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Report of a Seminar

Women and Agricultural Technology: Relevance for Research

Volume 1 – Analyses and Conclusions

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Women and Agricultural Technology: Relevance for Research

Volume 1 - Analyses and Conclusions

Report from the CGIAR Inter-Center Seminar
on Women and Agricultural Technology
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User-Oriented Research: a Synthesis of the IARCS' Experience

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This presentation will not be a detailed summary of the background papers prepared by the centers; the papers are included in the document which you all received a few weeks ago. Instead, I will focus on the four issues which are discussed by most centers and will raise some questions which should be addressed before we can draw lessons from the centers' experience to date. The issues are 1) the importance of placing production into a broad context, which includes both macro and micro considerations, 2) the necessity of having valid and relevant data on decision-making in the household, 3) the role of the social sciences in agricultural research, and 4) the relationships between the international agricultural research centers (IARCs), national research organizations, and policy-makers.

I. THE IMPORTANCE OF PLACING PRODUCTION OF A COMMODITY INTO A BROADER CONTEXT WITH BOTH MICRO AND MACRO CONSIDERATIONS.

Several of the centers, especially CIP, CIAT, and CIMMYT, retrace how broadening the scope of what they take into consideration when analyzing opportunities for improved technology led to an increasing awareness of users' diversity in role, needs, and potentials. This awareness in turn led the centers to diversify their research activities and to become more user-oriented when establishing their programs. Broadening the scope of what they take into consideration should not be taken as strictly equivalent to using a farming systems perspective at the farm level. It may involve placing agricultural production in context over time, beginning with management decisions taken before the selection of crops, varieties, and farming practices, continuing with actual production, and followed by processing, storage, marketing, and so on, all the way to consumption. It entails considering the effect of a number of macro-economic and policy decisions which influence the adoption of new technology. In this process, the centers are forced to consider several sources of decisions, even within the household, and certainly within the regional or national economy.

The centers' experience with user-oriented research falls into three categories, organized by level of the units of observation: the farm, the household, and the region or nation. These three categories are complementary and not mutually exclusive. At the first level, the unit of observation is the farm, i.e., land plus livestock, taken as one management unit. It involves on-farm research and varying levels of complexity of component or commodity research. This type of research provides information on constraints and priorities directly linked to the

production process. It identifies the head of household, usually the elder man, as the decision-maker, and researchers interact with, and request information only from him. It may ignore any activity outside direct agricultural production and livestock that other members of the household may be involved in.

CIMMYT reports how using "the on-farm research procedures (it) developed obligates the researcher to take the user's perspective....the design of an experimental program, and the development of relevant technologies, depends on close communication between scientist and farmer. If women play an important role in the production process, then they will be included in the activities of the on-farm research program."(p.19). CIP points out, however, that research at this level "has tended to ignore most of the important activities after harvest when women play important roles"(p.29).

Shifting the analysis to the second level--the household rather than the farm--is clearly identified by CIP and CIAT as having led these centers to a more systematic integration of the users' perspective into their research priorities and approaches. At this second level of analysis, production of a given commodity is placed in the broader context of the household as a complex management unit. This perspective includes activities and decisions before and after actual production of a crop. It recognizes that individuals who are directly or indirectly involved in a farm have different rights and responsibilities, and that these individuals may influence actual cropping and production decisions, even if they are not actually working in the fields. CIP calls this approach the Food Systems Perspective and makes it the basis for its new thrust, which "will focus on obtaining information on priority problems and client needs in production, marketing, and utilization of potatoes in developing countries' food systems."(Annual Report 1983, p. 118). CIP reports that by "broaden(ing) the relevant themes in agricultural research, ... by including areas beyond field production, such as storage, processing, gardening, and marketing, the role of women and their technological needs become more relevant" (p.32). IITA and IFPRI also emphasize the importance of looking at the household complex and at its many tasks, from production to consumption.

