

THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH  
TECHNICAL ADVISORY COMMITTEE  
Thirty-Ninth Meeting, Rome (Italy), 17-25 March 1986

FARMING SYSTEMS RESEARCH

(Agenda Item 8)

Objective of the Discussion

TAC at its 33rd meeting raised a number of issues concerning FSR activities in the CGIAR and requested the IARCs to organize an Inter-Center Seminar on FSR in International Agricultural Research in order to clarify those issues. ICRISAT agreed to organize such a meeting.

The Committee may wish to consider the TAC Secretariat's report on the Workshop in the light of TAC's recommendations on CGIAR priorities and future strategies.

ICRISAT is also expected to report to Center Directors and TAC in June. ICRISAT's report and the Center Director's commentary on it may lead to further discussion at TAC 40.

## INTER-CENTER WORKSHOP ON FARMING SYSTEMS RESEARCH

ICRISAT Center, Hyderabad, India

17-21 February 1986

### Introduction

During TAC's deliberations on Strategic Considerations at its 33rd Session, extensive discussions were held on the role of the IARCs in farming systems research (FSR). The Committee observed that there was a variety of analytical and conceptual approaches and differing denominations of similar activities at the various Centers. At some Centers FSR serves as an approach to problem solving, in others it is considered to be a legitimate area of research per se.

Noting that more than 14% of the System's total resources were being allocated to FSR activities, TAC agreed that clarification was required in view of the resource allocation implications and to avoid the possibility of conflicting advice flowing to national research systems. TAC suggested an Inter-Center Seminar on FSR at the IARCs to clarify the relevant issues- objectives, methods, approaches and the extent of IARC involvement in this area of activities.

ICRISAT agreed to organize such a meeting. A Steering Committee met on 28 February 1985 in Delhi, India to draw up a program for the Workshop. TAC was represented at the Steering Committee meeting by Drs. E.T. York, W. von Urff, and the Executive Secretary. The dates and the venue for the Workshop were agreed upon.

### Purpose and Objectives of the Workshop

- (a) To develop an understanding of the relevance and approaches to Farming Systems Research in International Agricultural Research Centers (IARCs);
- (b) to indicate the roles of international and national research agencies in FSR;
- (c) to harmonize the recommendations of previous reviews on FSR into IARC framework;
- (d) to discuss the results of case studies to assist in assessing the relevance and priority of such research for creating an impact on national systems; and
- (e) to outline the future of FSR in the CG System.

### Conduct of the Workshop

The Workshop was well organized and brought together some 58 participants with widely different backgrounds in Farming Systems Research, mainly from the IARCs of the CGIAR. Nine CGIAR Centers made

presentations. Four developing countries, namely Ecuador, India, Indonesia and Zimbabwe and three non-CGIAR Centers, ICRA, ICRAF and IFDC, also participated. A number of resource persons were invited from both developed and developing countries. Three TAC Members, namely Drs. E.T. York, M.H. Arnold and E. Alvarez Luna and the Executive Secretary of TAC participated in the Workshop.

### Results Achieved

The highlights and main conclusions of the Workshop are outlined under each of the major themes. A statement by representatives of the IARCs is attached as Annex I.

#### 1. Review, Philosophy and Concept of Farming Systems Research

The Workshop's keynote paper prepared by Drs. Dillon, Plucknett and Vallaeys identified and considered the major issues and key concepts. The authors re-affirmed their 1978 position (Stripe Review of FSR at the IARCs) that FSR should be considered as an approach to research rather than a new science or discipline. FSR should become a necessary and normal part of the agricultural research process. The paper proposed that the "up-stream" and "downstream" terminology in relation to FSR in their 1978 report should be abandoned. There was strong support for these view points. There was also general consensus among participants for the use of the term "Research with a Farming System Perspective" (RFSP) to describe activities under the FSR label.

