in Calculating Cost of Cultivation.
2. Objects and Methods of Crop Planning.
3. India's Foreign Trade in Agricultural Commodities.

Rs. 6-8

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This issue of the Journal is a record of the proceedings of the Twelfth Annual Conference of the Society held in November 1951, at Gwalior, Madhya Bharat. In addition to the delegates from the Universities, the Central and State Governments sent their representatives to the Conference. The papers read at the Conference were of a high quality and the presence in the gathering of educationists, research students and persons who had a live contact with the problems of our agricultural economy, either as administrators or policy makers, contributed much to the level of discussions.

I had observed in my preface to the Lucknow Conference Number (1950) that the reason for the growing interest in our Annual Conference is mainly the selection of subjects for discussion, which have not merely theoretical and academic value but also have a practical bearing on some of the vital problems that affect our present agricultural economy. Our Papers are usually based on field studies. The subjects discussed viz. "Calculation of Costs of Cultivation", "Crop Planning" and "Foreign Trade in Agricultural Commodities" have all an immediate relevance in their practical application to any plan of integrated agricultural development in the country.

We are endeavouring to prepare a comprehensive note on the problem of calculating cost of cultivation in Agriculture based on the Papers submitted at the Conference and the discussion which followed. This note is expected to be ready within a month and we shall circulate the same to members.

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We wish to take this opportunity of thanking the Government of Madhya Bharat, who acted as the hosts of the Conference and who by their excellent arrangements made it a complete success. We must particularly express our grateful thanks to H. H. the Maharaja of Gwalior, the Raj Pramukh, Shri Takhtamal Jain, the Chief Minister of Madhya Bharat, Shri K. B. Lall, the Chief Secretary of the State, Dr. L. C. Jain, the Economic Adviser and Development Commissioner, Madhya Bharat, and the members of the Reception Committee for their generous hospitality.

MANILAL B. NANAVATI  
President.

Bombay, 15th February 1952.

considered that interest on investment should be taken as an element of cost when the relative profitableness of different enterprises is to be determined. A further advantage of such a procedure is that in the case of rent the differential advantages enjoyed by various classes of land will tend to be equalised with the inclusion of rent.

Some authorities suggest that the cost figures be worked out with and without interest on investment. Such a procedure is sure to add to the usefulness of the figures.

The apportionment of interest on investment, other than the charge for the use of land, is made in proportion to the capital sunk in each branch of the business. The rent, however, is usually distributed over the farm area at the flat rate per acre. Such a procedure assumes equality of productiveness of all the land—a condition which is not usually found. It is obvious that where the quality of farm land varies from field to field to a great extent, the rent charge should also be varied, depending upon the judgment of quality of land. The same principle should also be applied to general expenses as those of hedging, ditching, etc.

## PROBLEMS OF CALCULATING THE COST OF CULTIVATION IN MADRAS STATE.

By

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### *Emergence of a New Approach to the Problem of Agriculture*

In the past fifty years, increasing attention is being paid by Governments all over the world to the development of agriculture on scientific lines. One of the important planks in the policy programmes of the modern Welfare State is to give agriculture its proper share in the national dividend by the fixation of a fair price for its produce which will, at the same time, be fair to the consumer. The subsistence of a parity economy between the primary, secondary and tertiary services has become a live issue. The late Lord Stamp once observed that for the last 150 years the world has been fed with agricultural products below cost. The modern state has set its face definitely against this form of exploitation. For instance, the objective of the agricultural policy of the Government in U.K. has been set forth as "promotion of a healthy and efficient agriculture capable of producing that part of the nation's food which is required from home sources, at the lowest price consistent with the provision of adequate remuneration and decent living conditions for farmers and workers, with a reasonable return on capital invested."<sup>1</sup> The price support programmes and the system of subsidies for production of special crops adopted by many western Governments are clear indications of the new approach of the modern welfare state towards agriculture.

1. Report of the Prices Sub-Committee of the Policy Committee on Agriculture, Forestry and Fisheries, p. 43.

*Studies in Cost of Cultivation*

In all these countries "enquiries into the costs of production are a common feature and, in fact, form the basis of all attempts to fix prices. In the U.K. one of the bases for fixation of prices is the economic and financial accounts relating to different types and sizes of farms and the statistical material relating to costs of production collected by means acceptable to Government and Industry. The United States Department of Agriculture conducts detailed investigations into the costs of production of different types of agricultural produce. The crops dealt with range from major crops such as wheat, cotton, sugarcane and oil seeds to minor field crops such as hay and seeds and the livestock statistics relate to beef, cattle, hogs, sheep, horses and mules and to dairy and milk products."<sup>2</sup> In Australia a clear account of cost per unit is kept for agricultural products while the floor and ceiling prices for rice in Japan since the first World War "were based on calculations of the cost of cultivation, cost of living and general trend of prices."

