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Report of a Seminar

Women and Agricultural Technology: Relevance for Research

Volume 2 – Experiences in International
and National Research

WAITE MEMORIAL BOOK COLLECTION
DEPT. OF AGRIC. AND APPLIED ECONOMICS

The Rockefeller Foundation

International Service for National Agricultural Research

Citation:

The Rockefeller Foundation and International Service for National Agricultural Research. Women and Agricultural Technology: Relevance for Research. Volume II - Experiences in International and National Research. 1985. The Hague, Netherlands.

Report of a Seminar

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Women and Agricultural Technology: Relevance for Research

Volume 2 - Experiences in International and National Research

**Report from the CGIAR Inter-Center Seminar
on Women and Agricultural Technology**

Bellagio, Italy, 25 to 29 March 1985

July 1985

The Rockefeller Foundation

1133, Avenue of the Americas, New York, NY 10036, USA

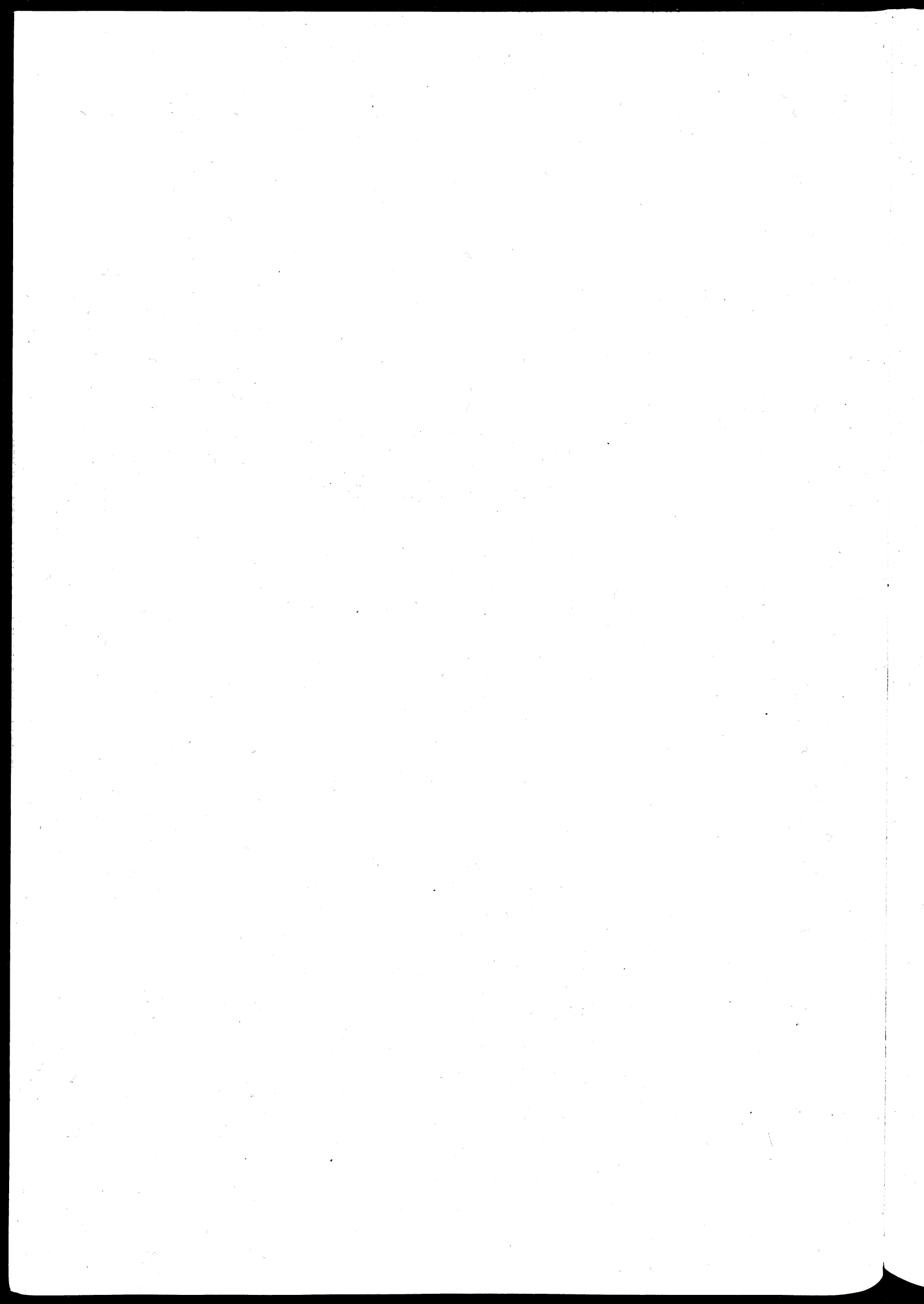
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Women and Agricultural Technology
Critique and Program Strategy

