



Gender Research Methodologies for Agricultural Research in India

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Abstract

ICRISAT is concerned about the implications of technological changes in agriculture for the welfare of women. A 2-day informal workshop on methodologies for gender research was held on 27 and 28 May, 1996, at ICRISAT Asia Center. The primary objectives of the workshop were to refine the Institute's gender research methodologies and to initiate the development of a strategy for mainstreaming gender analysis in technology development at ICRISAT. Specifically, the workshop was intended to identify gender-related differences in preferences for varieties and technologies that may constrain technology adoption; identify a set of key indicators to measure the intrahousehold distribution of welfare gains from the adoption of given technologies; and identify simple, accurate, and quick methods for data collection. The workshop was attended by participants from research and training institutions and nongovernmental organizations in addition to ICRISAT scientists. This document contains a synthesis of discussions that took place, and the summaries of presentations made by participants. Specific recommendations on developing a strategy for mainstreaming gender are included in the synthesis.



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**Gender Research Methodologies
for Agricultural Research in India:**

**Summary and Recommendations
of a Workshop**

27-28 May 1996

ICRISAT Asia Center, Patancheru, India

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**International Crops Research Institute for the Semi-Arid Tropics
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Contents

Introduction and Objectives

S Kolavalli, Rama Devi Kolli, and D D Rohrbach 1

Workshop Synthesis

D D Rohrbach, S Kolavalli, Meri Whitaker, and Hilary Sims Feldstein 3

Summaries

ICRISAT's Gender Research Agenda

D D Rohrbach 11

Gender Research in the CGIAR System

Hilary Sims Feldstein 13

Gender Analysis of Effects of Technology Intervention in India's
Semi-Arid Tropics: Indicators from a Case Study

Rama Devi Kolli 15

Indicators for Measuring the Impact of Technical Change
in Agriculture on Women's Welfare: an Outline

G Parthasarathy and K A Nirmala 16

More Questions Than Answers: Gender in Farming
Systems Development

D Mosse and Mena Mehta 17

The Role of Women in Ecological Agriculture: Training

V Gandhimati 18

Gender Sensitization in Agriculture: a Framework

D Sen and G Jhansi Rani 19

Gender Related Data Collection

B Underwood 20

A Methodological Note on Assessing the Gender Impact of
Technological Change in Agriculture

Swapna Mukhopadhyay 21

The Gender Impact of Technology

Srilatha Batiwala 22

Participants

24

Introduction and Objectives

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ICRISAT is concerned about the impact of technological change in agriculture on the welfare of women. Where possible, ICRISAT promotes technological changes that improve women's welfare, and seeks to avoid technological developments that worsen their welfare. Yet the practicality of these objectives depends on our capacity to measure these welfare effects. A set of gender impact indicators is needed which is both reliable and cost effective to apply. The use of these indicators needs to be incorporated in the broad research program. In the past ICRISAT has relied upon one or two scientists to assess gender impacts of technology design and adoption. In the future, we seek to encourage all scientists to consider how their technologies may affect the welfare of women.

This workshop was organized to bring ICRISAT scientists together with a range of experts on gender analysis from the wider scientific community in India to discuss how we can incorporate gender assessment more broadly into our research program. The workshop program was planned to permit us to share our experience of gender analysis relating to technological change with similar efforts within the national agricultural research systems (NARS), nongovernmental organizations (NGOs), and university communities of our host country.

More specifically, the workshop aimed to:

1. identify a set of key indicators to measure the gender impacts of technological change, and
2. develop methods for identifying gender related technology adoption constraints.

The 2-day workshop began with a presentation on ICRISAT's mandate and gender research agenda, and an overview of the gender program in the Consultative Group on International Agricultural Research (CGIAR). In the discussion periods following the opening presentations it became clear that most of the participants invited from outside ICRISAT were focused on gender impacts of broader agricultural and rural development programs. Questions arose about the relationship between technological change and women's empowerment. Some participants argued that the indirect effects of changes in technology on women's decision-making authority may be more important than the direct impacts on labor, food supply, and incomes. They then questioned whether ICRISAT was willing to pursue these empowerment objectives.