*Cost of Cultivation Studies in India*

Studies in cost of cultivation in the Western countries have now passed from the academic and theoretical stage to the practical; A high degree of accuracy in the calculation of cost is aimed at so that the price fixed on the basis of such costs will be fair both to the producer and the consumer. We have no doubt conducted some studies in the past on the subject. We have, for example, the surveys carried out under the auspices of the Board of Economic Enquiry, Punjab, the Gokhale Institute of Politics and Economics, Poona and the Universities. The Settlement Officers also made some estimates of cost of cultivation while the Agricultural Farms run by the Departments of Agriculture have accumulated a mass of data on the various aspects of agriculture including cost of cultivation. But the only enquiry on a scale comparable to the enquiries conducted in foreign countries was the one organised by the Imperial (now Indian) Council of Agricultural Research between 1933-'36. It is unnecessary to go into the details of this enquiry at this stage except to point out that the large volume of data collected at a time when agriculture was in doldrums on account of the Great Economic Depression is of little practical value at present especially as the enquiry was limited in scope and was not continued after 1936. The survey is however useful inasmuch as it revealed a number of difficult problems likely to be met within any enquiry of the kind.

*Main Problems*

The main problems that have to be faced in any survey of cost of cultivation may be broadly grouped into four classes (1) administrative (2) financial, (3) technical and (4) psychological. They are discussed below seriatim.

*Administrative Problem*

The administrative problem arises from the fact that the vast majority of our peasants are illiterate and are not in the habit of maintaining any record of their farm operations. It has been said that the management of a farm without records is like "having a clock without hands". But this does not worry the cultivator although it may be the cause of much worry to the administrator. Some other person will

2. Report of the Price Sub-Committee of the Policy Committee on Agriculture, Forestry and Fisheries, p. 49-50

therefore have to be asked to maintain the ryot's accounts. This is generally sought to be done by posting educated young men specially recruited and trained to each village or group of villages. But the main difficulty is, as the Indian Council of Agricultural Research found at the time of its previous enquiry, to persuade these men, with an urban outlook, to stay in the village day in and day out. One way of getting over this difficulty is to persuade the village *karnam* or the village school-master or any other literate person in the village to maintain the farm accounts. But this is often resented by the individual farmer.

#### Finance

The second difficulty is that of Finance. This has been the stumbling block all through. There is no satisfactory agency for the collection of statistics at the village level or to provide guidance and check. The primary agency for the collection of agricultural statistics is the *karnam* or the village accountant. He is a jack of all trades and his work has increased tremendously these days on account of the expansion of Governmental activities. It is not therefore possible to overburden him with additional work although his experience of village farming and accounts would be invaluable. The employment of special investigators for each village or even a group of villages would be very costly. For example, even if 120 investigators at the rate of one for two holdings are appointed on the minimum pay of a lower division clerk for the enquiry the annual expenditure will exceed a lack of rupees. A more satisfactory arrangement would be to give an honorarium of about Rs. 100 to an educated and intelligent person in the village to maintain the accounts of the holding selected. In that case the annual cost may be brought down to about Rs. 24,000. The difficulty would be to find suitable men for the job in the village.

#### Technical Problems

Several technical problems will have to be tackled under this head. It is therefore necessary to have an exploratory survey which will reveal the practical difficulties to be faced and also help in finding proper solutions. Some of the more important of these problems are discussed below:

(1) Apportionment of area grown under mixed crops: The cultivation of mixed crops may be confined to one or two definite varieties like cotton and millet or a number of items in scattered bits like *chulam*, *cumbu*, gingelly, pulses, vegetables etc., or it may be of the type of inter-cropping in fields under perennial crops like coconut or fruit trees.

In the case of mixed crops, the extent of area under each crop can be determined on any of the following principles.

(a) The number of plants of each component based on the quantity of seeds used or (b) space occupied by each component where they can be easily measured as millets grown in a mango garden, or (c) where it is not possible to ascertain on the above two bases, it may be calculated on the basis of yield of the different components as between pure and mixed in an adjacent plot.

