The Gender Variable in Agricultural Research

H.S. Feldstein, C.B. Flora, S.V. Poats
The International Development Research Centre is a public corporation created by the Parliament of Canada in 1970 to support research designed to adapt science and technology to the needs of developing countries. The Centre's activity is concentrated in six sectors: agriculture, food and nutrition sciences; health sciences; information sciences; social sciences; earth and engineering sciences; and communications. IDRC is financed solely by the Parliament of Canada; its policies, however, are set by an international Board of Governors. The Centre's headquarters are in Ottawa, Canada. Regional offices are located in Africa, Asia, Latin America, and the Middle East.

Le Centre de recherches pour le développement international, société publique créée en 1970 par une loi du Parlement canadien, a pour mission d'appuyer des recherches visant à adapter la science et la technologie aux besoins des pays en développement; il concentre son activité dans six secteurs : agriculture, alimentation et nutrition; information; santé; sciences sociales; sciences de la terre et du génie et communications. Le CRDI est financé entièrement par le Parlement canadien, mais c'est un Conseil des gouverneurs international qui en détermine l'orientation et les politiques. Établi à Ottawa (Canada), il a des bureaux régionaux en Afrique, en Asie, en Amérique latine et au Moyen-Orient.

El Centro Internacional de Investigaciones para el Desarrollo es una corporación pública creada en 1970 por el Parlamento de Canadá con el objeto de apoyar la investigación destinada a adaptar la ciencia y la tecnología a las necesidades de los países en desarrollo. Su actividad se concentra en seis sectores: ciencias agrícolas, alimentos y nutrición; ciencias de la salud; ciencias de la información; ciencias sociales; ciencias de la tierra e ingeniería; y comunicaciones. El Centro es financiado exclusivamente por el Parlamento de Canadá; sin embargo, sus políticas son trazadas por un Consejo de Gobernadores de carácter internacional. La sede del Centro está en Ottawa, Canadá, y sus oficinas regionales en América Latina, África, Asia y el Medio Oriente.

This series includes meeting documents, internal reports, and preliminary technical documents that may later form the basis of a formal publication. A Manuscript Report is given a small distribution to a highly specialized audience.

La présente série est réservée aux documents issus de colloques, aux rapports internes et aux documents techniques susceptibles d'être publiés plus tard dans une série de publications plus soignées. D'un tirage restreint, le rapport manuscrit est destiné à un public très spécialisé.

Esta serie incluye ponencias de reuniones, informes internos y documentos técnicos que pueden posteriormente conformar la base de una publicación formal. El informe recibe distribución limitada entre una audiencia altamente especializada.
THE GENDER VARIABLE IN AGRICULTURAL RESEARCH

By

Hilary Sims Feldstein, Cornelia Butler Flora, and Susan V. Poats

The Gender and Agriculture Project

Prepared for the Women in Development Unit

International Development Research Centre
Ottawa Canada

Material contained in this report is produced as submitted and has not been subjected to peer review or editing by IDRC Communications Division staff. Unless otherwise stated, copyright for material in this report is held by the authors. Mention of proprietary names does not constitute endorsement of the product and is given only for information.
FOREWORD

Since its inception in April 1987, IDRC’s Women in Development Unit has undertaken a number of training activities aimed at developing methodologies for and expertise in the incorporation of gender concerns into research on development issues. These activities have included not only training courses for researchers designed and administered by fellow researchers in developing countries, but also in-house training for IDRC staff.

This manuscript report resulted from one such in-house training exercise conducted with the staff of IDRC’s Agriculture, Food and Nutrition Sciences (AFNS) Division in Ottawa in September 1988. During an intensive, day-long session, participants were exposed to many different facets of gender analysis in agriculture. The intent of the training session was to provide a basic overview of gender analysis methodology and to articulate a few key questions that researchers should ask when undertaking research in agriculture. These relate to access to resources, participation in household and farm decision-making and the sexual division of labour.

This report provides a checklist of questions for agricultural researchers which will enable them to design gender-sensitive research projects. Although it is recognized that research in agriculture, and indeed, the nature and extent of women’s participation in agriculture varies immensely from one part of the world to another, this manuscript report has been prepared in such a way as to achieve maximum applicability in differing geographical settings. However, researchers who wish more detailed information on the integration of gender concerns into research design are advised to consult some of the further readings suggested in the bibliography.

Eva M. Rathgeber
Coordinator
Women in Development
TABLE OF CONTENTS

INTRODUCTION ................................................................. 1

PART I: RATIONALE ............................................................ 1
   FIVE BASIC FACTS ABOUT GENDER AND AGRICULTURE .......... 2
   THE GOAL OF AGRICULTURAL RESEARCH .......................... 3
   THE NEED FOR A USER FOCUS ........................................ 4
   PATTERNS OF GENDER RESPONSIBILITY IN AGRICULTURE .......... 6

PART II: TOOLS ................................................................. 12
   GENDER ANALYSIS ....................................................... 12
      A. Activities Analysis ............................................. 13
      B. Resources: Access and Control ............................... 18
      C. Benefits ........................................................ 18

   THE APPLICATION OF GENDER ANALYSIS ........................... 20

   GENDER ANALYSIS IN THE PLANNING, DESIGN AND TESTING OF
   AGRICULTURAL RESEARCH ............................................. 22
      A. Planning Agricultural Research ............................... 23
      B. Design and Testing of Alternative Solutions on Farms .... 25
         Varieties or species ............................................. 26
         Cultural practices .............................................. 27
         Nutrition and Protection ..................................... 29
         Post-harvest processing and storage ....................... 31

   METHODOLOGIES ......................................................... 32

   GENDER ANALYSIS IN DEVELOPING WOMEN-FOCUSED STRATEGIES .. 36
      A. Women-focused strategies in agricultural research ....... 37
      B. Women-focused strategies for other specialists which support improvements in
         agricultural production. .................................... 39

   MONITORING IMPACT ..................................................... 40

   THE WIDER IMPLICATIONS OF GENDER ANALYSIS AND
   AGRICULTURAL RESEARCH .............................................. 43
      A. Policy and infrastructure ..................................... 43
      B. Issues of Staffing .............................................. 45
      C. Training ......................................................... 46
TABLES AND FIGURES

FIGURE 1  The User Perspective and Technology Development  7
FIGURE 2  Agricultural Calendar Gender Disaggregated  16

TABLE 1  Pattern of Gender Responsibility  10
TABLE 2  Research With a Predetermined Focus  14
TABLE 3  Activities Analysis  17
TABLE 4  Resources For Farm Production Access and Control  19
TABLE 5  Benefits and Incentives  21
TABLE 6  Varieties or Species Trials  28
TABLE 7  Experimentation on Cultural Practices  30
TABLE 8  Considerations for Choosing Methodologies For Gender Analysis  33
TABLE 9  Checklist on Household Members Participation in On-Farm Trials  42
TABLE 10 Checklist on Household Members Participation in Farming Systems Research  44
INTRODUCTION

As we are ready to enter the 1990s, we need more than an awareness that women are important in agricultural production and processing in developing countries. We need tools that allow us to link that awareness to agricultural research. This brief monograph is aimed at providing those involved with agricultural research the rationale and tools for carrying out gender analysis.

It is intended for those engaged in agricultural research as researchers, policy makers, and project officers in developing countries in order to help them formulate and design agricultural research that will meet more nearly the needs of farmers in their countries.

PART I: RATIONALE

Most of the time, the practice of agricultural research relates to sex only in terms of the reproduction of plants and animals. Yet the fact that agricultural research, particularly that aimed at bettering the lives of the impoverished majority of individuals in developing countries, occurs in a social context requires looking at sex through its social construction, gender. All aspects of agricultural research, from problem selection to methodology to testing to dissemination, have social implications. The

1 The authors are listed in alphabetical order. Hilary Feldstein and Susan Poats are Directors of the Gender and Agriculture Project of the Population Council, New York City; Flora is a University Distinguished Professor at Kansas State University in the Department of Sociology, Anthropology, and Social Work.
challenge for agricultural research, a challenge which gender analysis helps to meet, is to begin to better specify research toward specific groups in order to increase both equity and efficiency. By specifying research by user group, we make explicit the actual biases inherent in technologies. For example, when we are developing a wheat variety that is most productive with high nitrogen inputs, we know that wheat technology is biased towards rich farmers. Class has definite economic identifiers across cultures. The gender bias in technology is less visible but equally pernicious.

