AN OVERVIEW OF THE HOLISTIC FARM MANAGEMENT RESEARCH AND EXTENSION PROGRAMS WITH EMPHASIS ON PAST U. S. FARM AND HOME PROGRAMS AND CURRENT FARMING SYSTEMS RESEARCH IN THE DEVELOPING COUNTRIES

By

S. Sri Ramaratnam

A Plan B Paper

Submitted to
Michigan State University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Department of Agricultural Economics

1981
Dedicated
to
My Parents
Dr. and Mrs. K. Sivagnanaratnam
ACKNOWLEDGEMENTS

I wish to express special appreciation to my major professor, Dr. Glenn L. Johnson, initially for introducing the topic of this paper to me and for giving an opportunity to study and benefit from this exercise. His guidance, encouragement and assistance in carrying out the historical review and in the preparation of this paper was very valuable and would be remembered most sincerely. The counseling provided by him throughout my graduate studies at Michigan State University is also very much appreciated.

I also acknowledge the willing participation of Dr. Eric W. Crawford in my research guidance committee, his patient review of my paper and the editorial comments which substantially improved the presentation of the material in this paper.

My thanks also to Dr. Carl Liedholm for his comments and for serving on my examination committee on short notice due to Dr. Daniel Suits' inability to be present.

Finally I wish to extend my thanks to Ms. Julia McKay for typing an early draft of this paper and to Ms. Judy Duncan who diligently typed the profusely mended final draft of this paper.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
</tr>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td>1</td>
</tr>
<tr>
<td>Objectives</td>
<td>3</td>
</tr>
<tr>
<td>Nature of the Study</td>
<td>3</td>
</tr>
<tr>
<td>Some Shortcomings of the Study</td>
<td>4</td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td><strong>FAMILY FARMS OF THE UNITED STATES AND SMALL FARMS IN THE DEVELOPING NATIONS</strong></td>
<td>5</td>
</tr>
<tr>
<td>Defining the Family Farm</td>
<td>5</td>
</tr>
<tr>
<td>The Small Farm Setting in the Third World Nations</td>
<td>12</td>
</tr>
<tr>
<td>A General Comparison of U. S. Family Farms in the 1950s and Current LDC Small Farm Situations</td>
<td>17</td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
<tr>
<td><strong>THE THEORETICAL FRAMEWORK FOR HOLISTIC ANALYSIS OF THE AGRICULTURAL HOUSEHOLD</strong></td>
<td>21</td>
</tr>
<tr>
<td>Development of the Field of Farm Management</td>
<td>22</td>
</tr>
<tr>
<td>Managerial Concepts and the Extension Service</td>
<td>27</td>
</tr>
<tr>
<td>Some Concepts of Home Management</td>
<td>32</td>
</tr>
<tr>
<td>The Whole Farm Planning Technique as the Core of the Farm Management-Extension Programs</td>
<td>35</td>
</tr>
<tr>
<td>Holistic Approach to Farm Household Analysis</td>
<td>37</td>
</tr>
<tr>
<td>Firm-Household Interdependence</td>
<td>37</td>
</tr>
<tr>
<td>Balancing Capital Uses between the Firm and the Household</td>
<td>39</td>
</tr>
<tr>
<td>Recent Knowledge on the Theories of the Household-Firm and &quot;New Home Economics&quot;</td>
<td>42</td>
</tr>
<tr>
<td>Agricultural Systems and System Studies</td>
<td>45</td>
</tr>
<tr>
<td>System Studies</td>
<td>46</td>
</tr>
<tr>
<td>The Farming System</td>
<td>48</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (continued)

Chapter                                                                 Page

IV    HISTORICAL REVIEW OF SOME PAST HOLISTIC FARM MANAGEMENT-EXTENSION PROGRAMS AND STUDIES IN THE UNITED STATES ................. 50

Some Underlying Circumstances that Led to the Creation and Development of These Programs .... 52
Balanced Farming Program of Missouri ............... 53

Procedures and Methodology of the Missouri Balanced Farming Program ............... 54
Historical Perspective ..................... 57

Farm and Home Development Programs .............. 60

The Origin of the Kentucky Farm and Home Development Program .................... 60
National Farm and Home Development Programs .... 62
Economic Framework for the Farm and Home Development (FHD) Programs ............ 65

Broad Program Objectives .................... 67
Basic Program Strategies or Responsibilities ........... 68
Comprehensive Analysis of Program Impacts and Benefits .................. 70
1. The Kentucky Program ..................... 71

Farm and Home Practices Influenced by the Program ..................... 72
The Agents of Change under Program Activities ..................... 72
Some Measures of Success of the Program ........... 73
Main Benefits of the Program as Conceived by Farm Families ............. 74
Changes in Program Suggested by Participants .... 74
Farm Families' View of Workability of Program ..................... 75
The Conception of FHD Among Extension Agents .... 75

2. The Tennessee Program ..................... 76
3. The Washington Program ..................... 79
### TABLE OF CONTENTS (continued)

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. The Wisconsin FHD Program</td>
<td>82</td>
</tr>
<tr>
<td>Some Characteristics of Cooperating Farmers</td>
<td>83</td>
</tr>
<tr>
<td>The Different Extension Approaches Used</td>
<td>83</td>
</tr>
<tr>
<td>Some Short-Term Impacts of FHD</td>
<td>84</td>
</tr>
<tr>
<td>Research Activities Related to FHD</td>
<td>85</td>
</tr>
<tr>
<td>Cost Effectiveness of FHD</td>
<td>86</td>
</tr>
<tr>
<td>5. Experimental Township Extension Program of Michigan</td>
<td>87</td>
</tr>
<tr>
<td>Organizational Aspects of the Program</td>
<td>88</td>
</tr>
<tr>
<td>The Level of Intensity of the Program</td>
<td>88</td>
</tr>
<tr>
<td>Some Important Effects of the Program</td>
<td>89</td>
</tr>
<tr>
<td>Allocation of Funds for the Program</td>
<td>91</td>
</tr>
<tr>
<td>Limited Benefit-Cost Considerations in the Program</td>
<td>91</td>
</tr>
<tr>
<td>Summary Remarks</td>
<td>92</td>
</tr>
<tr>
<td>V</td>
<td>THE SCOPE, NATURE, METHODOLOGY AND ORIENTATION OF FARMING SYSTEMS RESEARCH</td>
</tr>
<tr>
<td>Farming Systems Research (FSR) Methodology</td>
<td>99</td>
</tr>
<tr>
<td>Extent of the Holistic Nature of Farmings Systems Research Approach</td>
<td>102</td>
</tr>
<tr>
<td>Multidisciplinary Orientation of FSR</td>
<td>103</td>
</tr>
<tr>
<td>FSR in the Context of the Mainstream of Agricultural Research in LDCs</td>
<td>105</td>
</tr>
<tr>
<td>Improving Agricultural Technology for Small Farmers</td>
<td>106</td>
</tr>
<tr>
<td>Bringing about Institutional Changes and Developing Human Capital in LDCs</td>
<td>108</td>
</tr>
<tr>
<td>Complementing Prevailing Traditional Practices and Research Methods</td>
<td>108</td>
</tr>
<tr>
<td>The Extent of Locational Specificity of Farming Systems Research</td>
<td>109</td>
</tr>
<tr>
<td>The Dynamic and Iterative Nature of FSR</td>
<td>110</td>
</tr>
<tr>
<td>The Criteria for Evaluating Improved Farming Systems</td>
<td>111</td>
</tr>
<tr>
<td>The Potential of FSR for both Developed and Less Developed Country Small Farmer Needs</td>
<td>113</td>
</tr>
<tr>
<td>The Potential of FSR in the U. S.</td>
<td>115</td>
</tr>
<tr>
<td>Chapter</td>
<td>Remarks</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>VI</td>
<td>IMPORTANT PARALLELS BETWEEN FARMING SYSTEMS RESEARCH AND U. S. FARM MANAGEMENT RESEARCH AND EXTENSION PROGRAMS</td>
</tr>
<tr>
<td></td>
<td>Theoretical Basis</td>
</tr>
<tr>
<td></td>
<td>Methodological Features</td>
</tr>
<tr>
<td></td>
<td>Philosophic Orientation</td>
</tr>
<tr>
<td></td>
<td>Conceptual Framework</td>
</tr>
<tr>
<td></td>
<td>Institutional and Organizational Aspects</td>
</tr>
<tr>
<td></td>
<td>Evaluation and Measures of Performance</td>
</tr>
<tr>
<td></td>
<td>Farming System Research (FSR) and Farm Management Research (FMR)</td>
</tr>
<tr>
<td>VII</td>
<td>SUMMARY AND CONCLUSIONS</td>
</tr>
<tr>
<td></td>
<td>SELECTED BIBLIOGRAPHY</td>
</tr>
<tr>
<td></td>
<td>APPENDIX</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Static economic theory views the production and consumption sides of the economic environment separately as two unique activities. The distinction between the business and home aspects in the case of farming arose in economic theory and principles of analysis, especially because static theory assumes perfect knowledge, perfect foresight and the absence of change in production techniques and consumption patterns (Knight, 1921), and overlooks their interrelationships and interdependence when farmers are viewed both as producers and consumers.

A great number of personal values, wants and desires are encountered on the production side of farming and a major part of management consists of appraising the subjective costs and values of performing the various managerial functions. On the other hand, a great deal of production is recognized to be occurring on the household side of farming too (Bradford and Johnson, 1953). For instance, farm wives were viewed to be producers in a very basic sense.

Therefore, it was then realized that the distinctions maintained between the business (firm) and home (household) sides of farming were artificial and unrealistic. As a result the distinction between the firm and household, made so clearly in static economic theory became increasingly confused and less meaningful. This understanding of the
basic nature of operation of farm households led to the development of holistic or comprehensive farm management research and extension activities in the middle part of this century. Farm families were found then to operate in an environment of much technologic, economic and social change in the U. S. and in need of assistance from special "Balanced Farming," "Farm and Home Development" and "Experimental Township Extension" programs to help them make the necessary adjustments.

In the subsequent period, these programs and the holistic focus on firm-household interrelationships in farming were delegated a somewhat reduced role in the research and extension activities. Recently, however, there has been a growing interest among general and development economists in this concept of firm-household behavior, and the related research and extension programs, particularly in relation to the current needs of small limited resource farmers, and others, in LDCs. For the most part the development has ignored past and present emphasis on firm-household interrelationship in the traditional field of farm management. One such development is the Farming Systems Research (FSR) concept viewed to have much to contribute to the development of small farmers. It is the intention of this paper to emphasize the importance of making use of the valuable research and extension knowledge gained in the U. S. through the development of the holistic farm and home programs and the need to incorporate these concepts and the learning experiences, as appropriate, into the newly developing methodology of Farming Systems Research.
Objectives

In order to accomplish the above task, this paper has the following main objectives:

(i) To describe briefly the family farms of the U. S. and the small farms in the LDCs and make comparisons.

(ii) To review and summarize the literature, especially those that emphasized the holistic aspects, related to the theoretical developments in the fields of farm management and farm planning and also the FSR methodology.

(iii) To present a historical review of studies and programs that viewed the farm business (firm), and the farm family (household) together in the U. S.

(iv) To outline the current emphasis, achievements and the future potential of the FSR concept in the Third World.

(v) To draw important parallels between the focus of farm management research in the mid 1900s and Farming Systems Research of the 1970s and also between the U. S. farm and home programs and the FSR in relation to their theoretical and methodological basis, conceptual framework and philosophic orientation, and finally.

(vi) To consider the desirable features of such programs with respect to family farms in the U. S. and small farms in the LDCs.

Nature of the Study

The methodology of this study has been primarily to review the secondary data and materials describing the theoretical concepts and positive developments related to the U. S. farm management/research/extension and teaching programs and Farming Systems Research in LDC, to better comprehend their workings and usefulness. Thus it is a deductive study rather than an inductive one based on the collection of primary data. But is is the view of the writer that deductive
investigations of this nature have as much, if not more, to contribute as the inductive studies.

Some Shortcomings of the Study

It is common knowledge that extension programs and the related activities are mostly not carefully documented. Thus heavy reliance had to be placed on the personal files and memoirs of the professional participants in these programs, particularly when one does a study after 2-3 decades. However, following extensive correspondence with some of them who were actively involved in the development and implementation of these programs, fairly adequate, but far from complete, material was gathered. It is frustrating when one is not able to gain access to some important piece of work cited as is often the case for extension material. The early stage of development and lack of consensus on some methodological issues related to FSR also posed an important constraint on this study, where an attempt is made to compare FSR with early farm management work in the U. S.
CHAPTER II

FAMILY FARMS OF THE UNITED STATES AND
SMALL FARMS IN THE DEVELOPING NATIONS

This chapter attempts to describe the so-called family farms, their operators, the farm families, and their environment, as they were the major clientele of the holistic farm management research and extension programs in the United States in the mid-part of this century. Then it goes on to identify and briefly outline the nature and scope of the small farms in the third world and the environment in which they function, and finally compares and contrasts the underlying circumstances of the U. S. family farms as they are found in the developing nations at the present time.

Defining the Family Farm

Few concepts are more widely and more loosely used than the term "family farm" (Hagan, 1963). In the pioneer days the family farm concept was synonymous with the small self-sufficient, subsistence unit that prevailed. Then, management decisions were mainly family centered with few outside influences and controls. In the early Jeffersonian concept, the family farm was a small unit and was exemplified by the 160 acre limit in the early Homestead Act. However, with rapid commercialization in the subsequent period, gross sales were used as a measure of farm size, based on which farms were divided into economic classes.

5
A more refined interpretation of the family farm was given by the International Tenure Conference of 1946 which identified the following characteristics to be significant:

- entrepreneurial functions vested in the farm family
- the human effort required to operate the farm, provided by the farm family with the addition of supplementary labor as may be necessary
- a farm large enough in terms of land, capital, modern technology and other resources to employ the labor resources of the farm family efficiently.

In order for the farm families to earn incomes and returns comparable to those non-farm occupations in the rural as well as urban areas of the U. S. (although these jobs were available to farm people too), there was a real need that they operated farm holdings which were large enough in size of land and the availability of other basic resources. This was especially important in the temperate conditions of the U. S., where for the most part only one cropping season per year was available for the majority of the U. S. farmers. Further, the technological developments that resulted in the use of modern agricultural machinery on farms also required fairly large scale operations for them to be economically viable.

Another common notion of the family farm operation during that period was the official USDA definition of the family farm as a farm on which the operator, devoting substantially full time to operations, with the help of other members of his family and without employing more than a moderate amount of outside labor, can make a satisfactory living and maintain the farm plant (USDA, 1944). This
definition included operations that might be quite large in terms of capital investment and land, but excluded part-time farms, farms that failed to utilize the family resources fully and those which could not provide adequate incomes to their residents.

According to these guidelines, the department estimated in the mid-forties that about 56 percent of the nation's farms were family operations and predicted that this would rise to 70 percent by 1955. But in 1957, it was reported that the percentage of commercial operations that were family farms remained largely unchanged, whereas only part-time and residential farms, which were considered too small to be called family operations previously, were increasing in absolute terms. These findings posed a potential political problem, especially considering the climate of the times, since the definition excluded the only kinds of farms that were becoming more numerous (D. Brewster, 1979).

In addition, these guidelines were proving to be unsatisfactory as an analytical concept too. When the number of family farms had to be calculated, it was usual then for the researchers to simply exclude all operations in economic class I (the largest) along with a percentage of places deemed too small to support a family. Nevertheless, the analysts knew fairly well that a portion of class I farms were family operations, and the guidelines included no measurable indicator that could be used to discover their numbers. Moreover, they did not stress the importance of incomes in farming comparable to sources in the non-farm sector. Thus, the USDA criteria did not last long as an official definition of family farms.
The shortcomings of the old definition of family farms resulted in the replacement of this post-war criteria, and what emerged in place was a family farm definition still frequently used today. The family farm was described as "a primary agricultural business in which the operator was a risk-taking manager, who with his family did most of the farm work and performed most of the managerial activities" (R. Nikalitch, 1972). This new definition allowed the inclusion of large operations as well as those at the bottom of the size spectrum such as the part-time farms, poor farms and marginal farms. This new concept reduced the family farm to three basic elements namely, management, risk and labor, but data limitations on the aspects of management and risk, led researchers to concentrate only on labor. The new definition precisely stated that the family must supply more than half the total work force, which was estimated to be about 1.5 man-years of labor for an average family.

Since only labor could be measured, this implied that any farm not run by a hired manager could be viewed as a family operation irrespective of other characteristics. Thus, the proportion of family farms rose from 56 percent of all farms under the old definition to 95 percent under the new concept. In this respect the new definition has been politically favorable, for whatever problems beset the agricultural sector, the family farm was holding its own as a percent of the total (D. Brewster, 1979).

Although the various classifications of farms based upon farm size, gross sales, income criteria, etc. were accepted then by many
researchers and policymakers, several did not believe it to be realistic in a modern agriculture to place such limitations on the scale of the family farm. The shortcomings of such definitional restrictions was pointed out by several workers.

Most of the turmoil over the definition of family farm was alleged to be a concern over the problem of measurement rather than of any substantial meaning. Further, it was felt that the careless use of census data led to the conclusion that the family farm was in the process of destruction either from the growing concentration of holdings or from parceling farms into units of exceedingly small size (Hagan, 1963).

It was concluded that a perfect definition of the family farm was not possible. However, in relation to the basic notion that a family farm is any farm unit run by the farm operator and his family, Hagan identified four basic features of these farms which endured over time even during periods of depression, inflation, automation and other techno-socio-economic changes. They are as follows:

- the management vested in the farm operator and his family, especially the primary decision making responsibility

- the farm operator and his family resided on the farm unit or near enough to permit convenient employment of family labor

- the operator and his family supplied at least a part of the farm labor, and

- the farm operator and family alone bore financial responsibility for the farm operation and received the benefits that accrued therefrom.
Thus, the main consideration in identifying family farms was based upon these "durable" characteristics retained through the years and embodied in the "whole farm-whole family" concept. Further, the above delineation placed neither a ceiling nor a floor on the scale of the family farm with respect to acres operated, income, capital investment or management. This concept facilitated the inclusion of part-time, part-retirement and subsistence farms along with the commercial farms typically identified by the census.

The notion of the family farm ideal was defined by Tweeten in 1980. While agreeing that no precise definition of the family farm was acceptable to all, he was of the opinion that there was some agreement that family farm ideally should be a farming unit in which the operator and his family:

1) control most of the decisions—with a preference for, sole proprietorship in relation to the legal organization, price system in market arrangement and ownership with respect to tenure patterns

2) supply most of the labor

3) derive most of their income from farming

4) receive personal income and rates of return on sources comparable to those in the non-farm sector

There are indications that the family farm concept is still undergoing further change but the direction of the shift is reportedly unclear. Further, the practice of distinguishing between small farms and family farms too has reappeared in the Department of Agriculture, especially due to practical considerations. It is also partly a result of the 1977 Food and Agriculture Act that requires
separate reports on these two categories of farms thus implying a difference between the two. Some researchers have on the other hand, divided family farms into three overlapping sub-groups namely small farms, part-time farms and commercial farms (Knutson, Emerson and Black, 1980).

It is, however, important to note that Hagan (1962) classified the family farms into adequate and inadequate commercial family farms, part-time farming units and part-retirement units. His belief was that such a distinction would give a realistic perception of the managerial problems faced by farm families under different situations and lead to better research and teaching efforts which will hasten the improvement of managerial performance. But this form of classification was then criticized based on the fact that they were not mutually exclusive, thus making the identification of specific managerial resources needed by each group a more difficult task.

Although much of the U. S. agriculture traditionally has been dominated by family owned and operated farms in the past, important changes have taken place in farming in recent years. The trend had been towards fewer and larger farms, greater specialization in production and more dependence on the non-farm sector but more importantly vertical integration, and other forms of coordination due to the basic technological and economic forces that have influenced U. S. agriculture. In this respect, the future of the family farm has
recently received much public attention and concern. While the structure of agriculture has both economic and social connotations, there are wide differences of opinion on the importance of changes in the structure of agriculture. The three issues that appear to have become the focal point of concern are efficiency, control and social values (Knutson, Emerson and Black, 1980).

The Small Farm Setting in the Third World Nations

As with the family farms in the U. S., the definition of "small farmers" in the developing countries has been the subject of much debate and still remains to be fairly ambiguous (Wharton, 1969). However, as for the U. S. a precise definition is not required to recognize either the reality of the small farmers' plight or their importance in development (Dillon and Hardaker, 1980). They constitute the bulk of the world's farmers, have a very small resource base resulting in chronically low standards of living, rely to a greater or lesser degree on subsistence production, and tend to be on the margin rather than in the mainstream of their national society. A higher proportion of "family farms" in LDCs are subsistence farms. Wharton (1969) suggested that about half of the world's population was dependent on subsistence agriculture, about 40 percent of cultivated land was worked by small farmers, about 60 percent of all farmers are small farmers and they account for less than 40 percent of all agricultural output. McNamara (1973) estimated that by the year 2000, there would be 2.7 thousand million rural people in the developing countries, constituting 50 percent of their population.
and that the bulk of them would be on small farms. These figures indicate the immense significance of small farmers in world development. But many small farms in LDCs employ too much labor to be regarded as family farms in the U. S. sense.

