Some Issues Facing Economists in Farming Systems Research[1/]

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1.0 Overview

Recently, a great deal of work has been undertaken, both in the international centers and in various national programs, to identify research methods that will lead to improved technologies for LDC farmers. "Improved" in this case refers to acceptability and usefulness to the farmer in the context of his own problems, goals and circumstances.

Social scientists, especially agricultural economists, have been assigned an important role in these research procedures. It is their job to ensure that the goals and circumstances of target farmers are ascertained and employed in the design and testing of technology. Economists can help agronomists focus their research on important farmer problems, help select experimental treatments by "pre-screening" them relative to the local farming system; and help in the selection of fields for trials that are representative of those of target farmers. They are also called upon to help in the analysis of experimental results and in the formulation of recommendations.

Economists are faced, however, with a host of methodological issues relative to the performance of their assigned role, including the following:

1/ Background notes for Symposium on "Methodological & Evaluation Issues in International Farming Systems Research", AAEA 1980 Annual meeting, Urbana, Champaign, Ill. This note is based on discussions conducted during the workshop on "Methodological Issues Facing Social Scientists in Applied Crop & Farming Systems Research", CIMMYT, April, 1980.

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Which data acquisition tools (secondary data, informal vs. formal surveys, single visit vs. multiple visit surveys) should be used under which circumstances?

Which analytical tools (e.g. budgets, LP) should be used in the "pre-screening" of experimental treatments? In the analysis of experimental data?

Which environmental factors (e.g. input distribution or product marketing systems) should be viewed as fixed, and which variable, under a given set of conditions?

Related to the above, should farming systems research necessarily proceed by taking as variable all management activities for all crops? When is it acceptable to concentrate on one pre-determined enterprise, in the context of the farming system?

How does one determine the group of farmers to whom experimental results may be applied?

How should economists collaborate with agronomists and other biological scientists in each of the several steps of on-farm research?

What can the economist do to ensure that farming systems research procedures are cost-effective?

2.0 Needs of National Programs

A careful consideration of the needs and circumstances of national agricultural research programs can help the economist in taking a stand on methodological issues. National research programs typically operate with a small budget, employing researchers who have only modest levels of training. Research procedures useful to national programs, then, should be inexpensive to implement and simple to operate, yet should be sufficiently

robust that they will lead to the development of improved technologies useful to target farmers.

Three of the methodological issues noted in the above section will now be examined in light of the needs and circumstances of national programs.

3.0 Whole Systems vs. Pre-determined Enterprise

The phrase "farming systems research" (FSR) carries with it a connotation of wholeness, a feeling that everything in the farming system must be considered simultaneously. In an extreme form FSR advocates might state that, "You need to know everything about everything to say anything about anything". In a less extreme form, much FSR nonetheless concentrates on the development of whole new cropping systems, including selection and sequence of crops and selection of management practices for each crop, to replace the farmer's current system. Winkelmann has referred to this as "FSR-in-the-large".[2/]

To this may be compared "FSR-in-the-small". This refers to research that focuses on one pre-determined enterprise (or a few very closely linked enterprises). Trials are conducted and recommendations made only for the target enterprise in question - but technology is designed and tested for the target enterprise in the context of the whole farming system. For example, in N. African countries where wheat is by far the major crop, scientists could work toward increasing farmer income by designing and testing new cultural practices for wheat production. These practices, however, would be designed and evaluated in the context of the whole farming system. In this case, this implies taking into account effects of new wheat production practices on sheep husbandry.

2/ Personal communication

The advantage of using an enterprise focus instead of a whole system focus lies in the reduction of the cost of information acquisition. Less information is needed on the farming system in order to develop useful changes in current farmer practices. To national research programs with scarce financial and human resources, such a saving is likely to make FSR considerably more attractive.

Collinson (1980) offers two cogent arguments in favor of an enterprise focus in FSR. (1) When research is planned in a region where the predetermined enterprise in question is the major absorber of resources, it frequently occurs that this enterprise offers the best leverage on system problems. (2) Agricultural research in LDC's is frequently organized by crop. The use of the pre-determined enterprise focus allows earlier introduction of FSR into on-going research programs.

4.0 Grouping of Farmers

It is clear that a single recommended technology is unlikely to be appropriate to most farmers in a given region, given any significant heterogeneity of 'farmers' problems and circumstances. It is equally clear that it is unreasonable to develop individual recommendations for each farmer. Some middle ground must be found, whereby farmers in a target area may be divided into more or less homogeneous groups.

There are at least two alternative methods for grouping farmers. Those agro-climatic and socio-economic factors that explain important changes in farming systems may be used as criteria for stratification. More simply, the current farming system itself may be used as a single criterion; farmers operating significantly different systems will belong to different groups.[3/]

3/ Collinson(1979) offers an example of an inexpensive procedure to group farmers. CIMMYT Economics Program (1980) explains this parallel concept of "recommendation domain".

Grouping of farmers can materially help national programs conduct FSR. Once groups of farmers are distinguished, it becomes possible to choose groups that will receive priority in research. The data from trials can be grouped for pooled analysis, the results of which may be applied to a defined target population. Too frequently, however, one finds research conducted on a regional basis with little or no effort to stratify farmers into homogeneous groups. This makes the task of planning and evaluating research much more difficult.

5.0 Data Acquisition Tools

One of the major issues facing economists in FSR is how to obtain from farmers information needed to orient research. Economists at ICRISAT rely heavily on multiple visits to selected farmers in a small number of villages (Binswanger & Ryan, 1979). In contrast, economists in the Guatemalan national agricultural research program (ICTA), employ what they refer to as a "sondeo". This is, in effect, an informal, non-random survey of farmers in which the senior researchers themselves spend a week in the field in the target area. They identify pressing problems and prescreen possible solutions to those problems (Hildebrand, 1979). The Indonesian national program proceeds somewhat differently: they advocate the construction of a series of village - level agro-economic profiles, largely based on secondary data and information from key informants.[4/]

Finally, CIMMYT's Economics Program urges the use of a two-stage approach: An informal, exploratory survey is conducted by senior researchers (economists and agronomists) to gain an understanding of the local farming system - especially with regard to such sensitive or complicated variables

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4/ R. Bernsten, personal communication

as tenure, credit, etc. Then, a small-sample, single-visit formal survey, using random sampling techniques, is conducted to test hypotheses formulated during the informal survey and to quantify key variables (CIMMYT Economics Program, 1980).

Which data collection tool is most appropriate depends on a host of factors: the availability and reliability of secondary data, the availability of suitable sampling frames, the precision required for continuous, non-registered variables, size of research budget, etc.

The value of the informal survey to national programs with scarce resources should not be over-looked. In regions with little secondary data or in the absence of easily-used sampling frames, an informal survey can give useful and timely guidance to the design of on-farm trials. This is partly because the planning of trials makes relatively few demands for highly precise data of the continuous, non-registered class. Informal surveys have been used to good effect in several instances (e.g. Bruce, et. al. 1980).

6.0 Conclusions

Economists are being called upon to participate more fully in farming systems research, especially in the planning and evaluation of on-farm trials. A number of unresolved methodological issues must be addressed by economists, however, as they commence this work. By focusing the development of research procedures on those procedures usable by national programs, economists may make a more lasting contribution to the practical implementation of FSR in developing countries.

Sources

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