The broader perspectives of the external participants, and limited experience of most participants with gender analysis relating to agricultural technology per se,

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caused an unexpected shift in the focus of the workshop. Rather than simply evaluating alternative gender impact indicators, there was considerable discussion on how ICRISAT should be pursuing this sort of work. Much of the debate examined problems of targeting gains in women's welfare in the context of agricultural development, and the difficulties in 'mainstreaming' consideration of the value of targeting improvements in women's welfare among scientists at institutions such as ICRISAT.

This report outlines the presentations and associated discussions that took place. A series of recommendations is offered for mainstreaming gender analysis in the larger scientific programs. We expect these will be considered both by the ICRISAT scientists, project leaders who participated in the workshop, and by ICRISAT's Gender Analysis Committee in its efforts to develop a strategy for wider implementation of our gender impact objectives.

Finally, it is worth noting that the focus of the workshop was almost entirely on India. Undoubtedly, many of the issues discussed are relevant to ICRISAT's programs in Africa. However, further discussions are needed to review how the targets for gender analysis differ for this continent.

Workshop Synthesis

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Setting Gender Objectives

Most workshop discussions equated gender issues with the need to be concerned about the welfare of women. Participants seemed to accept the view that essentially women are disadvantaged in their control over resources and decision-making authority in rural India. This translates into a reduction in the welfare of both women and children. By inference, most participants felt that institutions such as ICRISAT should target improvements in women's welfare directly. ICRISAT should aim to develop technologies that improve the situation of women and not simply seek to avoid technologies that worsen women's welfare.

This argument was extended by distinguishing between the objective of improving the practical needs of women, and the objective of improving their strategic needs. Practical welfare relates to improvements in readily measurable impacts such as income, nutrition, and health. Strategic welfare encompasses gains in social status and decision-making authority. A number of the visiting workshop participants argued that practical welfare gains could only be sustained with complementary strategic welfare improvements.

If carried to the extreme, this argument suggests there is no such thing as a gender-neutral technology. Technologies that fail to improve both the practical and strategic welfare of women reinforce inequities which represent a continuing cost to family well-being. Some participants argued that ICRISAT's primary goal should be improvements in strategic welfare and, correspondingly, the empowerment of rural women. Others indicated we ought to at least be aware of the distinction in the objectives, and to pursue both strategic and practical gains as our technology development programs warrant.

For example, researchers can enhance the strategic welfare of women by simply involving them more fully in the process of technology development. Field days for women farmers provide access to specialized knowledge that improves status and authority within both the family and the wider rural community. This may enhance the likelihood of technological change extending far beyond the specific varieties and management practices highlighted in the demonstrations. ICRISAT has pursued selective interaction with women during the course

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of technology design in order to obtain information otherwise unavailable from interviews with men or community groups. As a consequence, the process of interaction may also encourage stronger participation of women in future decisions about technology adoption.

Correspondingly, ICRISAT should view gender analysis both as a means to improve technology design and as a means to enhance the probability of technological change. Viewed from the perspective of rural development, ICRISAT's technologies and the Institute's research process can contribute both measurable gains in household welfare, and improvements in the process of agricultural development. The impacts of the more strategic effects may be larger, in the long run, than the gains associated with the adoption of single specific technologies or crop management practices.

Key Indicators of Gender Impacts

A broad range of key impact indicators was cited both in the specific workshop presentations and the discussions which followed. Many of the indicators, particularly those relating to the design of specific technologies, account for the distribution of costs and returns derived from technology adoption. These include measures of labor use and income flows. Do technologies increase the labor demands of women within the household while the productivity gains are captured by men? Who pays for the additional inputs? Where do the additional resources required for the adoption of particular technologies come from? How do resources shift between enterprises and between alternative end uses? Such direct effects of technology adoption on resource flows to and from a single enterprise are relatively easy to measure. However, the systemic linkages are substantially more difficult to assess. A reallocation of labor associated with the adoption of a particular technology, for example, may affect many other farm and nonfarm enterprises.

Several participants commented on the need to measure not simply the number of hours worked, but also the level of drudgery entailed in such work. By inference, a net increase in the drudgery of labor could be worse than a net increase in labor hours per se. It is necessary to measure labor flows, but also important to assess how women perceive the tradeoffs in labor allocation.

