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RAPPORTEUR'S REPORT
ON
ECONOMICS OF MIXED FARMING IN INDIA

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A total of sixteen papers on the subject of mixed farming has been submitted to this conference. Two of these papers deal with the topic in a general way; while in the remaining fourteen a factual approach has been adopted in the discussion of the issues raised. Each of these fourteen papers deals with the conditions in one or two districts and/or regions of India. Even though there is an attempt in one or two of them to present a comparative picture covering a few regions, the conclusions in most of these papers are either based on or supported by data obtained from regional studies or collected from a few farmers in the areas concerned.

Most of the authors have adopted virtually the same definition of mixed farming, interpreting it basically as a method of farm organisation and operation in which the complementarity of different enterprises is made the basis of combination of activities. The definition that seems to have found favour with practically all the authors is the one given by D. N. Singh in his monograph on *Mixed Farming in India*. Following him and, in fact, virtually quoting him, all the authors have defined mixed farming to imply "dovetailing of crop production and animal husbandry to the best advantage of the farmer . . . complementary use of livestock and crops . . . a full utilisation of the by-products of crops and their conversion into valuable animal products . . ." Only one author, H. S. Singh, has tried to analyse this definition to some extent. He has pointed out that the criterion of complementarity should be interpreted not only in relation to the main and by-products of the different enterprises but also in respect of utilisation of "input requirements from the point of view of timeliness, quantity and quality of resources." He has further pointed out that mixed farming need not necessarily imply self-sufficiency in regard to consumption items or input resources at the farm level.

The issue of the definition and content of mixed farming merits far more attention than most of the authors have given to it. Describing it merely as the "dovetailing of crop production and animal husbandry" does not really carry us very far. In fact, it can and has led to a wide variety of loose interpretations and philosophical reasonings. For example, one extreme position is that most of the farmers in India, because they happen to maintain a pair of bullocks and one or a few cows (not necessarily as milch cattle in the real sense) practise mixed farming. At the other extreme are points of view that would include under mixed farming intensive livestock enterprises, particularly milk production. Again some others think that the addition of any of the livestock or poultry enterprises of any size to crop production constitutes mixed farming. It thus becomes a problem to draw a line and say where mixed farming begins and where it ends within the range of possible combinations of enterprises on a farm.

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The first step in reducing the area of uncertainty in this matter is of course to judge enterprise combinations from the point of view of, their competitive, complementary and supplementary nature, particularly as between the crop and the animal husbandry groups. It is assumed, at the outset, on the basis of economic, nutritional and agro-technical reasonings that some combination of crop and animal enterprises, if it can be proved to be viable and satisfactory in different respects, is the desideratum for mixed farming. Coming down to competitive enterprises, it is obvious that there will be many crops that can compete for the farm acreage, the different crops having varying potentialities for supplementary or complementary enterprises. What should then be the starting point for categorising mixed farming? Shall it be the existing crop pattern or shall there be a different crop plan altogether? The question is vitally relevant under Indian conditions, particularly since any re-organisation of the cropping pattern that would involve a substantial substitution of acreage under grain or commercial crops by fodder crops is not realistic or practical. It may, therefore, be advisable to start with cropping patterns as they are or as they may change from time to time under the impact of the forces operating on the farm.

In short, mixed farming should be defined, if it is to be realistic, in relation to certain cropping patterns which are already known. This means that the animal husbandry enterprises that are to be added to the crop enterprises will have to play somewhat of a subsidiary role, at least as far as decisions regarding their choice are concerned. This subsidiary role can be defined in terms either of the principle of complementarity or that of supplementarity or both. In the general thinking on this subject, it is the complementary relationship that has been given by far the greatest prominence. This approach is justified by a number of considerations, for example, fuller utilisation of by-products as well as of family labour, value addition to the product, improvement in the dietary standard of the farm family and in the fertility of land. This approach leads in effect to what may be called partial product integration which necessarily leads to some diversification in enterprises on the farm. Full product integration, it should be noted, leads to *specialised* livestock farming.

