Farming Systems Research and Development

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The term "farming systems was applied in the 1970 s to several different activities being developed around the world. These activities had a common thread and general purpose, but the methods used to pursue the goals differed greatly. The threads that bound them all together and which are basic to the farming systems approach are these:

- ☐ A concern with small–scale family farmers who generally reap a disproportionately small share of the benetits of organized research, extension and other developmental activities.
- ☐ Recognition that thorough understanding of the farmers situation gained firsthand is critical to increasing their productivity and to forming a basis for improving their welfare.
- ☐ The use of scientists and technicians from more than one discipline as a means of understanding the farm as an entire system rather than the isolation of components within the system.

Farming Systems Approach

In the 1980 s, as the generic term "Farming Systems Research" (FSR) came into more common use (for example, see Byerlee, et al. 1982), it became evident that two basic components, when used together, comprise the farming systems approach to research and development. This concept is similar to that used by Shaner, et al. (1982) who *termed it FSR&D. This term will be adopted here. The two complementary components* of FSR&D, recognized by Norman, (1982) under slightly different terminology, are:

- ☐ The farming systems approach to infrastructural support and policy (FSIP).
- ☐ The farming systems research and extension (FSR/E) approach to technology generation, evaluation and delivery.

FSIP and FSR/E Described

FSIP is more "macro" than is FSR/E Since it deals with policy, the variables it treats are mainly outside the farm gate and involve more social scientists and economists than agro–biological scientists. Methodologies frequently include surveys to provide the perspective on farming systems as a means of more accurately predicting farmer responses to different policy stimuli.

FSR/E is more "micro" in scope and deals mostly with conditions inside the farm gate. Because it is concerned with technology generation, evaluation and delivery, more agro–biological scientists than socio-economic scientists are involved and methodology is heavy in on–farm biological research with relatively little time devoted to surveys.

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FSIP is *applied, farmer-oriented, socioeconomic research,* supported by the agro-biological sciences in a *team effort.* The principal product is information. The primary clients are policy makers and managers of services and infrastructure.

FSR/E is *applied, farmer oriented agro-biological research,* supported by the socio-economic sciences in a *team effort* which includes *extension responsibilities.* The principal product is technology. The primary clients are farmers.

Components Are Compatible

The two components use different mixes of scientists and methods. Their primary clients also are different. Still, they are highly complementary and compatible. FSR/E can have significant impact on policy makers because it can provide more detailed information on farms and farmers than FSIP can obtain. Similarly, FSIP can have significant impact on agricultural technology because it can provide FSR/E with more complete information on infrastructure and policy than it would other wise be able to obtain.

Taken together, then, FSR/E and FSIP comprise a complete development concept termed here FSR&D.

FSR/E Steps Outlined

Although FSR/E is flexible to fit the agricultural and institutional conditions found in different country and cultural settings, it will usually involve a sequence of steps similar to the following:

1. Initial characterization and analysis of existing farming systems through close consultation with farmers.
   a. Tentative partitioning into homogeneous farming systems or recommendation domains.
   b. First estimation of problems and constraints.
2. Planning and design of first phase work.
   a. Biological research.
   b. Continuing agro-socioeconomic characterization.
3. Selection, generation and evaluation of technologies.
   a. Commodity and discipline research on experiment stations and in laboratories.
   b. Researcher managed on-farm trials with farmer participation.
      - ☐ Exploratory trials.
      - ☐ Site-specific trials.
      - ☐ Regional agronomic trials.
      - ☐ Agro-socioeconomic trials.
   c. Farmer managed trials.
      - ☐ Individual evaluation of acceptability by the farmers.
      - ☐ Refined partitioning of recommendation domains by researchers.
      - ☐ Initiation of technology transfer activities.
4. Information accumulation and analysis
   a. Agro-technical data from onfarm trials.
   b. Economic records on farm enterprises from farmers.
   c. Other agro-socio-cultural-economic and political information through directed surveys of area residents.

5. Frequently programmed reevaluation of research information to do the following:

   a. Refine partitioning of recommendation domains.
   b. Make recommendations of acceptable technology for dissemination into specified recommendation domains.
   c. Feedback into the sequential process.
   d. Serve as a basis for planning future work.

6. Extension of acceptable results throughout appropriate recommendation domain (s).

Farmer Manages Complex Processes

In many ways this sequence parallels what farmers have always done. The farmer manages a complex set of biological processes which transform the resources at his or her disposal into useful products, either for home consumption or for sale or trade. The choice of crop and livestock enterprises and the methods and timing of cultivation, husbandry and harvesting are determined not only by physical and biological constraints, but also by economic and sociopolitical factors which make up the larger milieu within which the farmer operates.

Within this complex milieu, through a process of trial and error and a number of seasons or generations, farmers move toward appropriate technologies and allocation of resources which make best use of those at their disposal–given the objectives of each individual farm family. While the choices available to each farmer are different, those with similar sets of resources and constraints tend to make similar choices as to crops, livestock and management practices. Those who have responded in similar ways can be grouped together into homogeneous farming systems (recommendation domains).

FSR/E brings scientific method and additional expertise to bear on this process of problem identification and technology generation. Teams of scientists from different disciplines, working with farmers, can speed up the process and make it more efficient in responding to a rapidly changing world.

References

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