Two characteristic features of small farms was reported to stand out, namely their small size in terms of resources and their low income levels (Dillon, et al., 1980). While small farmers have these common attributes, their "modus operandi" around the world exhibits tremendous diversity. Just as great as differences in ways of farming are the differences in culture that exist among small farmers from country to country and region to region. Consequently small farmers, even within a relatively small region cannot be viewed as homogenous. Thus, one of the major tasks of farm management research relative to small farmers is to detail their diversity around the world as an important prerequisite to the specification of problems for farm management research.

The overall need for farm management research on small farms, however, lies in their importance as both a major component of the world's disadvantaged population and as potential contributors to the provision of adequate world food supplies. It is generally agreed that small farmers use their limited resources and knowledge fairly efficiently with their traditional farming systems (Schultz, 1971). But from the farm management point of view, it is necessary to provide them with more resources including improved technology and the relevant information on market trends and prospects to
improve their incomes and hence welfare. Farm management researchers also have a role to play in guiding planners on the likely responses of small farmers to price changes for farm inputs and products. They also have a significant role to play in cooperative research with agrobiological scientists in the development, testing and evaluation of improved farm production systems. The determination of the economically viable size of holdings for the various types of crops and crop mixtures grown in the LDCs too is to a great part the responsibility of farm management researchers. This information is required by the LDC governments to carry out land reforms and other forms of social and welfare measures and as the basis for resource distribution following the land reforms.

It is a well known fact that the general methodology and principles of farm management research was developed in the context of commercial farms in the western world. Although these principles of analysis are correct for small farmers in the developing world, the conceptual and situational framework in which they have to be applied is different. But, it has to be noted that differences in the needed research framework are much greater within regions of the the provision of adequate world food supplies. It is generally between them. Further, it was the opinion of some rural development researchers that farm management research in western developed nations emphasizes the individual farm and is based upon private ownership of land (Umali, 1978). They argue that in most regions of Africa and also Asia, research for small farm development will be more effective if oriented to farmers as members of local community
groups as they feel that traditional agriculture in these parts is based primarily on a communal concept of land ownership (Wong and Reed, 1978). However, it is generally known that Asian farmers are usually much less communal in their activities than their African counterparts and even in Africa the farms are not uniformly communal.

Another important concept which poses limitations for analysis and planning in the small farm context is the profit motive which generally dominates most analysis in farm management economies. Nevertheless, utility maximization has long been recognized to be important for the farm firms both in the developed country as well as less developed country situations (Knight, 1921). Under small farm situations in the third world countries, although the profit motive is present to varying degrees, it is seldom strong enough to furnish the unique basis for farm management research and development (Dillon, et al., 1980).

An additional source of caution is related to the possible limitations of an apparently simple concept such as farm size. Just which part of land we accept as defining the "farm size" will depend on our specific purpose and the kind of data being collected such as the case of shifting small farmer agriculture found in many LDCs. An area of farm management research that developed rapidly in recent years is farmer decision making. However, the main concern has been with how farmers arrive at their decisions and in determining those factors that influence decision making, whereas little attention
has been paid to who makes the decisions. This was so since, it was
generally assumed that they are made by the farmer which may be the
case to a certain extent in the western agricultural context. But
this assumption can often be wrong if applied indiscriminately to
small farm situations. Cases of group or multi-family decision
making as found in some African tribal situations and community con-
sensus being dominant in certain Asian Villages are merely two of
several such departures from individual farmer decision making
activities.

Further, farm management analysis as being based on the concept
of separability and comparability of different crop and livestock
enterprises, though quite valid for farms in developed countries and
for many areas of Afro-Asian agriculture, is not applicable to several
situations of small farmer production (Rutenberg, 1976). Even though
intercropping is seldom found in the context of agriculture in the
U. S. and other developed countries, the complementarity and sup-
plementarity between farm products produced on small family farms and
other farms and the existence of joint products have been studied
adequately in static marginal production economic theory and principles.
In farming systems where five or six different crops are intermixed,
it is physically and economically impossible to make valid comparisons
among single crops in the system. Thus, it is usually only possible
to make comparisons between farms of the entire system, and between
this and other systems. In many such multi-crop systems it has been
found that although yields of individual crops and species were
genearly low, the overall economic returns, both cash and food, per
family for these small farms were surprisingly high. In such situations almost all the modern agronomic data available on the crops grown in the system refer to them grown in pure stands and practically nothing when grown together. Here the need for basic agronomic information is quite obvious.

The scope for farm management research is very broad and its range of contexts extremely varied as they relate to small farm situations in developing countries. Unlike the other specialists in crops or livestock, the farm management researchers have to be concerned with the whole farm in all its dimensions as a purposive system with agro-biological, family, consumption social and community elements. This is especially true in the case of small farms which generally tend to involve complicated interdependent multi-product farming systems with a significant subsistence component (Dillon, et al., 1980). These characteristics naturally make farm management research on small farms a difficult, but not impossible, task.

A General Comparison of U. S. Family Farms in the 1950s and Current LDC Small Farm Situations

It will not be surprising if many who were superficially aware of farming in the U. S. and also marginally knowledgeable of small farm agriculture in the LDCs concluded that there was no basis at all for comparing these two farm situations. As discussed earlier in this chapter, both the concept of "family farm" in the U. S. and of "small farm" in LDCs were, and still are, very widely and loosely used and their definitions are subject to much controversy. Therefore, it is the view of the author that one should go beyond what
appears on the surface, to details of these farm situations to recognize their similarity in basic features. There is a need to compare them both at the macro level and also in relation to the micro aspects of behavior, attitudes, values, etc.

Another aspect to be taken into account is the apparent diversity of small farm situations in the various regions of the third world, making it difficult to decide which of these has to be taken as the unit of comparison with U. S. family farms. Moreover, there is great variability in family farm situations among the various states and regions of the U. S. as well as in LDCs. However, with respect to the extent of diversity of enterprises on individual farms and the size and scale of operation of each of these enterprises, there are clearly distinct differences. While the small farms of LDCs in general appear to be more diversified and low in their scale of operation of individual enterprises, U. S. family farms were comparatively less diversified and were larger scale operations in relation to each crop and livestock activity. Both fail to produce incomes comparable to those earned by non-farmers in their respective settings.

The pioneer day definition of family farms as small, self-sufficient subsistence units appears to be compatible with conditions prevailing now in many LDC small farm situations. Even the subsequent definitions which stressed the provision of a major portion of the farm labor by the family, the responsibility of undertaking managerial functions by the farm operator and family, etc. are also generally applicable to small farm cases.
In relation to attitudes toward farming and motivation for change, however, the family farm operators evidently were more progressive since they enjoyed larger resource endowments and also probably had better access to information related to new production techniques and market situation. But in relation to the managerial process of decision making there apparently is a strong similarity, although the segment of commercialized farms among the family farmers was much greater in numbers and size of operation, in comparison to the meager commercial operations among LDC farmers. Many LDC countries have larger farms than the U. S. measured even in terms of land and especially labor.

Both U. S. family farms and the LDC small farms represent the largest single component of the total farm population in their respective environments. While under the new definition of family farms about 70 percent are reported to be "small" family farms within the U. S., the percentage of small farms in the LDCs is indicated to be more than 60 percent and growing. This implies that the "small" family farms of U. S. and the small farms of LDCs are, or should be, the automatic focal point of those farm programs emphasizing equity and the provision of adequate incomes.

An important area that requires critical distinction is related to the small and large farms in the many regions of LDCs. In this respect the concept of an economically viable unit for each type of farming activity and system needs investigation. The fragmentation of holdings as the major cause of declining size of farms in LDCs
seems to have been valid to a certain extent in the U. S. with respect to family farms too. However, one major difference in relation to the incomes of farmers in the U. S. is related to the abundance of off-farm employment opportunities in the rural areas of the U. S. as opposed to the relative scarcity of such sources of income in LDCs. Therefore, it can be envisaged that there is more dependence on earnings from the farm activities in LDCs than in the case of U. S. farmers, especially when we speak about the "small" farmers in both situations.

In spite of the reappearance of the practice of separating family farms and small farms at the USDA for administrative reasons, viewing small farms as a category of family farms appears to be still a common practice. This implies that the type of farm management-extension programs developed then for the family farms in general, and "small" family farms in particular, must have some relevance to at least certain small farm situations in the LDCs, even as learning experiences and concepts to be modified and built upon to suit local needs. But one significant aspect to bear in mind is that the extension services and programs in many regions of LDCs are patterned after the European system which is somewhat different from that of the U. S. extension administration.
CHAPTER III
THE THEORETICAL FRAMEWORK FOR HOLISTIC
ANALYSIS OF THE AGRICULTURAL HOUSEHOLD

Having looked at some of the important characteristics of the subjects under consideration, the farm families and the small farmers, it is now necessary to review the literature related to the analysis and description of these farm situations. In this chapter the author first documents briefly the historical development of the field of farm management including the decision making or managerial concepts in the U. S., as an area of study most concerned with the problems of farm families. The research and extension concepts and economic principles related to farm management are examined and "whole farm" planning technique discussed, as they influenced the way in which the major Farm and Home Management programs were carried out in the U. S. In addition, some concepts of Home Management are taken into consideration.

Subsequently the theoretical framework for balancing capital uses between the firm and the household is discussed in detail, followed by an examination of recent theories of the household-firm and "new home economies." Finally, the farming systems framework and system studies as applied to less developed country situation is outlined.
Development of the Field of Farm Management

Throughout the twentieth century the definition of farm management although remained the same in many aspects, the emphasis on basic features underwent change over time. Warren (1913) defined farm management as the study of the business principles in farming and the science of the organization and management of a farm enterprise for the purpose of securing the greatest continuous profits. In 1924, Spillman defined a successful farm as the one which makes a fair rate of income on the capital invested in it and gives the farmer and his family sufficient income to permit a satisfactory standard of living. Boss and Pond (1949) defined farm management as the act or the art of judiciously and skillfully managing a farm. Others defined it as an intelligent and skillful method of combining the scarce resources available at the farm to produce output at maximum profit subject to meeting goals of the farmer (Heady and Jensen, 1970).

It is, however, important to note that as far back as 1954 and before, researchers have not emphasized profit maximization as the sole aim of farm management (Johnson, 1954). It was pointed out that besides the above norm, other norms such as security, equity, progress, freedom, mercy and justice were also important. Heady (1970) described the role of farm management to be to guide the individual farmer in the best use of his resources and in a manner compatible with the welfare of the society. In fact, this aspect of linking the micro and macro aspects of production efficiency to a greater degree than it had been in the past led Heady (1970) to conclude that there was little justification for differentiating between farm management
and production economics. But Johnson (1957) argued strongly for their differentiation as he was convinced that lack of differentiation was detrimental to both farm management and production economics. A few years later Johnson wrote "... Farm management research with production economics orientation has become increasingly less focused on the practical problems of managing the farms, and more focused on the methodological and theoretical issues of less relevance to the solution of practical farm management problems."

At the same time, Jensen (1970) seeing the divergence, warned that a clearer and more specific orientation was needed so as to know farmer problems, goals and values and help them articulate them. He also stressed the need to clearly identify the unit of analysis such as a farm-firm, a farm-firm-household, etc. and to be involved with the decision makers or policy makers of these units so as to improve the decision making process.

Although farm cost studies were reported as early as 1845 by the U. S. patent office (Boss and Pond, 1974), there is no record of significant research in farm management before the passage of the Hatch Act in 1885, followed by the establishment of the state agricultural experiment stations attached usually to the agricultural colleges. Records show that farm management teaching began in the U. S. in 1874 (Boss and Pond, 1947). Professors I. P. Roberts of Cornell University, W. M. Hays of Minnesota and T. I. Hurt of Ohio may perhaps be called the pioneers in teaching farm management.
From the early days agricultural economists such as Taylor, Black and Spillman saw rather clearly the substantial contribution that economics could make to farm management (Wilcox, Johnson and Warren, 1940-1941). Later in 1957, Glenn Johnson observed that "farm management as a discipline is now well on the way to being dominated by production economics, a subfield of economics, and agricultural economists." In theory and practice of the managerial process, economics turned out to be a necessary but insufficient basis for management (Johnson, 1957).

The farm and home development program or whole-farm unit approach of the extension service was viewed to be really a very broad management program involving the integration and attainment of the family and business goals of a farm family with the resources and technology at the disposal of that family. The earlier farm management research however, did not have the organized interdisciplinary breadth required to support this increasingly broad concept of management. Typically the earlier farm management work emphasized technical agricultural sciences without giving adequate attention to the social sciences, including economics, and the humanities (Johnson, 1957). Further, since it was highly inductive and empirical, it did not always use enough theory and principles from any science.

Early in the development of farm management it may have been easy at times for the farm management worker to think in terms of the most profitable farm organization without taking into account as fully as he should the differing circumstances of the individual farmer. Even
within the same community and especially in diversified farming areas, the farmer's choices of the products were determined by many factors concerning his particular farm and his own situation (Case and Williams, 1957). It is evident in the literature that the ideas of viewing farm management in a system perspective began quite early in the history of farm management. It was realized that land use capability of the farmland could vary and that family labor supply as it changes can influence the organization of the farm.

Economists engaged in farm management research have employed many methods over the years to investigate the causes of inefficiency in the use of agricultural resources. At one extreme the emphasis had been on deductions from static and dynamic economic theory where statistics and the scientific method were employed rigorously. At the other end research has been performed without the use of economic theory, etc. but based mainly upon the findings of previous studies, which in turn has been determined largely by induction (Back, 1952). Early research findings in farm management by induction have had limited value as decision making guides to individual farmers as well as national policy makers.

The failure of farm management research workers to use theory in the early days apparently arose from a lack of understanding of the logic and techniques of "modern" science. Pure economic theory, however, did not contain ready-made hypotheses on the solution of all empirical problems in farm management (Back, 1952). Thus, perhaps the failure of research workers in farm management to find ready made
theory for each particular small segment of agriculture led to the pure empiricism or induction. Further, the persistent lag in economic progress in low income farming areas suggested the possibility that some important elements of the individual family ends were inconsistent with the efficiency criteria of economic theory.

In the field of farm management there were two schools of thought. The empirical school was probably more realistic in dealing with farmers and their decision-making problems as they occurred. The other school was termed the experimentalists because they used both theoretical and empirical tools. Until the mid forties, both these schools of thought had not yet developed any decision making or managerial concepts (Johnson, 1955)

However, this conceptual development was already underway elsewhere. At the end of World War I, Professor Frank Knight pointed out clearly that the assumptions of classical static economic theory eliminate managerial concepts from static economics (Knight, 1921). He reasoned that it was the existence of imperfect knowledge of change in the real world made it necessary for each business to have in it a decision making unit. T. W. Schultz who was in complete agreement with Knight pointed out the sterility of both the empirical and experimentalist approaches to farm management as far as the managerial concepts were concerned (Schultz, Social Science Research Council Report, 1939).

These developments sparked many researchers to re-examine their theoretical concepts and became a turning point in the field of farm
management. The empiricists, however, were more or less unresponsive to this and continued to be so in the case of farm management extension workers, even after they became engaged in carrying out a farm and home development program which had as its very core the decision-making process of the farm family (Johnson, 1957). The response of the experimentalists, on the other hand, took several forms. Work on price expectations by Schultz and D. Gale Johnson (1947), on flexible farming and uncertainty by Heady (1950), on needed theoretical developments for farm management by Johnson (1950) and on the decision-making principles relevant to farm management by Johnson and Haver (1953), brought together the concepts which formed the nucleus around which the interstate managerial project was built (Johnson, 1955).

Managerial Concepts and the Extension Service

The early theoretical distinction between firms and households was based upon the conception that firms are concerned with maximizing dollar incomes, whereas households on the other hand are concerned with maximizing personal satisfactions (utility) derivable from spending dollars (Johnson, 1954). However, the realization that many personal satisfactions are involved in farming, in a dynamic environment made the above distinction vague and indefinite. In fact the lines of demarcation between firms and households become so indistinct and the lines of interrelationships so complex that we are forced to combine the two and treat them jointly (Johnson, 1955).
The land grant system in the U. S. was unable to maintain the distinction between the farm business and farm home and had, in many instances, set up extension programs designed to eliminate the distinction. Extension services, as semi-governmental agencies, designed to speed up the flow of information to farm managers were found most effective in furnishing information on production methods and prices, but somewhat less effective in furnishing information on innovations and institutions (IMS, 1961), and virtually non-effective in providing information on human problems. This suggested the need for the "regular" extension service to make a concerted effort to present a more balanced program for disseminating data and information in all five of the above problem areas. In this respect the FMD and BF programs represented a step in the right direction.

It was also suggested that deductive learning processes are almost as important as the inductive learning processes (demonstration and illustration) in the managerial activities of farms. Training in managerial skills requires training in both deductive and inductive reasoning methods, despite the emphasis on induction in the early period (Johnson, 1955). Tools useful in deductive reasoning included logic, economic principles, budgeting and mathematics. Thus, the farm management extension workers had to play a primary role in increasing the skills of farmers in the performance of managerial tasks. This involved far more than furnishing the farmers data and information including training farmers in methods of both inductive and deductive logic. Moreover, it was realized that farm
management research needed to be reoriented toward solving operational problems of farmers rather than toward the problems or organizing alone (Johnson, 1954).

Agricultural economists and others have been concerned for a long time about the adequacy of the managerial concepts and principles in guiding the thinking in extension, resident teaching and research work. Although, many worthwhile concepts contributed in the past to the work in farm management, they tended to be far from complete. For instance, farm management workers dealing with the money-making problems on the farms without regard to home problems were unable to do a complete job in planning a farm. In the same way general economists were no more successful than agricultural and home economists in their thinking about management (Johnson, 1952).

Extension workers have or should have a close interest in the managerial process as it is through this process that extension teaching is absorbed and finally incorporated into farm and home activities. In short, it was felt that a greater understanding of the managerial processes was needed in order to help the entire land-grant system produce the types of information needed and desired by farmers and, subsequently, transmit it via both extension work and resident teachers to both adult and young farm people.

One of the most important realignments in farm management thinking has been the introduction of the concept that learning and management are almost identical processes (Johnson, 1952). In this respect it was recognized that the task of extension workers was that of teaching
whereas the "new" managerial concepts were built around learning. The learning process covers the first three managerial steps (observing, analyzing and deciding). Taking action and bearing responsibility follow. In the process of working with farmers and members of farm families who perform these five managerial tasks, the extension worker is generally impressed with the personal nature of the decisions made by farm managers. Thus, another aspect of importance was that FM workers became increasingly aware of the personal subjective nature of the managerial process and of the normative question to be answered as a prelude to deciding what ought to be done (Johnson, 1960).

Further, it was also realized that the cost of learning was not restricted to merely dollars and cents but were personal subjective things. It was in fact noted that both the cost and value of learning are personal subjective features and it is natural for managers to economize in their learning processes. A person does not desire to devote time, money and effort to the task of learning unless the value of learning exceeds the cost (Johnson, 1952). The ease with which farmers may be taught depends, to a very great degree, upon the knowledge situation in which they happen to be. The five different knowledge situations defined in terms of the value attached to, and personal costs encountered in learning by managers are important to be noted here. It is easy to teach the manager who is in the learning situation as he values what he can learn at more than the cost of learning it, whereas it is almost impossible to teach the manager who is in an inactive situation because he feels that the costs of what he can learn exceed its value (IMS, 1961).
In the above context it was realized that extension teaching can be made more effective by either heightening the value which the managers place upon learning and/or by lowering the cost of learning. These two measures together or separately can shift the manager from the inactive to the learning situation. These managerial thinking recognized that wants and preferences were as important on the business side of farming as on the home side. Every indication in both managerial theory and in practice was that the overall farm approach via the planning process of the manager was an effective way to get extension teaching put into action on individual farms (Johnson, 1955). The land-grant system was not the only agency interested in educating farmers as the private commercial establishments who were involved in marketing their products and services too were important in providing information related to the use of these new innovations (IMS, 1961).

The Farm and Home Development program or the farm unit approach, as it was sometimes called, recognized that there was essentially one managerial process on a farm which interrelates household and the firm decisions and to attempt to plan one in isolation or ignorance of the other was futile. The realization that value systems were crucial on both the production and consumption side and that this situation inseparably unifies farm and home making decisions was of utmost importance. The land-grant system and the personnel attached to it were effective in developing value systems among farm people and in motivating them, despite the notion that the objective was to
"help farm people do what they want to do" (Johnson, 1955). But since the study of value systems and patterns of wants and preferences falls partially, at least, in the humanities, the study of management and of decision making goes beyond the sciences of agricultural and home economics.

Some Concepts of Home Management

Household management is in all countries the most common occupation employing the most number of people, handling the most amount of money and is of fundamental importance to the people. Although home management is a very commonly used term, it is imperative to clarify its meaning as the basis for better understanding. To show how management helps families achieve their goals, it is appropriate to state here a detailed definition given by Gross and Crandall (1954):

Home management consists of a series of decisions that make up the process of using family resources to achieve family goals. The process was identified to be consisting of three, more or less successive, steps namely planning, controlling the various elements of the plan when implementing it and evaluating the results for the purpose of future planning.

Therefore, it is a mental process with definitive steps, but not considered to be made up of the six functions recognized in relation to the performance of the managerial process on farms.

There were, and still are, several misconceptions regarding the managerial and decision-making process that take place in home management. One such misconception was that in each family there should be "the" manager, which leads to the opinion that the individual may
"manage" the other members of the group. However, as noted in the definition one manages the resources and not people and while there may usually be a leader, all family members who are old enough to make decisions can and do participate in home management.