The supplementary relationship of enterprises may lead, however, to a different type of combination, since the attempt in this case is to utilise more fully the available economic resources on the farm and not necessarily to partial product integration. Thus, addition of goats or sheep or even ducks and poultry may not lead to a fuller utilisation of crop by-products, but at the same time may make for a fuller utilisation of the labour, capital and other resources available. It is this point that H. S. Singh has in mind when he talks of complementarity in respect of input utilisation. The point here for consideration is whether mixed farming should be theoretically defined so as to include this type of combination also. It will be worthwhile for the group to discuss this question in its different aspects.

In any case, it can be safely stated that mixed farming is different from specialised farming either of crops or of livestock products. Of particular importance is it to note that a dairy farm in which the whole cropping pattern is dictated by the feed requirements of the herd is not a mixed farm even though it engages in both crop production and dairy husbandry (full product integration). Similarly, any diversification of enterprises without reference to the integration

either of enterprises or of the use of input resources cannot be termed mixed farming.

The complementary-supplementary distinction provides a useful guide to the system of costing that will be relevant and meaningful for analysing the economics of mixed farming. In the case of enterprises of the supplementary nature, practised or recommended largely with a view to ensuring fuller use of available factor resources, separate costing for the different enterprises is meaningful. Detailed costs may be worked out, even though the size of these enterprises may not be determined entirely on the consideration of profit maximisation from each of them separately. As regards complementary enterprises, the validity of the separate costing of each of these is somewhat questionable, particularly since the efficiency of the combination of a number of them may not be reflected in the total of net returns from each calculated separately. It is better in such cases to do the costing for the combined group of enterprises, specially since the by-products of the crop enterprises are used as intermediate products or inputs for the other enterprises. In any case, the measure that is perhaps most relevant for judging the relative economics of different enterprise combinations under Indian conditions is labour return, *i.e.*, return to farm family labour and management. Also implicit in this measure is the effect on the overall utilisation of the family labour resources. Net profit will be an incomplete measure in this respect.

The considerations mentioned above acquire some importance in view of the fact that almost all the authors who have based their arguments on the relative costs and returns of the livestock and crop enterprises have used detailed costing methods and calculated net returns for each of the two groups separately. The case for combinations of grain crops and milch cattle on a farm rests on the advantages arising out of their complementary relationships. And these advantages should be measured or assessed for the combined enterprises rather than separately for each. Hence the costing should preferably be for the whole farm.

This is one of the number of considerations that should be borne in mind in attempting any comparative assessment of the economics of mixed and either specialized or traditional types of farming. Most of the authors have tried to prove the superiority or desirability of mixed farming by trying to show that it will increase total income, net profit and in some cases the labour utilisation. For this purpose, separate calculations have been made for crop and livestock enterprises. Such a procedure is not necessarily conclusive. The dangers of double counting are there, besides a number of other difficulties arising out of the uncontrolled differences among different types of farms. These have vitiated the results of the I.C.A.R. trials on mixed farming (1941-46), as H. S. Singh has rightly pointed out in his paper.

Some of the other points raised by the authors may be noted here. C. Mu-thiah and a few others have approached the topic of mixed farming from the angle of pressure of population on land and of grain farming on land use. The apparent conflict arising out of the limited land resources between livestock and grain farming is not, however, satisfactorily resolved.

S. P. Dhondyal has used the arable/ley ratio to measure the intensity of mixed farming. While this is a satisfactory index, it has one disadvantage, namely, that it does not make a distinction between specialized dairy or livestock farming and mixed farming. M. Srinivasan and others have taken a slightly different approach. According to Srinivasan, mixed farming implies, among other things, "adequate provision for cultivation of suitable forage crops." The criterion of adequacy is not, however, defined or laid down.

C. P. Shastri, B. D. Taleb and Harpal Singh and some others have pointed out the dependence of the dairy enterprises and mixed farming on market facilities. This is also an important factor.

A few of the authors, notably Singh and Shastri, are keenly conscious of the lack or inadequacy of data needed for formulating and recommending sizes of different enterprises on mixed farms. Singh, in particular, considers mixed farming practicable and economic only on medium and large farms, while some other authors believe that it is good for the small farmers also. This issue merits further discussion.