Most of the centers also address a third level of analysis, where the unit of observation is broadened to the regional or national economy. This third level includes the policies that influence production, marketing, and industrial potentials, as well as factors that influence consumption preferences in rural and urban areas. Relevant policies can be very diverse, involving possibly pricing mechanisms, subsidies, marketing and import-export regulations, and availability of credit and support services. Factors influencing consumers' preferences may include questions of taste and tradition, and also relative prices, storage quality, and processing and cooking characteristics. These policies indirectly determine the likelihood of adoption of improved technologies or practices, because they influence the relative rate of return to particular commodities and their marketing opportunities, and so are taken into account by the producers when selecting cropping patterns and farming practices for each crop season.

How far an international center goes into this third level depends upon its mandate. As expected, the two centers with a non-commodity mandate, IFPRI and ISNAR, are also the two centers most active in analyses at this level. IFPRI is by definition the center most involved in "the analysis of national and international policies that influence food production, consumption, and trade." (p. 59). IFPRI studies cover a broad range of topics, which are "grouped into three component parts: i) the technology adoption process; ii) the effects of technological change on households and the distribution of impacts; and iii) the intra-household decision-making process in resource allocation." (p. 62). IFPRI includes laborers and consumers among users, and traces interactions between categories of users as well as "the differential impact of technology on various types of producers and consumers." (p. 75).

ISNAR's reviews of an agricultural research system consider national priorities and policies as well as existing farming systems. In its methodological guidelines, ISNAR specifies that the scope of work for these reviews should include a section on "the country setting" as well as sections on "contribution of research to development" and "linkages between research-extension-users". How research objectives are selected, and whether they seem appropriate to users' needs, is also reviewed. ISNAR is now developing methodological guidelines for the review of the agricultural technology management system in a country, that is, the broad array of organizations involved in technology generation and diffusion, and the policy context in which they function. The purpose of these guidelines is to help identify with minimal fieldwork those elements, whether within or outside a research organization, which determine the likelihood of adoption of the technology generated.

The commodity-oriented centers are also involved in some activities at this more general third level, usually through concern with consumption preferences and nutritional aspects of their commodity. IRRI, ICRISAT, CIMMYT, CIP, CIAT, and ICARDA are particularly active on this topic. IRRI, for example, analyzes how its success in increasing production led to economic changes (falling prices and increased demand for better quality grain) which in turn led IRRI to shift some of its research activities to place greater emphasis on grain quality for irrigated rice (p.127).

The centers report that work at any or all of the three levels of analysis discussed in this first section (farm, household, region/country) has two related consequences: (1) user-oriented research at any level requires data beyond those directly linked to biological production of a specific commodity; and (2) user-oriented research involves multidisciplinary teams, giving an important role to the social sciences in helping identify, develop, test, and evaluate improved technologies. I will discuss these two consequences in turn.

II. DATA REQUIREMENTS OF USER-ORIENTED RESEARCH

ILCA, IITA, ISNAR, and CIAT are particularly forceful in calling attention to the insufficiencies of available data, especially at the household level of analysis. This is particularly true of data on

individual responsibilities and obligations within the household, and on the way in which the ultimate decisions regarding cropping patterns and selection of practices and technologies are made at the farm level. Women's role in decision-making and production is often underestimated because of inadequate data, especially in Latin America and possibly in Africa. The problem has two causes, one conceptual, one operational.

Conceptually, the identification of the farm as the unit of observation is a problem because it artificially isolates crop and livestock decisions and activities from other productive and social activities. Operationally, it leads to gathering information from "the farmer," typically the man with social authority over the household. The sample interviewed is often biased in two ways: the head of household may not be fully informed of actual activities and priorities of individual members of his household, and he may distort facts to emphasize his control and authority over household affairs.

The data problems are particularly evident when it comes to activities and decisions of the women members of the household, because in many regions women have specific rights and obligations regarding production, and also have off-farm activities and income. In West Africa, women are typically free to cultivate individual fields outside the household fields (on which they must work but without controlling the use of the production). The product of individual fields is used in part to supplement feeding of the woman's children, and to be sold for personal income, without fully informing the head of household. Other sources of income for the women, such as processing and trade of agricultural products or crafts, are also kept apart from the household income. The same problem of grossly incorrect information on women's involvement in production or related activities is reported for Latin America, partly because of a rigid definition of household labor in statistical surveys.