(2) The apportionment of cost of cultivation among the various crops will be one of the most difficult problems. The value of permanent improvements like removal of kans grass, deep ploughing by tractors, heavy application of tank silt or gypsum to correct alkalinity, or provision of drainage cannot of course be debited to particular crops but will have to be spread over a number of years depending on local conditions

and the period for which each will have effect. The problem will be more complicated in the case of garden crops like cocoanut, mango etc., which take initially several years to yield but continue to yield for a number of years, while subsidiary crops are grown in the meantime. The apportionment of cost on the basis of the life period of the tree crops and also on the extent of benefits derived by each will be rather difficult.

(3) The calculation of residual value of manure applied to a particular crop may also present some difficulty. For practical purposes it is not taken into account unless there are special reasons as, for example, where a field manured heavily for paddy or tobacco, could not be cultivated with that crop due to unforeseen causes.

(4) Farm economy is closely blended with domestic economy. A few such instances are the feeding of the permanent labourer, his employment on all sorts of miscellaneous work, use of animals, implements and buildings for farm work and other purposes etc. Under the cost accounting method, it may be possible to find out the number of man-days spent on farm works or the proportion of use made and then apportion cost. This cannot be done with the same degree of precision in a survey method.

(5) Apportionment of overhead charges such as supervision may also be difficult in cases where the farmer has some other subsidiary occupation. In such cases, it will have to be done on the basis of man-days spent on each.

#### *Psychological Problem*

This is perhaps the most difficult of all the problems to be encountered. Our farmers do not generally evince any special interest in such an enquiry which at its best is only theoretical and harmless or at its worst, they consider inimical to their interests. They may even become suspicious of such enquiries especially in view of the proposals for levy of taxes on agricultural products and income, limitation of the size of holdings, changing of systems of land tenure etc. If the co-operation of the farmers is to be secured, a new orientation must be given to such enquiries so as to give them a practical turn. As pointed out by Dr. Taylor at the first International Conference of Agricultural Economists, "cost accounting should be used not as a basis of statistics but as a means of helping the farmer to visualise his own problem."<sup>1</sup> The mists of suspicion and indifference will melt away the moment the farmer is convinced that the enquiry will be of practical benefit to him and to the farming community in general.

#### *Scheme of the Government of India*

The Government of India have in a recent communication to State Governments, emphasised the importance of conducting such enquiries and have also furnished them with a number of schedules for collection of the statistical material. The main features of this scheme are (1) that the enquiry may be conducted in the villages selected for their agricultural labour enquiry employing the same staff, (2) that the cost accounting method may be adopted which means that an Investigator should be posted to each village or group of villages who will maintain the day to day accounts of all the farm operations, (3) that the enquiry may cover a period of 15 months constituting a crop year and (4) that as the enquiry will be of great use to the State Governments in dealing with their many agricultural problems, the State Governments may meet the entire cost from their own funds.

<sup>1</sup> Proceedings of the First International Conference of Agricultural Economists, p. 81.



So far as the Madras State is concerned, this would mean a survey of 84 villages by employing an equal number of Investigators at a minimum expenditure of Rs. 1.03 lakhs excluding the cost of the supervisory staff. It may be difficult to undertake this work at so much cost when the State Government is hard pressed for money for carrying out many a social and developmental scheme and when economy has become the key note of Government policy.

#### *A Scheme for Survey into Cost of Cultivation in Madras State.*

I have worked out a scheme for a survey into the cost of cultivation of the major crops in the State of Madras. The scheme which I envisage is to be worked out with the existing staff and will not involve any additional expenditure to Government.

#### *Object of the Enquiry.*

Accurate data as to costs of production of the principal agricultural commodities are required by the Government for various purposes. The reports received from several agencies at present are defective as there is no uniformity in the principle and procedure followed by the different agencies and there is no scientific basis for calculation of the components of costs of cultivation. It is now proposed to gather, in as complete a manner as possible, reliable data on the subject on a scientific basis which will command wide acceptance.

#### *Scope of the Survey.*

For the time being the survey will be exploratory in character like a pilot survey so that the procedural details can be finalised on the basis of the difficulties encountered during the course of the investigation and also as a result of its findings. While the enquiry is directed mainly towards finding out the total farm costs and the cost of production of the major crops in the holding and in each locality, certain ancillary information relating to the family of the cultivator and the economy of the village in which the selected holdings is situated will also be collected. But it will not include all the points mentioned in a full fledged enquiry like the one contemplated by the Government of India.