From the papers submitted, one gets the impression that mixed farming has been recommended by all, but not necessarily for the same reasons. Further, the non-economic considerations and factors seem to have swayed them more than the economic ones.

SUMMARY OF GROUP DISCUSSION

Chairman : Dr. J. P. BHATTACHARJEE

The Group decided to confine the discussion to five topics that had earlier been formulated in the Rapporteur's report on the papers. These topics were : (a) definition and interpretation of mixed farming ; (b) yardsticks for measuring the size and intensity of mixed farming business ; (c) cost accounting analysis meaningful for mixed farms ; (d) procedure for evaluation of mixed against other types of farming ; and (e) conditions suitable to mixed farming.

Definition and Interpretation

At the outset the Group tackled that ever-important but never-fully-resolved issue of the goal or objective that should be emphasised in decisions regarding enterprise combinations on the farm. A point of view was presented that this objective should be to increase the volume of the products marketed. In other words, an enterprise combination that would lead to an increase in the quantity of product marketed from a farm could be considered more desirable. This view did not, however, find much support. The consensus of the Group was that the objective should be to maximise, within the range of possibility, the gross output or income from the farm as a whole, subject to the condition that the farm business income also increases in this process. It was against this background that the issue of mixed farming was discussed.

It was noted that whether in its conception or in its usage, the term mixed farming had an entirely British pedigree, there being no contribution to it in any line from the U.S.A. If it had to be used in India, it needed acclimatization. In the first place, it had to be distinguished from the traditional types of farming, on the one hand, and from the specialized crop and livestock farming types, on the other. In the second place it was agreed that mixed farming would involve a combination of arable farming with one or more of livestock enterprises. Thirdly, wherever it was a question of introducing mixed farming on an arable farm, the existing cropping pattern with feasible modifications would have to be made the basis for the planning of the livestock enterprises. Fourthly, the principle that should guide the choice of the latter would be their complementarity to the crops grown and the carrying capacity of the farm determined on that basis. The Group thus agreed to restrict the scope of mixed farming to combinations of crops and their complementary livestock enterprises, which under Indian conditions would largely comprise milch cattle and buffalo. Bullocks would not, however, be considered as part of the livestock enterprise. Some participants wanted to extend the meaning of the term so as to include in the combination possible supplementary enterprises like sheep, goats, fishery and poultry. It was, however, agreed generally that such combinations would better be classified under diversified farming. Another point of view that did not find favour with most of the members was that the basis of mixed farming should be tied up with the nutritional needs of the farm family. Since the production of milk or milk products might not necessarily lead to an increase in their consumption by the farm family, the nutritional improvement was assessable only at the macro-level and to that extent could be assumed to have been passed down.

Yardsticks of Size and Intensity

A number of yardsticks were discussed as possible measures of the degree or intensity of mixed farming practised on a farm. The arable/ley ratio or the ratio of crop to fodder acreage was considered a very rough and crude measure, particularly since utilisation of crop by-products would not be reflected in it. The ratio of crop acreage to number of heads of livestock was regarded as a slightly better measure. It was, however, agreed that a better yardstick than these two would be the relative share in the total farm income of the livestock enterprises. The Group attempted also to fix certain norms for mixed farms in respect of this share. While no scientific procedure could be readily adopted, it was agreed on the basis of the available data that for a farm to be categorised as of the mixed type, at least 10 per cent of its gross income must be contributed by the livestock activities, the upper limit being 49 per cent.

Cost Accounting Analysis

Reference was made in the course of discussion to the difficulties and problems faced in the allocation of joint costs and costs of owned or farm-produced resources separately to the different enterprises. There were two points of view that the Group tried to reconcile. One emphasised the adequacy, validity and meaningfulness of cost accounting for the farm as a whole, particularly, since profitability of each enterprise was not the objective. The other pointed out the need for costing the different enterprises separately on the ground that the

efficiency of each enterprise needed an assessment. One line of reconciliation that was attempted was that while efficiency measures (like return to labour and management) for the farm as a whole were considered most meaningful and desirable for judging combinations of complementary enterprises, some sort of operational measure would still be necessary for the purpose of within-farm adjustments in respect of the two broad enterprise groups, crop and livestock. Detailed unit cost was ruled out for this purpose. Variable cost was also not found fully suitable, because it would include family labour and make no allowance for new capital or outlay likely to be needed.