Another misleading view among some was that home management principles dictate to families what their goals should be and that these goals being socially acceptable dominated judgments about family management. This was incorrect since the goals though important in any home, whether they are good or bad is not a part of the managerial process. Even if the goals for which the family strives should be "good" ones so that management be successful, it would still be impossible for anyone to dictate to a family or an individual what their specific objectives should be. Each can choose from a variety of socially acceptable goals that are possible and in this respect home management poses a challenge to the family to choose its goals thoughtfully.

Further, home management has to be viewed in relation to the fact that it concerns people and is interwoven with family and group relations. Nevertheless, it is possible that a family or any other intimate group might consciously choose the goal of working toward better group relations. However, some important obstacles existed, and still do, to the improvement of management of homes. They are as follows:
1) Many families not aware of the steps in the managerial process and often consider management to be synonymous with planning.

2) Frequently, families lack information of the total supply or variety of resources available especially the less tangible or less obvious ones.

3) Some families fail to evaluate the results of their management in the light of family goals, and others do not define their goals sufficiently for the goals to direct or motivate action.

4) Numerous families wish to have experts give them ready made answers to their problems instead of guides to use in solving problems.

5) Finally, improvements implied they brought about changes and people generally disliked changes.

Management takes place in every home irrespective of whether they may be good or poor since the quality varies from one home to another. The Farmers' Home Administration judged household management as "good," "average," and "below average" on the basis of the following five points:

(a) ability to set goals and accomplish them
(b) possession of information and ability to use it
(c) ability to conserve resources and use money to advantage
(d) possession of skill in household tasks
(3) sharing of responsibility with other members of the family

On the whole, the true challenge of management can be viewed to be threefold. First, home management is a process made up of decision making offering an intellectual challenge to the homemaker. Second, the vastness of resources involved in management stretches the imagination and, finally, decisions made by the homemaker and by the family have far reaching results in determining the quality of life which families achieve.
The shortcomings of the Interstate Managerial Study (IMS) in dealing specifically with home management decisions were pointed out by Johnson (1955), even though IMS covered some of the interrelationships between business and home management decisions. Thus, the need for supplementing the home management end of the study was recognized, in addition to the importance of studying the role played by the wife and older children in making farm-home decisions. The interrelationships between the decision-making roles of husband and wife too was not included in the IMS. But, more importantly the interrelationships of values and decision making in home management was realized.

The Whole Farm Planning Technique as the Core of the Farm Management-Extension Programs

The integrated nature of production on small family farms both in the U. S. and abroad necessitates considering the system as a whole. Alternative enterprises usually compete for the same basic resources and often important interrelationships among various components of the farm system must be taken into account. It is often difficult to account adequately for such interrelationships in any partial analysis which considers some aspects of farm production systems to be given. Therefore, it has been a common view among researchers that the planning of family farms and small farms is best undertaken on a whole farm basis.
Historically, the whole farm planning technique typically involved three main steps:

(1) the development of the farm plan;

(2) the testing of the plan for feasibility with respect to farm resources and consistency with institutional, social and cultural constraints that are relevant; and

(3) the evaluation of the particular plan and ranking the various alternatives in accordance with an appropriate criterion so as to choose the "best" plan.

Identifying what is "best" however, has to reflect what has value to the farmer and his family which is usually complex and difficult to elicit. Frequently, net farm earnings is considered as a suitable proxy for the farmer's actual but unspecified objectives.

Farm planning involves examining the implications of reallocating farm resources. At one extreme farm planning may be considered as a part of an extension program wherein a specific plan was developed for each individual farm. Although the planning techniques adopted in the context of U. S. farm management extension programs, such as the balanced farming programs, were suited to use in an advisory context, the large number of small farms in most LDCs may make the individual approach as used in the U. S. impracticable as a means of achieving broad objectives; however, other less costly programs may be designable for working with individual farms and families in LDCs.

Nonetheless, in the developing country context the extension use of farm planning methods may have to involve planning one or more case study farms that can be regarded to some extent as "representative" of
the target population of small farmers. However, the great diversity among farm populations with respect to resource endowments, management goals and abilities, etc. obviously limit the value of the representative farm approach. It is not usually possible to obtain a close match between the circumstances assumed for the representative farms and circumstances of any large proportion of actual farms. Rather, it may be best used to identify general guidelines about the economical use of resources and the small farmers can be taught to make use of them and plan their farm operations themselves as opposed to being carried out by the extension.

Holistic Approach to Farm Household Analysis

It was stated earlier that the distinction made between the farm firm and farm family by researchers in the past was vague and indefinite and that there was a need to combine the two and treat them together in a comprehensive manner, taking into consideration the production-consumption relationships on the one hand and profit vs. utility maximization goals on the other.

Firm-Household Interdependence

The household is interpreted broadly to mean the center of family activities (Back, 1952). The physical facilities and personalities of a household usually is taken to be the basis for status in a community of households. The household in agriculture encompasses both production and consumption activities of the family. The farm firm is the collection of production and consumption facilities
belonging to the household. The firm includes the physical items such as land and other capital equipment and the services of the personalities of the household.

Viewing the values of the family as being independent of the production processes is equivalent to assuming that a unique set of variables enter into each function and a change in one does not evoke a change in the other. Separation of the consumption and production functions in agriculture is less valid as the entire consumption and production of a farm family takes place in one center (Back, 1952). Further, the existence of interdependence in production and consumption, limits the usefulness of research based exclusively on profit maximization principles as decision-making guides to low income farmers.

If firm-household interdependence exists, the farm management research worker must identify the relevant values and obtain some measurements of their importance. A stable set of values were an important feature of low income farm areas because of the comparative stability of the culture and the lack of a wide range of socioeconomic strata. Although no culture in the U. S. and LDCs can be considered absolutely stable, given the institutional changes and technological progress; nonetheless within the life cycle of a farm family changes in low income farming areas are often rather small. The pattern of life cycle of low income farm families in the U. S. can be viewed as similar to the economic life history of the peasant families in LDCs, with respect to the changes in the size of the family labor
force, the holdings of productive assets and the consumption requirements of the family (Back, 1952).

The three procedural steps identified for joint theoretical-empirical research on firm-household interdependence in agriculture were:

1) an identification of the elements of the value system that affect production decisions,

2) the development of a theoretical system from which the importance of specific values can be ascertained, and

3) the design of an appropriate empirical procedure for testing deductions developed in the theoretical system.

Problems related to the measurement of values enter into each procedural step in research to determine the effects of individual family values on resource use. Measurable variables have to be identified and placed in the theoretical system employed as a guide to empirical research. The efficiency of an empirical procedure in testing a hypothesis on firm-household interdependence depends to a great extent upon the ingenuity of the research worker in formulating the deductions to be tested (Back, 1952). Deductions from a hypothesis form the basis for delineating an area of facts to obtain in the empirical phase of research. Nevertheless, testing a firm-household interdependence hypothesis directly instead of indirectly through the use of deductions does not necessarily increase the validity of the test.

Balancing Capital Uses Between the Firm and the Household

In no other industry is the interdependence between the household and the firm so strong as it is in agriculture. Since such a close
relationship exists, it is necessary to treat the farm firm and the farm family household as a single composite unit which was to be called the "farm." Erroneous conclusions, however, were possible if profit maximization rather than utility maximization were taken to be the goal. It was considered that the firm side of the farm was dominant when profit maximization was the aim whereas the family side was viewed to be overriding when maximization of satisfaction was the ultimate end (Redman, 1951).

The significance of firm-household interrelationships arise primarily from time uncertainty and other forms of uncertainty which play a major role in the decision-making process. Due to the complex nature of time uncertainty, capital limitations arise and firm-household relationships become important. The degree to which funds are limited would determine the closeness of firm-household interrelations. The problem really is one of allocating resources and income in a manner to maximize satisfaction over time.

The firm side is concerned with income yielding investments of one time period as compared to another period more distant in the future, whereas the household is concerned with the satisfaction to be derived from income now as compared to that expected in the future. Therefore, the optimum allocation of income between consumption and capital accumulation depends on the following two important considerations:
(1) The time-opportunity possibilities in production and income facing the individual or family, and

(2) Time preferences, which depend upon the value which the farmer as a consumer places on current as opposed to future income.

Knowledge is imperfect when the farmer cannot see certain elements of a situation accurately enough to predict the exact outcome of a course of action. Each farmer will subjectively form a unique course of action when he tries (a) to identify all the variables affecting the outcome and (b) to place a value on the importance of each variable identified.

Subjective uncertainty leads an individual to depend upon his culture for patterns of behavior and cultural patterns for adjustments. Individuals are more certain of outcomes from actions based upon personal experiences and observed activities of others than upon activities new for the culture (Redman, 1951). Greater dependence was thought to be placed upon cultural standards in low income farm regions than in high income regions. The ends were said to be set by the culture and the means of attaining them obtained from the culture in these situations. A low income farmer usually does not consider the entire production possibilities. The farmers who are most likely to adopt the recommended techniques are those who are already employing elements of the new techniques and thus have the least to learn in order to estimate the probability of success.

A farmer will not have the motivation necessary for initiating production changes requiring considerable effort and costs without a change in his utility or value system. Stability of values concerning both the household and the firm lead to little flexibility in
resource organization. However, the current asset position of the farmer depends upon the past allocation of income between production and consumption and also past preferences and asset purchases.

Recent Knowledge on the Theories of the Household-Firm and "New Home Economics"

Even though research by social scientists had focused attention for a long time on the family and the household in which it resides, we know very little about the internal workings of families and households. The so-called household production model serves as a basis for a growing body of literature known as the "new" home economics. In the household production model families are assumed to derive satisfaction not directly from purchased market goods and services but from basic objects of consumption called household commodities (deTray, 1977) or "Z" goods. The main features of these goods are that they are not exchanged in the market places and their production requires apart from the market goods and services, also the time of the members of the household.

The emphasis in the model on time as a production resource within the household appears to be its critical departure from the conventional economic theory of consumer behavior. Thus, family production-consumption decisions at any point in time and over time depends also on the value or scarcity of time to family members. Nevertheless, this model in the general sense does little more than provide a convenient language within which to discuss issues of family behavior. However, it brings out certain characteristics of
the household that were not adequately recognized by the traditional economic theory, such as the importance of the value of time and the allocation within the household, the significance of non-market contribution to the welfare of the family and above all the empirical nature of many crucial issues concerning family behavior.

Many researchers in the social sciences recognized their inability to separate family behavior along disciplinary lines. Further, the rationale of distinguishing economic and non-economic behavior too has been questioned (White, 1977), because these two aspects of behavior are so closely linked and together make up the integrated behavioral network called the "family." It is also suggested that one fundamental aspect of behavior which distinguishes families in different societies is the allocation of time by household members.

The theory of the household-firm permits the determination of household food availability both directly through market purchases and indirectly through on-farm production for own consumption. It also takes into account the indirect effect of own labor use on consumption through own farm production or in terms of off-farm income generation. Contributions to the literature of these household-firm models has been reviewed by several research workers (Koo, 1978; Barnum and Squire, 1979). Central to all these models is the assumption of a household utility function. Household-firm models typically maximize the utility function subject to a production function, to a budget constraint relating sales and purchases of home and market goods and a constraint relating labor and leisure time of individual
members to the total time endowment of the household-firm (Barnum and Squire, 1979).

The theory of "new home economics" as developed by Nerlove (1974) and others has the following four main elements in its structure:

(1) A utility function with arguments which are not physical commodities but home-produced bundles of satisfactions.

(2) A household production technology described by a production function or functions.

(3) An external labor market environment providing the means for transforming household resources into market commodities and

(4) A set of household resources constraints which consist of inherited material wealth and time available to individual family members.

Thus there appears to be a distinct relationship between the theory of the household-firm and the "new home economics."

Although the household production function model is not the richest of models, it can do more for research than simply provide a means to correlate various elements of household behavior with each other, since evidently there is tremendous untapped potential of research strategies that attempt to better integrate theory and empirical analysis. Although we may be a long way from understanding the internal workings of the household, our knowledge of the complexities of family structure and of the activities that are performed within the home in developing nations is increasing rapidly. Further, researchers have begun to realize that the household economy is an important part of the total economy in LDCs (deTray, 1977).
On the other hand, if we are to understand family behavior, even within the household, our models and empirical analyses must also take into account the institutional settings in which families function. In this context, the "new home economics" stresses the interrelated nature of many of the decisions that families make over their lifetime. This in turn points to the need for more sophisticated estimation techniques to accurately estimate behavioral links and the value of longitudinal data (time series) and sequential observations on the same households over long periods of time (case studies).

Agricultural Systems and System Studies

A system can be defined conceptually as any set of elements or components that are interrelated and interact among themselves (CGIAR/TAC). At the most basic level, agricultural systems are assemblages of plants wild or domesticated and human beings utilize those plants directly or secondarily through animals. The value to human beings of what goes into the system and what emerges from it are crucial in determining the value of different possible systems. At the management unit level, a farm family assembles individual enterprises into systems. Since the farm family may not be able to allocate to each crop or enterprise all the resources necessary to achieve the greatest possible yeild, it has to use its resources as best it can to maximize the return from the farm system as a whole. The reason is that optimization or improvement to merely a part of a system or a sub-system cannot be presumed to lead to enhanced
performance of the overall system (Dillon, 1973). Indeed, it will generally result in overall sub-optimization.

System theory derives from the perceptions that a system cannot be understood unless it is considered as a functioning whole as well as analyzed in its parts. System performance must therefore be judged not simply in terms of how each part works separately, but in terms of how the parts fit together and relate to each other, and in terms of how the system relates to the environment and to other systems in that environment. Only such a holistically-oriented approach can lead to the capturing of adequate understanding of a system for purposes of improving performance.

System Studies

System studies seek to determine the most effective ways of utilizing the resources of a community for its own development. They have important contributions towards solving the widespread problems of determining the kind of technical advances that are needed and can be used by the farm people, and why so many advances made by agricultural scientists are of no interest to the people they are intended to benefit (Johnson and Bunting, National Academy of Sciences, 1974). System studies are intended to define the areas and ways in which new technology can help most effectively to improve the design and operation of more productive systems of resource use by rural people. Therefore, the ultimate object of system
studies is to build a matrix of information from which the optimum mixes of inputs for each single enterprise can be computed for all mixes of prices likely to be experienced by the unit of the next higher system, the farm.

In system studies complex algebraic and arithmetic methods of analysis, facilitated often by computers, make it possible to determine which of the many theoretically possible systems should actually be tested in the field. They also make it possible to estimate the size of the effects and interactions of specific factors in these complex systems, whose actions cannot readily be determined by direct measurement. As more and better data and theories become available to an increasing body of workers, system analysts must rely increasingly on computers to build elaborate mathematical models and to test the effects of changes in one or more components in a system. Further, simulation studies may prove helpful in overcoming the constraints of large multi-factoral experiments and in accelerating the collection of information on which to base predictions. Here studies simulating the operation of whole farms, based on single crop or enterprise studies may help to eliminate operationally or economically unsuitable sequences. However, very often given the shortage of basic data and the problem of evolving suitable models, many partial solutions could be derived at low cost with less sophisticated methodology.
The Farming System

The components of a farming system were delineated by Norman (1976). He categorized the "total" environment in which farming households operate into two parts: the technical and human elements, of which the former he considered to provide the necessary condition and the latter to be the sufficient condition for the existence of a farming system. The technical element he stated was divided into physical factors such as soil, water, temperature, etc. and biological factors such as the crop and animal diseases and pests. Human elements were viewed to be made up of exogenous and endogenous factors where community structures, beliefs, values, etc. and institutions were considered to be exogenous to the system and farmer goals and motivation were identified as critical endogenous human elements. It is also important to take into account the system constraints, both physical, such as those related to cost and technology, and human in nature, dealing with the institutional and cultural limitations.

Even though the farming systems research concept is claimed to be holistic in its focus, the apparent neglect of the household aspects in small farm agriculture, the lack of development of the managerial theory and small farmer decision processes, and the inclination to have a perverted view of risk aversiveness by and large, has raised questions about its scope and the extent of comprehensiveness of the FSR approach. Further, the emergence of the field of farm management in 1920s and 30s, as an area mostly involved in the integration of the knowledge of the technical fields of agricultural science, appears to have been true in the case of FSR too. With FSR, the strong
influence of the commodity-oriented research was quite prevalent in the international agricultural institutes until recently, when a multidisciplinary approach incorporating the social sciences has been advocated.
CHAPTER IV
HISTORICAL REVIEW OF SOME PAST HOLISTIC FARM MANAGEMENT-
EXTENSION PROGRAMS AND STUDIES IN THE UNITED STATES

It is the belief of the author that much can be gained by LDC farm management research and extension workers in the United States related to the conceptualization, designing, planning, implementation and evaluation of some of the very important farm and home programs that viewed the agricultural households, especially the family farms, in a comprehensive manner. Their rich experiences are the result of participation in these programs over a period of several decades where they faced successes and failures, were motivated by their achievements and also learned from failures to modify these programs. Thus farm management research and extension personnel currently concerned with the welfare of small, limited resource farmers both in the developed and less developed countries have much benefit to be derived from this rich knowledge accumulated by these workers in the past. However, the author recognizes the fact that the underlying socioeconomic, ecological and cultural environments in which the small farmers of LDCs operate presently vary considerably from that of the U. S. farm families 2-3 decades ago. Nevertheless, as seen in a previous chapter, many similarities can be found in the basic ways in which the family farms operated then and the LDC small
farms function now and that neither U. S. nor LDC farms are homogeneous. Both probably display more variation than the constant differences between U. S. and LDC farms.

This chapter, which is considered by the author to be the most important one in this paper by way of its contribution, first looks at some of the factors that motivated the development of these farm and home management programs some 30-40 years ago in the U. S., and then goes on to describe the methodology and the economic framework of some of these significant programs, such as the Balanced Farming (BF) program, Farm and Home Development (FHD) or Farm and Home Planning (FHP) program and also the Experimental Township Extension program as they were conceived and practiced in some of the major agricultural states of the U. S. Most of these programs, as can be expected, developed in and around the agricultural colleges of these states with the Experimental Stations and the Cooperative Extension Services participating in the research and extension components of these programs, respectively. This chapter reviews these programs in a historical perspective. It investigates broad program objectives, basic program strategies or responsibilities as conceived by both the extension workers and the farm families that cooperated and finally the major impacts or benefits of these programs with respect to changes in farm and home practices adopted, attitudes of farmers towards farming and farm life, patterns of farm decision making and especially the effect on net income and net worth from farming.
Some Underlying Circumstances that Led to the
Creation and Development of these Programs

The post World War II period was characterized by an unparalleled development of new technologies, including those in the field of agriculture which influenced the research programs greatly in various spheres of activity. New discoveries in various fields had tremendous impact on productivity and efficiency in agriculture as an industry, once they were adopted by a large portion of the farm population. However, it was largely left to the sagacity of each individual farm operator to determine the workability of these innovations and to evaluate the economic consequences of their application on his own farm either as a package or as separate practices (Hagan, 1963). Many farm families thus faced perplexing adjustment problems because of the scope and rapidity of technologic, economic and sociologic changes.

Many family farm operators at that time lacked the training and experience to analyze the economic potential of alternative resource combinations and to make the adjustments that would meet the changes in conditions effectively. From an organizational point of view, many farmers were reported to cling to the highly diversified "general farming" systems of a previous generation. Farm and home management problems, however, were viewed to form a continuum from the simple questions of technology to the coordinated unit approach to farm and home problems (Sargent, 1960). Further, it was pointed out that while every family was striving to develop a complete farm and home
plan, they were in different stages of its development when they came to extension for help and thus needed and desired different degrees of management assistance (Croy, 1955). According to Croy the need for an intensive and complete approach was to be determined after an analysis of the farm and home unit.

**Balanced Farming Program of Missouri**

Early in the post World War II period of rapid change, a new and unique program was initiated by the Agricultural Extension Service of the Missouri College of Agriculture. After 1941 the program gained statewide and national prominence under the name of Balanced Farming (Hagan, 1963). The key feature of the program was the whole farm and family unit approach to solving the problems of more effective farm organization and adjustment to changing economic conditions. Its focal point was the development of long-range plans for both the farm and the home to determine how the available resources could be used best to achieve family goals. A systematic step by step procedure was developed for guiding farm families in planning and carrying out Balanced Farming Systems which would give higher returns from the use of all resources.

It was noted then that the above procedures were in close compatibility and harmony with the basic theory developments that occurred simultaneously in the principles of decision making, through independent research by other researchers (Johnson and Haver, 1953). It was realized that especially among the low income families there
was a need for close integration of production and consumption plans existed. In this context it was considered significant that the BF approach originated in Missouri and FHD in Kentucky, states with many farms needing extensive development (Bradford and Johnson, 1953). Among these smaller farms, as credit for expansion and developmental programs were often unavailable, these farm programs had to be financed out of the low levels of income that prevailed. In those days, many Missouri and Kentucky farm families had limited resources, relative to farm and family needs, so it seemed imperative to develop alternative long-range plans and to evaluate them carefully before making major investments in farm and home improvements over time (Hagan, 1980).

