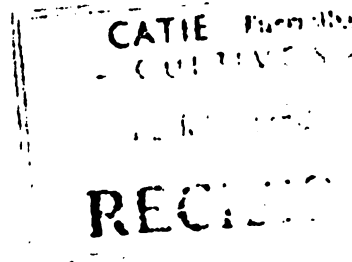


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CATIE  
CENTRO AGRONÓMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA  
Annual Crops Program



SOME ISSUES IN FARMING SYSTEMS RESEARCH; CATIE'S  
EXPERIENCE IN THE CENTRAL AMERICAN ISTHMUS\*

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SOME ISSUES IN FARMING SYSTEMS RESEARCH, CATIE'S  
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Luis A. Navarro\*\*

Since 1975 CATIE\*\*\* has been engaged in an agricultural research project for small farms (SFPS)\*\*\*\* in the Central American Isthmus. Objectives of the project included the production of a methodology to be used at country level - by a national team - in the development of improved cropping systems for small farms in priority geographical areas. In 1979 the project was expanded to include the improvement of animal production systems as well as "mixed" crop-animal production systems at small-farm level.

As a regional institution CATIE works through and with national institutions, especially agricultural research institutions.

The general approach to research at the small-farm level, developed by national institutions and CATIE in the Central American Isthmus, is considered a variant of the Farming Systems Research (FSR) approach.

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- \* Prepared for the CIMMYT Workshop Methodological Issues Facing Economists in Applied Crop and Farming Systems Research. CIMMYT April 1-3, 1980, Mexico.
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  - \*\*\*\* Small Farm Production Systems Project financed by AID/ROCAP.

It is possibly closer to the FSR "downstream" version<sup>1</sup> eventhough "up-stream" type of considerations are being explicitly introduced. This evolution follows the expansion of the SFPS project which presently includes research and methodology development responsibilities in extrapolation as well as in transference of research results.

The methodology to be developed under the SFPS project needed to be adapted to and accepted by all countries in the Isthmus. This exercise required the search and study of methodologies and approaches utilized for similar purposes within the region as well as throughout the world. The whole experience provided better understanding of the existing points of agreement as well as some of the remaining methodological issues for the FSR approach. Some of those issues are well-known but they are reviewed here to: a) stress their importance; b) attempt an explanation for their permanence and c) discuss possible forms to deal with them.

#### FSR, THE CONCEPTS AND THEIR APPLICATION AS SOURCE OF ISSUES

The development and study of different FSR types of programs and their specific methodology show no major issues in relation to the general conceptual framework of FSR. This framework is accepted as logically sound. The concepts, however, are too general and varied types of difficulties and issues appear when a particular group attempts to

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<sup>1</sup> Technical Advisory Committee, 1978. Farming Systems Research at the International Agricultural Research Centers. Washington. Technical Advisory Committee, Consultative Group on International Agricultural Research.

apply the FSR approach to a specific situation.

With the focus on agricultural research, the four generally accepted stages in FSR - descriptive, design, test and extension - situate agricultural research simultaneously within two contexts:

- a) The whole process of: agricultural technology development-extension-adoption by farmers.
- b) The whole farm-farmer's circumstances (resource endowment, knowledge and goals) to guide and evaluate research planning, progress and results.

As such - at least in Latin America - FSR is enlarging the responsibilities traditionally accredited to any particular agricultural research group on those two counts. Usually their concern about extension-adoption was minimal since it was the responsibility of a different group. Their concern about the farm-farmer's circumstances was at best very specific and therefore partial. They were only interested in those aspects considered to be directly related to a particular type of research, ignoring most of the possible interrelations within the farm. Furthermore, most works were done by individual specialists or small groups of biology scientists working on a specific subject under controlled environmental conditions.