A reference to the studies in Cambridge revealed, however, that the total farm approach had been successfully employed there to assess the relative efficiency in the operation of mixed farms of different degrees of intensity. The Group seemed finally to agree that this approach would be useful in India also and that in case such data were available there would be no special need for separate enterprise costing. It was recognised that the paramount need in India at present was for physical input-output, substitution and transformation data which could be obtained only through the co-operative efforts of agricultural economists and agricultural scientists. Marginal and other forms of analysis could be attempted, and the results thereof profitably used for extension advice to individual farmers on the basis of these physical data and their suitable processing with economic variables. Synthetic and experimental data would have to be obtained from dairy farms and other sources in order to work out the economics of farming types and combinations that did not exist and for which comparative data could not thus be obtained from farm investigations.

Evaluation of Mixed vs Other Types of Farming

The Group took note of the limitations and lacunae from which the I.C.A.R. trials on mixed farming (1941-46) had suffered. In view of the fact that the results of these trials provided the only systematic data available in the country, it was necessary to keep these in mind by any one using them. The Group felt that attempts should be made to obtain more scientific data permitting, on the one hand, a satisfactory evaluation of the relative returns and efficiency on mixed farms *vis-a-vis* other alternative types under comparable conditions and, on the other, assessment of the effect on returns of varying degrees of mixtures of crop and livestock enterprises. Some of the considerations that should be borne in mind in any such attempt were also discussed. Data should be collected for a period of at least five years, the exact period in each case being dovetailed with the rotational cycle of crops grown. Secondly, the bench-mark data for the year before mixed farming was introduced must be collected. Thirdly, for comparative purposes data should be collected from separate samples of mixed farms and other type farms matched as far as possible in respect of size, location, managerial ability, availability of technical know-how, and availability of assistance and financial resources. Finally, the data should be collected from different types-of-farming areas and separately processed keeping in view their applicability for extension advice to the average farmers.

Suitability Conditions

Considerable emphasis was attached by the Group to the analysis of conditions which favoured the adoption or introduction of mixed farming. The Group could only discuss four factors, and these too in a general way. The importance of the availability of market facilities and opportunities was emphasised. It was assumed that mixed farming would lead to an increase in the marketable quantity of livestock products, thereby making the location factor more important for mixed farms. It was agreed, however, that such locational disadvantages (in relation to market) could be mitigated through the development of organisations like co-operative marketing as in the Kaira District of Gujarat. The growth of such organisations would, however, be encouraged by the opening up of rural areas, the development of communications, and the emergence of dairy processing industries. It was, however, felt that even in the absence of the latter developments, markets in the small towns could be developed through better distribution organisations so as to help the spread of mixed farming.

The second factor considered by the Group was the cropping pattern. It was felt that mixed farming would require or eventually lead to greater emphasis on fodder cultivation, even though this might not necessarily lead to increase in fodder acreage. The consensus was that such marginal adjustments in the cropping pattern were possible, more or less, in all the type-of-farming areas and regions of India, but would probably require in all areas further extension of irrigation facilities. The corollary of this was that mixed farming would be spread out all over the country. A point of view was expressed, (but did not find general acceptance) that mixed farming should be introduced in specially favourable areas and merely as a transitional type on the line of development towards specialized livestock farming.

The conflicting views about the suitability of mixed farming for farms of different sizes were resolved. It was agreed that mixed farming was practicable and feasible for small and medium farms, provided part-time farmers were not included in this group. The available data tended to show that the large farmers were inclined towards specialized farming, particularly, of crops and this was considered somewhat natural.

Religious and sociological factors, particularly, beliefs and attitudes towards livestock rearing, milking and sales of livestock products, were sometimes not quite favourable to the development of mixed farming. Among other factors considered relevant to its growth were the quality of cattle, and the substitution of cows by buffaloes in some areas.