Procedures and Methodology of the Missouri Balanced Farming Program

Development of a broad scale and comprehensive program such as Balanced Farming requires attention to a number of facets and activities. Planning and organizing a well-balanced system of farming and family living is a rather complex task requiring many decisions. Through the years, however, a large number of planning procedures evolved, ranging from rather simple hand budgeting to highly sophisticated techniques (Hagan, 1980). In early years in Missouri, so-called "conventional budgeting" procedures were used which were very detailed and cumbersome. Frequent revisions led to the "block budgeting" procedures which have been in use and improved over a period of years in planning schools and individual planning with farm families.
In later years, a Farm Planning Handbook was developed and used which included a variety of materials such as enterprise budgets, general reference data, worksheets for planning, a review of economic and farm management principles and instructions for planning. The book, although designed primarily for use in hand budgeting, was equally useful for more sophisticated computer applications such as linear programming, computer budgeting and other programming methods (Hagan, 1980). The degree of sophistication of the procedure was to be, however, in accord with the conditions under which the planning was done. For the most part, it was felt that the block budgeting procedure was most understandable and workable in farm planning activities with individual farmers and small groups, as it seemed to facilitate their participation in the planning processes.

The farm management basics of the program were embodied in a 10-step procedure to guide the farm planning efforts over a period of many years. It was a logical, systematic sequence of activities and events for planning, evaluating, and adjusting plans for an individual farm unit over time. The steps in the planning process briefly are:

1) Inventory and evaluate resources--prepare a careful inventory of all resources available to the farm and family both in physical and economic terms.
2) Establish goals*-making progress toward achieving an unknown goal was considered a difficult task. The moral was that goals should be tangible, realistic and eventually with specific plans for implementation.

3) Identify problems--realistic and useful long-run plans were to be problem-oriented so that it will help in conceptualizing and formulating plans to overcome them.

4) Analyze alternative plans--many different measures such as profitability, cash-flow, requirements of capital and labor, etc. were used in analyzing the advantages and disadvantages of alternative plans.

5) Choose a plan--it was the farm family that was to decide on a plan to be developed based on the measures computed for the alternative plans but also taking into account family needs, desires, etc.

6) Act, develop the plan--best plan possible was viewed to be of no value to the family until implemented. Many good plans never developed, when facilities and materials were not available at times needed.

7) Assume and allocate responsibilities--although the manager was directly responsible for his decisions to act, he often was able to allocate some of them to family members and also hired help.

8) Evaluate progress--performance evaluated by the use of good production and financial records carefully analyzed and interpreted.

---

*A goal is a condition, not yet established or attained, which some entity is trying or could try to attain. Thus, the term goal is usually consistent with what is generally referred to as an objective. However, a value or normative belief, on the other hand, is the meaning of a concept of "goodness or badness." Thus, value concept is a word or sentence which has as its meaning a state of affairs which is good or bad (Johnson and Zerby, 1977). Whereas the goal is something related to the right and wrong course of actions, value, as mentioned is concerned with the good and bad. (It is sometimes right to do a bad and wrong to do a good act.) It was felt that it is necessary at this point to distinguish the goal and value concepts as these terms were used by various farm management extension and research workers, without specific indication of which meaning they wanted these to convey.
9) Establish controls--monitoring of plans, during transition years in particular, by use of financial management "tools" such as partial budgets, cash-flow budgets, computer investment analysis, etc.

10) Adjust--farm plans needed adjusting as conditions changed and flexibility was considered necessary when formulating plans.

The above steps were true to a great extent in the context of FHD programs too.

**Historical Perspective**

In Missouri, D. Howard Doane is reported to have worked with small groups of farmers in selected areas as whole-farm demonstrators during 1908-1910. These farmers were assisted in replanning their farms for higher production and income and in establishing various kinds of result demonstrations. Farm cooperators were also assisted in maintaining and analyzing records to evaluate progress. These demonstration case study farms and the records they provided over the years formed the basis for future development of farm management programs (Hagan, 1980). Don Ibach realized in the years that followed, the need for some systematic procedure for planning and evaluating alternative farming systems, while setting up demonstration farms and in conducting farm planning schools with small groups of farmers. Further, the need for additional subject matter information for developing enterprise budgets too was also recognized.

Albert Hagan, who succeeded Ibach, was convinced that some kind of coordinated approach was needed to help farm families apply "good
practices" in a productive and profitable way rather than working on a piece meal basis. In the years to come substantial progress was made by many farm families in increasing physical production, and net farm income is reported to have more than tripled in some cases in merely a few years. Following this, several detailed efforts were made to spread the information about the achievement of these farm families by means of visual aids of "before" and "after" situations and charts showing trends in output, costs and returns over a period of years. Here the main focus was to stress the pyramiding effect on productivity, income and improved family living that could be realized by combining the various appropriate improved practices or technologies recommended by the specialists into well organized systems of farming based upon carefully prepared plans (Hagan, 1980).

Accomplishments by demonstration farm families provided the enthusiasm and the potential for a state-wide program to be perceived. To implement a greatly expanded farm management-extension program, a non-project oriented name was considered to be essential. After several possibilities were taken up, the term "Balanced Farming" was decided to be most descriptive. During the next three decades the slogan "Balanced Farming for Better Living" was the widely publicized theme of the statewide program (Hagan, 1980). However, for the numerous farm families who participated in it and for those professional and business personnel who assisted, it was definitely more than a mere slogan, but the pathway to improvement of their land and other resources, higher family income and living standards and revitalized communities in which they lived.
Extension workers in administering this type of program took special interest in getting members of the farm family to plan jointly their production, borrowing, saving, investment and consumption patterns over a period of years. The objective was to balance the investment and consumption needs of a farm family against the earning power of the farm involved (Bradford and Johnson, 1953). Some claimed that BF was a system where soil fertility was in balance with the cropping system and the cropping system with the livestock system (Nesius, 1950). Thus it was quite obvious that a wide range of subject matter information was essential both in planning Balanced Farming systems and in developing and modifying them through succeeding years. Therefore, it was apparent at the outset that wholehearted vigorous cooperation among administrators and specialists from all subject matter areas was necessary. However, this cooperative effort was difficult to achieve in the beginning. This difficulty was overcome with many workshops, demonstrations, field days, training schools and personal efforts to accelerate the program.

When the records from many cooperating families began to show spectacular improvement in farm earning and family living, the cumulative effects of the application of many sound practices to a well organized farming system far exceeded expectations. Balanced Farming units truly became "show windows" for the recommendations of the Colleges of Agriculture (Hagan, 1963). The above exposition of the development of a unique extension program in Missouri highlights
two opposing forces that prevailed in many Land Grant colleges, one that stressed for departmental autonomy and the other group which sought for cooperation and united efforts.

Although in many cases the administrative policy was then in favor of departmental autonomy and independence for a long period of time, sporadic attempts at cooperative activity were quite successful and played a crucial role in laying the foundation for the Balanced Farming program. Some of these cooperative actions which ultimately shaped the creation of the cooperative agricultural extension services in many states are as follows (Hagan, 1963):

i) Farmers Institutes 1883-1933
ii) Agricultural Trains 1910-
iii) Farmers' Week 1910-
iv) Corn Shows 1903-

Farm and Home Development Programs

The Origin of the Kentucky Farm and Home Development Program

Looking at the origin of farm and home development, it is reported that in the earlier days the main thrust of the Soil Conservation Service (SCS) was a farm plan for individual farmers (Nesius, personal communication, 1980). The extension service in some states took this as an effort of SCS to establish itself in what the extension service considered its own "turf." Thus farms were planned, soil conservation measures applied and in addition to the soil conservation service approach, farm business management
was added. One of the best examples of this was Missouri. Needing new approaches to the agricultural problem of recovery and readjustment following World War II, referred to earlier, FHD was born as a concept. Its roots were, however, in Balanced Farming developed in Missouri. Extension efforts aimed at synthesizing the production and consumption ends of farming was developed as the Balanced Farming program at the University of Missouri (Bradford and Johnson, 1953). At the University of Kentucky a corresponding program known as Farm and Home Development program was developed. The presumed weakness in Balanced Farming was that it was concerned more with the business of the farm than the home (Nesius, personal communication, 1980).

The major areas in which the extension was to accomplish significant improvements through the farm and home programs and planning in Kentucky was identified by Nesius (1950). They are as follows:

i) Teaching farm people how to plan by making them aware of the available alternatives to accomplish a given end.

ii) Increase the knowledge of farm people related to technology, about conveniences, skills and home relations. It was felt that adjustments to changes comes naturally when people have the knowledge of the situation.

iii) Speed the adoption of technology on farms as it was viewed to increase the efficiency in production and satisfaction of life.

iv) Make sure that farm families exploit all income-earning possibilities.

v) Help the farm people toward greater security.

vi) Develop among farm families what the home economists choose to call "gracious living."
National Farm and Home Development Programs

As noted earlier, FHD programs for the most part had their origins in Balanced Farming concept developed in Missouri, but it was focused on giving equal emphasis to the home aspects of farming as to the business side. The consensus of most writers who were familiar with the FHD approach was that it was more of a method or process than a separate distinct program like BF (Sargent, 1960). In 1953, several national farm groups are reported to have helped to sponsor legislation that increased federal aid to each state extension service. The farm organizations which helped to influence Congress to increase extension appropriations fully intended the money to be used for FHD purposes (P.L. 83, 83rd Congress, Federal Extension Appropriation Bill). Additional extension agents hired with these funds were charged with the specific responsibility of implementing and carrying out FHD work at the county level (Sargent, 1960). Since this development, it is reported that, considerable growth and change took place and FHD agents discovered and refined methods to accomplish the goals of the programs (discussed later).

While county agricultural and home extension agents had always helped farm families with their individual management problems, for the first time an attempt was made to move directly into integrated farm and home management extension on a national scale. Few persons on the state or county staff, however, are reported to have had extensive experience with and integration of farm and home approach (Sargent, 1960). Extension directors and subject matter specialists
were given the opportunity to understand the Balanced Farming approach, whereas the Home Demonstration leaders are said to have set out to adopt a program for the home, patterned after BF (Nesius, P.C., 1980). The agents placed in the FHD work, however, had to learn through experience and on-the-job training for the most part (Cleland and Wilkening, 1957). While having some prior experience probably helped every agent, they still had to learn the technique of a new extension method and at the same time "sell" themselves to the county people and enter into a rather intimate relationship with the cooperating families (Sargent, 1960).

The U.S. Farm Management-Extension programs recognized rather explicitly the need to match values against possibilities in planning the organization and operation of farm businesses. Helping farmers do what they want to do works well when they know what they want to do. The difficulty which arose so often in FHD work was that farmers had not developed and organized their value concepts (Johnson, 1960). Value concepts had to be developed and coordinated especially when small farmers did not have coherent, consistent, workable value systems. Helping a farmer develop and organize his value concepts is more than merely helping him maximize profits.

Research was needed to decide what procedures seem to be most successful and under what conditions a certain procedure should be used. While it was recognized that the evaluation of an extension method was a complex matter that could not be done in absolute terms, there were ways to measure progress toward the goals that were set.
To set priorities, however, on just what an extension worker should
do, required constant study and attention to the needs of extensions' clients, their goals and the behavioral changes to attain this goal.

A study by the Federal Extension Service reviewed FHD in ten states after a short period of their existence. The ten states covered were Colorado, Iowa, Kentucky, Maine, Mississippi, New Mexico, Oklahoma, Utah, West Virginia and Wisconsin and they represented varying degrees of intensity and different approaches to FHD (Federal Extension Service, USDA, 1958). Progress in these states was found to vary but in general there was considerable evidence of progress in several respects. Some important findings of this study were that (1) there was an increase in the number of FHD families worked with, (2) the farm families developed better understanding of problems and opportunities that confronted them and were learning to make better and more decisions, (3) progress was being made in getting the farm and home development concepts developed and understood, and (4) the agents intended to work with families intensively from 2-4 years in most cases.

This section considers the broad objectives of these programs for all the states in which they were found, describes the basic program strategies and responsibilities which, however, varied to some extent from state to state as noted earlier, and finally performs an overall analysis of program impacts and benefits. Due to the limitations imposed by the nature of documentation of extension type
materials and work and because of time and space constraints, it was not possible to describe and evaluate the programs that existed in all those states that carried out Farm and Home Development work. The programs carried out by the states of Kentucky, Wisconsin, Washington and Tennessee and the experimental township extension program that was developed in Michigan are reviewed. It is the belief of the writer that this would provide an adequate overview of FHD programs in their totality and what they had to offer to the farm families of the United States for their economic, social and cultural betterment during the post World War II period of rapid technologic and economic change.

_Economic Framework for the Farm and Home Development (FHD) Programs_

Farm and home planning as carried out then had to overcome some of the traditional assumptions implicit in recommendations to the farmers (Heady, 1956). These assumptions were:

1) Farmers had unlimited capital and no particular equity limitations.

2) A limitless planning horizon existed and one plan was better as long as it brought in greater income sometime in the future.

3) The economic unit of relevance was a firm with profit maximization as its only goal, and farmers were expected to do things which may not be consistent with the more ultimate ends of consumption and maximization of household satisfactions.

4) An owner-operator was usually assumed and recommendations on practices were made for this mode of operation without any differentiation for the possibility of other forms.
5) Quantities and co-efficients were implicitly assumed to be known with near certainty.

However, if farm and home planning were to be carried out to the levels possible and desirable, the above implicit assumptions needed to be relaxed further. Recognizing that each farm was represented by a unique combination of characteristics such as the capital controlled, equity position, psychological make up of farm families, managerial ability, monetary and non-monetary goals, both technological and economic recommendations had to be tailored through farm planning to fit the conditions of individual farms.

In addition to overcoming the limitations posed by the assumptions, Heady was of the opinion that more thought had to be given to the fundamental basic concepts that were possible to be incorporated into the farm and home planning techniques. The basic decision rule of FHD was the maximization of the expected utility for the farm family, and the family was able to use its resources to produce extra money income or non-market goods or services to the family. Heady, in fact, went on to define the limits of farm planning under the FHD program in his analysis (Heady, 1956).

Some other researchers who were to a great extent part of the FHD programs identified the possible alternative objectives of farm families who participated in the program. They also developed the concept of the production function of the farm family (Redman, 1951). The farm family objectives that were relevant in shaping the nature of participation and success in FHD programs were on the one hand the desire to seek material advancement and on the other hand, the desire
for security against risks and uncertainty and/or the desire for stability in methods as opposed to change. The nature of the production function of the farm family was considered to be influenced by the size and composition of the family, both physical and social factors, and the kind and amount of capital used as influenced by age and equity. The time preference patterns with respect to the desire for current as opposed to future consumption, the formulation of expectations based on conditions both internal and external to the firm-household complex, and the problems related to the formation of goals in view of conflicting desires within households, were all considered to influence the objectives of the farm families.

**Broad Program Objectives**

The ultimate objective was an enriched and more satisfying life for the farm families. It was felt that farmers could make a better living under the complex requirements of modern farming, if they could make their farm production units more efficient, and if management decisions were made on an overall analysis rather than on a piecemeal basis. Emphasis was on greater "rationality" in decisions involved in farm and home management and both the husband and wife in a farm family were considered to be involved in the principal decisions concerning both farm and home. Thus the individual families were to be the core of these programs. The cooperating farm families were to be taught to consider all aspects of family resources and goals, as well as farming enterprises, in making plans for the use of resources to meet family goals.
Basic Program Strategies or Responsibilities

Initially families enrolled were given assistance in inventorying and analyzing their resources and deciding upon their goals, planning to reach these goals and implementing them. They were guided to work toward a relationship between the farm and home expenditures in line with the needs, goals and values of the farm families. Each family was expected to perform its own planning and make its own decisions aided by new information, additional services and extra motivation and inspiration provided by the program.

Programs reflected the belief that the family was the decision-making unit and although the needs of the farm and home compete, both needs can be satisfied by proper integration of and joint consideration of farm production and home consumption. Although the program was generally available to all farm families, it was viewed to be more appealing to those families that faced certain specific problem situations such as those just getting started in farming, working out a retirement plan, farming tenants employed part-time off the farm, etc. However, the programs were developed to be flexible so as to assist farm families with many different on-the-farm and in-the-home situations, with the ability to adjust for the changing wants and needs of farm families following the technological change and advancements.

FHD programs were administered by the Extension Services as a long-term program and were integrated in the county extension programs. FHD was a program of guiding farm families through an orderly problem-
solving procedure. It was carried out by the county extension agents. Subject matter specialists were viewed to be of primary importance in adopting and integrating the subject matter into whole farm systems and assisting with various operational aspects of the program including additional training of extension agents and the local leaders.

The process of FHD was to have a rather definite beginning and ending as far as an individual family was concerned, and the approach was to be fairly intensive so as to have an impact on the family. A logical sequence of activities were to be followed with emphasis on the more complex, interrelated learning experiences when the family appeared ready for them. There was evidence in some states that practice adoption increased rapidly up to the end of the third year of participation and then increased very little in the fourth year. This suggested that three years of FHD participation was probably sufficient to set in motion the changes that were to occur, but even then it was recognized at that time that further research into the optimum length of participation could shed more light on it (Sargent, 1960). Whereas the FHD programs were more concerned with the organizational aspects on farms needed to make the adjustments to technological and other changes that occurred during that period, the IMS study shifted the emphasis to cover the operational issues as well and focused on information and other needs of farmers.

Some workers stressed the educational approach rather than a "service" or "sales" approach and advocated starting at the point of major interest to the family and then moving into a discussion of
interrelated problems (Dorner, 1954). The techniques used by the FHD agents were referred to as a "box of tools" by some and the areas of management where these tools and materials were helpful was described (Pulver and Young, 1959). The effectiveness of various methods in teaching adoption of many farm and home practices was evaluated by few others (Wilson and Gallup, 1955).

It was found that FHD work in some cases was oriented toward the solving of unrelated specific problems rather than toward the teaching of overall analysis, planning and decision-making principles. As a means to interest and involve families in other than immediate specific problems, it was felt that better tools and techniques were needed so that families could be motivated into learning how to solve their own problems after FHD help was terminated (Sargent, 1960). There was general agreement that continued research was needed to find the most effective and efficient teaching methods, that would instruct families in problem solving and decision making which was to form much of the work in the farm and home development process.

**Comprehensive Analysis of Program Impacts and Benefits**

The effects of the development and implementation of the FHD programs in the various states were investigated especially in relation to the following aspects, among many that were identified:

i) Identification of family goals (objectives) and their attainment.

ii) Changes in attitudes towards farm life and the extension service.
iii) Changes in farm and home practices adopted by participating farm families.

iv) Level of knowledge about specific farm and home practices, even if not adopted.

v) Patterns of farm decision making in relation to responsibility bearing, etc.

vi) Conceptions of FHD approach by extension personnel and professionals and the relative emphasis placed.

vii) Impact on net income from farming, net worth, general economic progress and cost-benefit comparisons as permitted by the available information.

Due to the lack of investigation in the past into all these aspects of performance or effects in all the states under consideration, and also because of difficulties in obtaining the necessary extension materials related to even the work done, the analysis of program impacts is unavoidably incomplete in the case of each single state program covered in this chapter.

1. The Kentucky Program

Although personal contacts with county and home agents, letters from extension agents and advisory committee were reported by farm families to be the main sources of initial awareness of FHD programs in the State of Kentucky, altogether 14 different methods of learning were reported to be cited (Ramsey, 1951). It was found that there already existed the desire to change among farm families of Kentucky when FHD program was first introduced. There were also other contributing factors such as the birth, maturity or the departure of children from home, along with the initial availability of basic farm and
household utilities and services that became accessible around the same time. Therefore, in many cases the availability, incentive information and encouragement occurred simultaneously with respect to several new practices on the farm and in the home.

Farm and Home Practices Influenced by the Program

The major changes in farm practices were in relation to fencing, field arrangements, cropping plans and a shift from crops to an expansion of livestock operations. In relation to the practices in the home, the important changes were with respect to the quantity and variety of domestic food supply, remodelling of homes and furnishings, clothing practices and last but not least, increases in property insurance.

The Agents of Change Under Program Activities

The county extension agents and the personnel from the state extension office were found to be the major advisors instrumental in the changes of farm practices but the wife, neighbors and relatives too were indicated to a lesser degree. In relation to the home practices, apart from the aforementioned extension officials, neighbors, husband and other family members were attributed to be responsible for the changes. Overall the FHD program was credited for one half to three fourths of the changes made by farm families both on the farm and in the home. But some families indicated the main benefit of the program to have been in teaching the way to make changes that were already felt needed (Ramsey, 1951).
The teaching of the planning process was also an objective of the FHD. Husbands and wives were reported to have jointly considered the details of the farm plan and the home plan, where older children assisted in the preparation of farm maps, calculation of labor and feed requirements, paperwork, etc. in many cases. Family conferences were indicated to have been used by almost all farm families on all farm and home problems, although some were very informal. The appreciation for the work of the other family members was identified as a secondary benefit of FHD programs which contributed to the better understanding of each other's problems.

Some Measures of Success of the Program

A large proportion of the farm families viewed the FHD to have had a favorable influence on their attitudes toward farming as a way of life and as an occupation or business. Improved practices were used commonly as demonstrations to other farm people in the county and one important measure of success of any program or activity was the extent to which the members tried to get others to participate. Old members of the FHD in Kentucky were quite active in recommending or inviting others to join the program. Without the encouragement and conviction of participating families, the prospective new members were likely to have avoided the FHD program.