Gender bias cannot be as readily identified, because gender is a more culturally defined characteristic than is class. Our ability to generalize about gender, particularly the interactions of gender with agriculture, are even more limited than our ability to generalize about such economic variables as income or land holding. Because it can be critical to understanding socio-economic constraints, it is important to initiate gender analysis at the beginning of problem selection for agricultural research in each specific setting. Moreover, the tools of gender analysis are generalizable to other socio-economic constraints. The application of gender analysis will help make researchers aware of the variety of non-agroecological constraints that must be overcome if the needs of limited resource farm families are to be met.

FIVE BASIC FACTS ABOUT GENDER AND AGRICULTURE

(1) Many households in developing countries have different income streams, his and hers, with different sources and different destinations within the household. For example, he may be involved with the tree crops, which are destined for an export market. She may have the crops grown under those tree crops, which she sells in a local market. His income may go to build a house or expand the amount of holdings. Her income may go to feeding the children and the children’s schooling.
(2) Even where there are not wholly separate income streams, there are socially assigned differences in men’s and women’s roles and resources.

(3) Increasing household income does not benefit all members equally.

(4) In most parts of the world, technological innovation has tended to disadvantage women relative to men.

(5) Women farmers are as productive as male farmers when given access to similar resources.

THE GOAL OF AGRICULTURAL RESEARCH

With this factual base in terms of gender and agriculture we can examine the goal of agricultural research as we are using it here:

the development of technologies that farmers will use to improve their welfare and that of their country

There are four parts to that goal, all of which have gender implications. The first is the development of technologies. Agricultural research is technology oriented. It is not just basic research, although basic research is crucially important for technology development ultimately to take place. Technologies are only effective if they are used. No matter how well new technologies work on the experiment station, if farmers will not use them, the development of those technologies will have been in vain. This is discussed in more detail below.

Next, those technologies must improve farm family welfare. Sometimes technologies can be used profitably in the short term but have unrecognized negative consequences in the medium term. For example, technologies that may increase male welfare through higher yields and cash income may not reach the rest of the farm family. Or technologies may benefit men, for instance the introduction of mechanization for land preparation, but not women, who must weed a larger area.
Finally, a technology should improve the welfare of the country. Thus, we are obligated to examine how agricultural research affects such problems as debt repayment, environmental deterioration, etc. as the part of the goal that includes national welfare. If national welfare is ignored, it is unlikely that the bureaucratic process within a country will champion the technology developed, even if it appears ideal for the small farmers involved.

Agricultural research is an on-going process and specific goals will change. As a technology is developed and used, the production system changes. A new constraint becomes the most limiting and a new technology must be derived.

In the context of any particular project or research, the goals may be more narrowly focused as a result of government policy, donor interest, or resources available. The focus may be on a specific crop or animal, or on cash crops only, or on food crops. It is important to keep such specific objectives in mind when applying the concepts of gender analysis described below.

THE NEED FOR A USER FOCUS

Technology development ideally responds to user needs. These may change as different constraints are overcome. The user perspective is important at two levels--who will use the new technologies (seeds, inputs, weeding regimes, etc.) and who will use the output of improved production. Those affected by the technology itself may be many and varied, depending on the scope of the farm operations involved. For users of the products (including by-products or residues), changes in the nature, amount, or timing of the output may have consequences. The opinions of both sets of users will influence ultimate acceptance of proposed changes.

In market economies, where farmers are fully integrated into a commercialized system and have adequate incomes, the process of
technology development is relatively easy. The technology is developed in response to the needs of those who will purchase the technology. Often this link between user and developer is through market research undertaken by the private sector in anticipation of profit. In parts of the U.S., Canada, and in many developing countries, when the technologies developed were not used by the farmers who were currently in an area, generally smallholders with limited resources, those smallholders were moved out or became agricultural labourers, and larger farmers who could use the technologies took over the land.

In developing countries, particularly for programmes aimed at limited resource farmers, this is not a viable solution. Moreover, in developing countries, the link between technology use and technology purchase is broken. The buyers of the technology (those who pay for its development) are international donors and the national governments, who may have little in common with the small farmers who will ultimately judge whether or not the technology meets their welfare needs.

One consequence of the separation of research from the user is that development research is often technology driven, not user driven. For example, an enthusiastic inventor comes up with a technology (such as a fuel-efficient stove) which then defines the need. This then prescribes a solution for and limits the definition of the problem. If the problem is stated first (such as problems of deforestation to which the use of wood for fuel is contributing), an agroforestry project might prove a more viable solution. An imperfect diagnosis of the problem, as well as an imperfect diagnosis of the needs and possibilities of the user has led in many cases to emphasis on a technology independent of the setting.

For all agricultural research to be justified, the problem must come before the technology. There must be much greater emphasis on developing technologies that farmers will use, not just technologies that are abstractly effective in reaching certain production goals. Adopting a
user perspective increases the efficiency of agricultural research through better targeting and specification. The relationship between the user perspective, technology development, and production systems is illustrated in Figure 1.

Appropriateness of a technology is often gender-specific, based on the social context of who within the household actually uses it. Only recently has the donor community become aware of gender as a variable and only recently has the donor community made gender analysis part of the criteria for project evaluation, although gender specificity has long been a part of how farmers decide whether or not to adopt the results of agricultural research.

PATTERNS OF GENDER RESPONSIBILITY IN AGRICULTURE

There is general agreement that there are five general patterns of gender responsibility in agriculture, all of which have implications for agricultural research (Cloud 1985). ¹

The first pattern is separate enterprises. Under this pattern, women and men are responsible for production and disposal of different crops and livestock within the household production system. Women may specialize in certain crops, as well as participate with men in the production of others. There may be a division between women’s subsistence crops and men’s cash crops, between two cereal crops such as millet and rice, women’s horticultural crops and men’s cereal crops, women’s swamp rice and men’s irrigated rice, or women’s goats and men’s cattle. Alternatively, women may specialize in poultry, small ruminants, gathering of wild crops, vegetables or tree crops, beans, cowpeas and other legumes. Researchers must ask if the research is being conducted on both male and female crops.

The second pattern is separate fields. In this pattern, women produce the same crops as those produced by men but in different fields. Women’s
Figure 1: The User Perspective and Technology Development
crops are usually for home consumption and local markets, whereas men's crops may have a regional or national market. This pattern is found in West African systems, where women's fields are usually part of a larger system in which the labour of both sexes is also contributed to the communal fields of the extended households. In this case there are three interlocking production systems, the wives' fields, the husband's fields, and the joint fields of the extended family. The researcher must ask if on-farm trials are carried out under his, her and their conditions.

The third pattern is separate tasks. In this pattern, some or all of the tasks within a single cycle are assigned by gender. Common task assignments include men preparing the ground, while women plant or transplant the crop. This pattern is particularly prevalent in rice production and in African horticulture. Seed selection and storage is done by women in many systems. Plowing is done by men in most systems. Certain types of plant protection may be assigned to women, and certain kinds of harvesting tasks may be assigned by gender. Processing and storage of cereals, vegetables, tree crops and dairy products are often women's tasks. Care of animals when they are young and sick is often women's work. Milking is often assigned to one sex or the other. Sometimes this differs by animals. For example among the Tuareg, men milk camels, women milk goats, while both may milk cattle. Research must ask if ex ante analysis suggests that a proposed technological change will greatly increase male or female tasks or displace wage labor for men or women.

A fourth pattern is shared tasks. In this pattern, men and women share tasks on the same crop. This may mean that it is acceptable for both men and women to do the task or that there is actual sharing of responsibility. In many systems only labour intensive tasks, such as weeding and harvesting, are shared. Researchers must ask if the new technology will make a particular cultural practice a separate task and
identify the implications of such a change for the rest of the system. A
shared task may signify greater flexibility in terms of meeting labour
demands for that activity.

The fifth pattern is women-managed farms. These are of two-types:
de facto and de jure. In the de facto system, men work away from the
farm for days, weeks or even years, while the women manage in their
absence. Cloud points out the variations, which are many. For example,
men may work off-farm but return each evening. Many Kenyan and
Japanese women manage farms during the week while their husbands work
in the city. In Nepal, some husbands may be absent for several months.
In Jamaica, Lesotho, Botswana, Yemen, Zimbabwe, and Senegal River
Basin, male migration abroad may last for years, while in some highly
patriarchal systems, farm management and the investment of remittances
may remain in the hands of older men. In many systems women become
the effective farm managers. Many of these farms command significant
resources, but women managers may still lack legal authority to sign credit
agreements and commit resources. Researchers must ask if the resources
necessary for technology adoption are available to these types of farms,
since the separation of ownership from management may greatly limit the
kind of technology that can be adopted.