by

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1. IITA AND THE SCOPE OF ITS MANDATE

Established in July 1967, the International Institute of Tropical Agriculture (IITA) has a worldwide multicommodity-improvement mandate for cowpeas, soybeans, yams, sweet potato, cocoyams, plantains and bananas and for farming systems in the humid and subhumid tropics with the CGIAR SYSTEM and regional responsibility for maize, rice and cassava. On the basis of this mandate, the programs of IITA are organized into three groups: Crop Improvement, Farming Systems and the International Cooperation and Training Program. The crop improvement programs consist of the cereal improvement program which emphasizes the improvement of maize and rice for various environments in Africa, in cooperation with CIMMYT and IRRI; the grain legume improvement program which emphasizes cowpea and soybean; and the roots and tuber improvement program, in which priority is given to the improvement of yam and sweet potato worldwide and cassava in Africa in cooperation with CIAT. Included also are plantain and bananas. No other CGIAR institution has the complexity of IITA, either in terms of number of mandated crops or the supporting systems required technology. In the presentation to International Centers Week (Washington D.C., 9 November 1984) on EVOLUTION AND CHANGE AT IITA - THE WAY AHEAD, IITA Director General E. Hartmans explained that "the Institute's past research and achievements have brought it to the beginning of a new era of influence and impact in Africa - and this at a time when its work, and that of its sister institutes within the CG system are acknowledged to be critically important for the future of food production in the continent." (Hartmans, IITA 1984).

2. PRIORITY ON THE AFRICAN REGION

International news headlines focus on the famine, on the food aid requirements and not on the potential of agricultural development in the region. Africa is receiving the priority. Of the 38 countries listed by FAO's Global Information and Early Warning System on Food and Agriculture, 27 are African states (FAO, 1984). The World Food Program forecasts that yearly food output will drop below 100 kilos per person for 1984, whereas the requirement per person is about 145 kilos. However in some countries, food shortages are regional rather than national. Three Sahelian countries - Niger, Mali and Burkina Faso - have experienced bumper harvests in some regions, while suffering ruined crops in others.

One however cannot underestimate the serious food shortage, considering that during the 1970's, food production per person in the African Region dropped by more than 10%. The present situation is exaggerated by (1) population growth versus increases in crop production, (2) cereal imports and (3) food aid. Africa's population increased by 3% annually during the 1970's but food production rose by an average of only 1.8% a year. (FAO, 1983). Further constraints include a lack of trained personnel and supporting infrastructure. Over the past two decades, food consumption dropped below nutritional requirements and there is increasing dependency on food aid in some regions. The cereal import requirements for 1985 are

now projected to be 5.3 million metric tons, 65% more than the previous season. Export earnings are increasingly utilized for food purchases. In Sub-Saharan Africa alone the cereal import bills in 1979 and 1980 were equivalent to 30% of their total agricultural export earnings - while in some countries, these bills accounted for nearly all of these earnings. The result is that Africa has to depend heavily on foreign aid, especially food aid, to the extent that the region - despite having only 15% of the population of the developing world - now receives about 30% of official development assistance. Africa is also the largest recipient of food aid - receiving some 50% of all food aid flows to the developing world - a figure which has dramatically risen within the past few months (Economic Commission for Africa (ECA), 1984). All these factors - the drop in food production, the long term impact of nutritional deficiencies on efficiency and productivity in ensuing years and a possible dependency on food aid have major implications on "users categories" to accept new technologies.