The member families were reported to have assisted in securing new members and initiated action in community activities and in teaching new practices to neighboring farm families. Practices taught to
the neighbors included soil testing, fertilizing programs, treating pastures, freezing foods, labor saving measures, pastuerization of milk, etc.

Main Benefits of the Program as Conceived by Farm Families

Although satisfaction was expressed by a large portion of the cooperating farm families in general, some of them were more specific in their opinion and about the main benefits of the FHD program. The most frequently named parts of the program liked by the farm operators were good information, new ideas and practical guidance. The integration of farming and family living and the value of exchanging ideas with other farm operators at the meetings were also cited. On the other hand, most of the homemakers indicated the opportunity for men and women to work together to have been the main contribution of the program, and some reported contacts with other families, learning previously unnoticed things, etc. as some other aspects liked (Ramsey, 1951)

Changes in the Program Suggested by Participants

In relation to the various program activities, satisfaction was expressed with the preliminary and planning level meetings as to their scope and nature, whereas the follow-up part of the program was felt to have needed some strengthening. Important suggestions regarding the preliminary meetings included preference for nighttime and shorter meetings with less information and more inspiration. For
the planning meetings changes suggested included less paperwork, preference for meetings in the home and more individual assistance. There was, however, differences in opinion as regards the size of the groups, some preferring a smaller one whereas others indicated preference for a larger group.

Farm Families' View of Workability of Programs

As regards the relevance of the program for all kinds of people, farm situations, etc., half the families were of the opinion that all farm families in their county would get some benefit, whereas a third felt that tenant farmers would get only a limited help. However, several indicated that some families lacked interest in improving their farm and home situations due to the lack of formal education and/or finances, old age of farmers, too frequent moving and the difficulty in making changes on "established" farms.

The Conception of FHD Among Extension Agents

All the agents who were involved in the program responded favorably in comparison to the regular extension work and none were indifferent or showed dislike to any part of the program. About half of them were reported to have liked the program, since they viewed the family approach to have been its strong point. Other strong features identified were the development of leadership qualities among participating farm families and the teaching of the planning process (Ramsey, 1951).
On the other hand, many felt that there was too little time to do a good job. But overall, there was general agreement that the cooperating farm families had been helped a great deal by the program, although a few felt it was too soon to estimate the value of FHD programs. The extension agents indicated the clearer picture of the whole farm and home situation provided by the program, up-to-date information and recommendations made available and the increased appreciation of the total extension program to have been the main personal gains of being involved in the FHD program in Kentucky.

2. The Tennessee Program

Here, the impetus for FHD came from the general farm organizations and commodity groups. These organizations requested the extension service to do the educational job, but the available agents were already involved in programs of work of such magnitude that they did not have much time to devote to the new method of extension teaching. Thus an increase in funding was requested, to have additional agents, and the Congress provided the first such increase in 1954, with additional increments to be forthcoming later on. This new extension approach was considered to be an intensive one in the sense that greater amount of time was spent with each individual family.

The conceptions about Farm and Home Development in Tennessee can be viewed by looking at what the extension personnel and other professionals understood FHD approach to be and how much emphasis was placed on this new approach. It was also necessary to give some
attention to the general attitude toward the FHD approach, the training needs of agents using it and the importance of various subroles for those devoting most of their time to this new approach (Cleland, 1958).

Some of the important goals of the FHD program perceived by the extension personnel and others in Tennessee were as follows:

i) Getting families to make their goals (objectives) more specific, preferably in writing,

ii) Getting farm operators to adopt recommended practices applicable to their operations.

iii) Teaching families how to plan, by assisting in obtaining and organizing the necessary information so as to evaluate the various alternatives.

iv) Teaching farm management principles to farm operators and home management principles to homemakers.

v) Interpreting public policies or programs as they affect a given family's operation.

vi) Getting farm families to keep records.

As viewed by the county extension agents, greater emphasis was needed to get farm families to keep records and teach home management principles whereas less importance was placed upon trying to teach families how to plan. On the other hand, the state and district level staff viewed training of families to plan to be more important than merely getting them to maintain farm records.

However, overall a favorable or very favorable response was given in relation to the FHD as a method for achieving extension service objectives. Nevertheless, the major obstacle to placing more emphasis on the "intensive" approach in county programs was seen in
relation to the expectations of Extension's current clientele and the agent's own definition of his role. Farmer's indifference to this type of program and the shortage of trained personnel were cited as impediments to progress.

With respect to the background characteristics of extension personnel taken to be relevant, experience in working with people, training in farm management methods, recruitment methods (getting farm families involved in FHD), social sciences (including sociology and economics), and technical agriculture were considered to be the most important areas in the order listed.

As regards the importance of various subroles employed in FHD approach, the opinion of agents spending most of their time to it was that, the counseling (listening to problems and advising on alternative solutions), resource person (supplying requested information regarding practices, credit, etc.) and teaching (getting across principles of management or conservation) roles were significant (Cleland, 1958).

It was apparent that despite the fact that attitudes toward FHD approach were overwhelmingly favorable, this was primarily in terms of the approach as the various extension personnel and others understood it. Therefore, the accomplishments or lack of it could be in relation to something other than the FHD approach conceived by the administrators, supervisors and specialists. Without a similarity in conceptions among the personnel responsible for implementation and the administrators of the approach, the differences between the "new" and the old approach can become vague for those
supposed to use the new "intensive" approach thus hindering the progress over a period of time.

3. The Washington Program

Farm and home planning was viewed as a method of doing agricultural extension work. Congress provided the funds for FHP, and these funds were allocated to employ additional county agents. All county agents were expected to become proficient with the farm and home unit approach and were encouraged by the state extension administration to use these methods in their work with the farm families. In Washington, which had about 28,163 commercial farms in 1959, only about 1.5 percent of the potentially eligible families participated in the farm and home unit approach.

The participants, as may have been expected, made more contacts with extension agents than before they entered Farm and Home Planning (FHP). But, although the control group families did not participate in FHP, many of them in Washington did have considerable contact with the Agricultural Extension Service. Subsequently, it was noted that there was no differential increase in level of knowledge about specific farm and home practices among the participant operators as well as homemakers. This implied that participation in FHD did not necessarily increase comprehension of the subject matter programs of the extension service. But in general, the participants had 2-3 years of more education, were 8-10 years younger and operated acreage of about 10 acres less than the others (Slocum and Brough, 1962).
An interesting observation was that the patterns of decision making in farming changed markedly among those farm families that cooperated in the program. FHD families moved toward the assumption of greater responsibility by the operators for final decisions and away from joint sharing of responsibility for decisions. Discussion between the spouses, however, was reported to have continued at a very high level, probably associated with greater economic progress by participants.

The FHP process as approached by the Washington Agricultural Extension Service involved the identification of family goals (objectives). Although the cooperating families had a great variety of goals, the largest number of families reported general family goals most consistently and also those related to farm practices and land use, livestock and buildings. Not all the goals listed were attained but substantial proportions of families who listed their goals did accomplish their objectives, either partially or fully.

Farm and home planning as a process was expected to make significant impact on the attitudes and values of participating families. The principal measure used for this purpose was the Straus Rural Attitudes Profile (SRAP) which was an indirect method of attempting to measure selected values in rural life. It was found that basic attitudes and values as measured by SRAP did not change as a result of FHD. But it did not necessarily follow that FHP did not have any impact at all on attitudes or values, because it is such an extremely
difficult aspect to measure. Changes probably were subtle and specific rather than gross and generalized (Slocum and Brough, 1962).

There was general agreement among extension personnel in Washington that FHP approach should be continued as a method of extension work and overall the participant farm operators indicated the program to have been worthwhile for them. At the state level few of the subject matter specialists were reported to have been deeply involved in FHP and there apparently was less support for the method among state level workers than among county agents. At the county level there was relatively more support for the method among the women agents than among the men, and the farm and home unit approach was found to be used intensively only by a minority.

The participants made significantly greater economic progress than the farm families of similar socioeconomic characteristics who did not participate. Greater increases in net worth, in net income from farming and in total family incomes were realized by the farm families that took part in FHD programs. Net farm income was considered a good relative measure of the short-run success of the farm business and represents a return to the farm families' inputs of management and for risk bearing (Slocum and Brough, 1962). Participants' level of family living nevertheless, was reported to have increased less than what might have been anticipated, which suggested a strong pattern of deferred consumption and more channeling of resources to capital formation in the early period.
There was an average increase in gross farm income of about $4,500 for the FHP farms (in 1959 dollars) as opposed to about $2,250 for the control farms for the four-year study period. This represented an average gross return of 42 cents for each additional dollar invested for the participators and 29 cents for the control group. Average net farm income increased by about $1,350 per farm for FHP people from 1955-59, in contrast to $500 among the control sample (non-participants with matched characteristics), during the same period. Thus, the rate of increase in net farm income in FHP was three times that of the control group.

The most frequent source of non-farm earnings for both groups, participators and others, was wages and salaries received by family members working off the farm. The wife's earnings accounted for 24 percent of total non-farm earnings for FHP participators in 1959, and for the control families it was about 29 percent. However, non-farm income for the family as a whole increased about the same for both groups. Substantial increases were also made in average net worth by FHP farms when compared with the control farmers, but the increases were less pronounced than in the case of net farm income.

4. The Wisconsin FHD Program

FHD became an important part of the Wisconsin Cooperative Extension Service starting at its beginning in 1954. This emphasis on farm and home management education created new opportunities to serve farm families as well as greater responsibilities for extension workers. FHD enjoyed a steady growth since the initial launching of
the program and with the hiring of the first FHD agents. The average number of regular cooperators enrolled per county was about 64 families and there was little consensus in agent attitude towards what constituted the "ideal" period of family cooperation or graduation from FHD work (Sargent, 1960).

Some Characteristics of Cooperating Farmers

The mean age of a random sample of cooperators in the program was 37 years and they averaged 12 years of farm operating experience. Over 50 percent of regular cooperators were classified as being in the middle one-third of the county average in relative farm income and 55 percent of FHD participants had "little" previous extension contact in Wisconsin counties with 33 percent reporting to have had no prior contact at all. The frequency and length of farm and home visits appeared to be a function of the stage of the FHD process. The length of time spent on the average farm visit diminished with the years of participation from eleven hours the first year to four in the fourth year, the exception being the third year.

The Different Extension Approaches Used

The use of the group approach in farm and home development work was small compared to the time spent in farm and home visits. The kinds of FHD group meetings used in many counties in Wisconsin were of two types. One was county wide and institutional type and the other small, group neighborhood type. With respect to the intensity of the approaches used, four approaches were identified to have been
used by agents. They were the very intensive, intensive, less intensive and non-intensive approaches based on the frequency of farm visits and the learning experiences. Over one-half of the cooperating families received a very intensive approach and the remainder split among the three less intensive approaches (Sargent, 1960). It was found that most intensive approaches were used with families that had 10-15 years of farm operating experience, in the middle one-third income level and that had extensive previous contact with the extension service.

Some Short-Term Impacts of FHD

Some questions raised following the existence of the Wisconsin FHD program for about five years were related to the overall impact of FHD on the nature and extent of farm family participation and the changes made by them as a result of it, and the efficiency of this method in producing changes in people as compared to the other methods. The effectiveness of various techniques used by extension agents needed to be clarified and measured in terms of behavioral changes. There was a variation in the intensity of approaches used in different states and within Wisconsin as noted before. It was not adequate to merely say that FHD embodied a more intensive approach than the other extension methods. The FHD process needed to be studied in itself to help define the elements that made up an effective process (Sargent, 1960).

The learning experiences were considered to have cumulated over time, with the first and third years being the most productive
of learning experiences. The number of farm and home practices adopted by FHD cooperators was closely associated with the intensity of the approach used and the years of participation. The intensive individual work with farm families gave greater depth and scope to the educational activities of the Wisconsin Cooperative Extension Service. It reflected a return to the older methods used by agents before extension work became highly organized and group oriented. An evaluation of the early developments of FHD indicated the areas in which a few improvements were possible to be made in the state (Sargent, 1960) and also pointed to certain aspects where additional research was felt required.

Research Activities Related to FHD

It was fortunate that research on FHD in Wisconsin was started at about the same time the concerted emphasis on the intensive approach began and continued since then as a series of comprehensive studies. One such study was used in determining the kind of FHD program that was viewed to be of value to farm families where the operators were under 45 years of age (Fliegel, Copp and Wilkening, 1956). Several characteristics of young farm families were identified and the extent and nature of extension contact was measured. Another study described how the work got underway and gave the first comprehensive picture of how FHD work was carried out in the early period. This study found that FHD was oriented in the direction of farm management due to the predominance of male agents (Cleland and Wilkening, 1957). The income
levels of the families that participated indicated that the approach was not generally interpreted as directed toward low income farm families.

All phases of farm management were reported to have been covered during the first year by most agents. Good records were stressed and a planning guide was found useful or necessary by most agents. Agents said they spent about 80 percent of their time on FHD work and indicated they worked with families rather than for them (Sargent, 1960). A third study investigated the short term results of participation in terms of number of factors. The relative changes were compared for practice adoption, income, decision-making technique, farm size, farm productivity, level of living and social participation. However, the changes were studied for a two-year period and thus the findings were regarded as tentative. In conclusion this study stated that participation in FHD resulted in a somewhat faster rate of adoption of improved farm practices with respect to livestock production, crop production, soil management and farm record keeping and use (Strauss, 1958). A farm practice adoption index combining 18 practices was estimated and it was found that the Adoption Index of participants increased by 6.5 percentage points for the four year period as opposed to only 0.4 percentage points for the matched controls.

Cost Effectiveness of FHD

The effectiveness of extension methods in relation to the cost of the method was also measured by researchers. It was estimated.
that farm and home visits rated well in efficiency. The cost of influencing the adoption of an improved practice through farm and home visits was reported to be about 10 percent less than the average of all methods (Wilson and Gallup, 1955). In reviewing the early FHD process, it was felt that there was a need for a closer look at exactly what kinds of learning experiences were being provided for farm families and the success of those experiences.

5. Experimental Township Extension Program of Michigan

In the beginning of the decade of the 1950s, there was widespread concern among agriculturalists in general and extension workers in particular, about the direction that agricultural extension work took in the U. S. Some of the major problems faced by the Extension Service were the large number of farmers per agricultural agent and the infrequency of agents' visits to farms. (This problem is currently experienced in a still more pronounced form in many LDCs.) These concerns, among other things, led to the increased appropriation of Federal funds for Farm and Home Development work in the states starting in 1954-55. In Michigan, however, in addition to increased emphasis on FHD, the Township Extension Experiment was established.

This program provided the opportunity for researchers to study the process of change in farmers on farms and in rural communities (Nielson, 1967). In the experiment, extension agents worked intensively with farm families in five township areas for about five years.
One major objective was to develop and test techniques of production for increasing agricultural output. The research indicated that farmers in the experimental areas adopted improved farm practices at a faster rate and stepped up their use of inputs more than farmers in matched control groups (Nielson, 1967).

Organizational Aspects of the Program

The work in the townships was directed by the Michigan Cooperative Extension Service, with the assistance of local farmers. The research was conducted by the Michigan Agricultural Experiment Station and much of the financing for both the extension operation and the associated research was provided by the Kellogg Foundation. This was supplemented from the state extension budget to finance the experiment.

An extension association was formed in each of the township areas at the beginning of the experiment, and the members elected the board of directors who played an active role in developing programs, arranging local financing and assisting the township agents in carrying out certain phases of the extension programs. In four of the experimental areas, the township program was available to all farm families in the area whereas in the Newton area, the program was available only to farmers who joined the extension association.

The Level of Intensity of the Program

The township experiment provided the opportunity to study the results of an educational program which was much more intense than
regular county extension programs in terms of farmer to agent ratio. The level of intensity, however, was comparable to that in FHD programs and other intensive extension programs in which extension administrators were interested.

There was consensus among the township agents that an optimum workload for intensive on-the-farm extension work would have to be somewhere around 100 farm families or perhaps slightly more. The extension administrators expressed belief that one agent for 500 farmers would be somewhere near optimum as far as extension accomplishments were concerned. The extent of the area to be covered to obtain 100 active cooperators without undue influencing, however, depended upon such factors as the concentration of farm people, their history of extension cooperation, and their enthusiasm for the program and agent (Nielson, 1967).

**Some Important Effects of the Program**

The relationship between knowledge of the program and participation indicated that there was a close association between farmers' knowledge of the township program activities and their participation in them. The strength of this relationship suggested the importance of a carefully designed plan for informing farm people about a new program. Overall there was evidence that the township program brought about improvement in the managerial ability of some farmers, where the improvement for the most part was brought about indirectly through the farm analysis and planning work. All of the township
agents established close personal relationships with a number of farmers in their townships and in some cases the frequent contact and close relationships between agent and farmer resulted in farmers learning how to become better managers.

On the other hand, some farmers were reported to have become increasingly dependent on the agents and hesitated to make even small decisions connected with their farm business without consulting the agents. In fact, a few farmers indicated that their power to take information and make decisions for themselves decreased as a result of the township program. The extent to which farmers became dependent on the agent was mainly attributable to the approaches used by the agents, although the personality and initiative of the farmer too appeared to be crucial. In any case, it was felt that the farm analysis and planning work conducted by the township agents would have had more lasting value, if the agents had gone through more of the analysis process with the farmers rather than doing much of it by themselves and made more conscious attempt to teach farmers how to analyze and plan for themselves. The approach of presenting the information and analyses without making strong individual recommendations to farmers was considered preferable.

The township experiment did not provide adequate information to determine the optimum level of intensity but did provide comparisons of two levels of intensity, namely the county and township. Intensive programs such as the township programs, FHDs and county level subject
matter specialists were costly and the knowledge of benefits to be derived from such extension efforts were required by the Congress, state legislatures, USDA personnel, university and extension administrators and by groups of farmers, who intended to hire additional agents.

Allocation of Funds for the Programs

The principles of production economics were generally applicable to the problems of resource allocation in extension, whether the problem was allocation among states or regions, among extension projects or program or among alternative approaches that could be used within programs (Nielson, 1967). The principles are applicable for either maximizing extension output from given resources or minimizing cost for obtaining a specified objective. Nevertheless, economic principles probably do not come into use as often as they might in trying to solve the resource allocation problems, partly because of the difficulty of assessing the output (benefits) of extension and partly because many extension administrators did not think in economic terms.

Limited Benefit-Cost Considerations in the Program

The benefit-cost analysis on the township program indicated that conservatively the benefits exceeded the costs by better than two to one. Precise comparisons of benefit-cost ratios of the intensive program with the county agricultural extension program were difficult because of problems of cost allocation and determining the
clientele reached by county extension agents. As compared to the township agents, county extension agents usually worked with larger numbers of farmers, but provided less help to each farmer. Thus a more extensive program, such as one agricultural agent per county, was almost definite to give more return per unit of input on the average than a more intensive program.

However, in relation to increases in net farm earnings due to the township program, it was the opinion of researchers that the point at which the last unit of input was just paid for by the additional benefit.

**Summary Remarks**

Although in this chapter it was mainly intended to historically review the past Farm Management Extension programs in the U. S., the important objective of doing so was to bring out some of the desirable features of these programs to the attention of the researchers in farm management and extension personnel involved currently in the intensive as well as "normal" extension education work. At the same time it is also necessary to identify and correct the shortcomings of some of the conceptual, organizational and operational aspects of these programs, so that they may not be repeated elsewhere.

The FHD and BF programs in the United States gave greater depth and scope to the educational activities of the Agricultural Extension Service and to the efforts of farm management research workers in the Land Grant system. This was possible due to the holistic focus of
these programs of considering the agricultural households as the centers of both production and consumption activities. The extension approach used by these programs was to be "intensive" to have an impact on the farm and have activities performed on family farms of varying nature.

However, as seen in this chapter, the level of intensity of the various FHD programs varied somewhat in the different states, and the degree or extent of direct participation by farm families too was different, although considered to have been generally low. The measures of the level of intensity of the extension activities, though not very strictly defined, have been described to some degree to provide an indication of their effects. Further, although direct participation in FHD activities was very meager in several states, the important indirect and secondary effects arising out of the initial contact over a long period of time cannot be overlooked.

Another observation was that, in some cases, the enthusiasm and drive of the extension personnel to succeed and produce significant results within the "short" periods that they were given with individual farm families, resulted in the approaches used by individual agents to be more intense than initially intended, and often made the farmers, in the farmers' view, more dependent on the extension agents for all their decisions of organizing and operating the farms. However, overall the extension strategy employed was to teach the farm families the important steps in planning their farm and home activities themselves rather than to do everything for them.
Apart from the levels of intensity of the programs, different approaches and strategies were employed by the extension personnel in their educational activities and some desirable background characteristics and important subroles of extension agents were identified to be quite effective and useful in FHD activities. The need for compatibility and consistency between the objectives of the extension administrators and the field extension agents related to FHD work was emphasized as it was noted that in some instances they were somewhat different in their emphasis.

A further observation was that the success of a program like FHD could be enhanced appreciably if the farmers were more aware in the beginning itself, of some of the important details of the programs and what they were intended to achieve. The ideal duration of the intensive contacts between the cooperating farm families and the FHD extension agents, to bring about the necessary organizational changes on the farms and in the homes, was reported to be about four years in some states.