Other indicators relate to a wider range of secondary welfare effects, such as changes in the health, nutrition, and the educational status of women and children. Participants indicated such indicators are more difficult and costly to measure and that the effects may only be seen after a considerable time lag. Further, it is generally difficult to link such changes to the introduction of specific technologies.

Participants also suggested the need for indicators of strategic impacts, and not simply indicators of practical impacts. These include impacts on gender relations within the household or community, and impacts on women's decision-making power. An examination of household decision-making, in particular social,

Table 1. Potential Gender Impact Indicators.

Indicators	Votes received
List provided to all participants	
Productivity gains	2
Total income level	1
Income controlled by women	4
Independent source of income	3
Income diversification	1
Employment creation	0
Employment by women	1
Women's wages	0
Food consumption expenditures	0
Total labor savings	0
Women's labor savings	4
Reduced drudgery of women's labor	6
Changes in time allocation to different activities	1
Nutritional gains	0
Food security gains	5
Clinical status	1
Educational gains	4
Enrollment ratio	0
Control over household expenditure	0
Participation in the product market	1
Participation in the input market	0
Increased decision-making authority	9
Private assets held by women	1
Increased women's control over farm assets	1
Savings	0
What cash income/additional income is used for poverty alleviation	1
Return on investment	0
Sustainability	0
Additions by workshop participants	
Increased knowledge and skills	1
Increased access to information	1
More, or less, work for women	1
Food availability or food quality	1
Women's literacy	3

economic and cultural contexts, was proposed as a way of identifying more specific indicators for the increase or decrease in women's capacity to influence decisions. The workshop participants were asked to identify a few key indicators that ICRISAT should use in assessing impact of technologies on women in the Indian context. To facilitate this choice, each participant was given a list of potential impact indicators (Table 1) to make notes on, and the results were discussed.

The results of this survey reflect the breadth of perspective of most of the participants invited from outside and within ICRISAT. They ranked the most important indicator of gender impact, or more specifically, of improvement in women's welfare, as 'increased (women's) decision-making authority'. This coincides with the view that empowerment is essential for sustainable and longer-term progress in the improvement of the welfare of women and families. ICRISAT should at least be aware of how its work affects the decision-making authority of women.

The second most favored indicator was 'reduced drudgery of women's labor'. This indicator may be measured by asking women how they evaluate their work allocations to alternative farm activities and enterprises. Subjective values may not be adequately reflected in monetary terms.

The workshop participants then ranked a wide range of practical and strategic indicators including food security gains, educational and literacy gains, income gains, and labor savings. This implies ICRISAT should be concerned about secondary effects on family welfare and not simply about primary effects resulting from the adoption of particular technologies.

Methodologies for Gender Analysis

Much of the discussion on methodology concerned how best to incorporate women into the research process. Participants suggested that the design and development of any technological innovation should be preceded by careful identification of the target population, using techniques such as 'social and gender relations assessments' and 'community resources audits'. In a framework proposed by one participant, the degree of autonomy and decision-making power available to men and women can be evaluated in terms of six key dimensions: control over labor and income, access to public resources, control over private resources, control over reproduction, control over physical mobility, and access to and control over political authority. Such an analysis can complement a more direct assessment of the level and allocation of community resources.

Special efforts need to be made to assess women's roles because these are often 'invisible' to outside observers. While considerable information can be collected by participatory research methods, participants were warned that a participatory appraisal alone does not guarantee an understanding of resource allocation and decision-making authority relating to gender. The experience outlined by one NGO revealed that participatory rapid appraisals (PRA) often exclude women.

Much depends on the timing and venue of discussions. For example, women are often not accurately voicing their concerns in collective public discussions. Use of women field assistants and researchers may be essential. But women staff also need to be sensitized. Some of these difficulties can be overcome by interacting with women at the individual household level. For example, one can build household profiles of how work and decision-making is organized through prolonged, unstructured interviews with a sample of households that represent key segments of the population. But collection of information is demanding of researchers or development workers. Some information might alternatively and more efficiently be gathered in separate meetings with women, particularly if these involve female researchers.

