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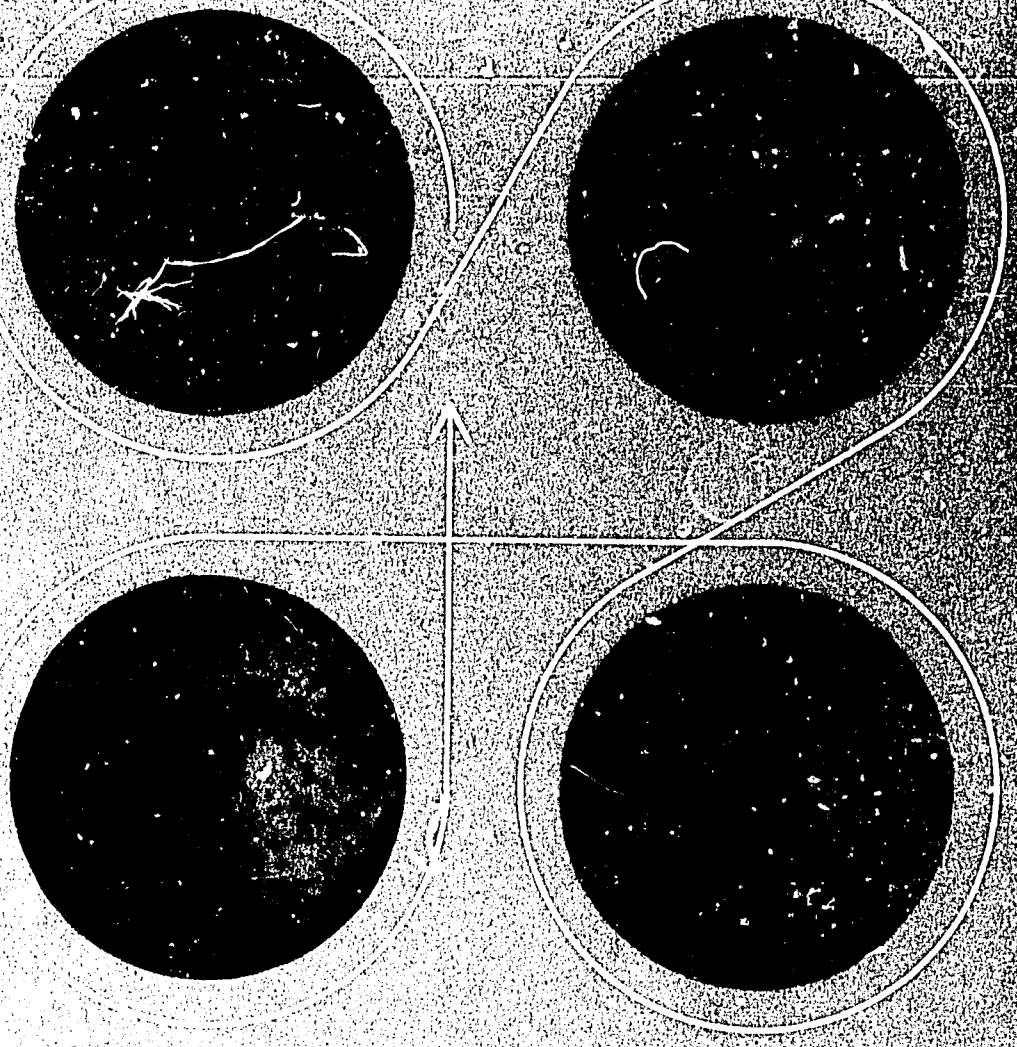

A COURSE IN FARMING SYSTEMS RESEARCH: THE CORNELL EXPERIENCE

Frank Casey and Randolph Barker

DEPARTMENT OF AGRICULTURAL ECONOMICS

New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, New York

July 1982

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Frank Casey and Randolph Barker
Department of Agricultural Economics
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INTRODUCTION

The purpose of this paper is to report the recent experience of students and faculty at Cornell University in a new course/seminar entitled, "Farming Systems Research in Developing Countries" (International Agriculture 650). The course was offered for the first time during the 1980 Fall Semester after extensive discussion by Cornell's international faculty and staff concerning the need for and usefulness of such a course.

An intensive planning period for developing the Farming Systems Research Course (FSRC) took place during the summer months prior to the 1980 course offering. Meetings were held on a weekly basis and 10-15 faculty members from at least eight different departments within the College of Agriculture and Life Sciences participated in discussing such issues as: the content and organization of lecture topics; design and purpose of discussion groups and field research teams; potential faculty and student participation; course mechanics (grading, papers, etc.); appropriate reading material; student application process to the course; and the preparation of a FSRC Workshop that was held at the beginning of the 1980 Fall Semester. A description of the program for the 1980 workshop is given in Section I.

Despite the somewhat technical nature of the subjects outlined above, a recurrent theme throughout these summer meetings was to search for a definition of FSR and the methodological benefits and constraints of this particular research mode. The questions associated with both the definitional and methodological issues are echoed and treated in

more detail within the context of the Minutes of the 1980 Workshop (Section Ib), Section II and Section III.

Reading materials associated with various lecture topics for the 1980-81 courses are provided in the Annex.

The major part of this report (Sections I, II and the Annex) was originally prepared following the completion of the 1980 FSR course. Since then a second semester's experience in developing the course has been gained (Fall, 1981).

Section III provides an updated description and evaluation of the second FSR course. Specific changes from the 1980 course are highlighted and a brief evaluation (based on student comments) is incorporated. The organization and content of future courses in FSR at Cornell will be subject to further modification and fine tuning. Offering the course has been a learning experience for professors and students alike and, as such, new learning techniques and analytical tools need to be tested further for classroom and field use. However, we hope the experience gained to date will be useful to those who are now, or will be, offering a course in Farming Systems Research.

Section I. Cornell University Workshop on a Course in Farming Systems Research

The purpose of this section is to present the program and the discussions which took place during the Cornell Workshop. The goal of the workshop was to consider and examine proposals by Cornell faculty and students and invited participants for developing an FSR course; i.e. the types of activities, materials, organization and teaching methods which could be appropriate and useful. However, not all of the topics discussed during the two-day workshop directly related to the course. In addition to constructive suggestions for the course's content and structure, there were also substantial comments with respect to identifying what FSR actually is, the nature of inter- or multidisciplinary research, procedures for conducting field research, and the philosophy behind the FSR approach.

Although the Cornell FSR course had been outlined by faculty and staff beforehand, the workshop was held to solicit the advice of persons from both Cornell and from outside the institution for further course development. Those topics discussed are listed in the workshop program and elaborated upon in the report on the Workshop. This report is followed by a list of summary observations which we believe bring out the main points covered.

The Workshop was sponsored by the Office of International Agriculture in the College of Agriculture and Life Sciences. Faculty and staff from the Department of Agricultural Economics provided logistical assistance.

Program for the Cornell
Farming Systems Research Course Workshop

September 11-12, 1980

Day and Time	Event
Wednesday, September 10	Arrival of non-Cornellian workshop participants and observers. No formal gatherings are scheduled
Thursday, September 11	
8:20 A.M.	Welcome, Dr. J. F. Metz, Jr., Director International Agriculture
8:30 A.M.	Statement of Workshop Objectives: Dr. R. Barker, Professor, Agricultural Economics
9:00 A.M.	Session I - Chairman: Dr. B. F. Stanton (Department of Agricultural Economics) Discussion Topics: 1. What are farming systems and FSR? 2. How does FSR differ from other methods of agricultural research? 3. Why teach farming systems research?
11:30 A.M.	Discussion open to workshop observers
12:30 P.M.	Lunch Break
1:30 P.M.	Session II - Chairman: Dr. H. D. Thurston (Department of Plant Pathology) Discussion Topics: 1. What basic issues are involved in teaching farming systems research? 2. Types of activities (course assignments) that students can benefit from in an FSR course that concentrates on methodology (field exercises, case studies, research proposals) 3. Is teaching FSR on the basis of U.S. examples (field work) relevant to future FSR work by students who will be located in developing countries?

Day and Time	Event
Thursday, September 11 (Continued)	
3:30 P.M.	Break
4:00 P.M.	Discussion open to workshop observers
Friday, September 12	
8:30 A.M.	Session III - Chairman: Dr. R. Barker (Department of Agricultural Economics) Discussion Topics: Topics to be covered in a course 1. Emphasis on research methodology versus case studies. 2. Do other areas of research need to be emphasized? 3. Suggestions for changes in course content and/or structure.
10:30 A.M.	Break
11:00 A.M.	Discussion open to workshop observers
12:00 Noon	Lunch break
1:00 P.M.	Session IV - Chairman: Dr. R. E. McDowell (Department of Animal Science) Discussion Topics: 1. What materials (case studies, references, etc.) would be useful for teaching a course in farming systems research?
2:30 P.M.	Break
3:00 P.M.	Discussion open to workshop observers
4:00 P.M.	Workshop Wrap-up: Dr. R. Barker

Invited Participants and Observers

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803 Bradfield Hall

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330 Plant Science Building

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513 Bradfield Hall

Randolph Barker
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349 Warren Hall

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122 Roberts Hall

Pat Garrett
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436 Warren Hall

Robert E. McDowell
Animal Science
204 Morrison Hall

Edward Smith
Entomology
162 Comstock Hall

H. Christian Wien
Vegetable Crops
166 Plant Science Building

Larry W. Zuidema, Associate Director
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Minutes of the Cornell University FSR Workshop

Rapporteurs: Michael Goe
Jack King
Peter May
John Mitchell
Kate Showers

Edited by: Frank Casey

September 11 - Session I

Discussion Topics:
1) What are farming systems and FSR?
2) How does FSR differ from other methods of agricultural research?
3) Why teach farming systems research?

Discussion Topic 1: What are farming systems and FSR?

To begin the discussion the following definitions of FSR were offered. A method of: identifying constraints in a multi-disciplinary setting; developing a broad and balanced philosophy of farming systems; putting a proposed method of research to a thorough test; identifying the complete framework of a system.

Within the context of FSR two major points were raised. One, is FSR confined to or primarily involved with the description of a particular system; i.e. finding out why farmers are doing what they are doing? Or, two, is FSR focused more towards research design to promote change within a specific system?

Description. The researcher/scientist must understand the farmer's system before change is introduced if technological "failures" are to be avoided. Two methods of describing a system were mentioned:

1. The anthropological approach that demands researcher experience in a farming community for many years.
2. Those techniques employed and referred to as "Rapid Rural Appraisal" or the "Quick and Dirty" approach.

It was commented that both approaches can obtain useful data, but it isn't clear how they should be combined to adequately describe a system.

Change. If the emphasis is put on change rather than the description of a system, research methods may differ. Some objections to the incorporation of change as a goal of research were raised based on the following questions: Who wants change? What do farmers want? Who's asking the researcher to foment change?

One person expressed the opinion that to study a system with the intent to change is dangerous and the desire for change must originate from those farmers using a particular system.

A second observation was made that the researcher/scientist requires, at the outset, an understanding of the system, not change. However, all those present at the conference are involved in promoting change. There is a need to study a farmer's system from a wide perspective of expertise with the intrinsic questions: What is? What could be? What ought to be?

A third participant commented that persons suffering from abject poverty are demanding change and that governments want action on meeting basic needs. Therefore, given the fact that decisions are going to be made, FSR should improve the quality of those decisions and must be action oriented.

At this point, it was observed that it was important to have realistic rather than inflated expectations of FSR as a discipline and that its first task was to describe thoroughly a mode of research.

Some discussion centered on the topic of whether there currently existed a philosophy of FSR or whether such a philosophy was still being developed. One participant mentioned that FSR should not be regarded as a new research technique, but a totally new concept of research. Specific qualities of this new concept were defined as considering the needs of farmers and the problems they face within the context of continually changing circumstances, the better working relations demanded between the farmer and the researcher and between extension agents and researchers, and the high degree of cooperation demanded between researchers from different disciplines in order to make research a more effective development tool.