Under the present agricultural research-extension organization in most Latin American countries, application of the FSR approach tends to have implications both at the policy and the practical application levels. Both types of implications are sources of issues as indicated by the next two groups of related questions. 1) How to organize FSR

programs within the present institutional arrangements? Are FSR groups advocating that the national agricultural research institution should also cover: extension, marketing, credit and other responsibilities? Is FSR being proposed as a guide for agricultural development planning and institutional organization and coordination? 2) Pertaining to practical application of the FSR approach general questions are: How to shape the general FSR methodology to fit the mandate, resource endowment and existing knowledge and research experience of local institutions or groups? How to organize the specific FSR groups?

A review of how particular mandates, resource endowments and knowledge may influence the development of a particular strategy to apply the general FSR approach may help to understand some of the existing issues at the practical application level.

#### THE RESEARCH INSTITUTION OR GROUP'S

##### MANDATE AS SOURCE OF ISSUES

Mandates usually specify the objects of research, geographical coverage, and policy considerations as well as institutional relations.

##### Objects of Research

Mandates in terms of objects of research could be commodity specific, management component specific, or resource use specific. In other cases, they may include different types of combination of previous objects to focus attention on complete production processes on part or on the whole farm.

Related questions in developing particular strategies include: What is needed to know about the whole farm-farmer's circumstances? Is it possible to exactly determine for each particular case a check-list of variables that is efficient and relevant for technology design and evaluation? In what detail should each variable and its interactions be known?

#### Geographical Coverage

Among institutions mandates in terms of geographical coverage vary from specific farming areas within a country, usually for national institutions, to worldwide responsibilities for some of the IACRC's.

Related questions in strategy development include: Should an attempt be made to develop a general and flexible strategy to cover the whole mandate geographical area? Will it be practical? Should several more specific and stricter strategies be developed to cover the mandate area in a fractional form? Will it be efficient? Is it possible to develop a strategy which combines both possibilities and is, at the same time, practical and efficient?

#### Policy Considerations and Interinstitutional Relations

Mandates in terms of policy considerations and interinstitutional relations may include responsibilities for coordinating action with other institutions in the agricultural sector. In other cases, a more independent action is allowed but this includes some responsibilities similar

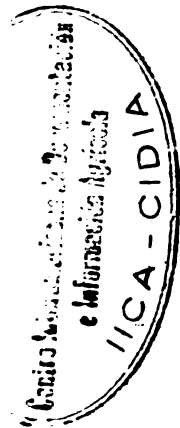
to those of other institutions, usually implying some duplication of action.

Related questions in strategy development include: How to coordinate with other institutions in an efficient manner or how FSR groups should be constituted? Should the FSR group and strategy include the participation of related institutions in a permanent form? Specifically, what is the best manner to coordinate the research and extension work? How much of the whole technology development-extension-adoption evaluation should be taken by the research group without motivating a duplication of action at institutional level? Should, in fact, FSR strategies and programs be proposed as temporary so as to motivate an institutional reorganization and coordination to fit the general methodology and allow it to function at the level of agricultural institutions? If so, how to evaluate and show in a credible form the possible benefits of such reorganization and institutional actions in terms of efficiency for agricultural development?

#### THE RESEARCH INSTITUTION OR GROUP'S RESOURCE ENDOWMENT

##### AS SOURCE OF ISSUES

FSR approach requires the formation of multidisciplinary teams and an organization allowing their members to act, at least partially, in an interdisciplinary form. Emphasis in work at farm level to describe and internalize the characteristics of the farm-farmer's circumstances - including their variability - in the approach also calls for certain levels of infrastructure, equipment and operational budget. Experience show that, in most cases, the personnel which form these teams, their



organization, material, equipment and operating budget have been mainly determined by what is available. Such availability influences the composition and strategy characteristics of particular teams.

In terms of personnel composition, some teams are stronger in the biological technical front, others in their social sciences component. Such composition also shapes their tendency as well as work organization. In view of this situation and given certain mandates, related questions include: What is the minimum size and composition for an efficient FSR team? How should the work be organized or divided across the different members' special fields? How to allocate extraordinary human resources available on a permanent or temporary basis? What are the characteristics required for the different specialists to efficiently participate on such teams? Is any special training needed for participating members? Are there possibilities for such training?

