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A Systems Approach for Use at Farm Level in Developing Countries

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SUMMARY

This paper suggests the development of a farming systems approach for use by on-farm agricultural advisers in the developing world. The procedures outlined could form the basis of a low-cost method of improving the effectiveness of farm-level advice in isolated areas with little recourse to institutional farm systems research organisations.

INTRODUCTION

Many development programmes undertaken in the Third World over the past two decades have not been successful, primarily due to poor understanding of the farming systems in operation. In order to improve the efficacy of investment in development schemes a number of organizations have built programmes around the farming systems approach. These include ICRISAT, India; IRRI, Phillipines; CIMMYT, Mexico; IITA, Nigeria; CIAT, Colombia; ICTA, Guatemala and CATIE, Costa Rica (Gilbert *et al.*, 1980). Using Farming Systems Research (FSR) methods, they aim to identify priorities for research which '...reflect the holistic perspectives of the whole farm/rural

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household . . .', develop improved strategies and teach farmers how to use them. Although this approach is considered admirable, it may not always be possible in many development areas. Due to its high cost, lack of suitably qualified staff and the political complications of fitting such a programme into the existing institutional structure, the large-scale FSR approach may be of limited potential in many Third World countries. In such situations one possible means of improving development achievements may be by instigating a farm systems approach undertaken by local farm advisers already employed by existing institutional bodies. This paper suggests the development of a methodical approach to the on-farm analysis of agricultural systems by farm advisers.

FARM MANAGEMENT ADVICE

Changes in both the physical and economic components of a farm system, governed either by external forces or directly by the farmer, can have considerable effects on the production of a farm enterprise. It is therefore essential to appreciate farm management advice as a dynamic process in which farm and adviser constantly contemplate possible changes to existing systems. Advances in science give rise to alternative technologies whilst, internally, the desires of the individual farmer may change over time. It is impossible for the distant agricultural planner to dictate the 'best' system or the sporadic visits of an adviser to identify the 'optimum' system with accuracy. The real objective of the adviser is to determine the most appropriate farming system, which most closely meets the farmer's needs and desires whilst also fufilling development objectives under the prevailing constraints of both external and internally influenced components.

THE NEED FOR METHODOLOGY

The stable maintenance of farm systems depends on the balance between many interacting components. If advice for change is given without taking account of this state of equilibrium, disruption, and consequent negative results, are likely to occur. Two common causes can lead to ineffectual advice at farm level.

(1) Farmer-diagnosed problems

Individual farmers are usually very willing to state their 'most difficult problem'. Discussion of such problems may well be a useful orientation exercise for the adviser; however, in many cases these 'problems' are found to be components of the system outside the farmer's direct control (e.g. low product price or weather). Within the existing system no advice can solve these problems and progress may only be possible by radically changing the entire system. A potentially more serious situation arises when a farmer incorrectly diagnoses a problem which the adviser immediately attempts to put right without first identifying the root cause.

(2) Adviser-identified problems and action

In order to gain acceptance with farmers, an over-zealous adviser may be tempted to isolate and rectify an apparent flaw in the farm system as rapidly as possible. This may be successful in the short term and actually improve production; however, in the longer term it may have the reverse effect. Many cases can be cited of development projects which have concentrated on specific components of farm systems which have had little long-term success due to insufficient emphasis on the necessary changes to other components of the system in order to maintain stability.

Both these cases illustrate the hazards of starting an analysis at an inappropriate point. A more rational approach would be to identify the purpose of the system and appraise current performance on that basis. Only then should it be concluded that change may be required, whereupon the system can be approached in a methodical manner.

METHODOLOGY AT FARM LEVEL

The study of farm systems *per se* is not guaranteed to result in rapid improvement of production or achievement of development objectives. However, a systematic approach attempts to avoid the mistakes often made in conventional development schemes, where, although a team of specialists may well be 'multidisciplinary', the advice at farm level is both fragmented between, and specific within, the various disciplines involved.