There was a strong consensus that FSR is and should be a research tool to be used to assist the resource poor and/or the small farmers in the world. Concern was expressed about the glibness with which people talk about small farmers. It was mentioned that it is very difficult to design or adapt technology for small farmer use only, and hard to assess whether new technologies or innovations are indeed scale neutral. One participant suggested a discussion should pursue the question of whether or not agricultural technologies are scale neutral and, if not, what technology can be adopted for small farmers use.

It was emphasized that FSR deals with an extremely complex set of interactions, and that awareness of and an appreciation for the intricacies of these interactions must be developed among researchers. FSR is seen as a link between the needs of the farmer and the direction of single component research as traditionally carried out on experimental stations. But, FSR also involves the investigation of the interactions between social and physical factors of a farm system, with an emphasis on the factors that predominantly affect the system. Research into a system should incorporate an evaluation of all interactions and their effects on the system. A method of investigation and evaluation must be devised for examining these interactions.

To illustrate the complexity of an FSR effort, the details of FSR are highly specific to location, season, and farm family circumstances. It was pointed out that FSR must include an examination of the social and economic constraints affecting the farm unit. The farmer should be considered as a <u>household</u> decision maker who makes decisions about both production <u>and</u> consumption. Because there are different production/consumption units in developing countries, different perspectives towards problem identification are required. An appreciation of the complexity of a given farming system should be developed. Systems research must also include an appraisal of the social structures within the farming community as well as the various institutions and policies within a country that affect farm livestock and cropping systems. FSR incorporates cropping systems research but it also includes an anlaysis of the social context of the farm and farmer's household.

Briefly, other ideas expressed in relation to the process and scope of FSR, included:

- FSR is meant to be a holistic approach to research and involves listening to farmer perceptions of problems and responding to what farmers have to say. It was pointed out that if the "holistic" approach is construed to be linear programming or computer modeling then it will be a top-down mode of research, and it may not be at all synonymous with listening to the farmer or making him a partner in research. A balance, therefore, in research processes and tools must be sought.
- The classromm setting could be used to develop the context for an interaction between the farmer and the researcher and to find out why specific farm practices are employed (rather than simply asking the farmer "what's your problem?"). To garner information on farm practices, different types of research methodologies will be appropriate to different locations. For example, the Sondeo method is not necessarily appropriate outside the Guatemalan context. Circumstances in any one country will allow for a different mix of basic, applied, and adaptive research.
- FSR should be a repetitive process and not be treated as a "straw man" that is independent of the farming system. Rather, there should be an effort to obtain a reaction from the system through the introduction of an innovation or technology to determine how well the system is understood. The basic questions to be considered should be; who does what, where (with respect to farming), with whom, and how. The practice of repetitive research (no time-frame identified) was considered appropriate from the standpoint of understanding changes in the system. Technical and economic changes, as well as other factors posing risks for productivity will be highly variable in their effects on the system, necessitating the need to understand the systems' dynamics. Criteria for evaluation should not only include profitability, but technical appropriateness and social acceptance.

Numerous questions were posed by the participants in respect to understanding the relationships involved in FSR. These questions included: What key relations in a system are researchable?; Is there a need for more biological systems research before the behavioral sciences can be interfaced with it?; Is it acceptable to assume that there are relationships between various sub-systems on the farm and if so how can these be identified and described?

The above discussion on "what is FSR?" undoubtedly raised more questions than it effectively answered and illustrated the lack of consensus as to what the goals of FSR should be.

Discussion Topic 2: How does FSR differ from other methods of agricultural research? What problem is FSR going to solve that other research approaches have not solved? Methodologies applicable to FSR.

It was mentioned that it would be useful to try to separate "traditional" research from farming systems research. One criterion for separation was that in FSR the farmer participates in and benefits from the research process directly; another is that FSR starts with farmers as its clientele. FSR is more concerned with the development and adaptation of new technology than with "discovery" in the sense of pushing back the frontiers of human knowledge.

The objection was raised that the above view betrayed an inadequate knowledge of "traditional" research. The agricultural research system of the U.S. does have farmers as its clientele. There has always been a strong link between U.S. farmers and research both because many researchers come from farm backgrounds and because the extension system provides feedback from farmers. The problem has been in establishing such "traditional" agricultural research in developing countries where the link between farmers and researchers is not so well established nor its importance appreciated from either the researchers' or farmers' side. The need is to fill the gap between farm practice and research -- basic and applied. The U.S. system is not perfect, but it is egalitarian,

and it does have the necessary linkages and enjoys a vigorous (two way) flow of information.

The viability of the U.S. research system with respect to developing countries was called into question because the information mechanisms between researchers and farmers are not all that adequate and do not help if they are only superficial or if there are no linkages to the outside world. When there is government intervention there is usually pressure for quick and simple solutions to complex problems. There is, therefore, a time dimension involved with the practice of FSR that requires some resolution. If FSR concentrates on research that is too in-depth, governments may believe time is being wasted. On the other hand, if adequate amounts of time and money are not allocated to the research process at the farmer level, failures may be more likely to occur resulting from mis-specification of problems.

In contrast to the partial reductionist method of traditional agricultural research, FSR seeks to understand the constraints imposed upon the farmers' system: biological, economic, social, and political; and then seeks solutions to these constraints. Unless the behavioral disciplines are a functional part of FSR, the "system" is incomplete The political constraints of a system may come into play in the more "macro" scheme of things when an innovation is developed but acceptance by government authorities is not forthcoming. In this case, the researcher/scientist has done agricultural research but has not understood the political system in which his innovation must be incorporated.

One participant mentioned it still was not clear how the approach to good research on, for example, soils within the FSR context in a developing country would differ from good soils research in the U.S. A second participant countered that soil fertility experiments in the U.S. are often carried out with irrigation or nutrient sources which are not available to farmers. Even in developing countries research at the experiment station is located on prime land and is not subject to the same problems encountered in the farmer's field. The research being done is then irrelevant to the problems of the region which the experiment station is supposed to be serving.

At this point the question was raised concerning the type of qualifications of the researcher/scientist vis-a-vis how the more technical skills of a scientist could be applied to a research problem. One participant commented that "good" research (applicable?), whether done in the U.S. or in a developing country, can only be done by well-qualified scientists who understand the basic chemical and physical laws involved in the problem they are researching. If biological problems in developing countries are more difficult to solve, then it is just that much more important than the scientists' knowledge of basic principles be thorough. If training in FSR broadens a student's field of study at the expense of more in-depth skills in an area of specialization, then that lack may become a limiting factor in the quality of the contribution the individual can make.

In relation to the reductionist technique that characterizes traditional research one participant asked that, while it is important to know why farmers do what they do, how is this knowledge going to be established without using criteria set up by experiments where variables are controlled and constraints are released? No answer to this question was offered.

With respect to other methods of agricultural research, the question was posed as to how FSR differs from farm management. One participant commented that farm management takes technology as a given, while FSR attempts to generate appropriate technology.

This question gave rise to further debate on the difference between FSR and farm management investigations. FSR was defined as an effort to understand what, how, and why farmers do what they do; what tangible and intangible factors enter into the farmer's system; what value can be ascribed to the different components of a system, and what effect change would have on the system. Farm management was described as being centered on more mathematical models of investigation and analysis with linkage to national and international agricultural policies, and technology acceptance as a given factor. As opposed to FSR, farm management investigations were not perceived as generating information useful to other disciplines. Farm management was said to be able to determine

what farmers are doing now, whereas FSR must not only accomplish this but also trace the development (mostly economic) of the present farming system before new technology is introduced.

There was considerable concern about the methods available for identifying the problems relevant to a farming system, determining precisely when the objectives of the research effort should be stated. For example, should research objectives be determined before or after farm visits and/or interviews? One participant suggested that the choice of problems to work on was subject to the identification of constraints in the farming system. A means for identifying some basic constraints prior to description of the farming system may be to conduct informal market or nutritional surveys, which depend on the status or scale of the target population covered by the research effort. It was stated, in addition, that because no one individual researcher can examine all of the factors affecting the system at once, researchers must be aware that, while in the process of selecting some factors for investigation, they are implicitly assuming that other factors in the system are fixed for the duration of their particular research effort.

Because FSR entails the study and identification of complex interactions, it may of necessity incorporate a varied set of research techniques. This suggests two requirements for the conduct of FSR. First, it may be required that researchers be knowledgeable, and perhaps skilled, in a variety of research techniques. Secondly, the identification of research problems will be an on-going process throughout the research period. It was stated that the course should help students understand that FSR entails a set of research methods which includes experimental as well as applied research techniques.

Other ideas for problem identification included selecting the means required for deciding on or distinguishing the predominant factors in the system, what specific problems required research, and how to ask the most relevant questions. These ideas point to the problem of what factors in the system need to be evaluated and how this evaluation procedure is gone about. One participant suggested that the place to begin was the evaluation of current farm practices, current farm technologies,

and new technologies as they are developed and targeted at the system, i.e. farm management.

An important consideration in the problem identification phase of the research effort is that the researcher must remain aware of the fact that farmers have different perspectives in regard to their own systems. It was stated that a balance must be struck between deriving a "systems/holistic" view of research versus "listening to the farmer." While the latter doesn't necessarily entail a "systems" viewpoint, the former may be interpreted as being "top-down" if the farmer does not participate in the problem identification phase. Mention was made that the challenge for a researcher is to determine how to go about relating what he or she knows from a specific discipline, and what the farmer knows from his or her experience. It was suggested that an intermediate step in the research process, referred to as "action testing", be carried out to test researcher ideas. This step could then be followed by the use of experimentation where controls are emphasized and thus would constitute a last step to confirm or reject an idea to be incorporated into the farm system. The intermediate step in idea testing would put the participant researcher in a position where he can determine how his idea may fit into the farmer's system.

After a problem area has been selected for investigation, research tasks involve data collection and analysis. With respect to data collection, priorities for investigation must be established. In addition, an important aspect of methodology is determining how to process the data gathered through FSR. Since a typical problem is that researchers are more concerned with how to collect data rather than how to use them, it was suggested that emphasis in an FSR course be placed on how to analyze and apply data for problem solution. The unit of analysis depends on the research objective itself. The unit of analysis could be an individual field, a whole farm, a specific group of farm families, or a village. The researcher must clearly explain why a particular unit is selected and how it fits the research topic under consideration. For the analysis itself, there may be a need in FSR to rethink the means by

which data are evaluated. For example, yield per acre may not be as important as yield per person hour of labor, depending on the system being studied.

Several comments were made in relation to the procedure for starting field work. An early field experience was noted as being essential for students to understand FSR. Prior to the field exercise, however, it would be extremely worthwhile to spend time searching for reports of fieldwork or other information that would help define the system. It was agreed that it is important for researchers to know as much as possible about the area they will be working in prior to actually beginning their investigative efforts at the field level.

Discussion next turned to the type of research tools that could be employed. Because many studies start with surveys, the question arises as to what type of survey may be appropriate. The "nature" of the population may influence the type of survey to be used. Again, dietary and market surveys were mentioned. However, even though surveys involve talking to the farmer, it was strongly suggested that there is a need for investigators to be doing some "hard" research while the dialogue process is in progress. For example, for plant scientists, it is important the researcher begin growing plants on the farmer's field so that he may have a reference point for talking with the farmer. This procedure is quite similar to the idea presented above that learning often occurs through the comparison of production results and practices. In respect to agronomic testing, the quality of the initial trials is not as important as the fact that it is crucial that some experimental research be set up early in the program. FSR was then further defined as being an evolutionary process, in the methodological sense, with the technique itself developing out of an interaction between research scientists, farmers, and the physical and biological factors that constitute the system. At this point it was mentioned that researchers must be "adventuresome" in their efforts to generate a reaction from the farmers' system. However, there are trade-offs made when a researcher takes his experiments to the farmers' field; the high degree of precision

of a controlled environment is replaced by a high degree of variability which more or less reflects the on-farm environment. A technical question in respect to field trials was raised as to how farmers can participate in the research effort without biasing the sample. No answer was offered.

One goal of any research effort might be to develop a methodology for predicting the effects on a particular system that are induced by change(s) in any of the component factors in the system. Again, it was stressed that a variety of research tools would be better than a single methodology for enhancing this predictive capacity.