Yet women's activities influence cropping and farming practices on household fields in at least two ways: first, they influence the amount of labor available for those fields, and second, processing qualities and marketing opportunities influence decisions on cropping patterns and choice of seed varieties, even if these decisions are apparently made by the head of household alone. This fact explains in part why some centers were led to a more coherent integration of the users' needs into their research activities when they broadened the scope of their observations. They were brought to break down the final decision into its original components and therefore became more aware of its complexity.

At the regional or national level of analysis, data on policy and economic structure of the country and data on the needs, potentials, and preferences of traders, processors, and consumers will all be necessary to establish priorities for research. Several centers stress the lack of readily available data on the basis of which research organizations could set their priorities and specify research objectives in line with national needs and goals. This need for information outside the strictly agronomic sphere requires the involvement of many disciplines outside the biological and physical sciences, with a number of consequences for staffing and organizational structure.

III. THE ROLE OF THE SOCIAL SCIENCES IN THE IARCs

All of the centers illustrate the important role of the social sciences at every step of research programming, implementation, and evaluation. While social scientists are present in all centers, their place and role vary, although most are involved in a cropping or farming systems program. This raises important questions on staffing patterns and for the organizational structure of the IARC and of national organizations, since most centers emphasize the importance of facilitating cooperation and coordination between the social scientists and their colleagues throughout the research process, including identification of promising research topics. CIAT states that the abolition of its economics unit and the dispersion of economists into each commodity team was a positive step, which led "economists to become involved in managing on-farm trials with economic evaluation of technology. The team approach appears to have stimulated economists to focus their research on very specific objectives relevant to the team effort, and this has maximized their influence and input to their respective teams" (notes to CIAT paper, p.1). CIP's Food Systems Research Thrust "crosscuts the nine technical thrusts in order to guarantee interdisciplinary exchange" (p.29).

However, an organizational structure in which social scientists are concentrated in one department does not necessarily prevent these scientists from contributing to the selection of research topics. ICRISAT, IRRI, CIMMYT, and IITA all have separate economics or social sciences divisions; yet all emphasize their interdisciplinary approach to research programs. ICRISAT is particularly explicit in describing how its village-level studies influence program decisions.

ISNAR raises the issue of administrative structure in its work with national research organizations, which are frequently weak in the social sciences, and where a sensitization campaign is often necessary to make policy-makers and researchers alike more aware of the importance of user-oriented research and of the potential role of social scientists. The question of the structural place of the social sciences in research organizations is quickly raised, because social scientists in some countries are likely to be concentrated in the universities, while biological and physical scientists are affiliated with the Ministry of Agriculture or a parastatal research organization. The problem may be compounded when an interdisciplinary team of outside consultants is involved in research with a farming systems perspective. Administrative traditions may make it difficult for a national organization to adopt the approach used in donor-funded projects, which are not always well integrated into the national organization. The very existence of these projects may tend to reinforce the isolation of social scientists from the mainstream of decisions related to research.

IV. THE RELATIONSHIP BETWEEN IARCs AND NATIONAL RESEARCH.

The division of labor and relative places of international and national centers is discussed by every center, which all state the national organizations as their primary client. Several centers also state as their client the beneficiaries of technology, or very explicitly, producers and consumers (e.g., CIAT, ICARDA, IFPRI).

However, some centers warn that the IARCs should not be too narrowly focussed in their research programs, nor should they be too location specific. These centers emphasize that specificity is the responsibility of national research, while the international centers, in ICRISAT's terms, should "develop technologies with broad tolerance windows" (p. 48). Yet, after the rapid increase in production resulting from the Green Revolution, international research is now faced with developing technology tailored to less optimal, more location-specific conditions. IRRI, for example, shifted some of its activities to non-irrigated rice because of "a growing realization....that the new technology had reached one out of four farmers in Asia" (p.126).