#### *Organisation of the Survey.*

The survey can be conducted under the technical guidance and direction of the Economic Adviser to the Government. In the absence of special staff, the enquiry may for the present be conducted by the staff sanctioned for crop sampling work adopting the survey method instead of the cost accounting method advocated by the Government of India. There are 8 Special District Agricultural Officers in charge of crop sampling work with jurisdiction extending over two to four districts. Each of the officers can carry out a survey into the costs of production of 30 holdings per year spread out roughly at three per month for ten months, the remaining two months being peak periods of their regular work. Each officer may spend two to three days in each village for the collection of the data required by oral enquiries and from records, wherever available. Some of the points in the schedule requiring clarification are explained in the note attached to it. The data gathered by the special district agricultural officers can be compiled at the State Headquarters by the Statistician attached to the Crop Sampling Scheme. The work of the Special District Agricultural Officers can be checked by the touring officers of the Public (Economics and Statistics) Department.

*Plan of Survey.*

As the special district agricultural officers who are in charge of the crop cutting experiments will be in charge of this survey, it is not necessary to make a separate selection of villages and holdings. For the crop cutting experiments conducted in Madras state in respect of paddy, millets, and oil seeds, selection of plots for each crop has already been made. "The plan of sampling adopted for that survey is the stratified plan of random sampling with taluk as the stratum, a village as the primary unit of sampling within a taluk, a field as the sub-unit of sampling within a village and a plot of one-hundredth of an acre as the ultimate unit of sampling within a selected field. Three fields in each village and one plot in each field are selected for the experiments."<sup>1</sup>

The universe for the selection of the sample for this survey will be the villages selected for crop cutting experiments excluding those selected for experiments on Grow More Food aids. The sample of required size will be drawn from the above universe with the help of random numbers. As already stated, the number of holdings for the survey will be 240 and they can be distributed at the rate of 30 for each special district agricultural officer. This provides for a minimum of one holding per taluk except in the Srikakulam and Visakhapatnam districts. Generally, the number of holdings will be one for each village except in a few of the more intensively cultivated taluks where it will be two for the village. This plan will ensure an equitable distribution of the work among all the special district agricultural officers although a more rational distribution might perhaps be in proportion to the strength of the samples in the crop cutting survey for each Taluk. It may also be considered necessary that the ultimate sample should be truly representative of all the varying types of holdings based on size, irrigation facilities, nature of tenancy and soil composition. It may be that the present sample of 240 holdings will not provide adequate representation to all these variations. If it does not, further modification can be considered in the course of the survey itself or in the next year. Statistics of costs of cultivation will no doubt be collected for all the crops grown in the holding but costs will be worked out only for the most important of them. The total farming costs of all the operations will be first ascertained both in terms of quantitative units and money value and their apportionment among the different components will then be made on rational and definite principles. This would be a better method of calculating cost of cultivation for each crop instead of apportioning the cost at every stage.

There is a model farm selected for each Taluk in the State from among those of the enlightened farmers. The owners of those farms also may be asked to furnish their farming accounts so that they may be useful for comparison. Similarly the accounts of the agricultural farms maintained by the Agricultural Department can also be collected for purposes of analysis and comparison.

*Labour Productivity in Agriculture.*

One of the uses to which the statistics of cost of cultivation can be put is to assess labour productivity in agriculture. The concept of labour productivity has not had any large scale application in the field of agriculture as in that of industry. The general definition of productivity of labour is the ratio of output to the corresponding input of labour. This concept can be extended to the agricultural sector also. The outturn of a

<sup>1</sup> Natarajan Dr. B: *Food and Agriculture in Madras State*, p. 113.

crop per man-day might be taken as a measure of productivity for that particular crop. But labour productivity should not be equated to labour efficiency, as the former is influenced by a number of factors other than labour. In regard to agriculture, the fertility of the soil, the quantity and quality of manure used and the type of irrigation are important among the factors influencing the crop yield. Of late, tractor cultivation is one of the new factors that is coming into the picture, though it has not assumed such significant proportions as to require any special notice. Seasonal factor has also considerable influence and must be controlled in comparing the index of productivity for one year with that for another. Otherwise the comparison will not be valid.