The question was raised as to whether or not it was essential for researchers to live with farmers while doing research, or whether there were other contact methods that would suffice, since there is a need to speed up the research process as much as possible without losing relevant information. Several persons at the workshop believed that without the experience of living with farmers the research effort would lack realism. Indeed, a key concept in FSR is working with and talking to the farmer and without direct contact on a daily basis critical information would be missed. One participant stated that the course's principal objective should be to instill in students a degree of willingness to learn from the farmer.

Discussion Topic 3: Why teach FSR?

Many diverse opinions were expressed in regard to teaching a course in FSR and its purpose. The basic question is, how are students assisted in doing their research?

It was first asked what the interest of Cornell was in offering an FSR course for graduate students; was it to train personnel in the use and importance of a multi-disciplinary approach to research, or to train students in skills for helping farmers in unfortunate circumstances? One participant responded that for a graduate student with little money and a lot of anxiety, there is a need for specific research guidelines. There are two possible approaches to conducting research, or training

students to do research. One is to seek the means to fit one discipline into the entire FSR strategy. The other method may be to start completely over again and develop an entire new research or educational system. At present it is difficult to inform a graduate student as to what or how much to measure in the FSR framework. Systematizing and organizing ideas is the first step in quantifying them.

The comment was made that students want hardware and research techniques: What to do and how to do it. FSR needs highly qualified scientists (specialists?) so the student should not become too diffused in his activities or education. The question of pure disciplinary training arose here. Would FSR yield better results when carried out in an inter-disciplinary framework, although individual disciplines may still consider their discipline to be the most important and try to influence any decision that an FSR team would make? One participant stated that he believed the student should understand the contribution of each discipline to an FSR effort and at the same time make sure that the necessary skills are being developed to make the contribution to FSR expected from his discipline.

This statement was debated from the standpoint of the risks and rewards involved for the student in doing FSR. As one person commented:

> Everyone is talking about "systems" now. This is fine for faculty members because they are tenured. But for graduate students there is risk involved. In the various disciplines those in control are generally individuals with a narrow, highly-specialized approach to problems. Work done in a farmer's field which is multidisciplinary probably will not be published and the graduate student will not find a niche when his research is completed. The reward structure favors specialists. It should be understood that going out into the field to study the problem of rural poor first hand usually involves sacrifice in terms of one's professional advancement.

Another participant mentioned that although FSR seems to be somewhat of a fad now, the reasons for having it become one are not contrived. Many who participated in the developments of the 1960s, the Green Revolution, are now those who draw attention to the inadequacies of a single crop or a single commodity approach to agricultural research problems. In a sense, an established peer group of scientists sympathetic to FSR is there. The need for a holistic approach to research is widely recognized notwithstanding the resistance of some entrenched disciplines. Recognition of the FSR approach as being a step in the right direction throughout the research community is a good reason for offering a course in this subject.

Finally, it was stated that a course in FSR should give the researcher the ability to recognize the research being conducted on the farm by the farmer.

September 11 - Session II

Chairman: H. D. Thurston (Plant Pathology/Cornell)

Discussion topics:
1) What basic issues are involved in teaching farming systems research?
2) Types of activities (course assignments) that students can benefit from in an FSR course that concentrates on methodology (field exercises, case studies, research proposals)?
3) Is teaching FSR on the basis of U.S. examples (field work) relevant to future FSR work by students who will be located in developing countries?

Discussion Topic 1: What are the basic issues involved in teaching farming systems research?

To set the stage for the discussion of the topic the chairman requested that each participant take five minutes and write down a response to the above question. The answers to this question can be broadly

grouped into three categories: the nature of interdisciplinary work; the problems of language, jargon, and communication; and the practicalities of how to organize and run a course in FSR.

1. The nature of interdisciplinary research.

There was considerable agreement that one of the basic issues in regard to FSR was the need for interdisciplinary "teamwork" during the research process. A major concern was the problem of how to bring together highly specialized scientists to work on problems defined in a systems context. It needs to be recognized that FSR does not contribute a body of scientific knowledge to any one discipline. It is, therefore, important that there exist a philosophy of adaptive learning among disciplines which allows for discussion and an exchange of ideas.

It was observed that in an FSR course it would be imperative to discuss the contributions and importance of the traditional academic disciplines in a research effort. In addition to adopting a new philosophy of cooperative research in order to define research problems, the FSR course should promote an awareness of the difficulties involved in having a group of people from various disciplines working together as a team.

It is necessary to understand what a multidisciplinary team is and how it should function. There was concern expressed that by working in a multidisciplinary team the rigor or integrity of the specialists' work is somehow compromised. It was considered essential, however, to try to break down the barriers that inhibit a holistic approach to research. In the context of the FSR course, it is important to discuss the considerable difficulties that exist in promoting an effective working relationship between members from various areas of expertise. During the course the roles and contributions of different disciplines should be brought to light as well as the communication process required for reaching a consensus in respect to defining the problems faced by the farmer. In conjunction with this suggestion, the role of the systems researcher as a link between component and subcomponent research exercises should be described.

The issue of how to establish and maintain these relationships between researchers was raised. The teaching method in the course must allow sufficient time to develop an awareness of the importance of disciplines interacting with one another. In a sense, people already know how to communicate, but don't realize it. The participants saw a need to distinguish between specialization and the general knowledge obtained through analyzing a system in a holistic manner. It was considered impossible for all FSR participants to obtain in-depth interdisciplinary knowledge, underlining the need for an atmosphere that eases communication between disciplinary specialists.

Each discipline approaches farm-level problem identification based on different perspectives and choice criteria; how to identify constraints, what constraints are identified (which in turn affects the design of alternative farm practices), and how the results of changes in a system are ultimately evaluated. For example, if labor at weeding time, and not land, is identified as a production constraint, there will be an effect on the specific research objective.

In relation to this point the question was posed as to whether or not it's enough to send out a group of researchers from different disciplines to work on a problem? All too often the report that results from such a team effort is highly compartmentalized and shows no evidence of synthesis or integration.

Two other questions were put forward. First, what sorts of exercises could be designed to break down "academic sclerosis and hardening of the categories between disciplines?" (no answer forthcoming). Secondly, is the approach to talking with the farmer based on sensitizing researchers to listen, or does it mean the creation of a new multidisciplinary subject area? The consensus at the workshop seemed to be with the former notion.

In contrast to this consensus, in terms of developing a long range interdisciplinary capacity, there exists a rigorous tradition of disciplinary separation within different academic fields which FSR must contend with. The acceptability of a FSR-type field experience in respect to an individual disciplinary curricula (academic) must be addressed.

One participant commented that perhaps a new academic program may be required to enable people specializing in a specific area of study to difersify their knowledge by participating in a broad research effort, i.e. systems analysis.

2. Language, jargon, and communication.

In conjunction with the preceding topics involving interdisciplinary research and researcher-farmer relationships, the subject of communication was considered an important issue in the FSR process. Concern was expressed about the problems of communication both between researchers and farmers, and among researchers representing various disciplines. In fact, communication was cited as one of the key factors in the success or failure of any FSR effort.

Some participants believed all researchers must speak the farmer's language. There was a strong consensus that in order to maintain credibility FSR must not create a jargon of its own but that it should try to establish a commonly agreed upon and understood terminology.

It is of critical importance that persons participating in interdisciplinary research understand what each participant is saying as well as being aware of the research methodologies used by various disciplines and the biases inherent in those methodologies.

3. Organization and running a course in FSR.

The first area of concern during this discussion included the nature of both the student and professor that become involved in an FSR course. It was suggested that the most important qualities to be sought after were sensitivity and the ability to work in an interdisciplinary group, and that researchers (professors and students) must be selected for these qualities. It was generally agreed that, because an FSR course had not been attempted before, it would be a learning experience for all those involved.

Since a wide range of skills and information are required in an FSR effort, wouldn't the subject matter in FSR instruction be better

suited to an entire academic program rather than a one semester course? There was a consensus (and compromise) that the course ought to be longer than one semester. Ideally, the course would span one agricultural year. On the other hand, because so much information and/or experience could be incorporated in the course, there was seen to be a need to establish some instructional priorities.

The participants generally agreed that a major element in an FSR course would be to set up interdisciplinary teams of researchers and give them the opportunity to interact with one another. A field experience was thought to be very important because there would be some contact between farmers and the interdisciplinary groups. Some of the major areas of concern included who (what discipline) does what, where, how, and in cooperation with what other discipline.

In respect to post course considerations, it was suggested that the FSRC could serve a useful function by making information available on some of the better overseas FSR projects. Also, it was deemed important that the FSR programs of overseas research organizations be described for the identification of after-course job opportunities. At Cornell consideration should be given to the development of an institutional capacity in FSR.

Discussion Topic 2: Types of activities (course assignments) students can benefit from in an FSR course that concentrates on methodology (field exercises, case studies, research proposals)?

In total, there were few tangible suggestions about the types or kinds of exercises that might be included in an FSR course. This was primarily due to what the participants referred to as the "uniqueness" of such a course. Generally speaking, most discussion centered upon exposing students to a field experience in interviewing farmers and the examination of research proposals and case studies.

1. Field exercise component.

There was general belief that students could gain valuable field experience from interviewing U.S. farmers and that an expensive field trip to a developing country was not crucial. One advantage of doing research in the U.S. as a first experience would be working with literate farmers concerning things like soil maps. In essence, the farmer literacy problem in a foreign environment could be eliminated. The most important aspects of a field exercise, regardless of location, are to go out into an unknown situation with an open mind and ask questions. It was suggested that the use of a domestic area for field research may exhaust the opportunity for future exercises. Some participants stated local farmers would have thoroughly informed first year student/faculty research teams and that unless further research and/or theses grew out of the initial experience there would be little justification for returning.

In contrast, other participants believed that there were good reasons for returning to the same area for a second or third year. With successive field visits to the same areas or farms, the same farmer might be approached with different questions, or different farmers could be asked the same questions. Although with consecutive interviews local farmers may not be as spontaneous, there would be an opportunity for comparing two sets of interviews based on the same general questions. There may be two advantages to this procedure. One, the exercises could help the researcher identify interview techniques for eliciting information from farmers. Two, consecutive interviews would help to focus on any bias that is introduced by the interviewer(s) with respect to personality, appearance, and/or other characteristics that may influence the quality of the information acquired.

There was discussion in respect to the mechanics of sending students to the field. In the course offering at the University of Florida, a low income farming community was used as a "quick and dirty" field exercise area. The two week survey time which Florida used was described as being insufficient and a two semester time frame for the course was deemed to be necessary.

The participants considered it essential to involve the extension service as part of the field exercise. In the Florida experience the extension agents were found to be helpful in locating farmers, and class members helped identify farmers that extension agents hadn't known. The fact that students could share their information with the extension service was considered a valuable asset of the course.

Discussion next moved to research team composition and the process of setting up the field exercise. In respect to team composition, the questions of the participants centered around how many people, how many disciplines, and which disciplines were optimum for a team? Another question was whether or not it was necessary for all of the researchers to have a farm background. One participant responded that a farm background does help the researcher to identify the relevant questions to ask, but at the same time a person with a non-farm background can pose "naive" questions that might be overlooked yet are pertinent to a research issue. It was also mentioned that when a "number" of disciplines are brought together to look at a specific situation, the vision of the group is broadened and the individual group members are apt to focus in on more than one problem. Should a research team begin with a common set of questions, or should each member operate on the basis of his or her own specific discipline? Whichever the case, the group agreed that the conclusions reached from the research process should be unified to reflect the nature of the interdependent factors in a system.

For setting up the field exercise, there was discussion concerning what students could do in the field. Surveys were mentioned as one activity, where, as noted in the Florida example, students spent two weekends (from a Friday afternoon through all of Saturday) interviewing farmers. There were student meetings every half day to discuss what was being learned from the interviews. One of the problems with this procedure was that the students spent more time talking with farmers than "walking" the farm itself. Concern was also expressed that too frequently everyone will try to do everything, irrespective of training. This leads to the problem of losing disciplinary rigor with an

insistence upon homogeniety. The participants believed that thought must be given to utilizing the diverse nature of disciplines to broaden and strengthen the research approach.