Teams also vary according to the use of research infrastructure, equipment and operational budget. There are those with intensive farm level work and those which concentrate an important part of their action in experimental station and other controlled environmental conditions. Related questions include: What should be the appropriate division by type and proportion of work at farm level and in better controlled environmental conditions? How to efficiently utilize the occasionally strong infrastructural research resources available at country level? How to determine the most efficient coverage of the farm area in order to budget the research resource requirements in all stages of FSR?



THE RESEARCH INSTITUTION OR GROUP'S KNOWLEDGE AND  
EXPERIENCE AS SOURCE OF ISSUES

Human resource endowment for different FSR groups varies also in terms of knowledge and experience in respect to the FSR approach, group's mandate and utilization of other research resources. Such knowledge and experience will influence the team's final composition, and organization as well as the characteristics of the particular FSR strategy.

Team composition as well as whole team influences could be manifested in the work characteristics. These include the importance given to and the resources and time allocated to the different stages and operation details of the FSR approach. In this sense, there are two general tendencies among the different FSR groups.

- 1) Strategies which give strong emphasis to the descriptive stage and the technology design stage based on existing technological knowledge and rapidly pass through a farm-level testing stage toward the extension stage. These groups are generally characterized by a strong component of social scientists. Otherwise, they are strongly influenced by what appears to be the European - with mostly African farm management research-based experience - approach to FSR. They are also believed to be influenced by the early U.S. Land Grant institution's farm management approach.\*
- 2) Strategies which tend to minimize the time and resources allocated to the descriptive stage, emphasize the technology design stage mostly based on technical factors and experimentation and a strong testing and agronomic evaluation stage, and release the extension stage to the responsibility of specific extension groups. These

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\* Gilbert, Norman and Winch; publication in preparation.

groups are generally characterized by a strong component of biology - and agronomy - centered scientists. Otherwise, in Latin American they are strongly influenced by the present state and approach of the U.S. Land Grant-type research-extension institution. These groups usually manifest themselves as "getting out of the experimental station".

Without doubt, both tendencies appear to be evolving toward a common ground. Present differences, however, explain the existence and permanence of many remaining issues in defining the different details of the FSR methodology at the practical application level.

#### CONCLUDING REMARKS AND REVIEW OF CATIE'S GENERAL APPROACH TO AGRICULTURAL RESEARCH

CATIE's present approach to research was developed in interaction with different national research institutions in the Central American Isthmus. As such, it reflects some remaining issues and the agreements reached despite the existing variability among the different countries' institutional mandates, resource endowments and personnel's knowledge, research experience and interests.

The conclusion was that development of a research approach flexible enough to cover all countries' particular characteristics and at the same time practical and acceptable under all conditions was not possible. For that reason an area specific research strategy was proposed as a flexible but general approach (Figure 1). As such, under every particular application, operational details should be adjusted to the local group's mandate and circumstances.