Figures 1 and 2 illustrate a three-stage method for assigning priorities for changes required in a farm system. Each stage utilizes different

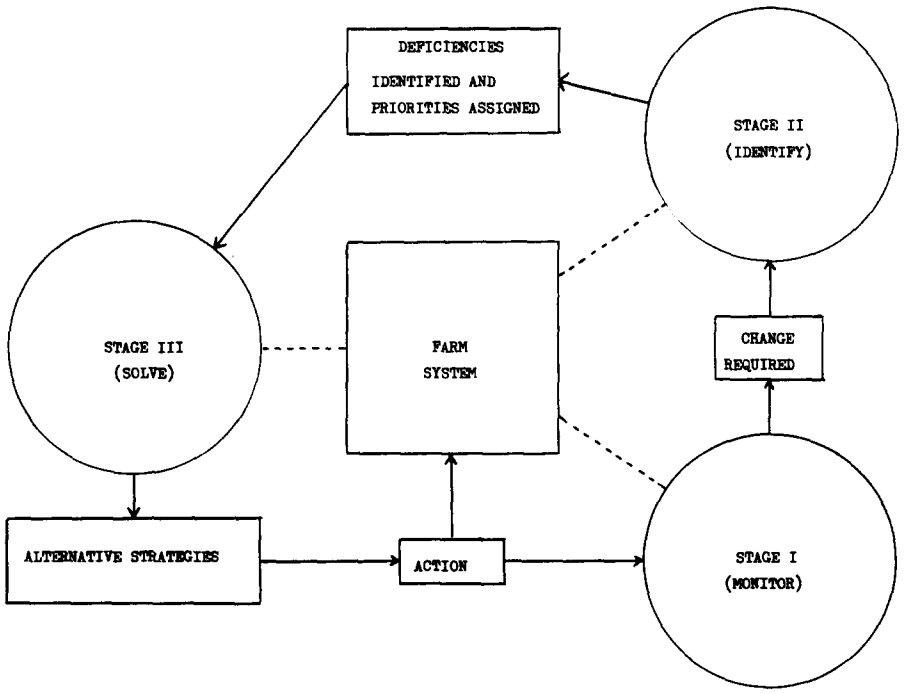

Fig. 1. General scheme for a three-stage analysis of a farm enterprise. (⟶ Flow of progressive analyses. – – – Major considerations. —— Major influences.)

analytical techniques with constant reference to the farm system. The relative simplicity and logical progression of such a method would make it suitable for use by farm advisers following limited training in its application.

Stage I

Stage I is a monitoring operation which seeks to establish whether or not the system is fulfilling its objectives. The starting point is the identification and relative priority of the desires and needs of the farm household (Fig. 2(a)). A farm adviser with knowledge of the system and the socio-ecological zone should be able to assess the importance of these desires through discussions with the farm household. This is a crucial part of the methodology since it forms a reference point for all further considerations.