The need for a clarification and standardization of FSR terms was stressed and endorsed in the ensuing discussion. Some of the terms proposed by Drs. Simmonds and Sands in their 1985 reviews of Farming Systems Research for the World Bank and TAC respectively, such as Farming Systems Analysis (FSA), Farming Systems Adaptive Research (FSAR) and New Farming Systems Development (NFSAD) found a lot of support among participants.

Some participants felt that the development of techniques and methodologies for On-Farm Research (OFR) had been adequately dealt with by CIMMYT and IRRI. However, the need for their further development was generally supported. There was broad consensus that the place of women should be considered more carefully when framing RFSP objectives.

It was generally observed that little emphasis has so far been given to extension in RFSP. The preponderance of FSR activities, particularly in Africa, were thought to be a reflection of the weak extension systems. It was argued that strong, effective national extension programs with subject matter specialists closely linked to research would serve many of the functions currently addressed under FSR.

The Centers were urged to coordinate their RFSP activities particularly training in the regions and in national programmes by inter-alia organizing joint training activities, and collaboration in the preparation of training material.

## 2. Area-Based Farming Systems Research

Presentations under this theme were given by ICRISAT, IITA and ICARDA. The programs of these Centers have a resource-based orientation.

The ICRISAT program has an ecological as well as a technical orientation; it has tended to be systems-based with relatively little economic input. OFR work was introduced relatively late although extensive village studies were conducted in parallel early in the life of the program.

The IITA program is component-based with the eventual aim of fitting the components together stepwise into new or adjusted farming systems. Until recently economic and OFR activities have been relatively small.

ICARDA stimulated several Farming Systems Studies in the early stages of the program. Recently the Center has embarked on a strong OFR program with a Farming Systems Perspective. ICARDA does more work on-farm than on-station.

The diversity of approaches was seen to be a reflection of differences in mandates, research histories and local agricultural opportunities. The objective of all three Centers in FSR is to increase productivity. There is great variation among the Centers in the extent and manner of co-operation with NARS, presumably an indication of the varying capacities of NARS. Centers claim there is good interaction between FSR activities and other programs but it was not clear to non-IARCs participants how this interaction is ensured.

## 3. Commodity/Input-based Farming Systems Research

Presentations were made by CIAT, CIMMYT, CIP, IFDC, IITA, ILCA and IRRI. Major similarities were noted both in their objectives and implementing strategies. However, there were differences in emphasis. Methodology development and assistance to national programs were prominently highlighted by CIAT, CIMMYT and IRRI.

Practically all Centers are involved in baseline data analysis, on-station research (except CIMMYT) and varying degrees of OFR. CIAT, CIMMYT and CIP put great emphasis on OFR; IITA has very little OFR, while IRRI is somewhat in between.

The Centers operate their FSR activities through a fairly diverse organizational set up. For instance, IRRI has two separate departments; CIAT incorporates its FSR activities into existing commodity programs and IITA lumps all activities aside from breeding and related research support into a FSR program. ILCA on the other hand has traditionally organized its FSR as field teams with a heavy socio-economic component in the various ecological zones of Sub-Saharan Africa. Recently ILCA has given more emphasis to component research, such as forage legume agronomy and animal nutrition to generate new technology.

#### 4. Evaluation and Policy Implications

Four papers were presented each in a distinctive topic. Evaluation was not considered. Suggestions were made by ISNAR on what it considers to be the best course of organizational development for RFSP in NARS. It advocates a staged process; a program rather than a project approach; and a long term involvement on a sustainable basis.

The need for better inter-center coordination of RFSP activities at the regional and national levels with particular emphasis on approaches to national programs was strongly advocated by the Workshop. The avenues suggested for facilitating such co-ordination include networking arrangements involving NARS and IARCs and training activities.

Policy issues of agricultural research ranging from research and management policy within IARCs and NARS to the implications of RFSP for government policy in the Agricultural Sector were also addressed.