The two quantities required for the measurement of the variations in productivity trends of a crop are the quantity of physical output and the volume of labour that has gone into its production. If the volume of labour is expressed in terms of man-days, the productivity for the particular crop is given by  $r = \frac{q}{n}$  where  $q$  is the quantity of the physical output and  $n$  the number of mandays.

For the study of productivity trend, indices will have to be computed. Supposing  $q_0, q_i$  are the quantities of a crop in the base and current periods and  $n_0, n_i$  represent the number of man-days required for the production of these two quantities in the respective periods, the index for the particular crop is given by

$$I \frac{r_i}{r_0} \times 100 = \frac{q_i/n_i}{q_0/n_0} \times 100$$

If  $I$  is greater than 100, it may be inferred that the outturn of the crop per man-day has increased from the base period.

The index for a farm growing more than one crop (say 3 crops) may be computed on the following lines. Index for each of the crops has to be computed separately first. Let  $I_1, I_2$  and  $I_3$  be the indices for the three crops. While combining the three indices into a single one for the whole farm, due weightage has to be given to them in accordance with the number of man-days expended in each case either in the base period or in the current period. If  $n_{i1}, n_{i2}$  and  $n_{i3}$  are the number of man-days required in the current period, then

$$IF \text{ (for the farm)} = \frac{I_1 n_{i1} + I_2 n_{i2} + I_3 n_{i3}}{n_{i1} + n_{i2} + n_{i3}}$$

Similarly an index for the State can be computed, on the basis of data for a select number of farms. Index for the State will be obtained either by directly combining the indices of individual crops with the number of man-days in the current period as weights, or by combining the farm indices. In the latter case, index for the State will be given by the formula:

$$I = \frac{\sum I F_i N_i}{\sum N_i}$$

Where  $N_i$  is the total number of man-days expended on all crops in the farm.

**Conclusion.**

Cost of cultivation studies have assumed considerable importance in the past three decades and much progress has been made in Western countries both in their planning and execution. The enquiries conducted in this country so far have been unco-ordinated and haphazard and have

not touched even the fringe of the problem. An integrated programme of crop planning for the country as recommended by the Planning Commission must be based on a scientific study of cost of cultivation. Such a study will also help in the fixation of fair prices for agricultural produce and will be of use in calculating the levy for agricultural income tax. From the statistics of cost of cultivation, it will also be possible to assess labour productivity in agriculture as in industry and to prepare an index of agricultural labour productivity for the State. The scheme proposed is only in the nature of an exploratory survey as preliminary to a detailed survey based on cost accounting method when finances are available. No doubt there are administrative, financial, technical and psychological problems to be faced in connection with cost of cultivation studies. But the task is worthwhile and should be organised on an All-India basis.

## METHODOLOGICAL PROBLEMS IN AGRICULTURAL COST ACCOUNTING

by

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### I. Aims.

It is very significant that just following "contents" in a bulletin entitled "*Cost of Producing Milk in Pennsylvania*"<sup>1</sup> there is a paragraph which reads as follows:—

"The costs of producing as determined in this study are not necessarily the costs which must be returned to farmers in order to bring forth a supply of milk sufficient to meet the demands of the market. No claim is made that they represent such costs. There are periods when, due to no other alternative opportunities for the use of their labour and capital at other farm enterprises or work off their farm, farmers will continue to produce milk for less than costs of production as determined by studies of their nature. There are also periods when the price necessary to bring forth production to meet market demands must be greater than such costs. The costs presented in this publication are simply the costs as determined according to the accounting methods explained in this bulletin."

The apologetic attitude expressed above has also to be assumed even today by all students of agricultural cost accounting. It does not mean that no more advances in the field can or will be made in the future. It only shows the grave limitations of most of the agricultural cost accounting studies.

One of the important aims of cost accounting studies is to arrive at data explaining cost structure with a view to price fixation. The serious problem of high prices for the consumer on one side and relatively low production by the agricultural producer on the other has raised a difficult question as to whether higher prices, if manipulated by the State, is a sufficient incentive in the long run for increased production. I believe when the lay public wants economists to study cost-structure, they implicitly mean that we should answer the previously stated question.<sup>2</sup>

1 Barr, W. L. "*Cost of Producing Milk in Pennsylvania*." The Penn. State College Bulletin No. 467, August, 1944.

2 Desai and Madiman; "*Cost of producing Milk in Anand Area*." *Indian Journal of Agricultural Economics*, August, 1951.