De jure women-headed households are increasing rapidly. These are
households that are legally headed by women. They are some of the
poorest farming households and have few resources and severe labour
constraints. Yet, as Due and White (1986) point out, there are many
people that depend on de jure women-headed households for survival.
These patterns and their implications for research are summarized in
Table 1.

Just as we cannot assume that all farmers are alike and all households
are the same, we cannot assume that all women are the same. For
example, Jones (1983) in her study in North Cameroon found that women
# TABLE 1
Pattern of Gender Responsibility

<table>
<thead>
<tr>
<th>PATTERN</th>
<th>IMPLICATIONS FOR RESEARCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Separate crops</td>
<td>1. Is research being conducted on both male and female crops?</td>
</tr>
<tr>
<td>2. Separate fields</td>
<td>2. Are on-farm trials carried out under both his and her conditions?</td>
</tr>
<tr>
<td>3. Separate tasks</td>
<td>3. Does ex ante analysis suggest a proposed technological change will greatly increase or change in timing male or female tasks? Are the increase in task commensurate with benefits?</td>
</tr>
<tr>
<td>4. Shared tasks</td>
<td>4. Will the new technology make this a separate task?</td>
</tr>
<tr>
<td>5. Women-managed farms</td>
<td>5. Are the resources necessary for technology adoption available to these types of farms?</td>
</tr>
<tr>
<td>a. de facto</td>
<td></td>
</tr>
<tr>
<td>b. de jure</td>
<td></td>
</tr>
</tbody>
</table>
acted very differently in households where husbands were present versus households where they were not. In any situation where men were responsible for the cash crop of rice and women for the subsistence crop of millet, conflicting labour demands during the production cycle negatively affected the success of the government rice project.

Traditionally, economists and others assume that the cropping mix that yields the greatest profit for households in general will be adopted. This is often referred to as the household utility function. Given the relative prices of the two crops, under that assumption it would have been more rational for all households in the area to invest the necessary labour in rice, sell it and buy extra millet. That did occur in women-headed households where women were responsible for both crops. However, in households where the husband was present, women rationed their labour, investing it in rice in direct proportion to the amount of the money their husbands had given them as a gift at the end of the previous season. The rest of the labour went into millet to feed families. Intra-household relationships, not only whether one is the head of the household, but the degree to which women receive payment from men in recognition of their work, have a huge impact on what happens to the male related crop.

Jones argues persuasively that we should not assume a household utility function in planning projects, including agricultural research, but should instead look within the household.

Class and stage in the life cycle also differentiate women from one another. In a study conducted in Pescador, Colombia, it was discovered that young married women without children, were engaged directly in agricultural production and were market oriented, preferring beans for the urban market; older married women with large families and responsibility for feeding hired labour preferred a bean which swelled and was tasty. With this information, bean breeders continued development of both types (Ashby, 1989). Among the Tubai in French Polynesia, the women most
likely to take advantage of opportunities for commercial potato production are ones whose husbands are employed outside the home but who themselves are not (Lockwood, 1989).

Learning about different patterns of gender responsibility in agriculture may seem like too large a task. However, the tools of gender analysis described below define the range of inquiry so that agricultural researchers can focus on what is most important to their work.

PART II: TOOLS
GENDER ANALYSIS

Gender analysis, as does any socio-economic analysis of technology, starts with a series of questions related to 'who'. What are the goods and services produced and who produces what? What resources are available and who has access to or control of them? Who benefits? The scope of these questions will depend on how widely or narrowly the project or research objectives are already defined.

The 'who' may vary depending on the situation being investigated. Generally we start with Female Adults and Male Adults, but other categories may be equally or more important: landed or landless, family labor or wage labor, children, female heads of household and female spouses, female-headed households and male-headed households, senior males of extended families, etc. These latter categories may cross cut gender and be the source of further, important differentiation. The worksheets and matrices illustrated here provide the means for 'mapping' gender differences and relations in the production system and provide a framework for integrating this knowledge with agricultural research.²
Research with a predetermined focus

As stated earlier, the objectives of agricultural research may be set in advance of actual work in a locality. In a project with a 'predetermined focus' such as a specific crop or animal, the questions would begin with the operations of that enterprise. Information about other activities or resources which would contribute to or compete with the demands of that enterprise may also be relevant. Table 2 illustrates the critical 'who' questions and their implications for research. This set of questions is relevant whether research is in the laboratory, on the research station, or on-farm.

Farming systems or whole farm research

In a whole farm analysis, one would look at the full range of enterprises. Using matrices/worksheets such as those illustrated below, the research can be systematically evaluated in terms of not only costs and benefits, but in relationship to other enterprises. The individuals who actually do the work, contribute resources, and benefit from it are identified.

A. Activities Analysis

In most farming systems work, one diagnostic step is the construction of an agricultural calendar. This shows the seasonal pattern of enterprises over the year. In order to fully capture the pattern of and constraints upon labour the calendar should be constructed with all production activities, not just major crops. The calendar should also include:

1. **domestic production** or home maintenance including collecting fuelwood and water, childcare, cooking, house construction and repair, etc. Gender analysis is never complete unless women's reproductive roles, which include not only bearing children, but providing the daily needs of the household, are taken into account.
## TABLE 2
Research With a Predetermined Focus

<table>
<thead>
<tr>
<th>WHO</th>
<th>RESEARCH QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>makes decisions?</td>
<td>Is the proposed technology oriented to their goals?</td>
</tr>
<tr>
<td>does the labour?</td>
<td>Will it increase or decrease their burden?</td>
</tr>
<tr>
<td>controls land and capital resources?</td>
<td>Will it demand their use?</td>
</tr>
<tr>
<td>uses the products produced?</td>
<td>Does the produce meet all their needs?</td>
</tr>
<tr>
<td>controls the outputs?</td>
<td>Does the beneficiary also pay the costs?</td>
</tr>
<tr>
<td>knows about current farming practices?</td>
<td>Will the checks take account of both male and female knowledge?</td>
</tr>
</tbody>
</table>
any gathering activities. Many important items for subsistence or sale are acquired by gathering in wild or public areas. This may be seasonal or on-going.

(3) non-farm production of goods and services through wage labour or other activities. In areas with landless households engage in wage labour this includes the identification of the activities upon which they depend for income.

(4) home processing of farm production or gathering which provides marketable goods for sale, such as baskets or beer; and, finally and most importantly, the activities on the calendar should be disaggregated by gender. This is illustrated in Figure 2.

The complete gender disaggregated calendar shows where there is competition or tradeoffs between enterprises which may affect willingness to devote extra labour to the enterprise of interest to researchers. For instance, in Figure 2, there is a potential conflict between planting, fertilizing and weeding of hybrid maize and the planting and weeding of sorghum, all tasks done by women. If a second weeding of maize had been proposed, the calendar indicates the labour may not be forthcoming if women choose (and can choose) to work on sorghum or that sorghum production will decline. Recognizing women’s labour constraint during November and December, researchers might focus on labour saving technologies in either enterprise which would reduce the burden and/or increase productivity.

An alternative way at looking at activities is illustrated in Table 3. While this does not capture seasonality, it does provide a systematic look at the pattern of gender responsibility for specific enterprises or tasks.