2. Case studies and research proposals

There was general discussion with respect to teaching effort which is short-term in nature (one semester) and geared towards a heterogeneous group of students. Activities must be ranked in importance, and the objectives of the course must be judged for suitability.

Nonetheless, there was some support for examining case studies and research proposals as part of the course curriculum. When an interdisciplinary team examines research proposals, more questions are raised about the goals and methodology of the research than when a single discipline approach is taken. A question was raised as to whether it was better to examine a few proposals and "tear them apart" or survey a large number of proposals and derive some research principles. Research proposals contain a lot of "boiler plate" which include some valuable procedural materials. It was suggested that students and teachers look at proposals in the context of what should be done, i.e. locate project or research proposals and identify elements that were missed during the development of the proposal.

Visual aids can be useful in creating a sense of being there, i.e. at the field level. The University Field Staff film series was mentioned as a resource that could be useful to the FSR course. It was cautioned, however, that the films had to be seen all at once or the farming systems aspect would be lost.

Another suggestion for the course was that it develop a literature review of some FSR projects which would be useful to persons who are in a position to fund FSR. The purpose would be to identify FSR strategies which have been tried and which strategies have succeeded or failed to meet their objectives.

The Cornell faculty stated that they hoped to develop a number of exercises for students over the semester. There was a problem in that

there is no expertise in farming systems research for resource-poor farmers and that no one knows how to do such research. This is the predominant reason why the FSR project at Cornell was called a seminar rather than a course.

It was suggested that greater progress could be made in developing exercises and activities for the course if research sites were chosen in advance.

2. FSR approach to describing a system

The questions posed on this topic include, what questions do you ask in the field; how do you define the components of the system; and how to teach ways of organizing or categorizing things never seen before?

Essentially, the process involved is one of going out into an environment that is treated as an unknown, looking for unknown answers to unknown questions. The main question is to determine the utility of various research techniques which can enable students to focus on the more important aspects of a particular farming system.

If the objective of the reserach is to change and/or to teach farmers, how can this FSR course help students motivate farmers to change, or make compromises? One person offered the opinion that the set of attitudes of professional change agents and/or researchers is class-biased, urban-biased, ethnocentric, and rigid. Specifically, researchers are always asking farmers to change their ways while researchers never change their procedures. Until the research community can demonstrate its ability to change and be flexible, it will not be in a position to be of any use. The area of ideology of science is a problem. If there is to be both behavioral and conceptual modification on the part of the research community, it must come in the FSR course. The traditional methodology of setting out the problem and producing a conclusion is part of the belief system in science and its culture bound set of perceptions. It is not an appropriate methodology for FSR. The question remains: are there alternatives in "scientific"

research and are there basic differences between western and non-western scientific research approaches?

3. Serving student needs

There should be an attempt to select FSR course students who will seek different employment opportunities. The course shouldn't focus on a specific student type as an audience. Rather than working with only scientists and extensionists the course should be open to all interested in agricultural development.

On the other hand, it was believed that the course should not get bogged down in discussing the administrative or bureaucratic issues of research. Although it was considered important to be aware of the pressure that bureaucrats face and the need for a political will to restructure the research process, it was thought to be more important to stick to the question of what is FSR.

4. Policy issues and FSR

An important consideration in the implementation of an FSR action program is the extent to which it is national policy to rely upon the small farm sector to increase productivity versus plantation operations or to encourage the growth of large farms. In reality, there exist real problems in restructuring research programs and priorities to focus on small farms.

It was stated that only a very small part of national research budgets is devoted to FSR. Of the support that does exist, most is going to cropping systems research which is mainly focused on export or cash crops rather than subsistence crops. This merely reflects the priorities of individual countries. If these priorities are to be changed then FSR must be shown to be an effective research procedure that can enhance production.

The number of U.S. universities and ministries of agriculture capable of fielding a FSR team is presently very low. In both developing and developed countries the expertise and institutional framework for

doing FSR is inadequate. Currently there is available both the interest and support to develop FSR programs.

One participant commented that there is a great need to establish the "state-of-the-art" of FSR, i.e. where is FSR now in respect to where it may eventually be. Both the scope and cost of an FSR program need to be identified. The practical aspect is that if countries are to be encouraged to pay attention to the small farm sector, the FSR package must look attractive.

September 12 - Sessions III and IV

Chairmen: Dr. Randolph Barker (Agricultural Economics/Cornell)
Dr. R. E. McDowell (Animal Science/Cornell)

Discussion topics:
1) Emphasis on research methodology versus case studies.
2) Do other areas of research need to be emphasized?
3) Suggestions for changes in course content and/or structure.
4) What materials (case studies, references, etc.) would be useful for teaching a course in FSR?

NOTE: Sessions III and IV were combined into one meeting that preceded the break. After the break the workshop was adjourned.

Session III

The third session was opened by Professor Barker's review of the historical development of the farming systems research course at Cornell. He commented that the basis of selection for the 10 faculty members and 25 graduate students involved in the course had been their interests and experiences. The student body was roughly evenly divided among M.S. and Ph.D. candidates, virtually all of whom had significant international experience. However, it was indicated that in future years perhaps one-third of the students would not have had prior overseas experience.

Formal faculty input into the class as a whole is envisioned to consist primarily of the presentation of case studies of projects in which faculty members had participated or had extensive knowledge. It is intended that the selected projects should differ structurally so as to offer complementary insights into FSR. It is expected that Plan Puebla, I.R.R.I., and the Ecuador Mountain Agriculture Project will be among those projects presented by the faculty. Additionally, the students working in multidisciplinary teams will prepare case studies and present these projects and their critiques to the class. The course is designed to be a learning experience in FSR for students and faculty alike. Both groups were encouraged to treat each other as peers to encourage a more informal and productive exchange of ideas.

Professor Barker requested that the workshop members take five minutes and write down brief specific criticisms and comments of the written proposal, "Outline for Farming Systems Research Course." The discussion then continued in a round robin fashion, each comment from a visiting participant usually eliciting a response from the Cornell faculty present.

The first speakers asked for clarification regarding the goals of the course. It was explained that for this course FSR is being viewed as an applied research field designed to identify modifications for existing technologies of benefit to farmers, though there are admittedly differing opinions held by the Cornell faculty. The course is designed to assist individuals recently back from fieldwork in their data analysis, be of service to those now planning their fieldwork, and also to provide a framework for understanding farming systems for M.P.S. candidates (those not undertaking research).

The discussion then focused on the fieldwork component of the course. It was widely agreed that the fieldwork exercise should be a major component of the course. There was a consensus that the study of local farms was indeed relevant and worthwhile, since individual farmers here in the U.S. were faced with similar constraints as farmers in developing countries. Though some discussion arose regarding problems

of seasonality specific to the use of local field cases, it was still felt crucial to the educative process for students to experience field situations, both to learn from the research problems encountered and to benefit from the experience gained by interaction with specialists from other disciplines.

In Cornell's "Forages of the Tropics" course it was found that cooperation among disciplines was an evolutionary process, with understanding each other's definitions and jargon being the first order of business. The farming systems research class and its relationship to the various fields and disciplines will also progress through stages of development, not only in this first year, but also in the years to come. It is likely that in the future certain other courses may be prerequisites to enrollment in the FSR course. Or, perhaps this course will be a prerequisite for other study, such as "Special Problems in Agriculture of the Tropics."

The question was posed, "What type of researcher is to be developed by this course; a generalist or a specialist who dialogues?" If the goal is to develop generalists then the students should learn the methods of other disciplines. If the goal is to develop specialists who dialogue there might not be any need for cross use of methodologies. It was felt that FSR should be a collaborative effort among specialists, not a social scientist learning a little about the biological sciences or vice versa.

It was pointed out that in practice the team approach to solving agricultural development problems is often weakened by the lack of a truly collaborative effort. The report which such "teams" produce is commonly divided into chapters written by individual team members from the point of view of their own discipline, negating any real benefit from the multidisciplinary approach. If team members who are highly skilled in their own disciplines could learn to integrate their efforts effectively, the report produced would be of more value.

The discussion addressed the problem of maintaining the standards of the various academic disciplines involved within the context of the proposed course. It was explained that the approach at Cornell would

be quite different than that taken by the University of Florida. In the class taught at Florida students come to the class knowing that one person from the field of economics will be in charge of the class. This gives the course a more traditional structure. At Cornell, with many disciplines involved on an equal footing, the possibility of academic conflict arises since the various fields represented may view the class as diluting the professional and academic standards of these disciplines.

The problem is that while research approaches taken by students who have taken the FSR course will be broader than those of their colleagues, thesis work must also be technically sound. The example was cited of a study in Botswana where the animal science department felt compromised by the necessity to use data on cattle obtained at slaughterhouses and water holes rather than performing a more controlled experiment. Under the circumstances, this approach was necessary to obtain information. However, the analysis of these data would not generally be accepted by the department for thesis work, one major problem being the lack of any relevant literature.

This brought up the issue of what type of material should be collected. A problem occurs when one goes out into the field not convinced of what the problem really is, and begins to collect large amounts of data in hopes of not overlooking any available information which may be needed.

Several participants mentioned a need to develop a list of minimum amounts of information required by each discipline in order to maintain professional standards. This "minimum critical list" would have to be rigorous without being rigid. There was widespread agreement that data sets of great volume or gathered by questionable methods were of little value and are found gathering dust around the world. Given the universal time and money constraints facing research projects the development of these minimum data sets might be helpful. It was also felt that the "bargaining" which would take place in deciding what data to collect would help develop an appreciation for the requirements of other disciplines.

The workshop also addressed the issue of what was to be done with data once it is collected. A distinction was made between data processing and data analysis to make the point that in a course of 10-12 weeks expectations of developing a methodology, collecting data, and analyzing it were perhaps unrealistic. The suggestion that any analysis of data should shun sophisticated hardware and utilize nothing more complicated than the TI-59 computer/calculator met with strong concurrence. This would benefit sutdents from other countries studying here at Cornell because they would be able to return home with a useful tool that was applicable and required minimum investment.

Ideal composition and size of the multidisciplinary teams was another major topic of discussion. The workshop was presented with Professor Hildebrand's consciously paradoxical guidelines: fewer people are better than many and many disciplines are better than few. Theoretically, a team might consist of two people - a bioscientist and a social scientist. As more members are added, there can be more diversity, including, for example, both plant and animal scientists, an anthropologist, and an economist. Faculty participation is also a crucial factor to group size determination. It was felt that groups consisting of 5 or 6 students from different disciplines with at least one participating faculty member would be an optimal team size.

It was observed that while the concept of this class centers on team participation, there should be some way of judging individual performance for the purpose of assigning grades. One possibility suggested was that, after the team had been in the field, each member might independently write a paper detailing his/her role in the overall team effort. Another possibility would be to have members of the team judge the individual's performance. It was remarked that the University should be as experimental and progressive as its students are asked to be. (This comment also had bearing on the topic of thesis requirements.)

A graduate teaching assistant outlined his work on development of the course reading list. He stated that the course approximately follows Andrews and Hildebrand's book on research methodology, indicating that in advance of this workshop it was impossible to detail the

exact reading assignments. It was never intended that the reading list be exhaustively covered by the students, but rather it can serve as an elementary bibliography on which to build.

Several comments specifying omitted works were made as well as a number of observations of general areas where the body of literature is known to be deficient. It was asked that workshop participants foward the suggested readings that they recommended.

Summary
Observations from Workshop on Farming Systems Course

1. The objective of the course should be to develop in the student an understanding, awareness of, and capacity to analyze a very complex system.

2. Farming systems research (FSR) is not so much a method of doing research as it is a philosophy of doing research.

3. To improve the system from the perspective of the farmer, one must first understand the system. Why are farmers doing what they are doing?