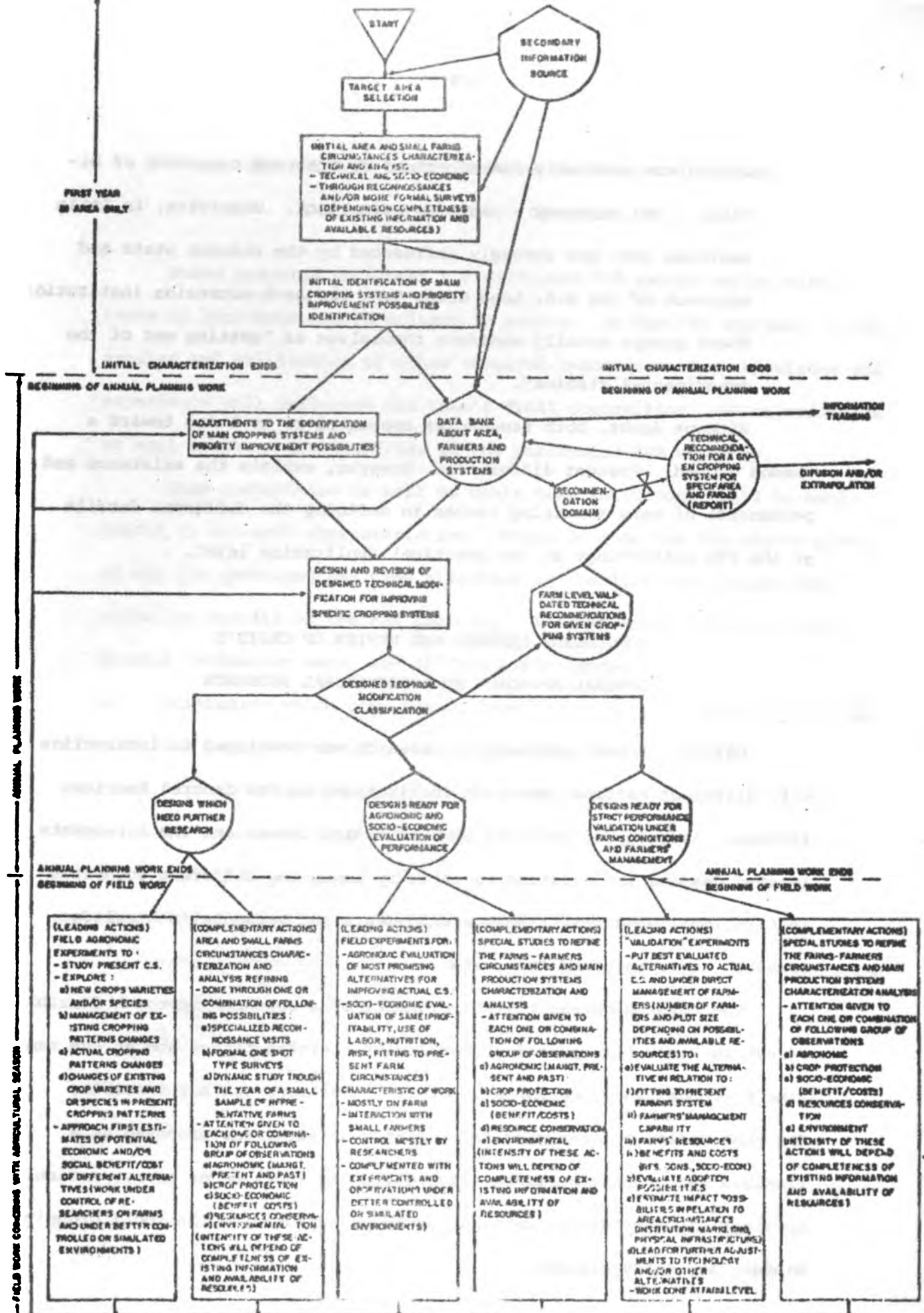


Fig. 1 Steps and actions in a strategy to develop improved production systems for a specific farming area

The main emphasis in the strategy refers to a clear identification of necessary activities and their chronological arrangement. The intention is to permit a multidisciplinary team to act interdisciplinarily and yet allowing each participating specialist to have a distinctive responsibility at all times. Experience shows this consideration should be given special attention in order to facilitate group's work organization and leadership as well as enhance the member's sense of participation.

The general strategy also attempts to equilibrate the emphasis placed on the descriptive-design stages and the emphasis on technology design and testing stages that could be in conflict in a particular group. Furthermore, as designed, the strategy would allow the possibility of efficiently absorbing extraordinary research resources that may be available on a permanent or temporary basis.

The selection of specific tools and methods at every step in each stage of the strategy is generally guided by each team's knowledge and experience. Possibilities to influence an appropriate selection of these seem to be in the development, study and documentation of better and alternative tools and methods for those steps. It is clear that no attempt to prescribe specific and/or strict unique methods, no matter at what level, will be universally accepted.

It seems that the logic behind the FSR approach should also be applied to the development of specific strategies. They should be appropriate to the particular program or project and group circumstances.