When recording the gender pattern of activities, it is important to observe how rigid or flexible the gender specification of task seems to be. Traditional roles may be changing under conditions of modernization and what people say they do may not be the same as what they actually do.
Figure 2: Agricultural Calendar Gender Disaggregated

<table>
<thead>
<tr>
<th>Climatic Pattern</th>
<th>HOT/DRY</th>
<th>WARM/WET</th>
<th>COOL/DRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>SEPT</td>
<td>OCT</td>
<td>NOV</td>
</tr>
<tr>
<td>Stumping</td>
<td>SP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize Hybrid</td>
<td>LP</td>
<td>P</td>
<td>W</td>
</tr>
<tr>
<td>Maize Traditional</td>
<td>LP</td>
<td>P</td>
<td>H</td>
</tr>
<tr>
<td>Sorghum</td>
<td>LP</td>
<td>PB</td>
<td>WT</td>
</tr>
<tr>
<td>Beer Brewing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finger Millet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>R</td>
<td>P</td>
<td>W</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>R</td>
<td>P</td>
<td>W</td>
</tr>
<tr>
<td>Sweet Potatoes</td>
<td>M</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Collecting Firewood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrying Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding Small Livestock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childcare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House Construction and Repair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fence Construction and Repair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle Herding</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend**
- Female Adult
- Female Child
- Male Adult
- Male Child
- Continuous Activity
- Intermittent Activity

- Sp Stumping (Pulling/digging stumps of trees out of fields)
- ST Stooking (Cutting and stacking, "tepee style", stalks with grain still attached)
- LP Land Preparation
- R Ridging
- M Mounding
- P Planting
- PB Planting by Broadcast
- F Fertilizing
- W Weeding
- T Transplanting
- BS Bird Scaring (12 hrs/day)
- H Harvesting
- L Lifting
- SH Shelling
- PK Packing
- TR Transporting
# TABLE 3
Activities Analysis

<table>
<thead>
<tr>
<th>MALES*</th>
<th>FEMALES*</th>
</tr>
</thead>
</table>

## CROP PRODUCTION
- Crop/Field 1
  - Task 1
  - Task 2
  - Task 3
  - etc.
- Crop/Field 2
  - Task 1
  - Task 2
  - Task 3
- Crop/Field 3

## LIVESTOCK
- Animal 1
  - Task 1
  - Task 2
  - Task 3

## HOUSEHOLD PRODUCTION

## OFF FARM PRODUCTION

*KEY: MA=Male Adult, MC=Male Child, FA=Female Adult, FC=Female Child;* 
*Or other important categories: ethnic, class, age, position, etc.*
B. Resources: Access and Control

Research on agriculture in developing countries needs to take into account the resources or inputs that are required for farm production. Obviously, one would not suggest a crop with high moisture requirements in an area of dryland agriculture with irregular rainfall. However, one would also not look at a crop requiring irrigation when water for irrigation is controlled by a different class or a different gender than the one responsible for the crop. Thus, one needs to analyze the resources for agricultural production in terms of both access and control. Control of a resource or input implies decision making about its use. Access to a resource implies conditionality about using it and how it is used. These inputs include labour, land, water, cash, seed, fertilizer, and implements. Sometimes, access is mixed. For instance, where fields are allocated to women by senior men, the amount and location of land are controlled by him. However, what is planted and how it is managed are probably decided by the woman. We cannot assume if males control one input, they will necessarily control the others. In particular, seed or germplasm is often controlled by females. Even if men use the technology, if women control the purse, as is the case in many parts of Asia, it will be crucial for technology adoption that the technology be evaluated in terms of the male and female criteria for effectiveness. A worksheet for organizing information on access to and control of resources is illustrated in Table 4.

C. Benefits

There are a number of potential uses for the outputs of production. These include: consumption; storage for later consumption, later exchange, or later sale; other domestic uses, such as fuel and building materials; exchange; sale; and reinvestment in agricultural production, such as manure, fodder or fencing.
TABLE 4
Resources For Farm Production
Access and Control

<table>
<thead>
<tr>
<th>WHO HAS ACCESS?</th>
<th>WHO HAS CONTROL?</th>
<th>WHAT ARE THE IMPLICATIONS?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who Uses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LABOUR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hired</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INPUTS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Purchase or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produced on farm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germ plasm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertilizer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pesticides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPITAL GOODS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fencing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CASH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGRICULTURAL CREDIT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARKET/TRANSPORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUCATION</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

KEY: MA=Male Adult, MC=Male Child, FA=Female Adult, FC=Female Child
In making sure that agricultural research provides technologies that will be adopted by the farmers, and will increase farmers’ welfare, it is often useful to work out a matrix of the uses and benefits of production to provide some insight into farmers’ incentives. This is illustrated in Table 5.

In analyzing benefits there are three important questions to consider:

1. What are the products? Are there products of post-harvest processing of a 'minor' crop which are important sources of income? For instance, is there beer brewing from traditional sorghum or holiday delicacies from glutinous rice which are an important source of income?

2. What are the uses and desirable characteristics of these farm products, including uses of all parts of the plant or animal?

3. Who has access to or control of the products and the income they produce? Will this pattern be an incentive or hinderance to the allocation of any additional labour or resources required by a new technology?

In later analysis, disaggregation of costs and benefits by gender helps anticipate which technologies will be accepted by whom. But it is important to understand the farmer’s calculations. Whose capital is invested, and who keeps the capital earned? Whose animal power is used, and who keeps the crop produced? Factors other than yields and returns frequently affect farmers acceptance of proposed changes. This is particularly true in limited resource peasant households. Ability to quickly identify these factors by gender can help enhance understanding the whole farm system and provide criteria against which to evaluate further research.

**THE APPLICATION OF GENDER ANALYSIS**

The gender analysis of activities, resources, and benefits improves on-farm research when it is used to

1. plan solutions to test,
## TABLE 5
Benefits and Incentives

<table>
<thead>
<tr>
<th>CROP PRODUCTION</th>
<th>LIVESTOCK PRODUCTION</th>
<th>HOUSEHOLD PRODUCTION</th>
<th>OFF-FARM ENTERPRISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO HAS ACCESS?</td>
<td>WHO HAS CONTROL?</td>
<td>USES OR CHARACTERISTICS?</td>
<td></td>
</tr>
</tbody>
</table>

1. What are the products? or proposed changes?
2. Who benefits? Who has access to and control of or income from each product?
3. How are products from farming used*?

*Uses include consumption; storage for later consumption, later exchange, or later sale; other domestic uses such as fuel and building materials; exchange; sale; and reinvestment in agricultural production, such as manure, fodder or fencing.
identify fruitful areas needing component research,
do ex ante analysis of proposed solutions,
identify whose interest is at stake and assuring that the "who",
male or female, is adequately involved in on-farm experimentation, and
identify desirable characteristics of new technologies and the
criteria by which they will be evaluated.

Gender analysis contributes substantially to planning and design in
two ways. The first is in the better design and testing of new technologies
for agricultural production by taking into account the actual patterns of
activities and resource use. This results in greater efficiency in the
application of technologies and in the use of scarce resources for research.
Second, gender analysis contributes to the appropriate targeting to women
where equity objectives are important or in otherwise designated women­
focused projects. We shall first discuss its application to agricultural
research, broadly defined; second to women-focused projects.

GENDER ANALYSIS IN THE PLANNING, DESIGN AND TESTING
OF AGRICULTURAL RESEARCH

Frequently gender analysis stops with diagnosis...a nice set of tables
about men’s and women’s tasks. The utility of gender analysis comes with
its application to the design and evaluation of on-farm research. Social
scientists or technical scientists responsible for insuring the user
perspective is taken into account should be involved throughout the
research effort, in design, strategies for implementation, and on-going
evaluation.

In the planning, design, and testing of on-farm research, it is crucial
to make clear assumptions about resource and labour availability. If those
assumptions are laid out, they can then be tested in the empirical situation.
The maps or matrices developed by the analyses shown above become a
"screen" against which research possibilities can be examined and the design of specific experiments fine tuned to meet local circumstances.

A. Planning Agricultural Research

During planning, the results of previous diagnostic work and experimentation are used to determine which problems or constraints are amenable to on-farm or on-station experimentation; what level of experimentation is appropriate (exploratory? refinement? regional testing?); and which problems need further diagnostic work for clarification. This becomes the basis for determining research priorities and strategies for the season or year.

The planning stage is an opportune time to identify those problems in agricultural production which may have their solutions outside of agricultural research and to refer them to the appropriate specialists. This is particularly true of the many demands on women's time. Freeing up that time, so it is more available for crop and livestock production activities or the extra labour of more intensified production, may be critical to improvements in the farm system. But the innovations required may be better done by other specialists: home economists, community development agencies, appropriate technology specialists. These are discussed in more detail below.

Russo et al. (1988) have come up with a number of questions that are extremely useful in examining the research components of agricultural projects.

(1) Will research consider the economic and technical feasibility of proposed solutions for farmers with limited resources and limited access to inputs as well as for high resource farmers?

(2) What is the role of women in the production of crops and livestock activities selected for research?
(3) Will on-farm trials, if any, include women as well as men cooperators?