4. Improvement may be in terms of equity, employment, quality of life, and/or productivity.

5. Central to the FSR philosophy is the process of developing a communication link between farmer and researcher, which implies that both can learn from each other, and an empathy among researchers of different disciplines. The flow of knowledge between researchers and farmers is as important as the flow of knowledge among researchers. There is a need to understand but not to master the other person's discipline.

6. Not only farmers and researchers, but also policy makers and action agencies must be involved in FSR if the follow through or implementation is to be successful.

7. To teach farming systems research effectively requires very early on the establishment of a farm laboratory situation which will allow students to perceive from first hand experience the interaction between farmers and researchers and among researchers of different disciplines in establishing a research agenda.

8. Part of the process of teaching FSR involves the identification of the problem, separation of the relevant from the irrelevant, and determination of major indicators in the design of alternatives and evaluation of results.

9. Case studies and practical exercises can be effective teaching tools.

10. In collection and analysis of farming systems data there is a need to avoid the pit falls that come from the use of large survey questionnaires.

11. Certain relevant factors which impinge upon the performance of the farming system, but are not directly a part of it (e.g. market structure, price, etc.) cannot be ignored in farming systems analysis.

12. A change in the farming system can be accomplished either directly by interacting with farmers in a given site, or indirectly (i) by influencing the development of component technology (sometimes referred to as upstream research) or (ii) by affecting policy change. The effects of the latter two are likely to be more pervasive and less site specific in their impact.

13. Farming systems research would appear to be relevant for developed and for developing countries.

14. Whether farming systems research grows and becomes institutionalized in national research programs or is simply a passing fad depends on the degree to which the process produces meaningful and useful results that benefit society.

Section II. FSR Course Description and Evaluations for Fall, 1980 (First Year)

Outline for Farming Systems Research Course

Week 1: I. Introduction - Why Farming Systems Research?

The purpose of this session will be:

(i) to organize the course.

(ii) to explain the general outline of the course.

(iii) to introduce students to the general concept of "what is farming systems research?" and why it is that for such research to be successful it must be conducted in an interdisciplinary mode. Faculty members from different disciplines will briefly discuss why farming systems research has become important to their respective fields.

Week 2: II. Workshop on FSR Course Development.

The purpose of this workshop is to provide a forum for the exchange of ideas as to the most appropriate form and content for a course in farming systems research. Participants will have a copy of this course outline as a basis of discussion. The workshop will be open to observers and those students taking the course for credit will be required to attend.

Week 3-5: III. Case study presentations of Farming Systems Research.

Prior to examining specific aspects of farming systems research, we believe it is important to take a holistic view of the FSR process by studying some case studies of farming systems research. These exercises are to determine how different researchers have approached a research problem and what results were achieved.

Three case studies of farming systems research will be presented by faculty members. Each case study will

be presented by a pair of faculty members representing a biological and a social science. Case studies will include:

(i) Puebla project

(ii) IRRI constraints study

(iii) Ecuador Project

* Beginning in Week 3, student multi-disciplinary teams (biological, physical, and social sciences) will be organized for preparing a written assignment and a presentation of a specific farming systems research case study. The written part of this activity must be submitted by Week 6. Group presentations of case studies will begin in Week 6 during the latter part of the Tuesday lecture period, continuing thereafter in the remaining weeks until all groups have presented their work. Groups will continue to meet throughout the semester to work on their research project.

Week 6-7: IV. Summarization of general research principles, techniques, and problems as illustrated in the case studies.

* Also in Week 6, students will receive orientation and instructions for developing a team research proposal (the second required report). Some examples of research proposals will be given. Team proposals are to incorporate realistic assumptions about available financial resources and professional skills. The research proposal is to be based on the teams knowledge of a farming area in New York State.

V. Orientation and focus of the research project. This topic initiates the material with regard to the methodological aspects for designing programs in farming systems research. The purpose for discussing these methodological questions are two-fold:

(i) How to determine why farmers are doing what they're doing, and

(ii) To develop improved technology for farmer use.

a) Specification of the research problem.
Effect of government policy and the organization and goals of participating institutions on the choice of research objectives. Problem definition and delineation of research objectives. Effects of resources available for research on the design of the project.

b) Techniques to assist in problem identification.
Collecting and organizing both primary and secondary data for research site selection and description of the farming system. Use of exploratory investigations to assess farmer goals and determine the present use of farm resources (physical, biological, human, capital, etc.) - for example, rapid rural appraisal and benchmark surveys.

* Student team presentations of case studies begin at the latter part of lecture period in Week 6.

Week 8-9: VI. Data collection, field observations and farmer experiences.

a) Data collection from people and field observations (non-experimental)
List of necessary information such as "soil types," "household composition," etc. Alternative techniques and alternative procedures employed by the physical, and social sciences to obtain data. Problems of accuracy and measurement of data. Farmer involvement and feedback.

b) Data collection using controlled experiments.
Range of experimental conditions, (experiment station, farmers' field, etc.) and their suitability. Methods of experimentation in farmers' fields. Participation of social sciences in the collection of technical data. Farmer involvement and feedback. Problems and/or constraints of experimental design.

Week 10, 11, 12 — VII. Analysis and Review of data obtained.

a) Analysis and interpretation of experimental data.
Methods and techniques for analyzing physical, biological, and economic data from experimental crop and livestock units. Identification of primary agricultural production constraints (technical, economic and social).

b) Analysis and interpretation of non-experimental data.
Methods of data analysis and flexibility in interpretation of data; implication of results, measurement devises, and reliability of results.

c) Integrating non-experimental and experimental data.
Techniques used to combine data obtained from different sources. Using non-experimental data to verify experimental observations. Analysis of combined data. Feedback of results to farmers.

Week 13-14: VIII. Summarization of key points of those topics that have and have not been discussed in regard to farming systems research.

Student team presentations of research proposals.

The same student teams that earlier worked on research case studies will be required to briefly discuss the highlights of their farming systems research proposals during these final two class mhetings. (Refer to Week 6 in regard to orientation and instructions students will receive in respect to the written propcsal.)

Fall 1980 FSR Course Evaluations

This section is based on a summarization of about twenty written course evaluations submitted by the course participants at the end of the 1980 Fall Semester. Topics addressed in these evaluations included: (A) FSR as a research methodology (need for, training in, the philosophy of, etc.); (B) substantive elements of the course (lecture topics, field exercises, data collection and analysis); (C) pedagogical issues, and (D) course mechanics (course length, class size, credit hours, etc.).

Part A. FSR as a Research Methodology

Most of the points that were made apropos to this topic are addressed in the available literature on FSR and in the proceedings from the FSRC Workshop.[1/] However, to set the stage for the sections that follow, some

[1] See the reading list in Annex I: Gilbert, Norman and Winch, Farming Systems Research in the Third World; Dillon, "The Economics of Systems Research," McDowell and Hildebrand, Integrated Crop and Animal Production: Making the Most of Resources Available to Small Farmers; Spedding, "The Study of Agricultural Systems;" Gotsch, "The Concept of Farming Systems in the Analysis of Agricultural Research and Development Programs."

basic points in relation to the perceived methodology of FSR from the class' perspective are covered.

1. The Rationale for FSR:

There was common agreement that the systems approach to agricultural research was long overdue, and necessary for an increased knowledge and understanding of small farm systems in developing countries. This "knowledge" is important not only to the researcher but to extension agents, development planners, and politicians.

The necessity of using FSR stems from the realization that a cognitive approach to investigating the farmer's production system is more appropriate than the classical and vertical research-extension-adoption strategy. If seeing a farm operation and its problems "as the farmer sees it" is a more realistic research objective than the classical approach, then the theoretical basis of reductionist methodology must be replaced with a systems construct. If the methods used for observing and analyzing the "whole" are faulted as "unscientific" then the scientific method itself needs to be called into question. "From the farmer's point of view, the world isn't compartmentalized." Farmers function in a multidisciplinary world and their perceptions differ from those in academia or government. Therefore, the most salient questions that FSR must address include: "how do farmers think; what do they consider the salient features of their system; what do they see as their problems; and what is their research agenda?"

2. What is FSR?

Apart from previously published definitions, class participants characterized FSR as the following:

(a) "It considers individual farmers",

(b) "It involves a multidisciplinary (research) team",

(c) "It aims for a holistic approach",

(d) "It aims to be practical rather than theoretical",

(e) "It complements conventional research",

(f) "FSR, of necessity, must be applied research",

(g) "FSR does not require in-depth research, but a broad range of investigations directed at an integration of the relationships among the salient features of the system, not a total knowledge of the system."

3. The Process of FSR

The student groups' understanding of the implementation process of FSR can be summarized with the following points:

(a) "Selection of a target community for research",

(b) "Description of the farming community
- What do farmers do,
- Why do they do what they do,
- Description of the environment
  - Physical
  - Social
  - Cultural
  - Political."

(c) "Problem identification and discussion with farmers",

(d) "Seeking solutions to identified problems with farmers",

(e) "Testing solutions with farmers",

(f) "Extension of viable solutions by encouraging farmers in the role of informal extension agents."

4. FSR and "Systems" Research

Although the subject matter of general systems theory was not specifically addressed in the FSRC, many students discussed FSR from this perspective. The perception is that FSR "requires the realization of theoretical constructs, at some level of abstraction, somewhere in the research process, to give order and meaning to the data that have been collected." Developing these theoretical constructs is important for three reasons:

(a) To reinforce the concern for a systems approach.

(b) To promote interdisciplinary communication.

(c) To improve the quality of interpretation of FSR activities whether in the form of case studies, a field exercise or a lecture topic.

In summary, "it is necessary for the course to demonstrate the difference between farming systems research and general multidisciplinary research efforts."

5. FSR and the Multidisciplinary Team

One of the objectives stated for the course was to expose students to a multidisciplinary research group. However, one doesn't learn how to function in such a group simply by being put on a team. Although there was general agreement that the purpose of the FSRC was not to train the biologist in economic research methods and analysis and vice versa, some critical questions concerning the organization and function of multidisciplinary teams were raised. The more common issues expressed included:

(a) How is a team selected and what alternatives for team selection exist?

(b) How can the problem of differing research objectives of team members be handled?

(c) How is full participation and work sharing among team members encouraged?

(d) How can teams be organized to allocate their time efficiently among secondary data collection, field work, research write-ups, etc.?

Within the multidisciplinary team the problem of "language" often arises. Consequently, there is a need to understand the jargon and assumptions of different disciplines at the start of a research effort. If not, the "of course" type of statement will be misleading because it is assumed that other team members understand and accept the point of view of the speaker. For example, even the term "methodology" means something specific to each discipline.

In the process of integrating experimental and non-experimental data for analysis within a multidisciplinary framework there are problems. The group perspective on a farming system may be broadened but vagueness may characterize the observations. There is a good case to be made for FSR and conventional disciplinary research complementing each other rather than one research mode replacing the other.

6. Interdisciplinary Training

While it is desirable to broaden the perspectives of specialized researchers for FSR, interdisciplinary training to the extent of losing disciplinary rigor has to be avoided. If the course instills in the student an appreciation of the requirements and techniques for data collection and analysis in various disciplines, and teaches a few basic skills in economic or social analysis and biological experimentation, it will be judged a success. Deriving a minimum data list and the procedures for collecting and analyzing these data may be useful to the interdisciplinary training effort.

Part B. Course Content: Lecture, Case Studies, Field Research Activity

The student evaluations of the FSRC which dealt with the subject of course content did so in varying degrees of detail and sophistication. In this first year, students believed it would be helpful to the students and faculty participating in future FSR courses to:

- establish the rationale for FSR and contrast FSR with conventional agricultural research methods.
- develop an understanding of what systems and farming systems research is.
- expose course participants to different FSR approaches and methods, and inform them of implementation constraints.
- provide practical training in a multidisciplinary research group.

1. Lecture Content

Recommendations for lecture content can be broken down into eight major categories: 1) systems theory and analysis, 2) the relationship of FSR to systems theory, 3) relationship of FSR to conventional research, 4) data collection, analysis, integration and interpretation, 5) team dynamics, 6) farmer involvement in FSR, 7) FSR and national research programs, 8) research vocabulary and terminology specific to different disciplines.