Generally the evaluation, mostly the short term effects, of these programs was carried out only by the rural sociologist or sometimes along with an agricultural economist. This usually resulted in greater emphasis on looking at the changes in, attitudes towards farming, social participation, patterns of decision-making behavior and more importantly on the rates of adoption and use of various adoption indices. There was relative neglect of measures of cost-effectiveness
and benefit cost analysis which was seldom done was incomplete or not adequately explained when done. Moreover, the adoption rates, although provide some clue to the success of these programs, cannot be considered to be the appropriate measures of evaluation by themselves alone, because the effects of adoption on more tangible results on the farm and in the home will vary substantially depending on the intensity of practical use, relationship to the total package of practices, etc., among other things.

Although, the extension programs are known to be difficult to evaluate in definite economic terms due to the diffused nature of benefits over a period of time and the problems of assigning certain specific cost components, more attention to this aspect of evaluation is required. Further, the economic analysis has to take into account the long-term effects of the programs in addition to the short-term impacts, as these farm management-extension programs were administered to be long-term programs, even though work with individual farm families ranged about 3-5 years in most cases.

The Michigan Extension Township program, although very similar to the Farm and Home Development work both in Michigan and elsewhere, was distinct in that it focused attention on a different group of farm people, those in the townships as opposed to the rural areas. It was also a means of obtaining additional funds to carry out the "intensive" extension education program, which was more costly, in a much wider area covering more farm families.
Finally, it is very appropriate that this chapter be concluded with a discussion of the circumstances that led to the relative neglect and the ultimate demise of these obviously beneficial holistic Farm Management Extension programs. It has been pointed out in a later chapter that these efforts were terminated because the U. S. agriculture underwent dramatic changes in the size and scale of operation, use of improved technology and farm structure and that American farmers who became more knowledgeable, better informed and commercialized no longer required an intensive program of this nature because it was too costly to support. However, the initial conditions that led to the ultimate cessation of these programs appear to be that immediately following the reign of these farm and home programs in the 1950s, the concept of rural development was popularized and strongly advocated in the U. S. by the administrators of extension services at the national level both in the USDA and other Federal agencies involved in development work in the rural areas of the country. Thus, in the view of some observers, farm and home development in the U. S. will appear as another passing fad, which was of course not the case.

Another reason for these turn of events in the history of these programs is that the FHD and BF programs were primarily concerned with the planning of the overall system of farm organization and family living in the transitional years of adjusting the farm system and failed to shift to the operational aspects on farms in the subsequent period, the improvement of which became an important goal.
CHAPTER V

THE SCOPE, NATURE, METHODOLOGY AND ORIENTATION
OF FARMING SYSTEMS RESEARCH

The abundance of empirical evidence in third world nations that the needs of small farmers have not been adequately addressed by past agricultural development programs has led to the advocacy of research on small farmer development within a farming systems perspective (Norman, 1980; CGIAR/TAC, 1978). Although it is rather difficult to pinpoint the exact birthdate of FSR, it is largely a product of the late-1960s. Thus, increasing concern over the failure of traditional research to address adequately the needs of small farmers (Poleman and Freebairn, 1973) and the realization that agricultural research should be conceived and appraised in a context extending beyond the traditional disciplinary boundaries led to the development of the concept of FSR (Dillon, 1973). Further, the link between the small farmers and research organizations and other government agencies is weak in LDCs; typically public agricultural research programs have not been designed with the objective of addressing the problems of small farmers (Stavis, 1979). This has been attributed to the following reasons:

a) a greater interest in expanding food production than in equity

b) strong influence of the expressed needs of more affluent farmers

97
c) emphasis on research which leads to professional advancement among academics

d) use of technology developed in high income nations and often inappropriate to local needs (not entirely true in the case of commodity research centers).

Although usually this interaction and the communication link is facilitated by the extension workers, due to several bottlenecks that are very common in LDCs, this link is not effectively provided.

In the above context it is argued that FSR has the potential of providing small farmers with an avenue of communicating their needs both to the research workers and the funding agencies. The primary motivation of FSR is to increase the productivity of the farming system, in the context of the entire range of private and societal goals, given the constraints and potentials of the existing farming systems (Gilbert, Norman and Winch, 1980). The focus of FSR is on the possible and practical rather than on what would be ideal or perfect, thus implying a pragmatic orientation. Looking at better rather than best solutions is stressed based on the fact that often the optimum is ambiguous due to the diversity in underlying circumstances.

Meanwhile, some researchers in development programs have expressed the opinion that the whole farm and family approach to farming systems research is far too complex, and that many years probably will elapse before suitable theoretical models can be conceptualized and perfected for field use. This view has been disputed by Hagan (1980) on the basis that such ideas are erroneous and are in the minds of researchers
and not necessarily those of the small farmers. He points to the fact that every small farmer has a plan for his farming systems, though often not a good, well organized one, is accustomed to thinking of his farming and family activities as an operating unit, and usually cannot wait for perfection in every new technology to be applied.

In order to describe briefly the nature and potential of FSR, this chapter will first describe the FSR methodology and then look at some of the important issues related to FSR such as its holistic focus, multidisciplinary orientation, technology development and adaptation, locational specificity of practices promoted and the criteria for evaluation. It will also discuss the future potential of FSR in relation to the present status of the analytical tools available to researchers, needed directions of research, and also the applicability of the FSR approach to the U. S. small farm situations. The Appendix contains an overview of the methodologies employed and the general direction of FSR in the major International Agricultural Research Institutes (IARCs).

**Farming Systems Research (FSR) Methodology**

FSR is said to be a generic term used to refer to any type of research which views the farm in a holistic manner (CGIAR/TAC).* Farming systems research should be viewed as a philosophy and

*However, in practice "FSR" is not used in this broad sense.
methodology of agricultural research for the development of improved technologies appropriate to small farmer needs and circumstances (Rohrback, 1980). Explicit integration of the consideration of real farm circumstances and the dynamics of farmer decision making into the research process provides the basis for FSR methodology. FSR is an attempt to carry out scientific study on the farm level and to come up with new information which can help the farmer maximize his profits subject to:

(a) meeting family subsistence food requirements throughout the year

(b) other family objectives

(c) community and societal goals and

(d) the locational specificity of the farms and farmers.

Some distinguishing features of the FSR approach vis-a-vis traditional agricultural research are as follows (Gilbert, Norman and Winch, 1980):

(a) a comprehensive or holistic view of the farm, farmer and farm environment (although this presently does not include the home aspects)

(b) research priorities determined in relation to representative target group farming systems (recommendation domains)

(c) performance evaluated in terms of individual sub-systems and the farming system as a whole

(d) entire process of research carried out by multidisciplinary teams of social and biological scientists.

Given the early stage of development of FSR methodology, it is too early to attempt to evaluate it in its entirety. Also the nearly 20 FSR programs in the third world at present differ substantially in
their methodologies. These differences are, however, justifiable
given the diversity in historic objectives of these programs, scope
of their responsibilities and the variability in the environmental,
social and political climate in which they operate. It is appropriate,
however, to outline briefly some of the important steps related to
FSR methodology as they are practiced in LDCs:

1) Choice of the target area and farmers--identification of
the target area characteristics provides the basis for
refining the recommendation domains.

2) Investigation of farmer objectives--small farmers are
viewed as having developed their existing farming systems
through generations of experience; an understanding of the
interrelationships of small farm enterprises and decision-
making behavior is necessary to determine if and how a
farmer can be assisted.

3) The nature of data collection--in addition to determining
the proper amount of information required, the appropriate
methods of data collection also have to be identified.
Some survey methods used are rapid informal surveys,
questionnaires, participant observation techniques and in-
depth case studies.

4) Value and extent of ex-ante screening of new technologies--
the benefit of extensive reliance on ex-ante screening has
been questioned, as the iterative FSR development process
ensures the continued re-evaluation of test designs and
farm production technology.

5) On-farm testing and studies--some of the testing methods
used in this context are (a) researcher managed and
(b) farmer managed on-farm tests, and (c) verification
trials etc. The degree of farmer participation in the
research process and the basis of selecting participating
farmers whether in relation to representativeness or
innovativeness are important issues.

6) Evaluation of research results--the nature of the criteria
and the procedure of evaluation to be determined. They
can be based on farmer's adoption rate, long-term con-
sequences of adopted technologies, etc.
7) Dissemination of research findings—not developed adequately to date.

8) The need for a dynamic and iterative process.

**Extent of the Holistic Nature of Farming Systems Research Approach**

FSR is considered to be more horizontal in nature than the traditional research which tends to be vertical. While reductionism practiced in most traditional research aims at precision and detail, holism tends to emphasize less precise measurements and observations which, if considered within a framework of attempting to understand the workings of the system will be very valuable and useful (CGIAR/TAC, 1978). However, FSR in its several activity areas focused on subsystems can involve both reductionism and holism as found in many IARCs. FSR has to evaluate the contribution of all the component subsystems to the whole system in order to design improved technologies. However, most FSR programs usually concentrate only on one or another of these subsystems. Moreover, while the research may be designed to develop a particular type of technology, it is based upon a holistic understanding of the farm system itself (Rohrbach, 1980). The efficiency of FSR in developing and adapting improved technologies depends to some extent on recognizing the relationships between proposed technologies and the functioning of the farming system as a whole.

FSR requires an approach which is comprehensive, incorporating the main activities of the farm household, but yet simple enough
to provide clear answers to the research questions of interest (Crawford, 1981). FSR does not require exhaustive enumeration of system activities, but involves instead a focus on the essential ones which should include household activities. The holistic perspective of FSR may therefore imply an increase in the types of farm household activities included in the analysis. Moreover, the status and the important role of women in the household and family is emphasized by many researchers in both theoretical and empirical analyses. The activities and time of women is increasingly recognized as a fundamental input into many household activities and contribute a substantial share of the utility yielding resources available to the household (DeTray, 1977).

The degree of comprehensiveness of FSR in practice is determined or limited by the state of development of FSR methodology, resource availability and the limitations of agricultural development planning in the Third World (Gilbert, Norman and Winch, 1980). As most agricultural scientists are trained more in reductionist than holistic thinking it may be difficult to acquire staff to work creatively in a holistic systems analysis and design program (CGIAR/TAC).

**Multidisciplinary Orientation of FSR**

Most early farming systems work was done by agricultural economists who specialized in farm management. Two approaches, case studies and sample surveys were used by them. FSR involves the use of multidisciplinary teams of researchers who can examine the
problems of the farming system. The necessity of recognizing and focusing on the interaction of the technical and human elements and fully appreciating the multiple use of resources requires a multidisciplinary team working in an interdisciplinary manner. Here multidisciplinary suggests involving several disciplines while interdisciplinary connotates the disciplines working together, rather than independently, in solving a specific problem (Gilbert, Norman and Winch, 1980).

In fact FSR activities require close links with strong commodity and disciplinary agricultural research programs. It is believed that the results of FSR will enrich commodity and disciplinary research programs. But FSR however, has to be seen as complementary to rather than a replacement for specialized disciplinary research of a "reductionist" nature (CGIAR/TAC, 1978). FSR has its institutional roots in the agricultural research institutes and thus has a bias toward bio-technical modifications in farming systems, although there is presently greater awareness of the importance of changes in non-technical factors, including those occurring within the farm household.

The establishment of a cooperative working relationship between social and biological scientists, especially when social scientists are newly being integrated into an agricultural research institution, is difficult and complex. Some of the problems of multidisciplinarity in FSR are related to determining the proper mix between the number
and quality of social and biological scientists, facilitating communication between and among them, developing a better understanding of each other's philosophy, terminology and disciplinary perspective and also the concern over the furtherance of the discipline and desire for professional advancement (Barker, 1980). Problems of multidisciplinary communication are said to be prevalent among scientists from the developing as well as the developed world.

FSR in the Context of the Mainstream of Agricultural Research in LDCs

Many national FSR programs are commonly associated with existing agricultural research institutions. But several FSR-type activities in national systems are undertaken as special projects funded by donor agencies which are often not well integrated into the core activities of national agricultural research institutions. Prospects for successfully introducing FSR programs at the national level are influenced by a complex of intra- and inter-institutional relationships involving national research institutions and universities, implementing agencies such as ministries, planning departments and funding agencies.

In relation to the responsibilities of national agricultural research institutions, "upstream" programs primarily aim to develop prototype solutions for major regional constraints whereas "downstream" programs seek to develop and adapt agricultural technologies to improve specific target group production and overcome system constraints. But the distinction between upstream and downstream FSR is not absolutely clear. In practice, most FSR programs can best be viewed
as lying somewhere on a continuum (Rohrbach, 1980) between the up-
stream and downstream ideals. The distinction, however, remains
important in the determination of the type of program a developing
country should implement.

The decision on the type of program to implement at a national
research center must depend on the actual character of national
goals and resources. These will include the nature of available
research personnel, the degree of commitment in FSR, the size and
character of the technology base available for on-farm research
and the types of constraints to be overcome. Most FSR practitioners,
however, believe that in the initial stages of establishment, the
downstream approach is probably most viable.

Improving Agricultural Technology
for Small Farmers

Formulation of technologies that can be widely used by farmers
has been one of the basic purposes of FSR. Effective research on
agricultural technology starts and ends with the farmer. Integra-
tion of the perceptions of biological and social scientists is an
essential element in such research. Many natural, biological, social
and economic elements impinge upon farmers' behavior and on their
response to new technology. Farmers reach decisions on their farm-
ing activities by lending these elements, hence research aimed at
developing technology must incorporate these elements or else be
irrelevant to the farmers.
A question often posed is why farmers in LDCs do not adopt the recommended packages in their entirety. This probably occurs because the technologies are not suitable for the resource base, climate, input and product markets in which farmers operate. In general, farmers seek technologies that increase their incomes while keeping risks within reasonable bounds.

The key to increased benefits in agricultural development efforts is identifying and designing appropriate technology through problem-oriented research. The contribution of an economist in this situation is based on the fact that economics plays a dominant role in farmers' decisions whether they are oriented towards family security or profit. The economist has to describe the circumstances in which the farmer operates, evaluate how these influence his production decisions and how they will determine the acceptability of the new technologies. In addition to assisting in the development of relevant improved technologies, the economist is involved in formulating the policies and delivery systems required by the new technology.

An integrated research program to develop technology for farmers should include off-farm research, experiment station research and policy analysis. Through on-farm research, technologies can be formulated and evaluated under farmers' conditions. On-farm research is an important means of increasing communication between researchers and farmers. On-farm research is essentially dynamic as information is gathered about farmer circumstances, about performance of various technologies, and about farmers' experience with them.
Bringing About Institutional Changes and Developing Human Capital in LDCs

Although there was some reference before to the institutional requirements of FSR, in the section dealing with FSR and the mainstream of agricultural research in LDCs, this area has not received the attention it warrants. The relevant changes in emphasis and organization needed both at the national and international agricultural research institutes and other appropriate support systems needs to be studied. Further, the extension strategies and other methods to be adopted to bring about the human changes and to develop the human capital in LDCs, required to make FSR an effective small farm research program, have to be investigated and resolved.

Complementing Prevailing Traditional Practices and Research Methods

FSR recognizes that the potential benefactor, i.e., the farmer, should be an integral part of the research process. This concept explicitly recognizes the value of the farmers' experience and their traditional experimentation (Johnson, 1972) as inputs into developing strategies for improving the productivity of existing farming systems. Traditional systems are, however, no longer likely to be optimal from either the farmer's or a societal view (CGIAR/TAC). Many changes envisioned in FSR involve small adjustments rather than complete changes in the farming system. Furthermore, even greater reality is encouraged in the research process through maximizing research under actual farm conditions. When testing improved
technology, as noted before, the managerial input is first provided by the research worker and then at a later stage by the farmer himself. In such activities the link with the extension workers is considered to be vital (Navarro, 1977), since his knowledge about the local situation at the farm level and future responsibilities in disseminating the results of FSR are crucial.

The results of the FSR approach in a specific area may be applicable with some modification to other areas with similar environments. Further the "upstream" variant of FSR can be used to develop prototype solutions in the form of packages of practices that are appropriate for a broad range of farming systems across one or more geographic regions. Such prototype solutions become part of the knowledge base used in applying the FSR approach to a local situation (Gilbert, Norman and Winch, 1980).

The Extent of Locational Specificity of Farming Systems Research

The FSR approach basically involves classifying farmers into homogenous subgroups and developing strategies appropriate to each. Disaggregation should be done first according to ecological systems; if further division is desired, subgrouping should be done based on differences in the human element (Gilbert, Norman and Winch, 1980). Downstream research results are specifically geared to the needs of particular target groups of farmers. The limited number of farmers reached entails two problems.
First, as the research process becomes more location specific, costs rise since the on-farm testing component of the FSR process is the most expensive part of the entire process. Secondly, the value of the location specific improvements must outweigh the opportunity costs of not reaching a greater number of other small farmers (Rohrbach, 1980). It is, however, important to note that FSR does not seek optimal solutions to each farmers' location specific problems but aims instead to develop technologies which promote sizeable improvements in productivity for large groups of farmers. Further, it has been argued that the true value of FSR should be judged by comparing its ability to generate appropriate technologies, institutions and human capital with that of the traditional research approach.

The Dynamic and Iterative Nature of FSR

The dynamic and iterative nature of FSR process is an extremely important characteristic. The developmental nature of FSR calls upon the researchers to constantly re-evaluate their basic knowledge about the farmer and the farming system. The adoption of improved technologies creates farming systems with new characteristics and often new constraints. An ongoing FSR program will involve a continual progression from testing and the evaluation of test results back to the redesign of on-farm trials and the testing process again (Rohrbach, 1980).

Moreover, the effective operation of feedback loops and a continuous process of learning are of great importance for FSR productivity.
In effect the research process is viewed as dynamic and iterative due to the backward linkages with farmers, research workers and funding agencies as opposed to the existence of forward linkages alone (Gilbert, et al., 1980).

The Criteria for Evaluating Improved Farming Systems

The evaluation of improved farming systems involves the determination of the criteria and procedures to be used. It is argued that improved systems should be evaluated both from the individual family's standpoint and that of the society as a whole. FSR practitioners generally agree that the most simple, but best measure of the value and appropriateness of improved technologies to the farming systems into which they are integrated is to ascertain whether they are adopted by farming households (Gilbert, Norman and Winch, 1980). Here the desirability is essentially assessed in an ex-post sense by means of various indices of adoption or acceptance. The necessary conditions for adoption are technical feasibility, societal acceptability and compatibility with external institutions or support systems, which eventually determine the profitability of practices adopted.

However, it has been pointed out that the above measures stressing the adoption rate could be offset by the lack of an effective dissemination process (Rohrbach, 1980). Thus it can be hard to differentiate the effects of an inefficient extension service on the rate of dissemination of knowledge about the new system, and the rate of diffusion
of the technology, from that arising from the nature of the technology itself. Further, the degree of dependability of returns and minimal risk of a new innovation should also be an important evaluation criterion (Norman and Palmer-Jones, 1977) due to the relatively low levels of living and the desire for self-sufficiency in food among most small farmers of LDCs. Taking into account the long-term consequences of adopted technologies has also been stressed, in addition to the desire and need for generating rapid, significant farm system developments (Rohrbach, 1980). Here the long-term effects on environmental quality, market conditions and price levels, socio-cultural traditions and national development goals have been considered to be significant.

The above argument implies that attention to the acceptability of new innovations from a societal point of view could be inconsistent with short run private returns to individual farming families. It is suggested that as far as possible divergence between private and public interests should be avoided. However, because most FSR programs are concentrated on individual farming families, it seems difficult to operationally or even conceptually link the societal and individual viewpoints in a sole evaluation criteria (Michie, P. C.). Societal evaluations at present appear to be based on separate aggregate measures and often tend to be ex-post (Gilbert, Norman and Winch, 1980).
The Potential of FSR for Both Developed and Less Developed Country Small Farmer Needs

So far FSR generally has not adequately taken into account such crucial factors such as the marketing system, rural small scale industry, the cropping and livestock sector interactions, extension, and the link between the national policies and local constraints that limit the more effective participation of small farmers in the developmental process (Gilbert, Norman and Winch, 1980). Moreover, on the theoretical side FSR has not given sufficient attention to the firm-household relationships in small farm production and consumption activities and the managerial or decision-making processes of small farmers in LDCs. These shortcomings and omissions arise partly due to the relative newness and lack of adequate experience with FSR in many regions of the third world, especially in the national research network.

It is felt that a strong case can be made for incorporating FSR in both the design of rural development efforts and in determining research priorities in commodity and disciplinary programs. FSR can complement and strengthen commodity disciplinary research programs by increasing their relevance and effectiveness. Moreover, in FSR the multidisciplinary teams of researchers facilitate interaction of technical and socioeconomic viewpoints and also attempt to complement, rather than dominate, the wisdom and experience of farmers and extension workers. Therefore, it is the general view that because FSR is relatively young it will more likely undergo considerable refinement in
the years ahead (Gilbert, et al., 1980). Here, U. S. history related to the development of holistic farm management research and extension programs is suggestiona due to similar patterns of development observed already in the LDCs.

Some major concerns expressed about FSR are related to the possibility of incompatibility between private and societal interests, noted earlier, the likelihood that "downstream" FSR, being evolutionary in nature, may not generate the spectacular changes achieved with developments such as the Green Revolution, and most importantly that FSR may not be given adequate time and opportunity to perform and prove itself due to the high expectations. Further, the cost-effectiveness of FSR also will not be resolved until more information has been generated on its costs and benefits in different ecological zones (Gilbert, et al., 1980). FSR is likely to be judged less by the "correctness" of its methodology than by its contribution to rural and agricultural development. It is the view of the practitioners of FSR that it can make a modest but significant contribution to improve the lives of small farmers in the Third World, although the exact nature of direction of FSR in the future is not quite clear.