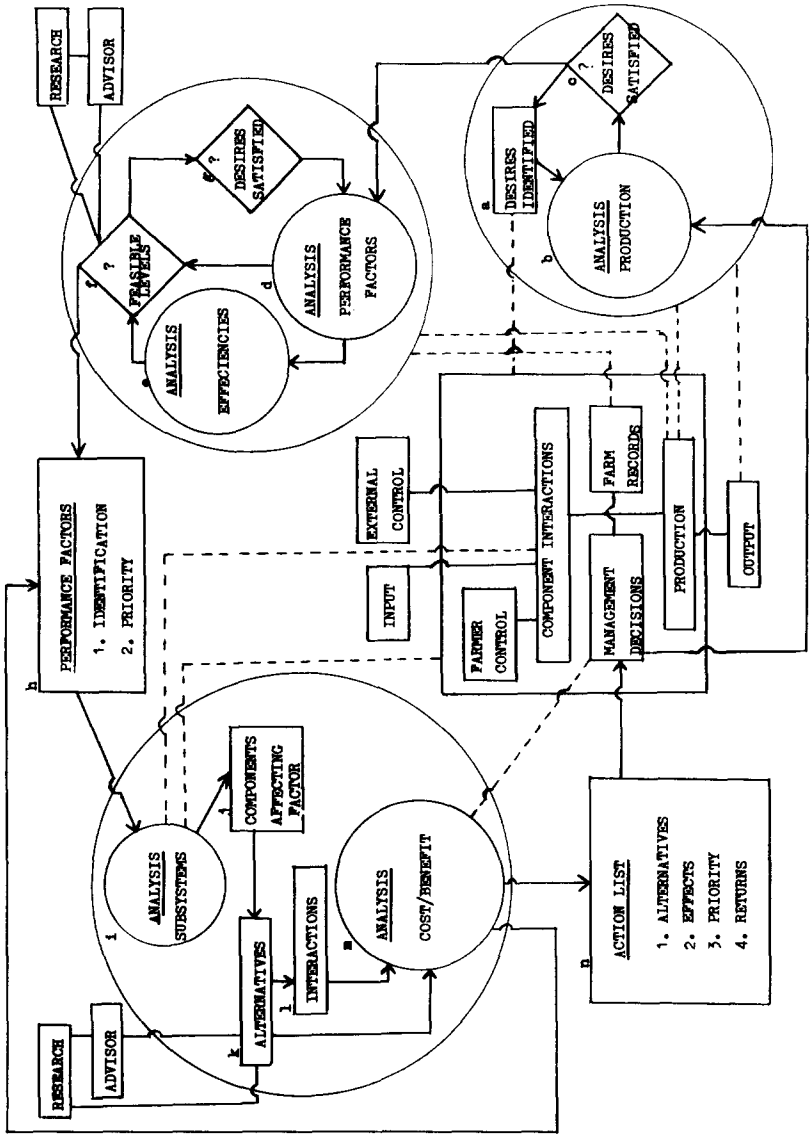

Fig. 2. Representation of application of three-stage methodology at the farm level. (For key to symbols, see legend to Fig. 1.)

Analysis in Stage I compares production with evaluated desires (Fig. 2(b)). This may be in terms of physical quantity and quality of products, cash income or availability of rest days, etc. If the system is found to meet all desires the methodology remains at Stage I as part of the normal farm management practice.

Stage II

Arrival at Stage II implies a failure of the system to meet its requirements and change to be necessary. Initially, this involves the evaluation of various physical and financial measures of farm performance (Fig. 2(d)). This information may then be used for the analysis of efficiencies in terms of output per unit of input, which are used to identify shortfalls in the system. Based on his knowledge of the system and reasonably up to date technical information, the farm adviser should be capable of ascertaining feasible levels of performance and efficiency (Fig. 2(h)).

Stage II requires a complete understanding of how the farm system functions and the interaction between system components. The construction of realistic flow diagrams of the productive process is desirable to comprehend fully the internal balance of the system. In itself this exericse leads to organized thought outside the normal considerations which may be restricted by convention and tradition.

Stage III

This stage formulates alternative strategies to bring about the necessary modifications identified in earlier analyses. The evaluated measures of performance which require improvement (Fig. 2(h)) are considered in turn and the subsystem by which each is most closely affected is identified. Using specific diagrams, the farm system can be dissected to isolate relevant subsystems and their interactions (Fig. 2(i)). Certain components may occur in different subsystems affecting different measures of performance. Hence the most frequently occurring components may be given priority. Components which the farmer is unwilling to change can be excluded from further consideration or a case presented as to the need for modification.

At this point it is known which components are responsible for the system's failure to meet needs and desires and feasible changes can be postulated. Possible alternatives for change must be appraised in terms of

their effect on the whole system (Fig. 2(l)) and subjected to appropriate cost/benefit type analysis (Fig. 2(m)). A number of possible alternatives can then be ranked in terms of potential to meet system goals (Fig. 2(n)).

Throughout the methodology a sound comprehension of the way the system functions has the effect of eliminating many possible alternatives on the grounds of their being inappropriate, undesirable or impossible to implement. Hence, the final analysis of subsystems and appraisal of benefits should leave a small number of alternative actions. These can then be 'packaged' and presented to the farmer with stated probable effects. This represents constructive and reliable advice as a basis for farmer-implemented change.

CONCLUSIONS

Under Third World conditions the variations in quality, availability and price of farm inputs over relatively short distances may dictate that almost every farm enterprise be considered as a unique system. Many parts of the method may already be practised by farm advisers in undefined forms. The value of a fixed structure of operation is that a uniform approach would be reasonably simple to carry out once the methods had been learned, particularly within a given socio-ecological zone where the basic biological interactions are similar within farm systems. The possibility of giving advice which is too specific and which creates unbalanced farming systems is minimized. A simple systems approach such as this would be a relatively low-cost method of improving the effectiveness of farm-level advice and the achievement of wider development objectives under the constraints of farmers' desires, needs and limitations.

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