(a) Systems theory and analysis: A need for material on general systems theory and analysis was stated. It was suggested that systems theory be defined and that specific analytical tools or models used in systems theory be explained. At the same time, the concern for the role of reductionism and positivism could be addressed. A discussion in future courses on the respective merits and disadvantages of holistic systems versus reductionist research approaches would naturally lead into the topic of FSR.

(b) Relationship of FSR to systems theory: An accepted definition or minimum character listing of FSR needs to be developed right at the outset of the course. This topic may include the historical developments leading to FSR as well as its philosophy. The objectives of FSR could be discussed from the viewpoint of planners, administrators, extension agents, and researchers. The concept of ethnoagriculture, which "systematically links the bio/physical environment and farming practices and strategies with the cultural and cognitive realm of farmers," should be included.

(c) Relationship of FSR to conventional agricultural research: There was general agreement that while the presentations of different research techniques by different disciplines were useful, it was too time consuming and not well integrated into a FSR framework. Various disciplines should provide a short explanation as to how they perceive their science fitting into FSR and describe the aspects of complementarity or conflict between conventional research and FSR. Also, a review of the traditional methods of research should be made vis-a-vis their characteristics (what are they trying to find out and how), advantages, and limitations. Another related point of discussion would be that the payoff or economic return to FSR should be compared with payoffs to conventional methods of research.

(d) Data collection, analysis, integration and interpretation: The overriding concern of the course participants was to learn how to obtain data by various methods.

Emphasis should be given to the practical techniques of interviewing, use of questionnaires/surveys, "sondeo" methods, benchmark surveys, participant observation, field experiments, and the advantages and problems associated with these methods. Other topics that require consideration include types of secondary data, and the issue of getting the "right" information.

Techniques and suggestions for handling data when there are no computers convenient to do the work. Evaluation of various kinds of analytical techniques requires some emphasis.

Means for integrating experimental and non-experimental data need to be reviewed. How is integration accomplished to produce a coherent and useful project or research proposal? There needs to be a systematic discussion of how research findings can be integrated into an FSR report.

(e) Team dynamics: A major recommendation was to include the subject of group dynamics or some kind of discussion on team working procedures. The topics of human, technical, and institutional problems of FSR team work should be covered. It was suggested that a speaker(s) be invited to discuss group psychology and communication. It is generally believed that there would be benefits gained by learning how course teams can effectively work together, including specification of some working rules and patterns. Because the behavior of individual team members is hard to predict for a field exercise, team composition can only be discussed in terms of the optimal number of persons and disciplines.

(f) Farmer involvement in FSR: This is directly relevant to the topics of data generation and interpretation. More specifically, what is the farmer's role in the design of research?; what type of data is the farmer expected to give or generate, if he/she is?

(g) FSR and national research programs: Although this topic deals with questions that are administrative in nature, participants believed that some minimal coverage of the role of FSR in national research programs, as well as conflicts between the two, would be desirable. Also, what are the implications of FSR for national research policies which emphasize commodity research programs? A comprehensive

reference source for discussing these issues is a paper by L. W. Harrington, "Initiating Applied Farming Systems Research in Developing Countries," in Papers from the AID/USDA Symposium on Farming Systems Research, Washington, D.C., December 8 and 9, 1980.

(h) Research vocabulary and terminology: A discussion or presentation of key terms, jargon, or language employed by different disciplines for carrying out agricultural research and interpreting research results was thought to be valuable. At the same time, there must be an understanding of the terminology that FSR employs. This could be incorporated into the presentation of general FSR and conventional research techniques discussed in subsection b and c above.

2. Case Studies

The case study presentations by faculty, and the student assignments, evoked varied reactions.

(a) Faculty case studies: Most students believed that the case studies presented were helpful in discussing some issues related to FSR, but it was commonly believed that they were too general and too oriented towards the institutional constraints and history of FSR. The case study should be concentrated on methodology and be presented by a faculty member(s) with first-hand experience. It was strongly recommended that readings be assigned before the case study presentation and that this material reflect different points of view regarding the specific FSR activity discussed.

(b) Student case studies: Some students saw no value in it; others thought it provided a good framework for learning how FSR (or what is called FSR) is being implemented in different parts of the world. Those who favored having students present a case study made the following observations:

i) the case study should concentrate on the methodology of FSR and not its administrative structure,

ii) the exercise and follow-up discussion should be confined within the team and not be presented to the class or written up as a project (due to time constraints),

iii) case studies should come after a research team has done some on-farm interviewing for purposes of comparison,

iv) there should be a pre-selected file of case studies from which course participants can draw,

v) past written case studies by course research teams should be put on reserve.

3. Field Research Activity

This course component was adopted as a result of the strong recommendation it received at the FSRC Workshop. Consequently, there was relatively little time to develop or prepare this activity. The choice of a field research site and farm group was left completely to the discretion of the four student/faculty teams that were selected at the beginning of the term. Thus, the main constraint observed by both students and faculty was the time to implement it.

The discussion of the course's field research component is subdivided into five parts: the goal of field research activity; preparation for the activity; timing of the field exercise; the process of actually doing the field research; and recommendations for follow-up to the research.

(a) The goal: Prior to going out into the field there was some confusion over what was to be achieved. Was it (1) the exploration or development of a field research methodology or (2) production of a field research report that described a farming system, identified a particular system's problems with farmers, and devised an agenda for further research? Eventually, all of the research teams combined the two goals but found that the amount of time available for doing so was insufficient. Considering the fact that all the participants found that actually doing FSR was the most valuable experience of the course, the subject of preparation for the field activity was frequently discussed in the student evaluations.

(b) Preparation of field research: There was a wide consensus that future FSRC field research sites should be pre-selected, especially if the course is going to take place only over one semester.

Participating faculty should be well informed prior to the beginning of the course about potential target groups and locations for research. Subsequently, they must work closely with the student research teams in order to provide some structure to the research effort.

Before the team actually goes to the field or engages in any interviewing activities some prerequisites must be met. These include:

i) a discussion of some interviewing techniques for developing a method of data collection and field note taking. A good article to read for this type of exercise is "A Mental Construct for Unstructured Farm Interviews," in the Rapid Rural Appraisal Papers.

ii) consulting a key bibliography concerning the selected research location.

iii) collection of secondary data relevant to the area of the research effort such as: the agricultural census, soil maps, climate and rainfall data, population data, etc.

(c) Timing and duration of the field exercise: Although the time available will likely vary, the most common recommendation was that the research effort should be intensified to include entire weekends and/or one week. (More inspired participants suggested spending one to three months in an overseas setting.) Although there is a possibility of offering extended field research opportunities in the future (such as summer practicums), plans for the field exercise have to be considered within the one semester framework for the time being. This being the case, the most realistic option to drawing out the research period over a number of scattered days is to designate 2 or 3 weekends or to use semester breaks to lend some continuity to the field research effort.

(d) The process of field research: Based on first year's experience the following recommendations were made:

i) working in multidisciplinary pairs is a good learning experience from the standpoint of becoming aware of what types of information are important to different disciplines. Doing this "paints a fuller picture" of the farm or system being studied.

ii) periodically switching team members into different pairings (say, every half day in the field) further broadens the perspectives of all team members.

iii) interviews or other research findings should be written up shortly after the time spent in the field in order to take advantage of better recall and to incorporate the views of the research partner(s).

iv) the types of information that may be useful include farm size, physical resources, marketing strategy, productive activities, the agricultural calendar, household composition, income, etc.

v) the entire research team must meet frequently to exchange ideas and information as well as integrate their research findings to understand the system.

vi) extension agents must become more involved in the field research process.

vii) there must be an adequate amount of time allocated to the research effort (possibly second and third interviews) to verify the accuracy of previously recorded information and to identify realistic problem areas for further research with farmers.

(e) Research follow-up: Three basic follow-up activities to field research were recommended by the course participants. They include:

i) continuation of groups sharing their field research experience: the methods used, the problems encountered, the level of success of the team effort, etc. Less emphasis should be given to describing the system during the group presentation (this information can be provided in a handout), and more on critiquing the research methods employed.

ii) research teams should make the effort either to provide some tangible management advice to the population studied, to make policy recommendations to relevant institutions affecting the farming system,

or to suggest specific areas for further research and call these suggestions to the attention of the local agricultural extension services.

iii) past field research reports by class participants should be made available to future FSRC groups.

Part C. Pedagogical Issues

The comments presented in this section are distinguished from the material in Part B (Substantive Issues) in that they deal primarily with course form and administration rather than content. The recommendations made with respect to these two topics were primarily generated by students' observations that there was some degree of confusion and/or inconsistency between the original course outline and the materials presented in lectures. Among some of the concerns voiced by students were that lectures were unrelated, there was too much emphasis given to case studies, course assignments were "too ambiguous," there needed to be some agreement on a common language for discussing research methodologies, and that the faculty define some formal procedures for the course before it begins. The manner in which these concerns are met will be contingent on how structured or unstructured the course becomes in future years.

1. Form

From the evaluations it was clear that the students preferred a more structured class setting or outline of course activities. There is a danger in this because students may approach the course in the "I came to be taught" attitude rather than being counted on to engage in a full participatory role that is expected in a seminar type arrangement. Keeping students busy will cut down on the opportunities they should have in sharing their own experiences. The suggestions can be divided into three topics: lectures, case studies, and field activities and reporting.

(a) Lectures: Many students mentioned the fact that there was a substantial difference between what was stated as a lecture topic in the outline and what actually took place. Whereas most agreed that the

interdisciplinary or "team" approach is an excellent teaching mechanism, it was thought that individual lectures should have been planned and discussed among participating faculty beforehand. Also, the majority of students, while favoring the maintenance of a multidisciplinary faculty, stressed that they wanted to know the "how" of particular research techniques (e.g. interviewing, participant observation, physical data collection, etc.) rather than the "why". In relation to the case studies, there was a preference for discussing "what should have been done" in the research effort and not "what went wrong."

Two activities were commonly suggested for the period before or during the initial course meeting. First, there should be ample time for faculty and students to get acquainted. Secondly, the participants in the course should develop a "common language" in relation to discussing FSR.

(b) Case Studies (Faculty)

It was stressed that the case study presented should be an accepted example of what FSR is and could include such areas as the Cornell Ecuador project or bringing in David Norman to explain the recent work he's been involved in.

(c) Field Exercise

Without exception, the most valuable course component for the class as a whole was the field research activity. For the majority of the students it provided their first real opportunity to discuss problems with farmers in New York State (or for that matter anywhere) from a research perspective. Under the activity of reporting the field research team's activities/findings the most common recommendations included the following:

i) field teams should share more of their research experience along with problems they're encountering by interim progress reports to the full class.

ii) a larger role should be played by extension agents.

iii) the final presentations of the field exercise should be limited to two per class sessions with written summaries made available beforehand.

2. Administration

If the FSRC is to remain a "course," as opposed to a "seminar," certain activities must be well coordinated by faculty. "Responsibilities of all faculty involved must be determined and worked out before the course begins." Before each lecture the faculty should have a planning meeting involving the full staff in order to avoid any misinterpretation of the subject matter to be presented. The course will require a full-time lead professor and a teaching assistant.

A system should provide vehicles for the field research activity, appropriate readings before a particular lecture, and typing and xerox facilities for team reports.

Part D. Course Mechanics

The comments and suggestions were varied, but there were some areas of general consensus.

1. Size of Class (faculty and students)

The decision to limit the number of students and/or faculty participating in future FSR courses is dependent on the relative emphasis to be given to lectures on the one hand and the field exercise on the other. Suggestions in regard to the number of students ranged from "not more than 24" to "15". Recommendations for the size of student field teams ranged from six to three. Therefore, a class of 24 would have four teams of six students (the model used in the first course) or five teams of three students, or any combination in between. Ultimately the class/team ratio depends on the number of research sites pre-selected. An optimum number of students might be a maximum of 20 divided into five multidisciplinary working teams. This suggested composition, however, also depends on the number of faculty involved.