The major issues raised in the wide-ranging discussion related to:-

- training needs and the desirability of the IARCs jointly organizing training courses and training materials;
- internal IARC policy implications of RFSP in terms of reward structures;
- the need of a farm household and community focus rather than simply a farm production system focus;
- the integration of on-farm studies and on-station research and the involvement of station-based scientists in OFR;
- FSR as a complement to good basic/fundamental research and to effective extension. The argument that if research and extension are working well together the needs for FSR are much less;
- tendency to look for technological solutions to policy problems - credit, marketing, and land tenure.

#### 5. Integration of Crop/Livestock/Agro-forestry and other Land Use Systems

The activities described under this section subscribe to a systems approach and recognize a hierarchy of systems and subsystems. The discussion concentrated on the use of systems analysis and modelling and transfer of results to the target clients, particularly emphasizing the shift in factors and clients as one moves up from a single farm to country and global levels.

The major conclusions arising from the discussion are summarized below:

- A number of models of interest to FSR are biophysical,

mechanistic and lack adequate consideration of the behaviour of individuals and institutions.

- In comparison to the amount of resources being invested in modelling, relatively few models are actually used in decision making.
- There is need to continue research on systems and systems analysis methodology as well as on the application of these as tools. Modelling is not an end in itself; a systems approach, however, is necessary in planning research and technology transfer activities.
- Although it is true to say that everything is connected to everything else, some connections are more significant than others. Skill lies in identifying the critical factors and developing appropriate diagnostic techniques.
- It is important to identify the client. Early involvement of the client is necessary because the target client (farmer, community, region, etc.) determines the point, time and scale of entry.
- It is important to recognize that there are significant differences in the socio-economic and political factors as one moves from lower (e.g. farm) to upper (country) levels.

#### 6. View Point on FSR Country Programs

Four papers were presented at this session relating to FSR experience in Ecuador, India, Indonesia and Zimbabwe. The paper on Indonesia described how an FSR perspective had been incorporated in the national research program. Substantial collaboration with IARCs, particularly IRRI was noted. Three points were emphasized; it was the national program that set the priorities and the extension system was involved from an early stage in the on-farm work. Policy makers were also involved from an early stage.

The paper on India described the national agricultural development objectives, including the need to increase the productivity of dryland agriculture to meet the projected population increase. A number of programs designed to evaluate the acceptance and impact of new technologies in farmers fields were stated. These include: operational research projects, lab-to-land programs, adaptive research programs, agricultural science Centers, minikit trials, model agronomy trials, etc. The author suggested that the IARCs could help the Indian national program through supply of new ideas and information on new technology as well as guidance on program planning.

The paper on Ecuador emphasized that FSR cannot exist as a separate program and should be part of the regular research programs. Continued involvement of the IARCs was needed and should be utilized in a co-ordinated fashion.

The paper from Zimbabwe described the activities of on-farm research in the East and Southern Africa region. It pointed out that on-farm research had a long history in the commercial farming sector but not in the communal lands. The paper emphasized the problems of countries where trained staff were in short supply and where there was a wide gap between what happened on research stations and what happened on farmers' fields. A large number of workshops, initiated by donors or IARCs, made heavy demands on staff time; the design of research programs was often too ambitious for the resources of those concerned to undertake. There was need for better techniques on data collection and statistical evaluation.

The conclusions arising from the discussion on the four national programs were:

- National Programs seem to encounter fewer difficulties in integrating their FSR programs into overall research programs.
- There is a need to obtain a clearer picture of what NARS expect IARCs to deliver and for IARCs to see what they could learn from NARS.
- On-farm research is basically a national responsibility. The role of IARCs is to support them in two major areas, training and supply of information. However, it is recognized that some countries do not have the capacity to do on-farm research and that for the time being the intervention and help of IARCs is needed.
- Linkages between FSR and extension may pose some difficult institutional problems that need political intervention for their solution, depending on the capacity and maturity of the NARS.
- Centers should act in harmony in their relationships with NARS i.e. they should not be seen to be giving conflicting advice although it would be undesirable to develop a single approach to the problems, given the diversity of Center programs and the opportunities which such diversity offers.
- The proliferation of networks should be checked so as not to overload national programs.