(4) Will the impact on the demand for and return to family labour be examined in comparing alternative technologies?

(5) Will women as well as men farmers be asked to evaluate proposed technologies, such as improved varieties?

(6) Will a special effort be made to ensure that women farmers participate in field days and other technology dissemination activities?

Once again, the issues raised here are raised by any kind of socio-economic analysis but are particularly relevant for gender research.

To resolve these issues, these same authors suggest the following solutions:

(1) disaggregate analysis of proposed technologies to examine their feasibility for low resource farmers, such as women, as well as high resource farmers;

(2) include efforts to develop technology suitable for low resource farmers as well as to develop high input technologies;

(3) include women farmers in on-farm trials;

(4) conduct field days for women with local language translation if necessary, or incorporate specific efforts to ensure women's participation in general field days and other dissemination efforts; and

(5) conduct research on traditional food crops, traditional livestock varieties, and other agricultural activities managed by women as well as men.

This last solution is perhaps the most challenging, particularly regarding traditional livestock varieties. Livestock research tends to be based on breeding programmes or enclosed management systems, which assume that the problems of limited animal nutrition and animal disease will be overcome by existing technologies. Work with traditional livestock varieties will often require a farming systems approach that can
increase animal nutrition through better crop management practices and improve animal health through livestock management practices which often are not familiar to individuals trained in the conventional animal science programmes. Such research may often involve species unknown in academic circles, such as IDRC's work with guinea pigs. Animal research, in particular, requires innovative training and a conscious effort to use the species already in the farming system, rather than attempting to introduce new species that often require higher protein diets in order to maximize their genetic potential. For example, research carried out in Mexico showed that an attempt by the government to introduce improved turkey varieties for peasant households resulted in good gains for well-to-do peasant households. However, the introduction was disastrous for poor peasant households, often headed by women, who did not have the capital resources to provide the necessary shelter for the turkeys nor the protein supplement and antibiotics necessary to keep them alive.

B. Design and Testing of Alternative Solutions on Farms

Once the area of agricultural research has been determined, including the crop or animal enterprise to be addressed and what constraint is sought to be overcome, research with limited resource farmers generally leads to on-farm research. Whether the research is on crops, livestock, or trees, trials focus on one or more of the following topics: variety or species, cultural practices, nutrition and protection, and post-harvest processing or storage. Building on the information obtained in the initial gender analysis, the design of (and assumptions underlying) trials and the specification of information to be collected for their evaluation, should explicitly take into account specific users' perspectives.

For each of the research areas listed above, Poats, Feldstein, and Rocheleau (1989) lay out a number of research considerations where the application of gender analysis is valuable.
Varieties or species

The specification of desirable characteristics for a proposed new variety or species should take into account current or desirable uses as defined by farmers and users. This applies to laboratory and research station work as well. Other considerations to incorporate into the design of varietal or species trials include:

(1) Activity analysis to indicate whether women and men have different management practices for the same crops. When testing the performance of new varieties, both male and female management practices should be included.

(2) Activity analysis to predict how changes in the seasonality of labour demands associated with new varieties will affect labour allocation of different household members. The changes in labour pattern should be monitored, by gender, to determine if the system adjusts to the new pattern or whether it results in constraints in another enterprise. Those whose patterns are actually changed should be interviewed.

(3) Resource analysis to indicate whether men and women use different cultivars. Both sets of cultivars should be used as farmer checks.

(4) Resource analysis to indicate who maintains the knowledge system with regard to native species or varieties used in the total production and consumption systems. Their knowledge should be systematically sought in evaluating the advantages and disadvantages of the introduced varieties.

(5) Benefits analysis to specify which crops have several purposes and who are the users of various products. Are all user preferences taken into account when determining desirable characteristics to the breeder? For example, when young green leaves are used for snack food, relish or beer brewing to pay labourers, and late season leaves are used for fodder, are these included in the breeding programmes (Jiggins, 1988)? Are core
requirements of post harvest storage and processing taken into account? Are all the product users included in the evaluation of product?

(6) Benefits analysis to identify household production or processing which provides significant income. Can production of the raw material be improved by a change in varieties? What may seem like a minor crop because of the small amount grown, may be an important contributor to household income. The questions raised by gender analysis and their research implications are summarized in Table 6.

Cultural practices

The management and practices associated with crop and livestock production include such things as spacing, timing, sequencing, crop and tree care (pruning, weeding, etc.), animal breeding, land and water management, and mechanization. Issues for assessment and design include:

(1) Activities analysis to specify who does what and the degree of flexibility each person has in doing tasks. Women’s availability for gender specific tasks is often a constraint. If women plant, and experimental treatments include row planting with different spacing, women must be consulted about trial feasibility and must learn the experimental techniques. It is women’s changes in labour inputs which must be monitored. This may require plot sizes large enough to monitor labour inputs in a realistic manner.

(2) Activities analysis to identify whose labour is being saved or displaced by mechanization. If women have formerly done the task, either as unpaid family labor or for wages, they should be given the opportunity for training even if working with draft animals or machines is a new behavior.

(3) Activities and resource analysis of tasks done by either men or women to determine if the opportunity costs for additional labour are the
TABLE 6
Varieties or Species Trials

<table>
<thead>
<tr>
<th>ISSUES RAISED BY GENDER ANALYSIS</th>
<th>RESEARCH AND DESIGN IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activities Analysis:</strong></td>
<td></td>
</tr>
<tr>
<td>-- Do men and women have different management practices for the same crops?</td>
<td>Trials should be put on both men's and women's fields</td>
</tr>
<tr>
<td>-- What is the seasonality of the traditional labour patterns? Will this be affected by the timing of the new variety?</td>
<td>Do ex-ante analysis to determine potential conflict</td>
</tr>
<tr>
<td></td>
<td>Monitor actual labour by gender to determine whether it fits existing system or sets up new constraints (including household production)</td>
</tr>
<tr>
<td><strong>Resources Analysis:</strong></td>
<td></td>
</tr>
<tr>
<td>-- Do men and women have different traditional cultivars?</td>
<td>Both sets of cultivars should be used as farmer checks</td>
</tr>
<tr>
<td>-- Who keeps the knowledge of traditional varieties?</td>
<td>Seek their opinion about desirable characteristics</td>
</tr>
<tr>
<td></td>
<td>Interview them in evaluating the experimental varieties</td>
</tr>
<tr>
<td><strong>Benefits Analysis:</strong></td>
<td></td>
</tr>
<tr>
<td>-- What are all the end products and who are the users?</td>
<td>Are all their criteria included in specifying desirable characteristics?</td>
</tr>
<tr>
<td></td>
<td>Are all involved in evaluating varieties after harvest?</td>
</tr>
<tr>
<td></td>
<td>Are tests which include their end use included in the trial design?</td>
</tr>
</tbody>
</table>
same and to apply any difference in costs appropriately in economic evaluation (Low, 1987).

(4) Activities analysis to clarify who 'owns' separate crops in a field. How is the non-research crop affected by new practices? Is its productivity enhanced or reduced?

(5) Resource analysis to predict which farmers have the implements necessary to engage in new practices. For instance, in Botswana, only those farmers who controlled draft power or had ready cash for hiring it were able to carry out trials on a double plowing before planting. Trials on different practices, thinning and hand planting were targeted towards farmers, particularly women, who could not do double plowing.

(6) Resource or benefits analysis to determine who has access to and control of the fields and trees. If new land is to be brought into cultivation, whose interests need to be safeguarded or compensated?

(7) Activities and benefits analysis to determine who does milking? What are its alternative uses (calf, home consumption, sale)? What are the benefits as seen by the person doing the milking in determining how much goes to each? Production for meat sold by men may conflict with production for milk which can be processed and sold by women. Monitoring should include actual offtake and uses by those doing the milking as well as interviewing a larger group to better understand tradeoffs. The application of gender analysis to trials affecting cultural practices is summarized in Table 7.