The most common recommendation concerning faculty size ranged from five to eight professors who would participate in both lectures and team exercises on a "regular" and "consistent" basis. There is a trade-off that is implicitly generated by this issue. On one side, it is desirable to include as many professors from as many different disciplines as possible in order to approach a true multidisciplinary viewpoint on

specific lecture topics or field problems. However, the large number of professors also caused problems (perhaps unavoidable) in the sense that there was difficulty in coordinating lectures and a lack of consensus in relation to various aspects of an FSR methodology. A proposed compromise would be to divide faculty into two distinct groups. The first group would be a core faculty composed of six persons (from six different disciplines) that would be prepared to participate in all aspects of the course on a consistent basis. The second group could be classified as those with course consultant status who would be available to give special lectures and/or provide advice and expertise during the field exercise.

2. Duration and Timing of Course

The basic issue here was whether or not the course should be offered in a two semester sequence. Those favoring a two semester course (including a summer or two-week practicum) were typically those students who believed that there was insufficient time for the field research procedures, i.e. site selection, interviewing, collecting secondary data, etc. This "time" problem can be allevaited somewhat with the pre-selection of research sites. Still, for future courses in FSR, there was popular agreement that the possibility for first learning about research methodologies (semester 1) and then implementing an FSR activity (semester 2 or summer) be considered and investigated.

For the one semester option, most students seemed to be satisfied with the one-time 2-1/2 hour lecture and the one hour discussion period. There were some calls for two or three one hour lectures, because 2-1/2 hours was too long. One or more lecture topics can be covered more comprehensively in one long session than in two short ones.

3. Discussion Groups

There was unanimous agreement that the discussion groups, composed of team members, should be continued. There were specific suggestions as to their role. First, those times allocated for group discussions should not be co-opted to attend case study presentations (this is somewhat a moot point since in future years the course will do case studies during the lecture period). Secondly, the groups should discuss

some of the recommended readings in order to clarify lecture topics, provided the faculty attending the group are familiar with them. Third, the main function of the group would be to prepare and discuss the strategy for the field exercise. Although the timing for the meeting of a group should remain the responsibility of its members, there was a consensus that they should meet at least one hour a week.

4. Grading and Course Credit

Grading: Most students want it made clear at the outset how and on what basis they will receive a course grade. If more emphasis is given to the field exercise and group discussions, less weight should be given to papers. This option presupposes that there is a faculty member whom can judge an individual's effort and performance in a group setting which gets to be somewhat of a subjective enterprise. It also assumes the faculty member is present and active at the student team meetings in order to make a fair decision. After all, as one student rightly observed, Cornell is "competitive."

If papers are to receive substantial emphasis then students should continue to have the option to either write-up a course evaluation or write on some aspect of FSR. For the latter case, the student could write-up the team exercise from his or her disciplinary perspective. It was generally believed that making an oral presentation of the field team's FSR activity to the class at the end of the semester was more valuable than submitting it in written form. However, a written exercise associated with the field work would prove valuable to future students and faculty that may be involved in the course. The written findings of the group would also more closely resemble "real world" working conditions.

Course credit: Suggestions for course credit depended on whether or not the FSRC should be one or two semesters, its demands on student and faculty time, and the content of the course. With more emphasis given to a field exercise, the inclusion of readings for group discussion, attendance at a 2-1/2 hour lecture, and preparing oral and written presentations, a case could be made for extending course credit to four hours for one semester. The final decision will depend on the

amount of time that students are expected to allocate to course activities and requirements.

Students agreed that the S/U option should be dropped. If the course is to improve it must have the active participation of students and the S/U option discourages this, especially when graduate students are usually committed to a heavy academic calendar.

5. Selection of Students

No complaints were registered in regard to the application process for determining the student make-up in the course. In fact, those students who mentioned this in their evaluations recommended that the practice be continued. However, more effort should be made to enroll more students from foreign countries. The basis for enrollment should be the interest expressed, future professional plans in regard to overseas work, the relative breadth of classes taken in the agricultural sciences, and the student's field of study.

6. Evaluation of the Course

Because the FSRC is still in the beginning stages of development, it was suggested that periodical evaluations (once every three to four weeks) be carried out during the full lecture sessions. These evaluations would encourage more extensive participation by students and would also serve to estimate the benefits of the lecture material presented. Specific problems in relation to the field exercise could also be thrown "out on the table." The questions to be brought up could include: What methodological issues were important in lecture and how well were they communicated? What types of research methodologies/activities require more coverage?

Section III. FSR Course Description and Evaluation for Fall 1981 (Second Year)

This section attempts to describe the FSR course in the second year and to summarize student evaluations at the close of the 1981 course. For the evaluation, students were asked to review the course carefully and write a brief essay indicating what changes they would recommend in content, organization, faculty participation, classroom presentation, assignments, etc. to improve the course. Although participants reflected varying degrees of expectation and satisfaction with the course, the comments in general were excellent.

A. Course Description.

There were some substantial changes made in the 1981 FSR course, most of which came about as a result of the student evaluations from the previous year. Broadly speaking, both the content and structure of the course were adjusted. Specific changes affected lecture topics, the case study exercise, the field research activity, and course mechanics (faculty preparation, grading, group presentations, etc.). The more important changes are discussed below.

1. Lecture Subjects

The subject matter for the various lectures in the 1981 course are outlined in Table I. A comparison with the 1980 outline shows not only a shift in lecture topics, but also more emphasis in the area of information gathering. Per the suggestions made in the 1980 evaluations, a section on general systems analysis was incorporated.

As opposed to the 1980 FSR course, the second year's offering substantially cut back on the sections dealing with the analysis of data. It has been our experience that the most that can be done in a one semester course is to briefly describe the tools of analysis used by the various disciplines and their advantages and disadvantages. While students can develop an appreciation for the various analytical techniques of the agronomist, economist, or the rural sociologist, it has not

Table I. IA 650 Course Outline for 1981

Week	Date	Tuesday (2:30-4:30 P.M.)	Thursday (12:20-1:10 P.M.)
		Weeks 1-3 Introduction to Farming Systems Research	
Week 1	Sept. 8	What is farming systems (staff) Introduction to course Glossary of terms	Farming system in NYS Case Study of dairying in the Hill-Valley areas of New York.
Week 2	Sept. 15	Systems analysis as an approach to research (systems engineer)	Organization of Field Groups and Site Assignment.
Week 3	Sept. 22	Interdisciplinary research and group dynamics	Discussion of Individual Group Projects.
		Weeks 4-9 Gathering Information from Farms and Farmers	
Week 4	Sept. 29	Strengths and weaknesses of the survey	Discussion of Individual Group Projects.
Week 5	Oct. 6	Ethnomethodology and other socio-economic procedures for gathering data from farmers	Discussion of Individual Group Projects.
Week 6	Oct. 13	Alternative techniques for measuring variables, yields, area, farm inputs etc.., (Barker) Investigating resources: I-Climate	Discussion of Individual Group Projects.

IA 650 Course Outline for 1981

Week	Date	Tuesday (2:30-4:30 P.M.)	Thursday (12:20-1:10 P.M.)
Week 7	Oct. 19	Fall Recess	Discussion of Individual Group Projects.
Week 8	Oct. 27	Investigation of resources II Crops III Livestock	Discussion of Individual Group Projects.
Week 9	Nov. 3	Investigation of resources IV Soils Experimentation in farmers fields, test farms and the experiment station. (Students)	Discussion of Individual Group Projects.
		Weeks 10-12 Specification of Problem and Analysis of Data	
Week 10	Nov. 10	Specification of the research problem/ objectives.	Case Study - Plan Puebla
Week 11	Nov. 17	Hand out take home exams Aids to analysis and interpretation of data.	Case Study - Ecuador Project.
Week 12	Nov. 24	Aids to analysis and interpretation of data. General and specific recommendations for FSR.	Thanksgiving

IA 650 Course Outline for 1981

Week	Date	Tuesday (2:30-4:30 P.M.)	Thursday (12:20-1:10 P.M.)
		Weeks 13-14 Summary and Group Reports	
Week 13	Dec. 1	Collect Take Home Exams Group I Report Group II Report	Group III Report
Week 14	Dec. 8	Summary Panel (Students)	Group IV Report

been possible to cover the mechanics and use of these techniques in any detail. What we emphasize at the outset is that the choice of any analytical tool is dependent on the specification of the research problem and the determined objectives of the research project.

Reading assignments for each lecture topic were pre-selected in advance for the 1981 course. A listing of the assignments associated with each lecture topic is provided in Table II. Additional reading materials related to definitions, methodologies and procedures of FSR were made accessible to students.

2. Case Studies

Although the student requirement to present a case study on FSR was dropped (to allow more time for the group field project), there were three studies presented by Cornell faculty. The first case study involved a description of a nearby farming community in Cortland County, New York, and was designed specifically to assist students in preparing for their field exercise. This study was presented early in the course. The other two case studies were associated with research projects in Latin America; one dealing with the CIMMYT Puebla project and the other with the Cornell Ecuador highlands project.

The purpose of these two studies was to illustrate how different researchers have defined and approached research problems at the small farm level. The timing of these latter study presentations was delayed for the 1981 FSR course in order that students could discuss and compare these "outside" research projects with their farm research efforts in New York State.

3. Field Research Activity

The major change in the field research activity was that it was implemented early on in the semester. Prior to the semester, seven field research options were identified with the assistance of New York State extension agents. Each field research area selected was studied by a multidisciplinary student team, assisted by an FSR faculty member. There were four research groups and the areas selected were Ontario County, Wayne County, Seneca County and Chenango County. The decision

Table II. Reading Assignments for IA 650 (Fall, 1982)

Week	Date	Lecture Topic and Faculty Member(s)	Reading Assignments
1	9/08/81	Introduction to Course: What is FSR? (Staff)	McDowell and Hildebrand. Integrated Crop and Animal Production. Gilbert, Norman and Winch. Farming Systems Research: A Critical Appraisal
	9/15/81	Systems Analysis as an Approach to Research.	Dillon. "Economics of Systems Research." Haith and Atkinson."A Linear Programing Model for Dairy Farm Nutrient Management".
3	9/22/81	Interdisciplinary Research and Group Dynamics.	Barker. "Problems of Interdisciplinarity in Farming Systems Research". Chambers. "Understanding Professionals: Small Farmers and Scientists". Capner and Young. "Interdisciplinary Research on the University". pp. 345-357, In: Porter. Nitrogen and Phosphorou Food Production, Waste, and the Environment.
4-5	9/29-10/06/81	(4) Strengths and Weaknesses of the Survey. (5) Ethnomethodology and other socio-economic procedures for gathering data from farmers.	Kearl. Chapters 3-6. Field Data Collections in the Social Sciences. Best. "An Approach to Selecting Farm Survey Techniques.." Norman. "Methodology and Problems of Farm Management Investigations..". Abalu. "Farm Level Surveys of West African Agriculture..".

Week	Date	Lecture Topic and Faculty Member(s)	Reading Assignments
4-5	9/29-10/06/81	(4) Strengths and Weaknesses of the Survey.	Norman. "Economic and Non-Economic Variables in Village Surveys."
		(5) Ethnomethodology and other socio-economic procedures for gathering data from farmers.	Catt. "Surveying Peasant Farmers - Some Experiences".
6	10/13/81	Alternative techniques for measuring variables, yields, area, farm inputs, etc.	Gomez and Gomez. Chapter 10. "Introduction to Multiple Cropping Research".
		Investigating Resources: I - Climate	Labadan. "How to Measure Bias in the Collection of Rice Statistics: An Approach".
			Norman. Methodology and Problems of Farm Management Investigations, Experiences from Northern Nigeria.
7	10/27/81	Investigation of Resources.	Paul and Mascarenhas. "Remote Sensing in Development".
		11 Crops 111 Livestock	Ewel and Whitmore. The Ecological Life Zones of Puerto Rico and the Virgin Islands.
			Ruttenberg. Farming Systems in the Tropics.
8	11/03/81	Investigation of Resources-IV Soils	Sanchez and Boul. "Soils of the Tropics and the World Food Crisis"
		Experimentation in Farmer's Fields, Test Farms and the Experiment Station (Students).	Gomez and Gomez. Chapter 11. "Experiments in the Research Station". and Chapter 12. "Experiments on Farmer's Fields."