The mandate of IITA as the only CGIAR crops research institute headquartered in Africa and the dedication of the scientists is based on the positive and potential factors of agricultural development in Africa. The FAO Study of Land, Food and Population shows that with new developments at the intermediate level of technology, the continent could feed up to five times its population by the year 2000. This prediction is significant, given the fact that the continent's population will double by that time. The intermediate technology level introduces limited use of improved varieties and agricultural chemicals, reduced fallow; animal traction as well as manual labor; some conservation measures and optimum crop mixes on half of the land (FAO 1983). Although FAO maintains that Africa has this potential by the year 2000, we realize that the interim task will depend on the development of supporting infrastructure, training and the promulgation of women's activities. It is difficult to imagine such an increased production level in 15 years, considering that in 1985, 85% of the land clearing done in Africa is completed with a short handled hoe, only 2% of the farms utilize mechanization and 13% animal traction.

The land on which IITA has a mandate in Africa is one dominated by shifting cultivation. In Africa, the area under shifting cultivation represents more than 30% of the estimated total exploitable area. The problem of land resources is unique to tropical Africa. Approximately 30 African countries are in the shifting cultivation areas with a population of about 300 million people (FAO, Tiffin, 1984).

IITA's audience is the traditional farming system, a complex situation in which the farm and household unit is made up of several component systems consisting of food and cash crops, compound/homestead garden, and animal production systems, with several non-agricultural activities (Okigbo, IITA, 1984). It is with this background of IITA's mandate, the seriousness of the African food situation and the complexities of a multiple crop farming systems so different from Asia that general constraints for "user categories" are presented. The last sections deal with IITA's experiences and future program strategies.

3. CONSTRAINTS FOR A MORE ACCURATE REFLECTION OF ALL USERS' CATEGORIES

3.1. Farming Systems/OFR has not adequately included gender variances

Much of the farming systems research has not adequately considered the role of women as decisionmakers and agricultural producers nor the household unit as part of the total farm perspective. The recording of work units, the development of recommendations domains and nearly all reviews, guidelines and methodologies for farming systems research have not considered sufficiently gender and resource variances. Data collection continues to be designed around the man as the head of the household. All male teams tend to concentrate on the work of the man in the field and "his" constraints to more efficiently adopt a technology. Some center staff have argued that factors related to gender should be considered only at the diagnostic/exploratory survey stages. Women's role still tends to be considered within the social categories without any economic value given to their contributions or an evaluation of potential negative consequences for women with the introduction of some technologies.

For instance, the issue of gender was not unanimously supported at the recent Inter-Center Consultation on Farming Systems Research in Eastern and Southern Africa (ILRAD, 18-20 October 1984, Nairobi). However, after considerable discussion it was finally decided that the final report could include this statement:

"There was agreement that trials should be evaluated by farmers and researchers using agronomic, economic and social criteria, such as household and nutritional factors, and the role of women." (CIMMYT, 1984).

Farming systems, in general, has not been sensitive to women's major input to agricultural production nor has an economic value been placed on the last three stages of the food system perspective - the post harvest, the food distribution and the food preparation and consumption stages. Yet extensive data regarding women's work in agriculture present a clear picture as to their contributions. In sub-Saharan Africa, women represent 46.2% of the official agricultural labor force (Dixon, 1983). Approximately 22% of the rural households in the same region are de-jure headed by women. In areas of high out-migration of males, the percentage of household heads which are de-facto headed by women is much higher, reaching 63% in one Southern African country (Buvinic, and Youssef, 1978).

With the introduction of new agricultural technologies, there are unintended consequences and many are negative consequences which increase women's work load, decrease independent capabilities for women's use of family income or limit the range of food crops for consumption at the household level. The introduction of technological change also affects the division of labor by sex. For instance, studies have indicated that to date more rice technologies have been introduced for men with negative consequences for women. In Madagascar mechanized ploughing has reduced men's labor input in this task and permitted an expansion in the area under cultivation which has in turn increased demand for labor in transplanting and weeding. Dey has written that the swamp rice development project in the Banfora region of Upper Volta (Burkina Faso)

imposes substantially more intensive cultivation practices (line transplanting, fertilizers, careful weeding and water control). Since rice production is entirely the women's responsibility, this has considerably increased their workload (Dey, 1983). The study by Burfisher and Horenstein indicates the additional work load for women in a development project among the Tiv in Nigeria. The project envisages an increase in productivity of nine major crops (including three coarse grain crops) in the hopes of raising the level of home consumption and of marketed surpluses. The crops are already grown by the Tiv with well demarcated divisions of labor and income for each of the crops. The study finds that while the annual labor requirements of the total farm are expected to increase by 14%, a disaggregation of the total farm indicates that women's annual labor requirements will increase by 17% while men's will increase by 6% (Burfisher and Horenstein, 1982).