Nutrition and Protection

Nutrition and protection includes such activities as fertilization, forages, enrichment programmes, pesticides, vaccinations, and fencing. Researchers should look at the following to determine and design appropriate trials.
# TABLE 7
Experimentation on Cultural Practices

<table>
<thead>
<tr>
<th>ISSUES RAISED BY GENDER ANALYSIS</th>
<th>RESEARCH AND DESIGN IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activities Analysis:</strong></td>
<td></td>
</tr>
<tr>
<td>-- Who has specific responsibility for the task in question?</td>
<td>-- Those who do the task should be involved in determining feasibility and in learning how to do proposed innovation.</td>
</tr>
<tr>
<td>-- Is there flexibility in task assignment?</td>
<td>-- If opportunity costs are different, are different costs being applied to the economic evaluation?</td>
</tr>
<tr>
<td>-- What are the alternative uses of labour; are they different for men and women?</td>
<td>-- If researchers make the implements available, are they also investigating long term availability?</td>
</tr>
<tr>
<td><strong>Resource Analysis:</strong></td>
<td></td>
</tr>
<tr>
<td>-- Do all farmers have equal access to implements needed for new practices?</td>
<td>-- Trials on practices designed to increase productivity of one crop should include monitoring the affect on associated crops.</td>
</tr>
<tr>
<td>-- Who 'owns' separate crops in a field?</td>
<td>-- Can the opening up of new land with land extending mechanization safeguard the most important trees?</td>
</tr>
<tr>
<td><strong>Benefits Analysis:</strong></td>
<td></td>
</tr>
<tr>
<td>-- Who harvests from trees, shrubs and other plantings in 'unused' or semi-public lands?</td>
<td>-- Trial design should incorporate means of identifying and compensating for tradeoffs.</td>
</tr>
<tr>
<td>-- Who benefits from milking offtake?</td>
<td></td>
</tr>
</tbody>
</table>
(1) Resource analysis to identify who has control of the local products, or the cash or credit necessary to acquire inputs. Does women's lack of access to proposed inputs limit the likely spread of these technologies or suggest the need for alternative labour intensive approaches?

(2) Activities analysis to indicate who is affected and who must be taught techniques of application when new technologies are applied. What are the tasks associated with applying the inputs? Are they labour saving or labour using? Are the opportunity costs correctly estimated according to the gender of who is doing the task?

(3) Activities or benefits analysis to indicate what other products might be at risk when herbicides or pesticides are introduced as in cases of intercropping different people's crops. Design should specify steps to protect those crops or provide an equivalent way of growing them.

(4) Activities analysis to determine who collects fodder in cut and carry systems. Introduced fodder and forages should be evaluated for their ease of access and portability by those who do the gathering.

(5) Activities and resources analysis to identify who handles each operation--from planting through harvest and post-harvest storage--which affects the ultimate vigour of seed saved for next season's planting. Best existing practices can be identified and materials or practices which could be improved should be the subject of research and extension.

**Post-harvest processing and storage**

Often consideration of crop and livestock production stops at harvest. But for the products to be useful to farm households, either for self-provisioning or sale and exchange, agricultural research should, and often does, include attention to technology development in post-harvest activities. Improvements in post-harvest processing and storage are intended to reduce losses, improve or preserve nutritional values, reduce
costs or time, or improve profits. Generally, but not always, such activities are undertaken by women. As with agricultural production, analysis of who does what, whose resources are used, and who benefits may be important in designing acceptable new technologies. Planners and designers need to consider:

(1) Activities and resources analysis to specify whose materials and labour are involved in constructing traditional storage units. Are their opinions sought in evaluating a new design? Are there properties in existing materials that contribute to better storage? Who has that knowledge? The construction and maintenance labour required by a new design should be monitored and compared to alternative uses of labour.

(2) Benefits analysis to identify all end uses of a stored product. Is seed production as well as food considered in design?

METHODOLOGIES

It is not always clear how to collect information on or disaggregate by gender. In determining what methods to use and what questions to ask, care should be taken to choose methodologies appropriate to research conditions and not to overburden the research with extraneous material. When biological and social scientists work together to choose the most critical research questions, the likelihood of getting the data most appropriate to agricultural research is much higher. Many social scientists working in agricultural projects make a point of making joint visits to the field with and interviewing extensively their technical scientist colleagues in order to understand their research questions. Considerations to take into account in choosing methodologies for including gender analysis in agricultural research are shown in Table 8.

Here are some simple rules and suggestions on how to go about incorporating a gender perspective into agricultural research.
### TABLE 8
Considerations for Choosing Methodologies For Gender Analysis

1. Project, research, or policy objectives.

2. Questions critical to the biological scientists.

3. Methodologies and modes of analysis already in use and accepted by the institution’s or project’s technical and social science colleagues and senior staff.

4. Level of detail and reliability required for decision making.

5. Resource constraints: money, transportation, etc.

6. Timeliness, including the speed with which analysis can be made available to decision makers.

7. Nature of the population: literacy, language, acceptability of male or female researchers, ethnicity, class, caste, cultural constraints and expectations.
(1) Make questions gender specific in surveys and interviews. One should not just find out if family labour is used, but include which family members provide the labour. In some circumstances, such as those in Central America, children may not be a good enough categorization. We need to know children by gender and also by their relationship to the head of household. For example, where there is a pattern of successive marriages, as often take place in semi-proletarian agricultural situations, the man may call on children of former wives to provide agricultural labour, yet the fruits of that labour go neither to the children nor to their mothers. This kind of disaggregation may be necessary to find out how easily labour can be mobilized.

(2) Include women farmers in surveys or other initial work to define the research agenda; interview spouses as well as male heads of household; note carefully who is present at interviews. In Colombia, a reanalysis of research notes led to the conclusion that it was when women were present that a particular bean grain type was listed among farmer preferences (Ashby 1989).

(3) Do "purposive" rather than random sampling, explicitly taking into account the differences between kinds of farmers or farm households. Such separation may be on the basis of 'wealth' or access to resources, by sex of head of household, by household size, by life-cycle stage.

(4) Use topic-focused intense participant observation. This is often necessary because direct questions will not yield the actual gender behaviour. The normative (desirable) behaviour by gender is often very different from the real behaviour by gender, often as a result of necessity rather than cultural desirability. Therefore, observation focused on particular activities can help figure out what is really going on.

(5) Interview homogeneous groups, by gender and by class. Often these groups should be segregated by language. In many parts of the world, the men may speak the national language, but women may feel
much more comfortable in their own dialect. During the interview focus on a specific topic or ask for best and worst experiences with the technology in question. In the private sector, focus interviews are an important tool of market research used to identify user niches, assess their needs, then decide on a product.

(6) Make multiple visit surveys along the production cycle from production to consumption. Because agriculture is cyclical, the activities that are engaged upon at any point in that cycle will be different from any other point. It is important to have multiple visits to begin to understand the potential resource conflicts and complementarities.

(7) Disaggregate labour surveys and income and expenditure records. We need to know who gets what income and who spends it for what. This "who" can help us specify the needed characteristics of the technology being developed, how much capital can be required, and who will ultimately need to decide if the technology is worthy of capital investment.

(8) Record and report household record-keeping separately for gender and, perhaps, for age. Household record-keeping is a tool used to gather more detailed information on activities and decision making in farming systems. Few households are included, and they are carefully selected to represent the larger farming community. The record-keeping instrument must be simple enough to use on a daily basis and include only the information necessary to actually influence research. A reason for the failure of household record-keeping in the past has been that the information gathered was too complex, trying to replicate the same measures a field researcher would make. As a result, information was often inaccurate and very incomplete. Another problem has been to aggregate the information and not capture the differences in task and seasonality of men's and women's activities.
Household records can be kept in a simple pictorial counting. This often gets more valid data than complex instruments. It is important to remember that not only must the household be motivated to keep the records in a timely fashion, and thus not be asked to produce too much data, but that data must be analyzed in such a way that they can impact research. Household record-keeping should never be established without the methodology for processing and analyzing the data already in place. That plan should include a programme for systematic gender disaggregation of the data.

(9) Have field assistants who are monitoring experimental plots or traditional farmer practices keep records separately by gender and age on who carries out each operation.

GENDER ANALYSIS IN DEVELOPING WOMEN-FOCUSED STRATEGIES

Women-focused strategies come into play either when there is an explicit commitment to ensuring that women's roles are not harmed and are improved by technology development or when women are stipulated as the target group. The declared objective is equity or welfare as well as efficiency.