One way to overcome the problem of additional demands on researchers' time implicit in supplementary and/or separate interviews with women is to collaborate with organizations, particularly NGOs, that are better equipped to do this. NGOs participating in the workshop explained that they welcomed such linkages. However, care needs to be exercised in establishing and maintaining such partnerships. When research organizations link up with NGOs, it is important for both partners to understand the objectives of the other, how their objectives differ, where they overlap, and where they may conflict. Flexibility on the part of both partners is necessary to create an agenda that is mutually beneficial. In particular, the NGO must have an appreciation for research, while the research organization must appreciate that NGOs are primarily development-oriented.

Partnerships with NGOs also involve reciprocal responsibilities. Research organizations may be asked, in return, to assist the community in responding to needs outside the original mandate of the project. Scientists should also recognize that reliance on NGOs cannot substitute for the researcher's own efforts in developing meaningful relationships in the communities in which they work. Finally, we were warned that many NGOs are now overcommitted. Their interest in supporting a particular initiative may be greater than their capability to do so.

Mainstreaming Gender Analysis

Most workshop participants seemed to believe that incorporating and emphasizing analysis of gender roles and their implications within a research organization requires a dual approach. The institution must be committed enough to gender analysis to establish guidelines for the pursuit of this mandate, and must provide incentives encouraging the implementation of such investigations. The expression of this commitment may take the form of: (a) a mission statement which articulates the commitment of the organization to gender analysis; (b) concrete objectives to be achieved relating to gender analysis in the programs of the institution (e.g., the specification of the gender impacts being most directly pursued); (c) measurable operational goals (e.g. gender-sensitive sampling) that are derived from the objectives; and (d) a conceptual framework to make these

goals part of monitoring and evaluation of projects. In addition, the allocation of individual responsibility for leadership in gender analysis can facilitate institutionalization efforts. This assures a focal point of accountability for the institutional objectives. It also provides a single node of information flow within the institution and with agencies dealing with similar issues outside.

Donor pressures have encouraged the adoption of gender research agendas in many research institutes. However, it is difficult to introduce gender sensitivity from the outside. Rather, gender research strategies need to reflect the values of the scientific staff. Several workshop participants correspondingly argued the need for special efforts to sensitize the staff, including women.

Several ways of gender sensitization were discussed. These encompass the development of case studies of circumstances where gender analysis has been, or should be, useful to ICRISAT's technology development. These might be built from a methodical documentation of gender-related distinctions in priorities for technology design. Such cases should then be evaluated openly in research workshops. The case studies and workshops might particularly target a strategy of 'convincing the skeptics'.

Gender sensitization can also take place through the broader involvement of scientists in participatory research. This includes wider participation in diagnostic survey discussions, including those organized solely with women. Recognizing that many scientists have a limited inclination to participate in on-farm research, videos of researcher-farmer interactions were proposed as a way to promote wider exposure. Some participants suggested the need for stronger and more direct incentives to encourage consideration of gender effects. Contribution to gender analysis could be considered in performance assessment. Questions regarding gender implications should be included in monitoring of projects.

In sum, to mainstream gender analysis in technology development at ICRISAT requires an agreement on mandate, a deliberate strategy, and an on-going discussion targeting broader involvement in the pursuit of the gender analysis agenda. This workshop represents a step forward in this on-going discussion. Yet it also offers a challenge through its exposure of the magnitude of the task still ahead.

Summaries

ICRISAT's Gender Research Agenda

D D Rohrbach¹

ICRISAT holds an international mandate for the genetic improvement of a range of crops, and for the development of resource management technologies designed to improve crop production in the world's semi-arid tropics. Staff are spread across seven disciplinary research divisions. Genetic Enhancement, Genetic Resources, Cellular and Molecular Biology, Crop Protection, Agronomy, Soils and Agroclimatology, and Socioeconomics and Policy. They contribute to 22 research projects involving problem diagnosis, technology development, technology transfer, and training. These encompass agroecologically targeted projects for improvement of sorghum (5), pearl millet (3), chickpea (3), pigeonpea (1), groundnut (3), and finger millet (1), four integrated production systems projects and two on economics. This work is carried out over eight regional locations in Asia, Africa, and Latin America by 100 national and international scientists. However, ICRISAT employs only one scientist with a specific mandate for gender research. This meeting aims to develop through options for expanding the consideration of gender issues in our wider research program.