In the discussion of the advantages and disadvantages of the present FSR programs, it is felt that closer consideration should be given to the ability of current analytical tools to meet the challenges posed by FSR approach (Crawford, 1981). FSR demands an approach which is comprehensive yet simple enough to enable achievement of definite and clear answers. FSR promotes a move in the direction of general
(though there is a long way to go yet), rather than partial, analysis but constraints related to theoretical and empirical tools of analysis limit the achievements of this objective. Matching methodologies closely with the objectives of FSR, conducting research on farming system components within the appropriate disciplines and the judicious use of flexible models of the systems simulation type to incorporate a wider range of relevant features, are considered to be crucial.

The Potential of FSR in the U. S.

There is a growing interest in and recognition of the usefulness of a FSR type of approach to address the specific needs of small farmers in the U. S. A reaffirmed commitment to the value of small farm way of life and a new concern over the effective use of small farm resources has led to this present focus. Moreover, the effectiveness of the national extension service to assist small farmers, and the relevance of agricultural research efforts to small farmer needs has been seriously questioned in recent years. Although most agricultural technologies developed in the U. S. are classified as scale neutral, the appropriateness of these technologies to small farmer circumstances is in doubt. The observed low rates of adoption on small farms is partly attributed to the multiple goal orientation of many small farmers and the inappropriateness of these supposedly scale neutral technologies to many limited resource farmer circumstances and needs (Rohrbach, 1980).
There is also evidence to suggest that small farmers in the U. S. have many unmet technology needs specifically related to the size of their enterprises*. In this respect the suitability of an FSR type approach has been considered, since the agricultural research institutions have apparently failed to serve small farmers adequately. It is the opinion of many that, while the specific methodology developed for dealing with LDC needs and circumstances may not be strictly applicable, some similar type of on-farm systems research method may be useful. However, it is pointed out that small farmers in different regions of the U. S. have different goals and needs due to their differing circumstances. In the final analysis, it is felt that FSR represents a potentially valuable option for the improvement of research and extension on domestic small farms.

Remarks

Farming systems research has developed as a research (and also an extension) concept in LDCs, following the recognition that limited resource farmer problems and technological needs were not resolved adequately by the traditional research and extension systems and after the realization that agricultural research efforts under small farmer circumstances are more effective when they extend beyond disciplinary boundaries and also look at the farm household activities in a more comprehensive or holistic manner.

*Even if these needs are satisfied, these farms would be too small to keep up with the technological developments, except when farming on a part-time basis.
However, in implementing such a program the FSR practitioners are faced with many obstacles, which have to be overcome by consideration of various possible alternatives and also by making use of the past experiences in conducting such multidisciplinary, holistic and on-farm, farm management research and extension programs. It seems that these problems are related to the lack of development of analytical tools and methodology on the one hand, and the difficulties in integrating together the knowledge and personnel belonging to the various disciplines on the other. The problems of communication between and among the social and biological scientists have been pointed out, along with the current limitations for professional advancement in a FSR type program.

Further, the neglect of farm household activities in FSR methodology that is claimed to be holistic, is probably the result of bio-technical orientation of the International Commodity Research Institutes around which FSR has developed. Thus, FSR as presently conducted is more a production systems research activity with emphasis on various subsystems on and off the farm, rather than a program which is essentially firm-household oriented.

In addition, the managerial processes and the decision-making theory related to the small farmers of LDCs too is not developed enough to handle the organizational and operational issues on limited resource farms. Risks in small farm agriculture influencing the decision analysis also has to be researched, as small farmers cannot be classified into the extreme cases of risk averters or risk preferers, as they are both, according to the situation.
Finally, the institutional and organizational changes needed to make FSR approach operationalized and the appropriate methods of human capital development that are so critical for its success have to be studied more systematically for each national agricultural research establishment.
CHAPTER VI

IMPORTANT PARALLELS BETWEEN FARMING SYSTEMS RESEARCH AND U. S. FARM MANAGEMENT RESEARCH AND EXTENSION PROGRAMS

Following a detailed description of the farm and home development programs and balanced farming programs in the U. S., and a brief outline of the emphasis of FSR, this chapter examines the similarity between these two developments in agriculture, which are separated by time (2-3 decades) and space (West and Eastern nations). This chapter first discusses the major parallels in the development of FSR and farm management and extension programs with respect to their origin, theoretical basis, methodological features, philosophic orientation, conceptual framework, institutional and organization aspects and the issues related to their evaluation. Subsequently, FSR is compared with farm management research in relation to their theoretical and conceptual evolution.

Origin

It was stated before that the balanced farming program originated in the State of Missouri in the 1940s, which at that time had many farm families with limited resources relative to farm and family needs. Both the balanced farming program and FSR address the felt needs of limited resource farmers. Both approaches consider the
farm in a holistic manner. Another important aspect to be considered is that the U.S. intensive programs were regarded as necessary to offset the lack of coverage and depth of the services then provided through the "regular" extension work. Similar problems are currently experienced in many LDCs where the level of extension contact with the farmers is too low to bring about the desirable changes in farming.

**Theoretical Basis**

The basic orientation of both the farm and home development and balanced farming programs is in the field of farm management and especially in farm planning. It was pointed out in a previous chapter that the theoretical concepts of both BF and FHD were derived essentially from farm management research efforts in the early part of the century and static production economics at mid-century, which is true in the case of FSR too. There is also evidence that viewing farm management in a system perspective, as done in FSR, began quite early in the history of farm management. However, FSR as presently carried out pays less attention to the home aspects, covers more but perverted risk analysis and also lacks the development of the managerial processes.

Moreover, the goals of farm management with respect to these two concepts or programs do not involve profit maximization alone, but more importantly stress maximization of family utility, minimization of risk (with reasonable bounds), and security in family needs. Private goals and needs and societal objectives and values are considered
together in both these programs, and are sometimes found to be in conflict. However, parallel theoretical developments with respect to managerial processes or dynamic analysis of decision making of farm families in the U. S. had not yet taken place.

Methodological Features

The emphasis on "partial"* holistic analysis and the stressing of a multidisciplinary orientation to research and problem solving are two of the important similarities in the methodology of FSR and U. S. farm management research-extension programs. Another important resemblance in their methodology is related to the dynamic and iterative nature of investigation where a continuous evaluation and adjustment in program activities is advocated to meet the needs of technical and economic changes.

However, with respect to the aspect of implementation, farm management-extension programs adopted an individual approach mainly and sometimes the group approach, whereas FSR in LDCs has essentially been oriented to representative farming systems or homogeneous groups of farmers within a recommendation domain. This is apparently due to the large numbers of small farms in LDCs. However, even in the U. S., the BF program of Missouri, for example, is reported (Hagan, 1980) to have used a case study approach for long-term evaluation purposes.

*They are partial with respect to FSR because of the relative neglect of the home activities, institutional and human changes and the decision process.
In relation to combining the theoretical concepts and empirical studies, there is evidence of lack of analytical tools to meet the needs of the FSR approach in LDCs. Thus there seems to be an urgency to integrate the methodologies developed for different disciplines (Crawford, 1981). On the other hand, when the farm management-extension programs (BF and FHD) were first developed in the U. S., computers and computer software if not static theory were at an early and less developed state.

**Philosophic Orientation**

Both FSR and the farm and home development programs of the U. S. emphasized a multidisciplinary orientation to research and development. Both approaches are based on farm management, implying a multidisciplinary orientation to subject matter research. This is not surprising since solving most practical problems require different types of knowledge (Johnson, 1977), including areas such as the biological sciences and social sciences other than economics.

However, the farm and home programs used both positive facts, arising from the inventorying and evaluation of farm and home resources, and normative facts related to the criteria of judging the "best" farm and home plan based on the analysis of alternatives, in order to make prescriptions to the farm families. This is so since the prescription of which action or goal ought to be sought depends on both the positive and the normative in a functional way (Johnson, 1977).

On the other hand, it appears that FSR practitioners, who seek a better but not necessarily the best strategy for the development of
farming systems, are essentially being pragmatic, believing that a feasible plan is better than a perfect plan which is unachievable. Test of workability is one of the cornerstones of pragmatism.

**Conceptual Framework**

Apparently the ultimate objective of both programs was to improve welfare and enrich life for farm families, especially those on small limited resource farms. Here greater consideration and closer attention is given to the identification and articulation of individual farm family goals and needs. The encouragement of farm operator participation in the entire process of research and development and the importance attached to the intimate relationship between the researcher and extension personnel and farmers is another important parallel. However, U. S. farm management-extension programs advocated a policy of working with rather than directing farmers and their families. Still another similarity is the emphasis placed on making use of the experience and traditional methods of both farmers and extension workers.

Both programs are basically concerned with the adoption of better technology in farming, so as to increase the efficiency and productivity in farm activities. FHD programs also attended to home activities whereas FSR presently does not cover the farm household aspects. Also whereas FSR stresses the development and adaptation of new improved technology to small farmer needs in LDCs, the farm
and home programs in the U. S. were mainly involved in assisting farm families make the best choices from among the improved practices that were already available. However, as indicated before, some of the U. S. programs did have as an objective, the development and testing of improved techniques of production (Nielson, 1967).

Another important parallel in their conceptual development was the importance attached to developing flexible plans that will enable farm families to adjust to rapid technological and economic changes. Flexibility is stressed for handling the diversity in social, economic and cultural environments experienced in the various regions of LDCs too, and to take into account the differences in small farmer needs and decision-making behavior. With respect to the evaluation of improved farming systems and the technologies associated with them, both FSR and U. S. farm and home programs often use the ex-post assessment of the adoption rate or adoption index. This measure is often considered to be appropriate, although its limitations has been pointed out by many.

However, evaluation of an extension program such as FHD or BF, as well as an approach like FSR, is difficult due to the problems of measuring their long run as well as the short run benefits and of identifying who benefit. In their early history (still true for FSR) both programs faced the task of producing quick and favorable results so as to establish credibility. Evaluation was therefore necessary, even when somewhat premature. FSR is very similar to the
traditional farm management which preceded BF and FHD. FSR has little more static production economics and some perverted risk analysis and little on the managerial processes.

**Institutional and Organizational Aspects**

Farm and home development and balanced farming programs when they were developed in the U. S., were administered by the Extension Services as long term programs, integrated in the county extension programs. They were considered to be intensive educational programs as opposed to the "regular" extension methods, and thus demanded much more manpower and funds.

FSR programs now face the same dilemma of having to be integrated into national research programs which are longstanding but usually not effective in addressing the needs of small farmers. Here again FSR has to prove itself, under conditions of skepticism on the one hand and high expectations on the other.

Further, FSR is often perceived as being very expensive by those not engaged in it and also by the funding agencies. The intensive U. S. farm and home management-extension programs were also viewed as costly to support in comparison to the regular county extension coverage of one agent per county in the U. S. The problem of justifying the cost involved is further aggravated by the difficulty of measuring the benefits of these programs, discussed earlier.
Evaluation and Measures of Performance

It was observed before in Chapter IV that it was mainly rural sociologists and in some cases agricultural economists together with sociologists who participated in the evaluation of most FHD programs in the U. S. Most evaluations were done at relatively early stages of program participation and thus estimated the short-term impacts only. The most commonly used measures of program performance were the various indices* of adoption of improved practices both on the farm and in the home. Some estimates of changes in gross income, net farm income and net worth were made and compared with control groups, but by and large these were very seldom done and even when done were not rigorous enough.

Most practitioners of FSR also acknowledge the desirability and convenience of using the adoption or acceptance indices for evaluating the technical feasibility, societal acceptability and compatibility of improved technologies recommended to the farmers in LDCs, although it is very likely that agricultural economists will play a major role in the evaluation of FSR.+ However, these measures of rates of adoption

*These indices of adoption were constructed based on the assumption that practice adoption will benefit all farmers in terms of substantial increases in net farm income, etc., and that those farmers who did not adopt are not rational or progressive. But it was often the case that many farmers did not adopt certain innovations with low payoff or expected utility to them under their conditions and thus in fact were being "wise." This was one of the major drawbacks of these indices.

+In the case of evaluation of FSR recommendations in LDCs, researchers presently require at least about 25 percent increase in net farm income from the use of a new practice or the package of practices, for it to be included in any measure of adoption being used as the basis of evaluation.
cannot be considered as an adequate basis for evaluation, even if they are composite estimates incorporating several qualitative performance criteria.

To provide a better basis for evaluation, cost benefit analysis and other measures of cost effectiveness have to be carried out. In this context, the long term and indirect effects of the programs must be accounted for along with the short-term direct impact on program participants. The dynamic and interactive nature of research and extension activities and the learning process of farmers make a short-run view of program impacts unrealistic.

Another important problem related to a quantitative evaluation of extension programs is the measurement of important intangible benefits, and also the difficulties in assigning specific categories of costs to various program components. The conflicts between private and societal objectives also sometimes pose problems in evaluation, in the context of FSR in LDCs.

Farming System Research (FSR) and Farm Management Research (FMR)

The practitioners of FSR have often strongly challenged the claims by farm management researchers that "FSR is no different from the farm system development approach practiced by them for many years," on the basis that FSR involves a distinguishing concentration on technology development as opposed to the reorganization of existing management practices and patterns of resource use. FMR workers respond
by saying that they too have been involved in technology development to some degree.* Nevertheless, FSR advocates stress that the goals and structure of FSR programs are different and that the fulfillment of FSR objectives depends upon farmer acceptance of improved technologies (Rohrbach, 1980).

It is, however, recognized that FSR has antecedents in farm management activities in the U. S. and that many features of FSR are reminiscent of FMR, as it was practiced in the early part of the century. Farming systems research is similar to the traditional farm management of early part and static production economics of the mid-20th century in the U. S. BF and FHD programs, however, were more advanced and included more household or home aspects and considered the institutional as well as technical changes. But all of them neglected the managerial processes and theory. A close examination of the definition, nature, scope and objectives of FMR in the early 1900s in the U. S. reveals that the current FSR has basically little to add. The FSR philosophy as propounded by Gilbert, Norman and Winch (1980), ICRISAT (1975) and CIMMYT (1976) owes much to the pioneering efforts with respect to FMR of the early and mid-1900s.

Some U.S. researchers and extension personnel feel that types of activities similar to FSR disappeared from usage in the U.S. only a few years ago. Some of the reasons for the termination of these efforts are (Rohrbach, 1980):

*For instance workers like Hogland were involved even then in the development of technology for Michigan small farmers and were quite aware of farmer problems at the field level.
1) The American farmer is now typically more knowledgeable, better informed and commercialized and they were capable of integrating the various information by themselves.

2) Input and output markets and research and extension services are well developed, and there is relatively greater emphasis on sole cropping and tendency to have monocultures, and

3) In relation to the felt needs, FSR type of approach will be too costly to support and such needs can be adequately served by the existing support services.

On the other hand, many others have reiterated the need for retaining an intensive small farm approach since the concern with medium and large scale commercial farmers has resulted in a relative neglect of limited resource small farmer needs (Rohrbach, 1980).

Although FSR may not differ much from FMR of 1920-1950, due to its strong convincing language and appeal it has gained support from donors and international research institutes concerned with the welfare of small farmers in the LDCs, in part because its philosophy is in line with current notions of equity and participation by farmers in the rural development process.

The whole farm/whole family approach in farm planning and management was initiated early in this century by some of the pioneers in farm management such as John D. Black at Harvard, G. E. Warren at Cornell, Boss and Pond in Minnesota and W. I. Spillman in the USDA (Hagan, 1980). Records show that farm level research was underway as test demonstration plots in the U.S. by Tennessee Valley Authority (TVA) in the 1930s (Norman, 1980). If FSR is distinguished partly for its active farmer-researcher partnership, then FSR again is not a new approach. The balanced farming program in Missouri that
developed in the 1940s is a good example of such a partnership. Another important parallel in their development is that both FSR in LDCs and FMR as practiced now in the U. S., were preceded by strong commodity oriented independent research which gave way to a multidisciplinary problem-solving focus among the researchers.

Farm management then was essentially multidisciplinary in nature and looked at the entire range of factors involved in running a farming enterprise. The range of concerns also encompassed political developments and philosophical considerations. More recently, however, farm management has received less publicity and is often undertaken by extension personnel and agencies such as TVA, etc. It was suggested that the main stream of farm management had not made much effort in understanding the logic of the farming practices that the mass of farmers were using and increasingly placed greater emphasis on normative prescriptions. The rise in interest in FSR in the third world nations has, to a great extent, come in response to the limitations of the traditional disciplinary approach that followed FMR in the U. S. and in most research stations in LDCs (Hagan, 1980).
CHAPTER VII
SUMMARY AND CONCLUSIONS

This final chapter is included to draw conclusions and summarize the main features discussed particularly in the summary remarks of Chapters IV and V and Chapter VI which discussed the important parallels between FSR and past holistic farm management research and extension programs in the U.S. Thus it is not intended to be a comprehensive summary of this paper. The conclusions have implications for the conduct of FSR; it is hoped that the conclusions will assist in re-orienting FSR programs to improve their effectiveness.

The early development of the traditional field of farm management in the U.S. took place in the Land Grant institutions beginning in the early 1900s. The FSR concept, which is similar to the early farm management work, developed in the late 1960s and 70s mainly in the international agricultural research institutes. In both the U.S. Land Grant system and IARCs, research, prior to these respective developments, was conducted primarily along traditional departmental lines of colleges of agriculture and the administrative structures of the IARCs. However, the recognition that separate commodity and subject matter research, though valuable, was not always capable of solving specific problems of the farm families in the U.S. and the small farmers in LDCs and the realization of the potential of a more
comprehensive and coordinated attack on the problems of farmers, helped overcome the reservations of the research establishments at least to the point of allowing the new approach to be tried.

Nevertheless, both early traditional farm management in the U. S. and current FSR in LDCs, which owes much to the farm management research of early and mid-20th Century in the U. S. and Europe, (i) neglected the home aspects of the farm household and dynamic managerial theory which implies utility maximization and (ii) do not give adequate attention to institutional and human changes relevant for farming and farm families. However, the more holistic farm management extension programs in the U. S., such as the BF and FHD programs, that developed mainly out of early traditional farm management and static production economics of mid-20th Century paid more attention to the home aspects and also human and institutional change. However, they also lacked a workable knowledge of decision making and managerial processes which developed following the IMS study in the U. S. in the early 1960s at the instigation of T. W. Schultz (1939) and, indirectly, Frank Knight (1921).

For FSR there is a large body of analytical techniques for use in the actual conduct of research and an opportunity to integrate the methodologies and theories from the different disciplines. By contrast, when traditional farm management was being developed in the U. S. and Europe, various analytical tools in farm management and
the field of production economics were at an early stage of develop-
ment. However, these problems were overcome in the U. S. and Europe
in the subsequent period with the rapid development of production
economics and computer programs and advanced facilities which per-
mitted the more efficient conduct of more holistic farm management
research and extension programs in the U. S.

Another important observation is that, although FSR is con-
sidered innovative in concentrating heavily on technology develop-
ment, there is much evidence in the U. S. to indicate that past
farm management and extension workers were also concerned with the
field level problems of farmers and paid attention to the development
of appropriate technologies.

An additional aspect to be considered is related to the dynamic
risk analysis and the application of the theory of expected utility
by farm management researchers in LDCs. They view the farmers as
risk averters if they insure against losses and as risk preferers if
they gamble in their choices of production activities, both at unfair
odds. However, Friedman and Savage (1948) have shown clearly that
risk neutral decision makers may both insure and gamble depending
on the nature and curvature of their utility function. The inappropriate
view of risk aversion prevalent in current FSR diverts attention away
from risk aversion and preference concepts which view managers as attach-
ing less or more utility to attained (not expected) outcomes, depending
on the risks incurred in attaining them.
This paper, in the process of outlining the historical development of the past farm management research and extension programs in the U. S., has shown that these more holistic U. S. agricultural extension programs were of much benefit to the family farms, especially those which were relatively small. This is a valid argument despite the fact that these programs were terminated after some time and their economic impacts not estimated adequately then to know exactly how cost effective they were.

These programs benefitted not only the small proportion of family farms participating over 2-3 decades but also non-participants indirectly in reorganizing their farms and adjusting to technologic, social and human changes. These Missouri balanced farming and Kentucky FHD programs aided family farms in a transitional period of rapid change. They also influenced the subsequent developments of farm management research and extension work in the U. S. The establishment of federal farm and home development programs in the Cooperative Extension Service in the 1950s is a good example of such work. Moreover, data from case studies and other materials and records kept by farm families participating in the program and gathered by the farm management extension personnel in the process of carrying out these programs, laid the foundation for much of the farm management research and production economics studies in the period that followed (Hagan, 1980).

If it is true that these programs played an important role in the evaluation of farm management research and extension work in the
U. S., it is equally valid that the experiences gained from them in the U. S. have value for developing the methodology of FSR and for conceptualizing the procedures and techniques for disseminating and operationalizing the recommendations of FSR in LDCs. Present farm management researchers in LDCs cannot afford to lose the knowledge of the past historical developments in fields which are similar and parallel to their own field in its present stage of development.