A cautionary note is appropriate in considering women-focused projects. A study of 100 agricultural projects by Center for Development Information (CDIE/USAID) identified three kinds of projects which included women: women-only projects, usually located in ministries of community development or social welfare; women-specific components of larger projects; and integrated projects. The advantage of the women-specific projects and components were that resources went directly to women; the disadvantage was that women continued to be marginalized and emphasis was often put on welfare rather than production activities. In general, women fared best in integrated projects if they were a large
part of the pool of eligibles and explicit steps were taken to identify
differences from men of women's time and access to resources so that
plans for implementation accommodated these differences (Carloni, 1987,

Strategies where the agricultural research team can help are discussed
below. Strategies which may free women's time and resources for
improving agricultural production, but are best addressed by other
specialists are discussed in a second section.

A. Women-focused strategies in agricultural research

One goal of such strategies for agricultural research is to avoid
increasing the labour demands placed on women so they are not forced to
reduce labour inputs into food preparation and childcare, which in most
societies are the traditional realm of women. A second goal is to identify
income-earning activities from crop and livestock production which
increase their capacity to take care of themselves and their families. This
is particularly important in systems where income and expenditure streams
and responsibilities are quite separate for men and women

Strategy 1: Introduce cash crops that do not directly compete with
food crops, especially for women.

(1) Assess the seasonal labour demands of the present cropping
patterns and the domestic duties of women. The mapping created by the
activities analysis will show their interactions and contradictions. Also
assess women's access to fields and consider whether proposed cash crops
affect women's access to productive land for food production.

(2) Identify cash crop alternatives that minimally compete with
present labour demands imposed on women by food crops and other
duties. Or look at cropping arrangements or land use patterns which
maintain women's access to land for food crops.
(3) Test these cash crop alternatives on farm family fields to assess their demands on labour. Modify record-keeping in such a way as to take into account enterprise interactions as well as what is going on in the particular plot under investigation.

Strategy 2: Focus research on crops grown by women in order to devise nutritionally beneficial interventions.

Agricultural research, in order to make sure that women as well as men benefit, can increase the production of supplementary non-staples to enhance a nutritional well-being of the household.

1. Identify food crops presently grown or gathered by women and access their constraints and potential.
2. Develop or identify ways of improving food crop production, such as improved varieties, new planting strategies, inputs, etc.
3. Test food crop interventions on farmers' fields, focusing on women's fields. Where women's crops are intercropped with men's, monitor the effects on both crops.

Strategy 3: Increase access to fuelwood.

1. Identify sources of fuelwood and learn about women's right of access to different kinds of trees. For instance in Western Kenya, certain kinds of trees are defined as 'trees' and owned and governed by men; other kinds are defined as 'bushes' and are therefore available to women for management and harvest.
2. Identify planting niches available to women for management and harvest. These may be public or semi-public areas.
3. Test new, exotic varieties and improved development and management of indigenous varieties in collaboration with women farmers individually or in groups.
Strategy 4: Develop labour-saving or resource-saving technology

(1) Identify women’s tasks or enterprises for which labour-saving or resource-saving technologies could be developed or adapted.

(2) Specify and develop improved technologies. For instance, in the Philippines, agricultural engineers were brought in to look at women’s glutinous rice processing and developed equipment which were time saving, more efficient (less loss, purer product), affordable, energy saving and could be locally manufactured.

B. Women-focused strategies for other specialists which support improvements in agricultural production.

There are a number of areas where constraints on women’s labour and access to resources negatively affect current production and the acceptance of new technologies. Solutions may draw upon the skills of other specialists. While the agricultural researcher cannot solve these problems, they need to be recognized. At a minimum, these problems will shape what can or cannot be expected from proposed technological improvements. More usefully, the researcher can draw these problems to the attention of appropriate decision-makers. Finally, the researcher can specify those elements of crop and livestock production which could be monitored for evaluating the impact of such solutions on production activities. Areas where the work of other specialists or institutions could make a contribution to improvements in agricultural production include:

(1) Increasing access to cash inputs and labour by promoting and strengthening women’s indigenous credit associations and labour organizations. In many cases, appropriate technologies can be designed by agricultural research, but unless that agricultural research is accompanied by institutional changes, it will not be adopted by those most in need of it. In Bangladesh, Grameen Bank has provided credit to women’s groups which has enabled them to own tube wells, using the water produced for their own production and for sale.
(2) Developing and/or introducing labour-saving technology to help reduce excessive labour inputs. Such devices may include solar cookers and driers, fuel efficient stoves, tube wells for domestic water, etc. Where there are crop or livestock uses associated with existing technologies, these should be pointed out to the appropriate specialists so they can be incorporated in planning interventions. For instance, in some areas stoves also serve as brooders for eggs and young chicks or guinea pigs. These multiple functions need to be included as the technology is assessed and its use of labour by gender evaluated.

(3) Introducing adequate community childcare facilities in situations where agricultural labour demands on women are high in order to avoid adverse nutritional impacts on children or in order to avoid safety risks to children. If child care is to be favorably considered by policy makers or organizers, ex ante studies of the implication of child care obligations on women's productive labour, particularly during periods when labour is scarce, must be assessed. Child care will only become part of a national development agenda when it can be shown to be cost-effective in the short run.

(4) Devising income-generating activities which are based on existing raw materials, sometimes crop residues. In Sta. Barbara, Philippines, rice straw became the basis of a mushroom growing operation which brought sizable and seasonable benefits to farm families (Paris, 1988).

MONITORING IMPACT

Even with good diagnosis and planning of agricultural research, it is still necessary to monitor its impacts. Questions that need to be asked in terms of gender analysis and socio-economic analysis include: is the impact measured as the return to the land, seed planted, animal unit, labour, capital, inputs required, animal power, time, expenditures saved,
hungry period covered, or cash saved? Are these measures calculated by gender—that is, benefits to women per a particular input provided by women? By monitoring solely on return to land or even return to net capital gain, understanding the degree to which a technology may actually be adopted within a given farming system will be lost. Limited resource farmers tend to be risk reducers rather than profit maximizers. Calculating return with a variety of measures by gender is crucial to evaluate the potential effectiveness of agricultural research.

Evaluation of impact should also take into account tasks which may be eased by mechanization or other labour-saving devices. This may raise important equity or welfare issues with respect to impact if such technology displaces hired labour. In rural areas, wage labour on other people’s farms is often the only income source for the landless, frequently women whose husbands are seeking employment in urban areas. For instance, a study of hours spent in cereal production in Aleppo, Syria showed that most mechanized tasks were done by men, and most manual tasks done by women. A shift to mechanized harvesting resulted in virtually no change in hired male labour, but a sharp reduction in hired female labour (Rassam and Tully, 1988).

Often it is useful to have a checklist to make sure that the appropriate household members are included in each stage of the agricultural research project. Russo et al (1988) point out that one of the most effective ways of monitoring gender in project activity is to indicate after each activity—contact visit, farm visit, individual or group interviews, training—the number of male and female participants. Accumulated in quarterly reports, these provide a quick indication of how well women and men have been included. Table 9 illustrates such a checklist for each element of designing, implementing, and evaluating an on-farm trial. Table 10 illustrates such a checklist for a whole farming systems research project. These might be used for researchers’ self-monitoring of the
### TABLE 9
Checklist on Household Members Participation in On-Farm Trials

<table>
<thead>
<tr>
<th>WHO IS INVOLVED IN DECISION-MAKING OR IMPLEMENTATION?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men? Women? Other group?</td>
</tr>
<tr>
<td>Farmers? Product users? Researchers?</td>
</tr>
</tbody>
</table>

#### TRIAL OBJECTIVES

#### PROBLEM BEING ADDRESSED

#### TREATMENTS & LEVELS

#### TRIAL DESIGN
Random block, etc?
Number of farms?
Number of replications/farm?

#### SELECTION OF COOPERATORS
Who selects?
Criteria?
Who are they?

#### TRIAL OPERATIONS
What are they?
Who is trained?
Who implements?

#### DATA TO BE COLLECTED

#### COMPLEMENTARY RESEARCH

#### EVALUATION
participation of household members and the use of project resources. The matrix looks at several aspects of inclusion:

(1) Who is included, particularly which household members?
(2) Why are they included? Were specific criteria used to include particular farmers?
(3) How are they included? Are they survey subjects, consultants or decision makers? Are they the recipients of project resources? What steps were taken to encourage or insure their inclusion?