ICRISAT's primary mandate targets crop and crop systems' improvement in order to improve household food security and alleviate poverty. This objective is pursued primarily through the development of new crop production technology that improves productivity. However, the Institute also attaches priority to resource sustainability, and how welfare gains are distributed. In the latter case the welfare of the impoverished and of women is of particular concern. These multiple objectives have been incorporated into a complicated priority-setting exercise underlying the Institute's 1994-98 Medium Term Plan. Possible research targets were assessed in terms of a benefit-cost ratio, internationality index, sustainability ranking, and equity criteria quantified in terms of the number of female illiterates in the zone targeted for technology development.

Once a research workplan had been outlined, project teams were asked to identify the gender impacts they hypothesized might result from their research. These were very varied. The scientists stated such perceptions as: 'the involvement of men and women in participatory breeding will result in varieties more acceptable to farmers,' and 'Integrated Pest Management (IPM) technology will contribute to reduction of women's exposure to pesticides and consequently, reduce family exposure to pesticides through women's food handling and breast-feeding,' and 'groundnut is an important food crop.' Our problem was to identify how to test these hypotheses and encourage more serious consideration of the underlying issues.

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ICRISAT's current gender research activities are somewhat ad hoc in their scope and targets as they are largely dependent on the interests of individual scientists. For example, we are considering gender differences in preferences for alternative variety traits, assessing the welfare impacts of groundnut technologies, assessing gender differences in farm investment priorities, and considering gender-related indicators for targeting nutrition interventions. But we are increasingly concerned with the need to better integrate this work into our broader research program. How can we involve a wider range of scientists and how can we improve the payoff to this work?

We envisage two major areas for gender analysis. Firstly, incorporation of gender analysis into the process of technology design can reduce constraints to adoption and maximize welfare gains. Secondly, the incorporation of specific gender welfare variables into adoption and impact studies can assist assessment of the impact of our technologies and better aim future technologies towards gender impact targets. However, we are still questioning how best to pursue this agenda given our limited resources. Debates continue about whether we should be targeting the development of technologies that improve women's welfare, or whether we should be targeting the development of technologies that maximize productivity gains without worsening women's welfare. We would like to reconsider what key variables we should be considering. What gender variables will help us evaluate the suitability of new technologies for women and the distribution of welfare gains? What gender impact indicators should we be using in setting research priorities? What are the most efficient methods for collecting such information? What sorts of analytical strategies will help us convince both the critics and skeptics of gender analysis that this sort of research is worthwhile? What options do we face for institutionalization of gender analysis in the broader research agenda?

ICRISAT assumes that gender provides an important basis for targeting technology development to improve food security and household welfare. We have sponsored this meeting to help us formulate a strategy for best pursuing this goal. We look forward to a fruitful meeting and a useful result.

Gender Research in the CGIAR System

Hilary Sims Feldstein¹

The Consultative Group on International Agricultural Research (CGIAR) is a group of public and private institutions financing a system of 16 international agricultural research centers (IARCs), each with a commodity and/or agroecological focus. The research mandate is to contribute to the development of technologies that improve the productivity and welfare of low-resource men and women farmers and contribute to sustainable natural resource management. The IARCs' role is predominantly in upstream, strategic, and applied research for the international public good. ICRISAT is one of these centers. Other participants in agricultural research are national agricultural research systems, applied and adaptive research for specific locations, universities, and NGOs.

The CGIAR Gender Program started in 1991 with two objectives: (a) to improve the use of gender analysis in technology design (gender analysis); and (b) to improve the situation at centers for women scientists and professionals (gender staffing). On the gender analysis side, the program has used a number of strategies to encourage center scientists to incorporate a gender perspective and to begin the process of institutionalization. These included workshops for center scientists, reviews of center research portfolios, collaboration with training departments, provision of consultancies and small grants, and communication and dissemination of exemplary practices and examples of innovation. In the future, priority will be given to the development and review of Medium Term Plans (MTPs), more focused work with fewer centers, and collaboration with a systemwide initiative on property rights and gender analysis.