Four roles are mentioned for the IARCs in their relationship with the national research organizations:

- a. sensitization of policy-makers and researchers to the importance of including user considerations in priority setting and programming for research;
- b. information to policy-makers on potential technologies and on the importance of appropriate policies that encourage adoption of research results;
- c. development of methodologies for survey work, and for testing and validation of research, that take user considerations into account;
- d. training of researchers in the use of these methodologies , and in programming user-oriented research.

All of the centers emphasize the importance of incorporating user-oriented considerations into research priorities and programs for both international and national organizations. The IARCs are seen as playing a role of sensitization with national researchers and policy-makers on this topic, in ILRAD's terms, to "encourage, but not replace site-specific national-level efforts aimed at fully incorporating the users' perspectives" (p.119). ISNAR, no doubt because its mandate puts it in constant interaction with national leaders, is particularly emphatic on this role, but CIMMYT, ICARDA, and others also mention it as important and necessary.

The centers elaborate on the role that the IARCs should play to make policy-makers in the LDCs more aware of the potential of agricultural technology, and of the conditions necessary for the technology to be used successfully. On the matter of policies related to the implementation of research or to the adoption of existing technology, the centers all emphasize the role of national research leaders in informing policy-makers on the likelihood of adoption, with ILCA emphasizing that "when policy constraints are a limiting factor in adoption, national agencies are in an advantageous position to encourage policy changes" (p.108).

IFPRI examines the effectiveness of specific policy options for their impact on production and on different categories of users, particularly their differential income impact. IFPRI, which diffuses its studies broadly to national, international, and donor agencies, mentions several

cases of government or donor decisions reflecting its findings. Both IITA and IFPRI emphasize the importance of making data and findings broadly known and available, and IITA is now building up a reference collection of user-oriented literature.

The centers which most emphasize the need for appropriate data and for on-farm activities usually consider that the IARCs have a pioneer role to play in the development of methodologies for data collection and analyses that take user considerations and research requirements into account. These centers also see an important role in defining either appropriate recommendation domains in a region, or more generally in defining how recommendation domains can best be identified and which variables need be taken into account, for the use of both international and national research organizations.

Finally, most centers are very explicit in the importance they place on training of national researchers and research leaders, going beyond the strict transfer of skills to emphasize awareness of user diversity and circumstances, and the understanding of how research design should incorporate user and policy information. Training in on-farm or farming systems research is emphasized as an important responsibility of the centers. Training activities are very diverse and include, in addition to the usual courses and seminars at headquarters, a diversity of in-country courses, collaborative activities, and informal contacts. Several centers also mention the useful role of regional and topical networks, which facilitate exchanges and discussions between national and international researchers. Some centers highlight the importance for the IARCs of having direct training contacts with farmers (IRRI), with female researchers and female extension agents (CIP, ILCA), and with home economics graduates (IITA).

V. QUESTIONS FOR DISCUSSION

I will not end this presentation with recommendations. Dr. Swaminathan will do so this afternoon. Instead, I will present five questions which, in my opinion, arise from the centers' papers and need further discussion.

1. What is the optimal package of relevant factors to take into consideration when establishing research needs, priorities, and objectives? This could well be discussed at the three levels presented at the beginning of this paper: farm, household, and region/country. It is not yet a discussion of which producers may or may not adopt a given technology, but an effort to ascertain what current conditions and practices are found in a country or region. The answer to this question is a complex blend of information on physical, political, social, historical, and economic factors, specifying which factors cannot be changed and which could eventually be modified to increase the likelihood of adoption. Here the main danger is to feel obliged to know everything. An optimal package of factors includes only those which are absolutely necessary to making the right decision.

The other side of the problem is to appreciate the differential impact of new technology ahead of time, so that potentially negative

effects on part of the population can be identified while measures can still be taken to alleviate them. This goes beyond agricultural research, but research leaders need to bring the likely contribution of research to development to the attention of policy-makers.

2. How can national and international organizations best cooperate on matters related to understanding and integrating the users' perspective? The centers cite four roles for the IARCs: sensitization, information, methodology, training. Are the current approaches to collaborative and other activities between IARCs and national organizations filling these four roles? What would be the optimal approaches, given the IARCs' resources and mandates?