There is no doubt that farm management research for small farmers in LDCs is best carried out in a systems perspective and a holistic or comprehensive view is necessary in order to have more appropriate and realistic results and recommendations. In the U. S. it was recognized during the post World War II period that the desire for change already existed among farm families. These desires were articulated and operationalized through FHD programs. So long as the technologies are appropriate and consistent with farmer objectives and environments, a similar pattern of attitudes toward change is likely to be found among LDC small farmers too.

Some observations on the methodology and implementation of FSR in LDCs, can be drawn from this historical study of programs in the U. S. One such aspect is the desired level of intensity of extension contact needed in LDCs. Some rough guidelines can be developed on the minimum intensity needed to have an appreciable impact on the adoption and intensive use of improved farm practices and innovations, and/or the undesirable effects of an extremely intensive approach
that results in the over-dependence of farmers on extension are two such observations. Nonetheless, the fact that there are proportionately much larger numbers of small farmers in the LDCs will probably necessitate the use of a variety of different extension methods and programs of varying intensity.

The FHD programs were developed in the U. S. to be long-term rather than a short-term program, although they had a definite beginning and ending as far as the "intensive" contacts with individual farmers were concerned. A similar long-term framework and emphasis on flexibility appear needed in FSR too. Thus farm management research such as FSR related to small farmers in LDCs has to first detail their diversities as a prerequisite to problem identification (Dillon, 1980).

In relation to setting research priorities for FSR in LDCs and selecting target groups of small farmers to receive early attention, there are some useful suggestions to be adapted from the focus of past U. S. farm and home programs. The BF and FHD programs first paid attention to the requirements of particularly needy groups among family farmers especially those who were making important adjustments in farming such as those getting started, tenant farmers, part-time farmers with off-farm jobs and those making retirement plans. Target groups to be identified and helped in LDCs may, however, be different depending on the relative emphasis on equity.

Farmers' knowledge and awareness of some program details and their major objectives at the beginning of the dissemination process
appear to be critical for the effective adoption of FSR recommendations, as they were in the case of FHD programs. This aspect is often neglected in the actual conduct of extension work in many LDCs even though it appears to be a simple and obvious consideration. It was pointed out earlier that there should be consistency between farmings system researchers and extension administrators on the one hand and field extension staff on the other, with respect to various extension strategies and program objectives in each recommendation domains.

Development of leadership qualities among participant farm families in the U. S. was reported to have aided in the dissemination process of FHD program activities, which may be a potential strong point for the success of FSR in practice. Stressing the pyramiding effects on productivity, income and improved family living as a result of participation in BF and FHD in the U. S. and combining appropriate improved practices or technologies recommended by the specialists into well organized systems of farms based upon carefully prepared plans, should also be advocated in the case of FSR.

The training programs to be developed for the extension agents employed in the implementation of FSR should take into account the lessons learned from the conduct of FHD programs. Certain desirable background characteristics and training received, appropriate sub-roles to be played by extension agents under different conditions and other aspects were identified in Chapter IV and were reported to have been most effective in farm planning and the dissemination of new practices.
SELECTED BIBLIOGRAPHY*


Case, H. D. and D. B. Williams. Fifty Years of Farm Management, University of Illinois Press, Urbana-Champaign, IL, 1957.


*Includes references cited in the text as well as others.


"Methodology for the Managerial Input," in The Management Input in Agriculture Workshop Sponsored by the Agricultural Policy Institute, Southern Farm Management Research Committee Farm Foundation, April 1963.

"Philosophic Foundations of Agricultural Economics Thought," Michigan Agricultural Experiment Station Journal Article Number 8577, May 1978 (to be included in the Survey of Agricultural Economic Literature, Part IV).


McNamara, R. S. *Address to the Board of Governors' Meeting, Nairobi, September 24, 1973*, World Bank, Washington, D. C.

Miller, M. F. *Missouri College of Agriculture Through a Half Century in Retrospect*, University of Missouri, College of Agriculture Bulletin No. 769, Columbia Agricultural Experiment Station, 1961.


________. Personal communication, January 1981.


North Central Farm Management Research Committee. Problems of Small Farms, University of Missouri, College of Agriculture Bulletin No. 660, Columbia Agricultural Experiment Station, September 1955.


Planning Technologies Appropriate to Farmers; Concepts and Procedures, Prepared by "The CIMMYT Economics Program."


Public Law 83, 2nd Session, 83rd Congress, Federal Extension Appropriation Bill.


Ramsey, R. J. "Evaluation of the Kentucky Farm and Home Development Program," Extension Division, College of Agriculture and Home Economics, University of Kentucky, 1951.


"Theory of the Firm and Farm Management Research,"

Slocum, W. L. "Reactions of Extension Personnel to Farm and Home
Agricultural Experiment Station, Washington State University,
Pullman, WA, May 1962.

and B. L. Brough. "Family and Farm Changes Associated with
Agricultural Experiment Station, Institute of Agricultural
Sciences, Washington State University, Pullman, WA, May 1962.

Spillman, W. J. Farm Management, Orange-Judd Publishing Company,
1923.

Stavis, B. "Agricultural Extension for Small Farmers," MSU Rural
Development Paper No. 3, East Lansing, Department of Agricultural

Strauss, M. "Short-term Effects of Farm and Home Development in
Wisconsin," Report No. 3, Department of Rural Sociology,
University of Wisconsin, 1958.

The Case Study of a Diagnostic Survey of a Farming System in Zambia
in "An Occasional Series of Papers and Notes" on Methodologies
and Procedures Useful in FSR and in the economic interpretation
of Agricultural Experiments No. 1, July 1979.

Tweeten, L. "Agriculture at a Crucial Evolutionary Crossroads,"
Professional paper, Oklahoma Agricultural Experiment Station,
Stillwater, 1980.

Umali, D. L. Opening Address: "New Concept of Farm Management," in
FAO Report of the Expert Group Meeting on Farm Management for
Small Farmer Development in Asia and the Far East, FAO Regional
Office, Bangkok, September 1978.

USDA, Interbureau and Regional Committees on Post-War Programs, What


"Origin and Development of Farm Economics in the U. S."
Journal of Farm Economics, 14:2-9, January 1932.

Wharton, C. R. (Ed.). Subsistence Agriculture and Economic Development,
Aldine, Chicago, 1969.


APPENDIX
APPENDIX

An Overview of Methodology Employed and the General Direction of FSR in the Major International Agricultural Research Institutes*

1) CIAT (Centro Internacional de Agricultura Tropical)
Cali, Columbia

Mandate

As specified in its By-Laws the mandate of CIAT is "to accelerate agricultural economic development and increase agricultural production and productivity of the tropics to improve the diets and welfare of the people of the world."

Historical Development

CIAT was established formally in 1967 but did not become operational until 1968. Its program objectives initially were specified by disciplinary headings within major program elements of animal science, plant science and a set of service disciplines (including economics) training and communication.

*Sources:


Since the early 1970s there has been a complete move away from a disciplinary-based program to a commodity-based multidisciplinary team approach emphasizing production systems. The commodities emphasized are rice, swine, beef, cassava and beans. Subsequently, concern grew that the center would not achieve its goals unless efforts were intensified to organize some systems activities so as to be responsive to welfare issues in addition to production goals. This resulted in the establishment of the Agricultural Systems program in 1973, which was to develop a process to identify and analyze farming systems so as to assist in the rapid adoption of improved technology. Later, it was renamed the Small Farm Systems program aimed at understanding the great diversity of farming systems in tropical Latin America and focused on family farms as integrated systems. This program was, however, discontinued in 1975.

But immediately following the discontinuance of the small farm systems program a number of organizational changes were made aimed at insuring the continued concern with small farmers and the acceptability of its component research at the farm level. These changes included the formulation of a special studies unit and the establishment of an Agricultural Production Systems Coordination group which included the production specialist from the commodity programs, all of CIAT's economists, senior staff members in the Special Studies unit and the administrators.
Current Strategy

CIAT's research has been organized around a number of selected commodities and it has adopted the strategy of providing improved technology in these selected commodity areas to its primary clients, the national organizations, with the primary geographical focus on Latin America.

CIAT's approach involves developing suitable technologies to bring new lands into production as well as to increase yields on areas now in production. CIAT scientists have taken steps aimed at insuring that their component research can be (a) adapted to local ecological and social conditions on a technical basis and (b) integrated economically with the local whole-farm systems, due to their recognition of the importance of the locale specificity problem especially in terms of soil type and climatic regime.

However, although CIAT technologies are mostly designed to be scale neutral, the impact of the Center could well continue to be greater on the larger and more advanced farmers who are usually more capable of making technological changes.

Program Components

These include:

i) Working with selected cropping associations to insure the applicability of the new technology developed to small farmer production systems.

ii) On-farm surveys to determine the nature of production systems and develop methodology to be used by local institutions.
iii) Collaboration with national programs in on-farm testing of new production systems.

iv) Ex-ante analysis of new CIAT production technology to insure its economic viability.

v) Ex-post studies on the adoption of new production technology to determine rate of adoption, distribution of benefits, etc.

vi) Constant effort to minimize the need for purchased inputs in the new production technology being developed.

Here the studies of existing farming systems are multidisciplinary where economists play a leading role. All CIAT's research can be recognized as being carried out in a systems framework where research in beef is fully consistent with a whole farm system focus. But other commodity programs emphasize more on crop systems and subsystems.

2) **CIMMYT (Centro Internacional de Mejoramiento de Maiz Y Trigo)** Mexico City, D. F. Mexico

**Mandate**

CIMMYT's mandate restricts the focus to maize, wheat, triticale and barley although it is often omitted from discussions of farming systems research.

**Historical Development**

Despite early success in gaining farmer acceptance of improved practices in selected areas and in spite of major differences in yields between traditional and improved practices, a great majority of farmers were found not to accept most of the CIMMYT recommendations.
This led to the initiation of a series of adoption studies in 1972 which revealed that by far the most important factor constraining adoption was the extent to which the recommended practices suited the specific environments or farming systems of farmers.

Thus the need for better adapted technologies suitable for specific conditions led to the second effort in 1975 involving ex-ante identification of the requirements for new technologies by assessing existing situations. Further almost all of CIMMYT's work is in target areas usually as part of national or regional cooperative crop improvement programs, which is a marked contrast with other IARCs.

**Current Strategy**

CIMMYT's work in developing technologies has the following basic orientation:

i) Concentration on research with near-term application.

ii) Provision for collaboration among biological and social scientists through the entire research process.

iii) Focus on formulating technologies for a single crop or a single crop as part of a crop mixture.

iv) Formulation of useful, but not always "optimal" technologies.

CIMMYT's FSR activities are unique in that they grew from the Center's rather narrow commodity focus and its long experience in many countries in designing improved technologies. Further activities are an integral part of cooperative programs and research station experiments are limited, with most emphasis on on-farm trials.
Program Components

These include:

i) Identifying relevant farmers, including grouping environments with similar ecologies and characterizing them in terms of information important to agricultural policy such as area, numbers, production, etc.

ii) Identifying farmers' circumstances which consists of exploratory surveys and formal survey work based on questionnaires focusing on issues critical to farmers.

iii) Organizing experiments on research stations to produce needed solutions to problems or constraints to expanding production identified by surveys.

iv) On-farm experiments used to test the "best-bet" strategies based on the survey work. Farmers and the research team together evaluate the performance of the trials at each critical stage to assess their adequacy. These trials include yes-no trials, how-much trials and verification trials on more sites, at the end of which formal recommendations are made and extended to farmers. Although there are similarities between CIAT and CIMMYT in terms of their focus on field investigation of commodities including mixtures of those crops, the resemblance does not appear to extend beyond this. Whereas CIAT's programs are essentially "upstream," the efforts of CIMMYT are basically "downstream" FSR in nature.

3) ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) Hyderabad, India

Mandate

Four objectives are specified by ICRISAT's mandate which are broadly:

i) To develop farming systems which will help to increase and stabilize agricultural production in the seasonally dry, semi-arid tropics.

ii) To serve as a world center to improve the genetic potential for grain yield and nutritional quality of sorghum, millet, peas and groundnut.
152

iii) To identify socio-economic and other constraints to agricultural development in the semi-arid tropics and evaluate technological and institutional changes needed to alleviate them.

iv) To assist national and regional research programs through cooperation and support and by sponsoring conferences, international training programs and assisting extension activities.

Historical Development

The FSR program of ICRISAT has emphasized the study of biological and physical processes involved in farming systems rather than the study of actual farming practices. Consequently, much of the past research has consisted of component research along somewhat traditional disciplinary lines and focused on testing various hypotheses. Since 1976 however, FSR program has become progressively more involved in cooperative programs with various national agricultural research institutions in Africa and the sub-continent, and more recently emphasis has increased on multi-disciplinary on-farm studies.

The FSR program of ICRISAT was one of the initial research thrusts that facilitated linkages with commodity improvement programs in contrast to the FSR activities at other IARCs which began in response to problems of acceptance and performance of new technologies (IRRI, CIMMYT) or as a depository of a range of non-commodity-specific activities (IITA).

It was noted before that research activities seemed to be divided along disciplinary lines. This resulted from the lack of basic information initially and the need for appropriate methodology development. Further, socioeconomic research was also assigned to a
separate economics program. Whereas technical scientists in FSR
developed data bases, methodologies, component technologies, etc.
mainly by carrying out research station work, the initial years of
ICRISAT's village level studies were essentially confined to col-
lecting data and analyzing existing farming systems with no apparent
linkages to adapting and testing technology.

In recent years however, research seems to have spread across
program and disciplinary lines, and technology design and testing
is now part of village level studies. Research efforts also appear
to be less sharply focused on improved soil and water management
practice in watershed units and attention has expanded on other
constraints that grew from analyses of existing farming systems.

Current Strategy

The objective of the Farming Systems program is to "develop
technology for improving land and water management systems," and
to contribute to raising the economic status for people in the SAT
by developing farming systems that increase and stabilize agricultural
output on the other hand, the goal of the economics program is to
identify socio-economic and other constraints to agricultural
development in the SAT.

Apart from the obvious differences in the disciplinary approaches
of Farming Systems and Economics programs there are distinctions in
the basic strategies of these two programs. Whereas the Farming
Systems program has an upstream orientation and views water as the most limiting factor to production, the Economics program work is more downstream and does not involve specific assumptions about constraints, but allows them to emerge from village level studies.

The basic research strategy of the Farming Systems program include:

i) Investigation of single production components in depth and investigate in a holistic manner in systems research.

ii) Testing hypotheses and developing approaches and methodologies with wide application for use by national programs.

Program Components

The Economics program consists of two major sub-programs, production and marketing economics, where production economics includes benchmark surveys on farm household activities. On the other hand, the Farming Systems program has five components:

i) Research in sub-program areas.

ii) Operational scale watershed-based, resource utilization research.

iii) Cooperative research with national and regional organizations

iv) Training programs and

v) Extension and implementation through national programs.

However, most of the work up to now has been in the first two program areas.
4) **IITA (International Institute of Tropical Agriculture)** Ibadan, Nigeria

**Mandate**

This has evolved over time and was last modified by the Board in 1977. This includes:

i) Conduct studies and research on farming systems in the humid and subhumid tropical zone in order to identify viable alternatives to shifting cultivation that will maintain the productivity of the land.

ii) Accept responsibility for research directed to the improvement of cowpeas, yams and sweet potatoes.

iii) Conduct research in cooperation with those institutes and organizations primarily responsible for the improvement of crops such as maize, rice, cassava, peas, soyabean, etc.

iv) Conduct research on other crops which may become important in the farming systems of the humid and sub-humid zones, and which contribute much to the diets of the people in the region.

v) To make available the results of studies and research carried out as above to institutions which wish to use them.

**Historical Development**

The original emphasis of IITA was to be an institute concerned with soil and, to a lesser degree, crop management to overcome the problem of shifting cultivation which was reflected in the early staff arrivals in 1968/69. Until the initiation of a program approach in 1971, scientists were largely left to pursue what they regarded as relevant prospects with minimal integration and central direction.
In early 1972 a proposal to create the three current crop improvement programs and Farming Systems Program (FSP) was accepted. A more purposeful focus within FSP was achieved in mid-1973 when attention was given to devising an FSP structure aimed at facilitating collaborative research. Current focus is still to develop further a group structure conducive to collaborative research.

Current Strategy

IITA now has the largest and possibly the most complex set of FSR activities of any IARCs. The primary focus of the FSP at IITA is on developing methods of crop management and land use suited to the humid and subhumid tropics which will enable more efficient and sustained production of food crops in those zones. The research program is mainly concerned with developing improved practices directly affecting food crops in the process.

Because of the wide array of constraints in the region served by IITA and because of the primary of secondary responsibility for virtually all the major annual food crops in the region FSR in IITA is "upstream" oriented and broad in scope relative to other IARCs. Thus the FSR program at IITA has had problems in achieving overall coherence, partly because of the diverse nature and large number of research problems. Much of the research has been rather basic, requiring effective national research programs with "downstream" FSR components to refine and adapt the findings to local conditions throughout the region.
Program Components

IITA's FSP has five components, namely:

i) Regional analysis involving the investigation of farming systems in the region to identify potentials and constraints on production.

ii) Cropping systems involving the development of improved cropping practices and systems of crop management.

iii) Land management involving development of improved methods for land clearing and soil management.

iv) Energy management involving development of implements and methods to relieve energy constraints to crop production and processing.

v) Technology evaluation involving developing, testing and evaluation of improved practices and systems.

To date most of IITA's farming systems work has been on-site at ITTA. The major multidisciplinary work of FSP is in problem identification and technology evaluation.

5) IRRI (International Rice Research Institute)

Los Banos, Philippines

Mandate

Research on cropping systems constitutes one of IRRI's major programs. The focus of the cropping systems program (CSP) is on the development of a cropping systems technology to increase cropping intensity on Asia's rice farms, making more efficient use of the available farm resources. Limited scope to further increase land area under crops in Asia and the difficulties in attaining major
advances beyond those now attainable with high inputs, has led to the rapid build-up of the cropping systems program at IRRI.

The specific objectives of CSP are:

i) To develop research methodology in cropping systems involving rice and to extend that methodology to cooperative programs.

ii) To develop and assemble specific multiple cropping technology for IRRI's target climatic zones.

iii) To feedback appropriate information on basic and developmental research to concerned agencies.

iv) At the national level, to encourage and assist national production programs in the target agro-climatic zones to achieve increased farm production through increased cropping intensity.

**Historical Development**

The CSP was begun at IRRI many years ago by Professor R. Bradfield, who developed techniques for intercropping a certain variety of legumes and other crops with rice and the primary objectives were to improve human nutrition and soil fertility maintenance. These innovations revealed the opportunities available for more intensive and diverse cropping.

Later emphasis shifted somewhat to the study of intensive cropping patterns on existing farms where rice was the basic crop, from the previous focus of determining the productivity of new or improved multiple cropping patterns. In 1974 the program was enlarged to provide a multidisciplinary team and the Asian Cropping Systems Network (ACSN) began to be organized.
The CSP was the first program at an IARC. It was pioneered in many aspects of FSR and has been a leader in developing methodology and concepts for multidisciplinary research notably in on-farm studies. Historically the CSP initially concentrated on research station studies (intensive multiple cropping research), then initiated on-farm studies to understand more of systems used by farmers and later began to conduct base data analysis to define agroclimatic zones.

**Current Strategy**

IRRI refers to its work on multiple cropping and intercropping as cropping systems rather than farming systems research. IRRI focuses its research on increasing multiple cropping both of rice and other crops such as grain legumes, sorghum and mung beans.

Fostering national programs to carry out cropping systems research in their respective countries or regions is a major component of IRRI's present program. IRRI's cropping systems program includes important "upstream" and "downstream" features that are closely linked. IRRI's relative success in the area appears to stem from the program being in existence many years, although the current emphasis on intensifying rice cropping systems and multidisciplinary work dates from 1974.

The CSP, a pioneering effort, has led in defining new concepts and approaches to FSR in organizing FSR research. Their decision to concentrate on rainfed lowland and upland rice farms is wise and provides a clear focus for technology development. Further, the
decision to concentrate on cropping systems, rather than farming systems, has probably helped to maintain a direct emphasis on rice and its associated crops.

Program Components

The CSP has five primary components:

i) Environmental Description

The objective of this is to identify more accurately the relation of physical and socioeconomic environmental variables to cropping pattern performances and to use the information in developing multiple cropping methodology.

ii) Cropping Systems Design

Here the main task is to perform a systematic analysis of the agronomic profile data which provides the basis for the initial design of an "improved" cropping system. Development of techniques for pre-testing evaluation of alternative cropping patterns and management systems is also covered.

iii) Cropping Systems Testing

The resulting improved cropping systems are field tested. Under the CSP more than 80 percent of the testing activities are conducted "off-site" which is one of the highest percentages of any of the IARCs. Only the most promising cropping systems are field tested under farm conditions and farmer management.

iv) Component Technology

The analysis of existing situations or results of field testing may suggest additional research on specific issues when the readily available technology is not closely suited to existing conditions or further adaptation is needed. At IRRI component technology research focuses on several areas including those identified during field investigations in various national cropping systems programs.
(v) Pre-production Testing/Implementation

Modifications in cropping which are successfully tested are then used in pilot production programs. Developing and testing cropping systems requires close contact with extension service personnel who assume an increasing role in the pilot production stage. The objective is to determine the suitability of specific recommended practices over a broader geographic area than emerged from the design and testing stages.