Factors favoring attention to poor rural women include the support of the CGIAR Technical Advisory Committee for specific attention to the needs of poor rural women, especially in the forthcoming MTPs, for the inclusion of postharvest considerations in the research agenda, and the attention to natural resource management where women are more visible stakeholders. Factors hindering this approach are scientists' unfamiliarity with gender analysis, internalized resistance, over reliance on NARs who are not gender sensitive, the location specificity of gender variables and difficulty of extrapolation, and the top down nature of research decision-making.

Ultimately, the location specificity of gender relations requires local capacity to analyze an agricultural problem in that context. This may be difficult for IARCs to do except as part of experimental or methodology-building efforts. IARCs can address gender concerns by improving ex ante and ex post assessment of impact on both women and men; identifying all relevant users and including them in

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technology development and evaluation; addressing directly the needs of poor women which fall within their crop or agroecological zone mandates; and by collaborating with NARS and NGOs on all of the above.

Gender Analysis of Effects of Technology Intervention in India's Semi-Arid Tropics: Indicators from a Case Study

Rama Devi Kolli¹

This study examined whether technologies designed for the semi-arid tropics have any differential effects on men and women in farm households and, if so, what was the relevance of this for technology development. It was based on a case study conducted in Maharashtra villages where a package of groundnut production technology had been introduced.

The evidence suggested that differences in perception about groundnut production technology did exist between the men and women members of farm households. While men were mostly concerned about financial gains, the women were concerned about human aspects (drudgery). Task specificity between genders increased the allocation of time to various activities by women, and was significantly influenced by the introduction of technology. Both men and women had an improved ability to access resources, but women had lost control over resources while men had gained. Similarly, men had better access to benefits but they could not increase their control. The decision-making patterns indicated that gender roles were being segmented into market and domestic activities, with men gaining greater control over market-related activities and women over domestic activities. This indicates that to ensure women's committed involvement in agriculture, there is a need to incorporate the views and perceptions of both men and women members of the farming communities prior to formulation of a research agenda. By incorporating analysis of farmer perspectives of the intended beneficiaries (both men and women) at the start of the technology development process, much faster and wider adoption of technology is likely.

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Indicators for Measuring the Impact of Technical Change in Agriculture on Women's Welfare: an Outline

G Parthasarathy and K A Nirmala¹

The nature of any impact of technology on women's welfare is determined by the nature of the technological change and the links between this change and women's welfare. The type of technological change can influence labor opportunities and sources of income for women. The impacts on women's welfare include changes in income and consumption of households, amount of income directly reaching women, the nature of households, and the status of women within households. Technological change can directly affect women through increased wages, employment opportunities, and productivity. Some of the direct indicators of women's welfare are food intake, anthropometric indicators, clinical status, literacy, health, morbidity, and maternal mortality.

However, the impact of technological change is modified by external agencies. Factors such as distribution of land, access to credit institutions, nature of post-harvest activities, training of women, changes in the domestic burden of women, the decision-making power of women, and the extent of male migration influence the nature of the impact on women.

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More Questions Than Answers: Gender in Farming Systems Development

D Mosse¹ and Mena Mehta²

This paper reported on a project concerned with meeting both strategic and practical gender needs. The objective was to enable women to define their own needs and priorities in farming systems development and to enable women to gain control over important livelihood resources. Participatory rural appraisal (PRA) techniques used in planning to allow for analysis of gender relations and voicing of women's perspectives may have excluded women because of their 'public' nature. Adopting an alternative approach, profiles of a few representative households were developed through extended informal interaction with members of those households. These profiles showed that men's and women's work in farming systems was represented in very unequal terms, as the social position and identity of women was normally defined as subordinate—despite women actually exerting influence based on considerable expertise. In the absence of specific efforts, external interventions in the farming system are unlikely to serve women's practical or strategic needs, and may in fact, work against them. Interventions need to be structured to change the conventional perception of women in the community in addition to changing the structures that give women unequal access to resources. Identification of gender roles, interests, and gender responsibilities, which require the person to ensure that the task is completed by mobilizing necessary labor and other inputs, would be necessary to identify potential benefits and costs, before intervening in farming systems with new technologies.