3. How can categories of users best be defined? How detailed and specific need the definitions be? Which variables are necessary and sufficient to define a user category? Does a recommendation domain always coincide with one individual category of technology users? IRRI points out that "modern (rice) varieties and fertilizer were widely adopted within irrigated and favorable rainfed environments. Adoption did not vary by size of farm or tenancy status...the benefits were fairly broadly distributed among landowners, operators, and landless workers"(p. 126). CIMMYT defines a recommendation domain as a "group of farmers whose natural and socio-economic circumstances are similar enough so that they are eligible for the same recommendations" (p. 16). ICARDA begins with ecological and agronomic zoning, then refines it for economic and management factors. Yet in areas of extreme soil diversity, a farm will typically include fields in different ecological zones. Selecting those factors which are likely to be relevant to adoption of a certain type of change, and therefore need to be included in the definition of user categories and of recommendation domains, is a key step in research, and one in which social scientists have much to offer.

4. Can women form either an appropriate recommendation domain or a user category? The three regional papers included in the background document and presented during yesterday's panel demonstrate the important role women play in agricultural production and, through various means, their influence on and participation in decision-making that influences technology adoption. Here I will discuss the place of gender in the definition of a user category or recommendation domain. First, one should be careful not to mix up a variable (gender) and a category (a group which can be treated as uniform). Even within a given culture, women are unlikely to form one uniform category in regard to agricultural technology. In a village, there are more differences than commonalities between the working day of the wife of the headman and that of the widow of a landless laborer. However, the variable gender does influence access to resources as well as rights and obligations towards the household; so it is relevant to problem identification and testing of potential solutions. ISNAR gives a clear example from Malawi, where male out-migration is very heavy; the main category of producers happens to share the variable of female gender. In the more usual division of labor by gender, either by tasks, by commodities, or a combination

of both, the question arises of how much (and how) gender may be a necessary part of the definition of recommendation domains.

It seems to me that the key issue is to obtain valid data and a correct analysis of a given situation, always placing production in its broad micro and macro-economic and social context. Once a problem and its parameters have been correctly identified, then appropriate technology can be generated without necessarily being keyed to a specific category of users.

5. Does an increased user orientation require changes in research staffing? The important role of social scientists is very clear from the centers' papers, and this group will probably want to discuss means of making it even more so. Here I wish to discuss the assumption found in several papers that female scientists are required for "women-oriented" research. I think this audience should be very careful to differentiate between designing and coordinating a research program, and gathering the data necessary for the program.

It is very true that in all cultures, the gender of the interviewer may influence the answer of the interviewee, and that it may be improper or very distorting for a male visitor to talk with a woman. There is no question that to gather valid data on intra-household decisions and division of labor, or to train female farmers in the use of a technology, some female field staff will usually be necessary. It does not follow that only a female scientist can design and coordinate the research program. Any knowledgeable and competent scientist can design an appropriate program as long as he or she is correctly informed of the situation. While first awareness of the role of women in production decisions may have come from female researchers, as reported by CIP, this may well be due to those scientists' discipline (anthropologists and sociologists) and their knowledge of rural conditions, rather than to gender. ISNAR points out that Thailand has a high percentage of female staff (34%) but that the majority are concentrated in Bangkok and are even less willing than their male colleagues to be posted out of the capital. A full use of what social scientists can offer matters more than an artificial search for female staff.

For each of these sets of questions we find the same key points: awareness of the diversity and complexity among users, and correct information on their situation. The first half of this seminar aimed at raising awareness among senior policy-makers in the CGIAR on both the relevance of the users' perspective and the particular characteristics of female users of technology. It also brought together for the first time much information on the past experience of the centers with these topics. But to be truly worthwhile, the seminar should lead to an agreement among the participants on desirable changes or initiatives in center activities. This is why, this afternoon, Dr. Swaminathan will present some concrete recommendations for your consideration, and why the remaining time in the seminar will be allocated to plenary and small-group discussions.