Farm mechanization also can have a negative impact upon women's work load. A study in Sierra Leone found differential effects of varying technologies on male and female labor inputs in the sex-specific nature of some farm activities. In the Bolilands, mechanization almost completely eliminates the land preparation undertaken by men but increases farm size so that there is an increase in the demand for labor. In this case, females worked 50% more in the households utilizing primarily mechanized cultivation than in those using primarily hand cultivation (Spence and Byerlee, 1976).

As part of an IITA research program, Heather Spiro completed research on women's involvement in agriculture in two Nigerian villages. She concludes that the reasons of the continued "invisibility of women" are their involvement in food crops which biases their total contributions (Spiro, IITA, 1980). Ay and Nweke give another reason in that research findings in social studies still reflect the dominance of researchers and publications from industrialized countries. The authors conclude that the social background of these researchers is reflected in the descriptions of African societies often ignoring the different social structures (Ay and Nweke, IITA, 1984).

Adequately planning a multi-disciplinary and male/female OFP interview team is sometimes difficult. However, the relevancy of any on farm adaptive research - both for the design and application - must include women and men in all stages of design, implementation and evaluation. IITA has recognized this necessity. To address the imbalance and paucity of information concerning women, the IITA female socio-economists and several female counterparts were members of the IITA on farm research multi-disciplinary team which recently completed diagnostic surveys in five villages, Oyo State.

3.2. On-Farm Research Tends to Under-Estimate Women's Multi-Faceted Work in both Household and Agricultural Production

On-farm research has tended to under-estimate women's multi-faceted contributions. The emphasis remains on the field and usually one commodity. The reality is different. Time for household and agricultural work by season, by task and by family assignment is specific and ensures a delicate balance to maintain the multiple cropping system

which is predominant in the shifting cultivating/bush fallow system of African agriculture.

In general, most labor force statistics have a built-in tendency to underestimate women's contribution to production. Efforts to evaluate subsistence work carried out by women in the household have been the exception, rather than the rule (Beneria, 1980). However, these are recent endeavors to better define and value household production. Goldschmit-Clermont proposes that a monetary estimate be placed on the income in kind generated by the household. The value added being the "Expense forgone by the household as a result of producing instead of purchasing." (Goldschmit-Clermont, 1984). Another approach is the "New Home Economics Model" which assumes that if a household member works in the household rather than in the market, it is because returns from unpaid household work are perceived as equal to or higher than those from market work. IITA is assessing these models for appropriate inclusion in a farming systems strategy for the necessary balance between field and household and a value for work inputs in both the production and consumption cycle.

4. IITA'S EXPERIENCES WITH IDENTIFICATION OF USERS' CATEGORIES

IITA has considerable experience in identifying users' categories. Studies include a "Manual for Identifying Innovations for Small Farmers" (1979) which outlines a methodology and a proposed questionnaire for the testing of innovations which are the most acceptable to the farmer. A 1979 study on "Unit Farms and Farming Systems Research" specifies five unit farms corresponding to five different levels of technology for profit maximization. Another document highlights "A Farming Systems Approach to Tropical Agroforestry" (1980) with emphasis on smallholders. Two other documents focus on farming systems in various ecological zones - an overview on "Farming Systems in the Humid Zone of West Africa" has been undertaken by Kenneth Menz and "Farming Systems of the Nigerian Savannas" by J.B. Raintree. An excellent study by F. Nweke and F. Winch is on "Bases for Farm Resource Allocation in the Smallholder Cropping System of Southeastern Nigeria: A Case Study of Awka and Abakaliki Villages" (1980). A multitude of other studies have been crop specific, including "The Potential of Soybeans in Nigeria" (Knipscheer and Ay 1982) and "Cassava Bench-Mark Study" (Ezeilo, Flinn and Williams, 1980). Other studies have looked at multiple crops - "Benchmark Surveys of Three Crops in Nigeria - Wheat, Millet and Sorghum" (Knipscheer, Menz and Khadr, 1980) and "Survey of Food Crop Farming Systems in the ZAPI-EST", East Cameroon (Atayi and Knipscheer, 1980) (Complete listing - Appendix 1). Nearly all the studies were financed by core budget and undertaken by staff of the Agricultural Economics Unit of IITA. Most of the studies placed users' categories within the framework of (a) residency in an ecological zone or site, (b) one or a multitude of crops, or (c) a farm unit categorized by size or resource level. For the most part, little attention was given to gender factors or specific needs of female producers. In many of the earlier studies there was a major deficiency in the value given to women's agricultural work. Female work was often times calculated to be less efficient and transformation factors were utilized to estimate total labor input per unit area. One study on rice farming in the Plateau State of Nigeria clearly showed that a transformation figure of less than one for female labor was not