7. (a) Conceptual Framework and Priorities for FSR at the IARCs

The Workshop generally accepted the need for some further classification of the underlying conceptual framework. There was broad consensus that farming systems should be seen as an approach rather than a research discipline. To avoid some of the current misconception about work on farming systems it was suggested that the term FSR be replaced by "Farming Systems Perspective" or "Farming Systems Approach". The generic term could be abbreviated to read "Farming Systems".

Within the farming systems approach, two research thrusts were recognized to have evolved. One sought to devise novel systems of managing natural resources for eventual translation into farming practice. The other sought to understand the circumstances of the resource-poor farmer in order to identify possibilities for improved technologies that might readily be integrated into existing farming systems.

The following terms were generally agreed as appropriate for describing the two basic concepts and work related to them:

- (i) Farming Systems Analysis (FSA) - to describe deep analysis of existing farming systems, including socio-economic aspects: limited to on-farm studies and data analysis.
- (ii) Farming Systems Adaptive Research (FSAR) - include elements of FSA but also involve on-farm and on-station research. Feed back from on-farm research used as an input for the design of on-station experiments in order to develop technology closely adopted to existing farming systems.
- (iii) New Farming Systems Development (NFSD) - will eventually encompass aspects of FSA and FSAR but would be based initially on on-station experiments aimed at devising novel production systems, including agro-forestry.

7. (b) Commonality of Approaches and Methodologies in Existing FSR in the IARCs

The Workshop highlighted the following points:

- In Centers with commodity mandates RFSP is similar. However, differences are noticeable among Centers with agro-ecological mandates.
- Linkages between OFR and on-station research are being developed by all Centers.
- Problems have been encountered in working with commodities that are not included in Center mandates.
- Centers were urged to nominate regional liaison scientists, to avoid duplication of effort and foster collaboration.
- The strength of most NARS in socio-economic research is still weak and hampers effective collaboration with IARCs.
- Exchange of information among IARCs started with the 1984 Nairobi meeting on systems-based on-farm research, during which similarities and differences in methodology were identified. The Workshop considered that the summary of



the 1984 meeting contained valuable information which should be brought to the attention of all IARCs.

7. (c) Interaction between NARS and IARCs

The major conclusions and recommendations were:

- The success of IARCs was entirely dependent on the NARS which constituted their most important client group. This relationship relies on mutual understanding and respect which needs to be reinforced.
- The extent of interaction between IARCs and NARS depends mainly on two factors: level of development of the NARS and stage of refinement of new technology available from the Centers.
- NARS could have an important role in helping to harmonize the activities of the different Centers if they could define more precisely what they require from the Centers.
- Existing training material should be screened with a view to developing more effective packages or modules which could be used in national systems. In order to accomplish this it was recommended that a small task force consisting of staff from both IARCs and NARS be established. TAC was requested to consider this idea further.
- There is an urgent need to improve the availability of literature on FSR; many of the existing publications have limited circulation.
- The Workshop recognized the role of IARCs in mobilizing political support for research with a farming systems perspective.

Concluding Remarks

The Workshop provided a better appreciation of FSR at the IARCs. There was broad consensus that FSR is not a new science but an approach. The weak extension services and poor linkages between research and extension systems in many developing countries - coupled with the fact that most of the research scientists who are currently active in the agriculture sector were not brought up on a farm and have not had close association with farmers problems - were considered to have been major determinants of why FSR has assumed such an important role in developing countries in recent years.