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The Role of Women in Ecological Agriculture: Training

V Gandhimati¹

This paper presented the experience of gender sensitization in training courses on ecologically sound agriculture conducted for those working in government and nongovernmental organizations. The objective of the training was to promote awareness about ecological agriculture, and the means to introduce the concept to farmers. The course had three phases. During the first phase, the participants were expected to collect information from the target area on agroclimatic conditions, village social, economic, and political conditions, and the problems faced by farmers. The second phase involved more classroom-oriented sessions on ecologically sound agriculture. In the last phase, the participants were asked to select those ecological agricultural techniques most suited to the area, and to discuss their implications for women. These three stages were occasionally followed by role play by participants simulating the introduction of suitable techniques. Subsequent discussion often highlighted the lack of involvement of women, and possible differences in the choice of technology between men and women.

The preparatory stage was always effective. Although participants collected information from different farming systems or geographical areas, their observations regarding the role of women were always consistent. There was agreement among them as to the nature and extent of work performed by women, the level of skills, and gender-based division of work. However, the participants generally found it difficult to imagine the impact a technology might have on women. They tended to assume that any ecologically sound technology would be beneficial in and of itself, and that it deserved to be promoted. The discussions on gender-based differences in technology preferences were also unhelpful as they were often based on such misconceptions as a belief that men prefer cash crops, while women prefer food crops.

The participants rarely agreed that there were biases in the way information is passed on to farmers. They often attributed biased flow to cultural factors rather than to any deficiencies in the extension system. Finally, although the discussion on gender issues was lively, very little attention was given to these issues in the final designing and planning sessions.

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Gender Sensitization in Agriculture: a Framework

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Although women have a sizable presence in the agricultural labor force, they have remained invisible in most of the agricultural development policies and programs in India. They make up 38% of all agricultural laborers, 20% of the cultivators, and 29% of the livestock and forestry workers. The neglect of women in India in development programs can be attributed to a 'household' approach that may prevent women receiving the benefits, inadequate recognition of their special needs, constraints to women participating in economic activities, a male-oriented delivery structure, and a lack of introduction of non-traditional activities for women. Overcoming this bias requires drastic changes in how development organizations work. Sensitizing personnel should go beyond changing knowledge and skills: it requires changes in the attitudes of development executives.

The training designed for this purpose calls for considerable research to prepare appropriate training materials. The inputs needed to develop gender sensitization modules for training included conceptual analysis of the gender and other related issues, policy analysis from a gender perspective, analysis of the gender perceptions of development workers, and case analysis of some development projects from a gender perspective. This information was used to develop exercises on self-awareness of gender perception, activity analysis in a typical rural family to realize women's roles, examination of differing genders needs in access to resources in various sectors, and case analysis to recognize the reality of the situation to enable programs to be more gender responsive. Exposure to these modules through various sessions facilitate behavioral changes through changes in knowledge, skill, and attitude, resulting in increased gender sensitivity.

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Gender Related Data Collection

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Two kinds of information need to be collected before any project intervention: the general status of women in relation to men in the community, and the particular role of women in the specific area of intervention. Role and status are related; a change in one will influence the other. The methodology for the collection of information on the status of women developed by Caroline Moser described in 'Gender planning in the Third World: meeting practical and strategic gender needs in world development. 17(1):1799-1825' organizes information on the activities of women into productive, reproductive, and community organization work. This information is collected in a process involving men and women separately. This process, in addition to providing the necessary information, raises the community's awareness of gender issues.

An adapted Harvard framework can be used for collecting information on the role of women in the activity targeted for intervention. In this approach, information is collected separately from men and women on the activity, on resources required to carry out the activity, and on the benefits accruing from the activity. Men and women are asked to list the various activities that they engage in and the relative time that they devote to them. They are also asked to discuss who has control over, and access to resources required, and also the benefits that arise from the activities. These approaches highlight the need for introducing activities which initially may not have been included in the development plan for the community.