applicable within the "mandays and manhours" categorization. A closer assessment would have shown that women's work was equal and perhaps more efficient than male labor in tasks of seeding, transplanting, harvesting and marketing. Only a few studies have recognized women as independent owners of land and managers of much agricultural production and all marketing. Another major gap is the assessment of the household work as well as decision-making between men and women as to the type of crops grown, period of harvesting and quantities of food sold and consumed at home. Women's empowerment for compound/household crops, including multi-use trees, as well as the uses and nutritional importance of indigenous fruits and vegetables in traditional farming systems has been given little attention.

Several doctoral theses done in collaboration with IITA have focused more specifically on women's role in agricultural production and acceptance of new technologies. These include The Role of Women in Farming and Trading in Oyo State, Nigeria (H. Spiro, IITA, 1980) and Yoruba Smallholders Farming System (Zuckerman, IITA, 1973). Based on extensive interviews by the authors, a discussion paper on "Women in Food Production and Research" gives an excellent overview on women's work and status (Ay and Nweke, IITA, 1984).

5. IITA'S STRATEGY FOR MORE APPROPRIATE USERS' CATEGORIES

5.1. Institutional/Organizational

A user-sensitive approach to institutional and family acceptance of technologies is one of the objectives of the Socio-Economic Unit at IITA Farming Systems Program. An expanding unit, the staff consists of four socio-economists including two production economists, a social scientist and a social anthropologist. By the end of 1985, eleven socio-economists will be included as members of inter-disciplinary IITA Farming Systems teams in six African countries. As endorsed by the April 1984 Technical Advisory Committee (TAC), top priority is being given to the decentralization of IITA activities. The unit is one which aims to direct and assess research in IITA's Crop Improvement Programs and provide linkages and collaboration between staff in the Farming Systems and Commodities Programs.

A strategy for user approaches is now being developed for IITA's On Farm Adaptive Research. Until now, the emphasis has been on the agronomic factors of On Farm Research (OFR). Closer links between the OFR group and the Socio-Economic Unit, particularly for diagnostic/exploratory surveys has resulted in a broader focus on socio-economic features within the methodology. Early in 1985, an IITA manual/guidelines on OFR will be developed. Increasing attention will be given to gender and resource factors as well as household production.

5.2. Network Facilities

Networking is being recognized as an efficient means to make the best use of limited funds. Duplication and redundancy is avoided, scarce resources are utilized to the optimum and the communications between national staff and international centers can accelerate the transfer of technologies.

Two African agricultural networking groups have been assisted by IITA. One is the West Africa Farming Systems Network (WAFSRN) which is a seventeen-country network with plans to establish regional collaborative trials on cropping systems and to organize a series of workshops. 1985 workshops are planned for Cameroon, Togo and Senegal with a regional workshop planned for November, 1985. The other network is the West Africa Regional Cooperative for Research on Plantains which coordinates the activities of scientists engaged in research on plantains. Collaborative experiments include tissue culture, off-season production, weed control, plant nutrition, mulching, black sigatoka control, multiplication techniques and socio-economic analysis. In addition, IITA plays a major coordinating role for the International Association for Research on Plantation and other Cooking Bananas (IARPCB).

The strategy for a greater concentration on women's role in agricultural research and development has been to review the existing IITA-supported networks, their national and international affiliation and membership, source of donor support and to suggest a reorientation for a more balanced perspective within network membership and workshop/conference themes. One such example is the International Conference on International Cooperation for Effective Plantain and Banana Research scheduled for May 1985 in Abidjan, Ivory Coast. Additional funds have been obtained for a Roundtable on Women and Plantain and Banana Production and Utilization at the conference and to specifically invite women participants.