THE WIDER IMPLICATIONS OF GENDER ANALYSIS AND AGRICULTURAL RESEARCH

A. Policy and infrastructure

Successful agricultural research results in technologies which improve farm production and are acceptable to farmers. Gender analysis will improve targeting and specification of desirable outcomes. But research does not stand alone; the successful dissemination of promising results are determined in part by policy and the infrastructure for the extension of information, inputs, credit, and market outlets. For agricultural research to be effective, it is not always sufficient to get an agricultural technology that overcomes a felt production constraint. Research must also address the institutional constraints to that technology adoption.

On-going attention to the gender implications of new technologies will provide guidance in such recommendations. For example, if only men can get credit and women need the technology, research must address the institutional issues involved as well. If sales to cooperatives are limited to male heads of household, recommendations about the inclusion of female heads of household and female spouses who grow the same crop are in order.

If mobility or cultural constraints limit women's access to extension advice, arrangements should be made for special field days or work with
TABLE 10
Checklist on Household Members Participation in Farming Systems Research

<table>
<thead>
<tr>
<th>Stages of FSR/E</th>
<th>WHO?</th>
<th>WHY?</th>
<th>HOW?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAGNOSIS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLANNING AND DESIGN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXPERIMENTATION AND EVALUATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOMMENDATIONS</td>
<td>To researchers</td>
<td>To policy makers</td>
<td>To extension</td>
</tr>
<tr>
<td>EXTENSION</td>
<td>Information</td>
<td>Inputs</td>
<td>Credit</td>
</tr>
</tbody>
</table>
women’s groups. Extension agents must not only have information that has been derived through the research process, but they must have access to women and understand the women’s various needs, not only for the particular enterprise itself, but to necessary credit, marketing channels, etc. Frequently extension services to women are offered only by home economists or community development workers whose ‘message’ is confined to domestic maintenance and welfare concerns. Women’s full access to extension may require stipulation by senior crop and livestock extension staff that reaching women is a goal and will be evaluated. Other possibilities include training of home extension agents in crop and animal husbandry and new techniques and the inclusion of more women in the agricultural and livestock extension services.

B. Issues of Staffing

What disciplines are needed and how can disciplinary strengths best be combined to generate appropriate and useful research? Will social scientists be present among national researchers on the research team? The odds of having good gender analysis are improved with the presence of social scientists and women on the team. But the presence of either does not guarantee an approach which while paying attention to gender, attends directly to the questions of the technical or biological scientists. Social scientists need help to see the agronomic research questions and to shape social science research to answer the production researchers’ questions. Early collaboration between technical and social scientists—in joint training or in planning the specifics of a survey or interview—will enhance the possibility of problem oriented rather than discipline driven research. In the absence of a social scientist, the kinds of questions and awareness inherent in the framework presented above, should provide guidance to the technical researcher.
C. Training

Training has an important role in enhancing awareness of gender issues and skills of gender analysis. In a recent survey of FSR/E projects to determine the integration of gender issues and analysis (Poats, Gearing et al 1989) it was found that in every case where training (either formal or informal) did occur, those projects subsequently conducted or improved gender analysis. The relationship between training and gender issues was stronger than the relationship between having either women or social scientists on the project team. This points strongly to the usefulness of explicitly including training as part of an overall strategy to incorporate gender issues in project activities.

Training in gender issues and gender analysis works to make project personnel more aware of gender and to conduct gender analysis more effectively. The results from the survey cited above showed that when project staff had training in gender issues and analysis, they were able to devise effective strategies to overcome the difficulties and obstacles that often stand in the way of effectively including women in projects or incorporating gender analysis in the process of technology development. Personnel without training could often recognize the need for including gender issues but were unable to overcome the obstacles preventing it.

Training in gender issues and analysis is most effective when formal and informal mechanisms are used. Formal training in shortcourses or workshops dedicated exclusively to gender issues may be appropriate in some setting. In others, developing modules on gender and incorporating them into on-going training in agricultural research may be more effective.

Follow-up to formal training programmes will ensure that professionals newly introduced to the issues can actually use these skills in their on-going work. Follow-up can be informal consisting of short-term support from outside consultant with gender analysis expertise. In the survey cited above, several respondents mentioned that group data analysis
and discussion meetings in which entire teams brainstormed strategies based on shared gender analysis results were quite effective. Managers of agricultural research and development projects can help ensure subsequent attention to gender issues by installing self-evaluation mechanisms whereby projects report periodically on how they are focusing attention to gender issues in their work (see Monitoring, above). Informal exchanges among project staff or between different projects are also useful reinforcement.

It is important in training not to target a single individual or discipline for gender training, but to include gender as an issue of responsibility for all team members. While it is true that social science is the domain for detailed, in-depth research on gender issues and the development of innovative methodologies for pursuing gender research, use of the results from this work are the responsibility of all team members.

Resources useful for training in gender analysis and agriculture are listed in Appendix A.

CONCLUSIONS

The challenge for agricultural research, a challenge which gender analysis helps to meet, is to begin to better specify research toward specific groups in order to increase both equity and efficiency. By specifying research by user group, we make explicit the actual biases inherent in technologies. In describing the tools of gender analysis and their application to agricultural research, it is clear that this perspective can make much more visible the assumptions underlying a proposed new technology and its implications. While it is not within the province of agricultural research to correct all inequity or to change all traditional patterns, it is within its mandate to be clear about its purpose, its constraints, and its likely consequences.
ENDNOTES

1. Kathleen Cloud has written extensively about women’s roles in agriculture. The most elegant synthesis of that work, a clear statement about women’s roles and their implications for gathering information on the household is set forth in a teaching module developed for the University of Illinois-M.S. University of Baroda International Workshop on Women, Households and Development: Building a Data Base. See Cloud, 1988.

2. This framework was developed specifically for the application of gender analysis in agricultural research and is described fully in Feldstein et al 1989. It builds upon pioneer work done by Overholt et al 1985.
APPENDIX A: TRAINING RESOURCES

Research on women's roles in agricultural production and the affect of agricultural development projects on women is plentiful. The development of training materials and training programmes is relatively recent. As of this writing, the Canadian International Development Agency (CIDA), the Food and Agricultural Organization of the United Nations (FAO), the Population Council in New York City, the United Nations Development Program (UNDP), the United States Agency for International Development (USAID), the Women in Rice Farming Systems (WIRFS) based at the International Rice Research Institute (IRRI) and the World Bank have undertaken efforts to develop programmes and materials on gender analysis or women in development. Some are focusing exclusively on agriculture (e.g. FAO, WIRFS); others include agriculture with other sectors. Where materials are available, we have cited them and marked them with an * under references. We suggest contacting the headquarters or regional offices of these organizations for further information on training programmes.

Three training sources which are already developed are cited here.

(1) Gender and Agriculture Project
A Project of the Population Council
Training with case studies and other materials
Contact information:
Hilary Sims Feldstein
Tannery Hill Road
RFD 1, Box 821
Hancock, New Hampshire USA
Tel. 603-525-3772 CGNET E-Mail CGI126
Dr. Cornelia Butler Flora  
University Distinguished Professor  
Department of Sociology, Anthropology and Social Work  
Waters Hall, Kansas State University  
Manhattan, Kansas USA  
Tel. 913-532-6865 Bitmail USERID CFLORA

Dr. Susan V. Poats  
108 N.W. 26th Street  
Gainesville, Florida 32607  
Tel. 904-378-5775 CGNET E-Mail CGI045

(2) Women, Households, and Development Project  
Women, Households, and Development: Building a Data Base  
Joint project between M.S. University of Baroda, India and University of Illinois, USA. Training focuses on methodologies for developing data on households.  
Contact information:  
Professor Frances M. Magrabi  
University of Illinois at Urbana-Champaign  
274 Bevier Hall, 905 S. Godwin Avenue  
Urbana, IL 61801 USA Tel. 217-333-6869

Professor Amita Verma  
Faculty of Home Science  
M.S. University of Baroda  
Baroda, Gujarat 390002, India Tel. 265-636-00

(3) Collaborative for Development Action  
Training with case studies and training of trainers in case study methodology  
Contact information:  
Dr. Mary Anderson and Dr. Catherine Overholt  
26 Walker Street  
Cambridge, Massachusetts 02138 Tel. 617-864-2680
REFERENCES

Items marked with * are particularly useful for training in Gender Analysis and Agriculture.


1. Ingrid Palmer, The Nemow Case.
2. Mary E. Burfisher and Nadine R. Horenstein, Sex Roles in the Nigerian Tiv Farm Household.