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A Methodological Note on Assessing the Gender Impact of Technological Change in Agriculture

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In India there is gender-based division of labor in agriculture and differences in access to available technologies. Technological upgrading has also resulted in displacement of female labor. An appropriate approach to assessing the gender impact of change in agriculture should begin with an examination of whether there are any gender differences in the adoption of new technology. In addition to yes/no answers on the patterns of use, explanations also need to be sought on the process of technology generation, its dissemination, and the associated motivation of users by questioning men and women separately

Gender impact ought to be examined at three levels. It can have direct impact on income for the household and labor for individuals who carry out the specific activities in which technology has changed. These task-specific effects are related to the impact of the change on overall income and labor use patterns for entire households, and for men and women individually. This overall effect needs to be to be evaluated in the context of a larger system within which the household operates - in terms of health and safety, environmental change, and the general quality of life. Over and above these impacts is the effect on the decision-making power, autonomy, and the status in the society of women - their strategic needs.

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The Gender Impact of Technology

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Science and technology reflect the priorities and character of society. Technology, as the applied dimension of scientific development science, is not above or outside but very much a part of social hierarchies and divisions. Women can be affected by technology through the the impact of general technology policy and decision-making, and by both the absence of, or the interventions of technologies in, the activities that they undertake. Priorities and agendas for research mirror the priorities of dominant social groups.

But for technology to play a genuine role in promoting social justice and equitable development, its agendas and priorities must be based on the issues of the mass of people, and on those sections, such as poor women, who bear the brunt of continuing poverty and injustice. If technology is to be liberative, particularly for the mass of women, there must be a conscious effort within the technology development process to materially improve the lives of the poor, and particularly poor women. Women also tend to be involved in activities that have benefited little from technology. When the simplest of technologies becomes available for tasks that are generally performed by women, these tasks are taken over by men.

The absence of technological inputs in so many of the critical tasks performed by women is a direct consequence of their subordination. But when technology development is sensitive to the nature of gender relations, it can improve women's lives in many ways. Technology is a double-edged sword for women. It is important to understand the factors which make technology liberative or oppressive. Analyzing why technologies have, more often than not, failed to make a positive impact on the status of women will help us to design interventions which create conditions that will improve the nature of existing gender relations.

Patriarchal gender relations are based on denying women equal access to public and private resources, and to decision-making roles in the public sphere. The visualization of women's needs is inevitably done by men, and the process of technology transfer adds to the biases that plague technology development because the information about maintenance, modification, or replication, i.e., management of a new technology, is rarely passed to women. Knowledge is a source of power; therefore, informing women, so that they gain new skills (despite not being vested with formal knowledge of any kind) gives them status and authority within the family and the larger community. In order to ensure that technology development and dissemination have a positive impact on women and promote gender equity, there should be awareness of women's triple roles: production as both wage earners and unpaid labor, reproduction to continually

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replace the labor force and subsistence, to create and maintain conditions permitting daily life and survival. An understanding of the nature of gender relations is also essential. This can be done through analysis of the degree of autonomy and decision-making power of men and women in seven key dimensions: control over labor and income, access to public resources, control over private resources, control over reproduction, control over physical property, control over physical mobility, and access to and control over political power and decision-making. An analysis of community resources is required because adoption of technology depends on the availability of resources to various groups.

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About ICRISAT

The semi-arid tropics (SAT) encompasses parts of 48 developing countries including most of India, parts of southeast Asia, a swathe across sub-Saharan Africa, much of southern and eastern Africa, and parts of Latin America. Many of these countries are among the poorest in the world. Approximately one-sixth of the world's population lives in the SAT, which is typified by unpredictable weather, limited and erratic rainfall, and nutrient-poor soils.

ICRISAT's mandate crops are sorghum, pearl millet, finger millet, chickpea, pigeonpea, and groundnut; these six crops are vital to life for the ever-increasing populations of the semi-arid tropics. ICRISAT's mission is to conduct research which can lead to enhanced sustainable production of these crops and to improved management of the limited natural resources of the SAT. ICRISAT communicates information on technologies as they are developed through workshops, networks, training, library services, and publishing.

ICRISAT was established in 1972. It is one of 16 nonprofit research and training centers funded through the Consultative Group on International Agricultural Research (CGIAR). The CGIAR is an informal association of approximately 50 public and private sector donors; it is co-sponsored by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the World Bank.



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