Most of the existing networks concerning women and development have not adequately considered agricultural research and certainly most of the agricultural research networks have not considered women. Therefore, emphasis is being given to the introduction of gender issues within agricultural research programs and agricultural research themes within women and development networks. With estimates of over 100 international networks in agriculture (Plucknett and Smith, 1984) IITA will be making an effort to sensitize and introduce gender factors for a more balanced "users' categories" within those networks related to IITA's mandate.

Linkages are being strengthened between IITA and the United Nations and several specialized agencies. With IITA representation at the African Regional Intergovernmental Preparatory Meeting for the World Conference to Review and Appraise the Achievements of the United Nations Decade for Women (Arusha, Tanzania, 8-12 October 1984), the following mandate was approved in the section on Agricultural and Food Production:

"The Consultative Group on International Agricultural Research (CGIAR) should give greater attention to the applicability of their research on household production for food crops and particularly the role of women in decision-making and in the process of technology transfer."

IITA has requested a Roundtable session on Women and Agricultural Research and a display at the Forum (Nairobi 8-17 July 1985) for the World Conference to Review and Appraise the Achievements of the United Nations Decade for Women (Nairobi, 15-26 July 1985).

Collaboration is being developed between IITA and the ECA Women's Training and Research Center for the dissemination of documentation on women and agricultural development to national institutions and researchers.

5.3. Linkages with National Institutions

During the past 10 years, IITA has collaborated with 31 national agricultural research programs in Africa; there are memoranda of understanding for on-going research and training with 12 African national programs, and with 9 universities worldwide. Increasingly, these agreements include the outposting of IITA scientists. There are decentralized activities in 7 African countries, and in Brazil and Southeast Asia, which together employ 27 staff. With the outposting of IITA teams and the increased staff in the Republic of Benin, Cameroon and Zaire, the total staff in those programs will be nearly 50 in 1985. The new center in the People's Republic of Benin is a major move into Francophone West Africa. Fifty hectares have been allocated for research and training facilities on the land of the University of Benin at Cotonou. A major training initiative in Eastern and Southern Africa will be possible with a multi-disciplinary farming systems team in Tanzania in agreement with the new Sokoine Agricultural University at Morogoro. Collaborations with national institutions have involved multilocational testing programs. The International Cooperation and Training program has strengthened relationships with a number of regional programs. These include the Semi-Arid Food Grain Research and Development (SAFGRAD) project with headquarters in Burkina Faso in which an IITA maize and cowpea scientific team has participated since 1978.

Several major activities are being undertaken immediately with existing resources, including (1) the training program; (2) assistance to the African Home Economics Association; and (3) documentation and information program.

- (1) A shortage of well-trained persons ranks as one of the most serious handicaps for the staffing of institutions to absorb the technologies and to be sensitive to appropriate user categories. Therefore, training is a top priority within the Institute's effort to strengthen national programs. Since 1970, there have been 3,238 graduates of IITA courses. Certainly these graduates have influenced national research and development capabilities. But there have been few women and every effort is now being made to increase their participation, both within the training courses and as masters and doctoral students affiliated with IITA's projects. In 1984, there were 445 IITA trainees, of which only 32 (7.2% of the total) were women.
- (2) A major review and reorientation is required of the home economics institutions with an introduction of more balanced home economics/agricultural curricula and in-service training in the agricultural fields. An assessment needs to be made on the levels and requirements of home economics extension staff in Africa - they form the largest cadre of female extension staff. Their numbers are in the thousands (Nigeria 5,000, Ethiopia 540, Uganda 405 and Kenya 635) yet their training is not equal to that of

their male agricultural extension colleagues. IITA is assisting the African Home Economics Association for an improved network facility and linkages with international donors for fellowships, particularly in the agricultural sciences and research fields.

- (3) For any institute to be sensitive to appropriate user categories, there must be available documentation at the institute's library and facilities to disseminate this information to national institutes and outreach staff. Given the shortage of necessary foreign exchange and funds for the purchase of books, provision of appropriate abstracts and articles can provide an invaluable service to cooperators and institutions throughout Africa. For that reason, IITA is increasing the number of socio-economic references at the library. Two thousand new entries on women and agricultural research are being abstracted and placed in the computer system. Priority will be given to the dissemination of this information to agricultural research institutes and agricultural colleges/universities as well as women and development national machineries/units, in collaboration with the ECA Women's Training and Research Center.