Week	Date	Lecture Topic and Faculty Member(s)	Reading Assignments
9	11/10/81	Specification of the Research Problem and Objectives.	Andrew and Hildebrand. Chapter 3. "Orientation and Focus of Research Projects". Gilbert, Norman and Winch. FSR: A Critical Appraisal. Chapter 5.
9	11/12/81	Case Study - Plan Puebla (Whyte)	Whyte. Participatory Approaches to Agricultural Research and Development.
10	11/17/81	Aids to Analysis and Interpretation of Data.	Anderson and Hardaker. "Economic Analysis in the Design of New Technology for Small Farmers". in: Valdes, Scobie and Dillon (eds.), Economics and Design of Small Farm Technology pp. 11-29. Perrin, Winkelman, Moscardi and Anderson, Farm Agronomic Data to Farmer Recommendations: An Economic Training Manuel. CIMMYT Economics Program, Planning Technologies Appropriate to Farmers: Concepts and Procedures. Chapter 10: "Analysis of Survey Data". Chapter 11: "Prescreening Potential Technological Components".
10	11/19/81	Case Study -Ecuador Project	Cornick and Kirkby, "Interactions of Crops and Livestock Production in the Generation of Technology in Sloped Areas".

to limit the research exercise to a particular type of farm enterprise and/or township within each of the counties was left up to the group's discretion.

The emphasis of the research activities were two-fold. First, each group made the effort to describe and understand the particular system they were researching. This phase required a two-step procedure of gathering and reading information from secondary sources and then conducting interviews with farmers, extension agents, processor's, bankers, local officials, etc.

Secondly, based on the descriptions of the selected systems (including technical and socio-economic constraints) each group was asked to define a list of researchable problems which could help alleviate the defined constraints.

The next logical step would be to present these problems to the appropriate faculty and staff members at Cornell who may be already involved or are interested in finding solutions to these problems. As yet, this step hasn't been incorporated into the FSR course but may come under consideration for the 1982 semester.

The field research activity, as with the 1980 class, was considered the most beneficial. It was substantially improved over last year because of the pre-selection of research sites which greatly increased the amount of time available to the research groups for conducting field interviews and gathering secondary resource material.

B. Student FSR Course Evaluations

Since there were two major components of the course, weekly seminars and field exercises, it seems logical to treat these separately. However, a word should be said first about the goals and objectives of the course. As one student wrote, is it "first to get a flavor of FSR, to learn how to deal with people in other disciplines, to learn something more about farmers in a foreign country, or really to master the ABC's of FSR to be applied in the Third World." A number of students clearly felt the latter, and felt that the course had not lived up to their expectations.

1. Content and Organization of Seminars

There were very mixed feelings on the seminars. The view was expressed by many that they tried to cover too much, that the faculty presentations were often too superficial, that there was inadequate time for general discussion, and that full advantage was not taken of the experience of graduate student participants. Although a few suggested that the course might well be extended to a two-semester sequence, the majority seemed to feel that the present one semester course could be tightened up, more sharply focused, and more rigorous without requiring more time.

An initial problem concerns the definition of farming systems research. In the literature and among practitioners there seems to be little agreement on definition. However, the view was expressed that for the purpose of the course, time should be spent initially on trying to establish a working definition and on criteria against which examples of "farming systems" research can be judged. In this context more emphasis should be given to the nature of previous research, especially in relation to how improvements or changes proposed by FSR might be incorporated. Will the focus on "technological" solutions in FSR remove the bias? A suggestion in keeping with these views is to introduce the work of Bill Whyte (see Table II) in the initial part of the course. Also, it was mentioned that some time should be devoted to discussing how FSR fits institutionally into national programs.

Various opinions were expressed about the focus of the course on the U.S. vs. developing countries and on the appropriateness of the course title. No one took the view expressed by one professor that FSR was an inappropriate term, although the answers of many suggested some doubts. Consider for example the views expressed by these two students:

"One is then compelled to ask how FSR can help the really poor and marginal farmers in the Third World who are by and large the landless, when the FSR approach commences with the premise of ownership of land and other assets which comprise the farming system or the individual farmer."

"I still don't see the usefulness or innovativeness of regarding the individual farm household as the farming system. In many Third World contexts, particularly among small farmers, nothing could be more analytically self-defeating. In fact, it wasn't until the middle of the course that I realized that the concept as defined in the literature identified the individual household as the relevant system level."

There was too much time spent in the seminars on topics which many felt might logically belong in another course. Faculty were too "reductionist" at times in their presentations. There was general praise for reading materials, but a sense of feeling that they were often not integrated into the lectures.

The general consensus seemed to be that time would be better spent in developing case studies, or discussing examples of research in which either faculty or students had been directly involved - for example the Ecuador project. Such a project might usefully be developed after the presentation of the NYS case study and the beginning of the field exercise.

It would also be useful to have small exercises. Although not mentioned in the reports, one such exercise might be developed around a farming systems game.

Not enough advantage was taken of the potential contributions of class participants with previous farming systems research and related experience. Early in the course some time should be taken to learn more about the background of the students with a view to using the class experience in developing the course.

2. Field Exercise

As in the previous year, students found this the most rewarding part of the course. However, there were concerns about a number of problems. Some participants felt that they wanted more guidance. However, there were mixed feelings on the degree of faculty involvement, with alternative suggestions including use of TA's to be assigned to each group.

At this stage in the course development, it should be emphasized that the faculty are also "students." Most of us, though we may have

visited New York State farms, have not done field exercises which permit an overall look at the farming system. IA 650 is as much a course in faculty, as in student education. If faculty are willing to devote the time, they probably should be encouraged to be involved with a group.

The degree to which faculty can or should provide guidance in the exercise is a matter of debate. Up to now groups have worked fairly independently, with no formal procedure laid down. The thought of the faculty was that too many guidelines might restrict initiative and imagination.

Another major concern was with the amount of time required for the field exercise. (One individual estimated conservatively that the FSR course required a minimum time input of 20 hours per week.) One thought was to offer four hours of credit. Another was to have no lectures or discussions on Thursdays, and leave this totally free for the groups. At the minimum, students should be forewarned about the time commitment.

Finally, group participants wanted more time to present and discuss the field projects.

3. Proposed Outline for Fall 1982

The following outline is adopted from the response of one of the students and seems to incorporate many of the ideas in the previous pages:

Week 01-02	Introduction to FSR - definition, history and development, the nature of systems and systems research.
Week 03-04	Introduction to field projects - Sondeo method, Florida project, past field exercises in IA 650, problems of interdisciplinary, practical guidelines for group project.
Week 05-10	Discussion of specific FSR or FSR related research projects, also small group problem solving exercises and class discussion of problem situations.
Week 11-15	Presentation of group projects.

4. Student Viewpoints on Farming Systems Research

An added innovation to the 1981 FSR course was to give a final exam. The purpose of the exam was not to test students on FSR, but to inquire about their interpretations of what FSR is and from where it has evolved. This section gives excerpts from selected student papers for two of the exam questions. We believe the thoughts expressed by students, are important for two reasons. First, they put FSR in perspective vis-a-vis "traditional" research modes, and secondly, they describe the role that FSR could play in developing countries.

(1) What is farming systems research? How does it differ from traditional modes of research?

Excerpts from Question 1.

"The holistic approach: I agree with the central thesis that the holistic approach is new to agricultural research but I disagree with the view that this is a "new" approach. Such a holistically-oriented approach to research has been a dominant paradigm of social anthropology and related fields such as sociology for a long time. Particularly the notion that "an understanding of the structure of the parts can be obtained only from an understanding of the function of the whole" has been the central thesis of one branch of sociology, namely functionalism, and advocated since the time of Emile Durkheim in 1858. For purely "technical" scientists habituated to commodity-oriented research that tends to focus on the "mechanical structure of the parts," this may seem to be a "new" approach. What is new is not the approach but the realization by these scientists (for whom agricultural research was their exclusive domain) that "only such a holistically-oriented approach can lead to the capture of adequate understanding of the system for purposes of improving performance," and therefore their willingness to approach the social science end of the disciplinary spectrum and view the dominant paradigms of the latter as within the purview of scientific interest. I therefore suggest that the real departure of the farming systems approach is "the marriage" of the dominant paradigms of the two ends of

the disciplinary spectrum. One can only hope that this marriage is between equal partners. Otherwise it is a foregone conclusion that the social scientist will again be relegated to the background, waiting to be "rediscovered."

Shyamala Abeyratne

"In conclusion, it might be stated that FSR does indeed differ profoundly from the traditional mode of agricultural research, but that the difference is more ideal than real, more in the promise than in the delivery. The traditional approach is more than a misguided historical abberation, and its impact on small farmers the world over is no accident. FSR provides us with a good critique of that paradigm, but in practice, it is forced to circumscribe itself well within its bounds. However, the groundwork analytical research phase of the FSR approach should be promoted as a useful and constructive exercise in its own right, however much "realism" might prompt one to doubt whether the application can have any significant success in the present context, particularly in the Third World."

Pierre La Ramee

(2) "The farming systems approach is a product of the imagination and professional skills of researchers and extension workers in developing countries. It is an attempt to compensate for the lack of an environment supporting technological progress in agriculture. Though it is also identified with the work of a number of international research centers and is closely related to farm management work as practiced in the United States and elsewhere, its full development and application is thus far clearly and uniquely a developing country phenomenon." Please comment on this statement. Do you agree with it?

Excerpts from Question 2.

"In summary, I would say that the farming systems research approach is based on developed country logic, developed country technology, and developed country failures--failures to understand the systems of the less developed countries. Neither the rationale for FSR nor the methodology for FSR are based on the lack of an environment for technological support of agriculture. Rather, we could say that misunderstandings of the developing country farm systems have caused the basic confusion regarding reasons why improvement of the technological support environment does not always lead to improvement of the developing farm systems. As a research methodology, farming systems research can at least explore these reasons.

Richard W. Ameral

"From the literature provided, it seems that this farming systems approach is not mainly a product of researchers and extension workers in developing countries. It is more a product of American and other Western researchers who have worked in the Third World, and have come to understand the need to revise or modify conventional farming socio-economic research in order to understand the man-behind-the-hoe better. Or the woman-behind-the-rice-mill. But it is true that developing countries' researchers and extension workers have been engaged in this shift of emphasis in farming research."

G. J. Aditjondro

ANNEX

Reference Material
for a Course in
Farming Systems Research

International Agriculture 650
Cornell University

Compiled by: Frank Casey
Department of Agricultural Economics

Introduction

The references and reading materials here compiled have been divided into four sections which more or less represent the chronological order in which they were developed. The first three sections are organized on the basis of FSR methodological readings (Section I and Supplement to Section I), bibliographical material (Section II), and selected references describing farming systems (Section III). The list represents a cross-section of material which includes both farming and cropping systems as well as farm management topics and/or experiences that were found relevant to agricultural research efforts in developing countries. The books, articles, mimeographed material, etc., have been produced by scientists and administrators from a wide spectrum of disciplines who are interested in FSR or agricultural research in general.

It was not the intention that the entire reference list be read by either students or professors, but rather a listing which faculty could assign from if they believed a particular reference would complement their specific lecture topic. With the exception of the lectures on the definition of FSR and data collection from people and controlled experiments, none of the readings were formally assigned. However, there were individual articles which were mentioned by the faculty and staff as being relevant to either the case study exercise or the course evaluation assignment.

Throughout the course there were mixed opinions about the adequacy, relevancy, and necessity of incorporating readings for instructive purposes. On the one hand it was observed that there appeared to be very little material on the general topic of FSR per se, and that it was even more scarce in the specific areas of data collection and analysis as well as experimental techniques. These criticisms were somewhat anticipated in light of the fact that no real methodological procedures, in the FSR context, have yet been developed and/or published in respect to these research components. Conversely, some students believed that more assigned reading would have been helpful to serve as a basis for discussion and to compare and contrast the research techniques.

Section IV (Additional References in FSR) consists of material that was located or written during the semester in which the 1980 course was taught.

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