The issues raised at the Workshop and the conclusions reached were very similar to those stated at TAC 33 and in the TAC Review of CGIAR Priorities and Future Strategies (pages 33-34). The future of FSR in the CGIAR was not clearly defined. A number of participants were of the opinion that the IARCs should continue to play an important role in FSA and NFSD. OFR and FSAR should eventually disappear from the IARCs as NARS capacity increases.

STATEMENT OF THE REPRESENTATIVES OF THE IARCS  
WORKSHOP ON FARMING SYSTEMS RESEARCH

This note summarizes the views of representatives of nine IARCs who met at ICRISAT in February 1986. The consultation aimed at comparing and contrasting objectives, strategies, and methods in order to facilitate inter-center understanding and cooperation, especially in working with national agricultural research and extension systems.

**Clarifying the Concepts**

It was agreed that the essential underlying concept is that farming systems research is an approach to agricultural research.

A farming systems approach has the following characteristics:

1. Problem solving research which explicitly recognizes the farmer and other agents in the food system as the primary clients of agricultural research systems.
2. Research which recognizes interactions between different sub-systems in the farming system and which may often require a multi-commodity approach.
3. Research with an inter-disciplinary approach that requires close collaboration among technical scientists (physical and biological) and social scientists.

The farming systems approach aims to improve the efficiency and relevance of the agricultural research system, especially in terms of increasing the productivity and income stability of

small farming households while preserving the resource base. A farming systems approach is best incorporated through complementary on-farm and on-station research with farmers' perspectives playing an integral role in technology design and development. In a farming systems approach, on-farm research is conducted with farmer participation in order to understand existing farming systems, identify problems and research opportunities, test appropriate solutions, and monitor acceptance of improved technologies.

It was recognized that the farming systems approach is not in itself new to agricultural research. Successful research has almost always embodied the elements described above. However, because a lack of a farming systems approach has often limited the effectiveness of many research systems, it was felt that there is a need to formalize the inclusion of a farming systems approach as defined above in the programs of both national and international research systems.

On-farm research should largely be implemented through national systems with effective feedback mechanisms to on-station research in national and international research institutes. International Centers often have a comparative advantage in developing methods and in training for incorporating a farming systems approach in national programs. International Centers should also continue to have direct involvement in implementing some on-farm research programs in order to refine methods and to ensure that scientists at International Centers themselves are exposed to farmer problems.

It was agreed that IARCs with a mandate for a broad agro-ecological environment may experiment with farming systems which differ radically from existing farmer practices, in order to explore the potential productivity and stability of the resource base in that environment. Such research need not always have a farming systems approach, but is often an important supporting research activity with distinct objectives.

### **Impacts and Lessons from the Past**

A farming systems approach is now being adopted and incorporated by many research systems. This is reflected in increased contact between scientists with farmers, a greater sensitivity of scientists to the complexities of small farmer systems and changes in attitudes of scientists toward addressing farmer problems (both in national and international research systems). Results of on-farm research have been particularly valuable in feeding back information to on-station research and changing priorities accordingly. At the same time, as the farming systems approach matures in many programs, there is growing evidence of acceptance of technologies being generated.

Experiences gained over the last ten years have also provided guidelines for incorporating a farming systems approach in research systems. These include: a greater need to cement linkages between on-farm research and on-station research with scientists involved in both types of research activities: The need to have clearly defined objectives and terms for the various research activities which comprise a farming systems approach:

the need for commitment and continuity of personnel for effective research; and finally realistic expectations that several years are needed before research will have an impact on farmers.

Looking to the future, the group sees continued emphasis of the International Centers in training and support for incorporating the farming systems approach in national programs. Considerable work is needed to further develop methods for on-farm research and especially to formalize linkages of on-farm research with on-station research and with policy analysis. The International Centers should seek to improve collaboration among themselves, especially in sharing information on methods and in coordinating work with national programs and in jointly conducting training programs. It was noted that collaboration has been increasing and that this has been beneficial to both International Centers and national programs.