5.4. Major Trends of Special Program Areas

There are several major areas and shifts of emphasis within IITA's overall program which will shift attention of user categories. Most of this work will require additional resources and staff.

A. Compound and Homestead Utilization

There is nutritional importance and major potential for the development of indigenous fruits and vegetables within traditional farming systems. In the publication, "Tropical Leafy Vegetables in Human Nutrition", Oomen states that "the total number of wild tropical plants used as edible greens including 'weeds' collected in the field exceeds 1,500 species. Some 50 to 200 species in each area may be traditionally known, but they do not contribute more than 10% of the leafy vegetables actually consumed, because the knowledge of these wild plants is getting lost and their contribution to people's diet is decreasing". (Oomen, 1977).

In IITA-conducted interviews with female extension staff in Uganda, they assessed that the survival of many rural households was possible with intensified compound utilization - "household gardens", as they described them and a sudden emergence of traditional plant foods that had not been produced or consumed in years.

Surveys are being planned by IITA to further document the compound utilization - the structural composition, productivity, use and economics of homestead gardens and compounds. The preliminary and preparatory phase of this work will also identify the utilization of multi-use trees and shrubs.

Of continuing importance will be IITA's alley cropping food production method which is essentially an agro-forestry system which involves growing of food crops in alleys formed by hedges of trees or shrubs (Kang, Wilson and Lawson, IITA, 1984). The alley cropping maintains the

basic positive features of bush fallow. Research in the use of "food shrubs" and trees in alley cropping systems, with Leucaena, is considered a stable system for tropical agricultural production.

Since there are other international centers and institutions involved with compound/homestead utilization and alley cropping, it provides some collaborative work with International Center for Research on Agroforestry (ICRAF), ILCA, CIP, FAO and IDRC.

B. Appropriate Farm Equipment and Tools

The IITA agricultural engineers have developed some farm machinery suitable for no-tillage in the tropics. This equipment has included the farmobile which has been designed for small farms operating less than 5 ha, the rolling injection planter which is suited for the rough cleared forest and humid tropical conditions and simple hand-operated corn shellers. The economic assessment of this machinery has proven to be efficient and the technologies are being tested with on-farm experiments (Garman, Ngambeki and Navasero, IITA, 1982-83). A further assessment of this equipment will include its acceptability by women. Attention will also be given to the design of other equipment (machinery and tools) for women's agricultural work, as well as food processing, storage and marketing.

C. Women and African Food Crops

IITA should be initiating studies of women's role in both agricultural and household production. The perspective should be the total production cycle - from field to household and/or market for each of the mandated food crops. All stages within the food system perspective should be considered, including (a) food production, (b) post-harvest, (c) food distribution and (d) food preparation and consumption (Presvelou, 1982). Emphasis is to be given to women's empowerment on land access and use, decision-making as to household consumption or marketing and a monetization of work done in the household on that particular food crop. This approach will allow for a hopeful inclusion of gender and household factors within on-farm research with more quantifiable information on that food crop. Another factor to be studied in the methodology is the nutritional impact of a shift from subsistence to cash crops (Kennedy, IFPRI, 1984).

D. Utilization of IITA-Mandated Crops

At the World Cowpea Research Conference (4-9 November 1984), IITA was mandated to expand its cowpea utilization program. Priority attention is to be given to both cowpea and soybean utilization at the household level with an identification of traditional and improved methods of processing, preparation and storage.

Roots and tubers utilization should be further investigated. Roots and tubers are a major source of calories for over 35% of the population in Africa. New varieties of disease-resistant sweet potatoes have made dramatic production increases. Thirteen African countries are largely dependent on root crops for their food supplies (Gebremeskel, IITA, 1984). Participants attending the IITA East and Central African Regional

Root Crops Workshop (10-15 December 1984, Kampala) discussed the need for increased training, particularly designed for women, on roots and tubers production and utilization.

IITA welcomes the organization of this meeting by ISNAR on Women and Agricultural Technologies for a more effective "users' categories" research program. We hope the meeting will determine priorities and specify collaborative inter-center programs.

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