

**WOMEN IN AGRICULTURE:
WHAT DEVELOPMENT CAN DO**

by

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Introduction

Before 1970, analyses of women's roles in Third World agriculture were found mostly in ethnographic studies of traditional societies. Ester Boserup, an economist, deserves full credit for placing this subject squarely within economic development. In 1970 she presented the first comprehensive, empirically based analysis of women's participation in agriculture and linked the evolution of farming systems to population pressures, technological change in agriculture, and the participation of women in the labor force.

Boserup (1970) distinguished three types of agricultural systems: female, male, and mixed. Female farming systems in some countries in Africa and Latin America and in certain areas of India are characterized by slash and burn agriculture, communal land ownership, and the use of the hoe. Except for land clearing, most of the work is done by women, who support themselves and their children. These women tend to be economically independent and mobile. If they generate an agricultural surplus, they engage in trade to supplement their subsistence earnings with cash income.

Male farming systems, found in Asia, are based on land ownership, settled production patterns, and the use of draft animals and the plow. Field labor is done almost entirely by men and is supplemented by hired labor; if women contribute to farming at all, it is during harvest time or at other peak periods. Women are often secluded and are dependent on men for economic support.

Mixed farming, which follows and shares many of the characteristics of male farming systems, emerges with rapidly growing populations. Increasing land pressure requires year-round intensive cultivation and multiple cropping, which are facilitated with irrigation. Labor demand is high and, despite social norms to the contrary, women are drawn into such tasks as weeding, transplanting, and harvesting.

Boserup attributes the disappearance of female farming systems to population pressure and the introduction of cash crops during the colonial period. Population pressure caused a shift to permanent agriculture. The plow replaced the hoe, plowing became men's work, arguably because it required physical strength and/or physical mobility, and men took over many of the farming activities. For example, in colonial Africa, European administrators and technical advisers introduced cash crops and modern agricultural technologies to men. Men, therefore, took credit for developing a highly productive export-oriented farming sector while women were left behind in the traditional low-yielding subsistence sector. As a consequence, women lost control over farming as well as the economic autonomy derived from farming.

Without question, Boserup's work provided much of the substance for the increased attention to women's issues by the United Nations, development agencies, and nongovernmental organizations (NGOs) starting in 1975, when an International Women's Year conference was held in Mexico City. Until this conference, international donors, national governments, and NGOs had channeled development resources to women only in their roles as mothers and homemakers. Women's roles as economic producers--farmers as well as wage laborers--had been ignored.

The 1975 Mexico City conference used Boserup's analysis to promote action that focused on women as producers and redressed sex-based inequities in development programs. But the weakness of these early efforts stressing women's economic participation was the inability of researchers and advocates to marshal convincing empirical evidence of the multiple roles of women and the negative impact that development had often had on women. In part as a result of lack of knowledge, the bulk of development assistance in the decade following the Mexico conference did not revise its assumptions about women. A variety of women-only projects were implemented over the 1976-85 period, with limited funding from donors. Although these projects demonstrated that donors were "doing something about rural women," ultimately they brought little improvement to the welfare of women. We shall now summarize findings on women's roles in farming systems, describe the impact of agricultural technologies on women in agriculture, and present an agenda for improving their situation in the 1990s.

The Research Evidence on Women's Roles in Farming Systems

Two decades of research have largely supported Boserup's (1970) insights in terms of variations in women's participation in different farming systems. But by analyzing in more detail the less visible work activities (such as domestic production and seasonal wage labor), the research has also shown that women's contributions to agriculture are greater than those postulated by Boserup. It is well accepted nowadays that women make substantial contributions to food production and agricultural wage labor, even when they are secluded or in male-dominated farming systems. Unfortunately, reliable statistics on the actual size and composition by sex of the agricultural work force are still lacking. More importantly, research has yielded useful information on the nature and determinants of women's work in agriculture and has revealed complex interactions between women's market and home production roles, household consumption, and family nutrition.

Although subject to considerable socioeconomic and agroecological variations, there is a traditional division of farm work by sex. Women are particularly active in growing food for subsistence, in weeding, post-harvest storage and processing, small-scale marketing of agricultural produce, and the care of livestock. Men grow cash crops for sale in local, national, and international markets. In many parts of Africa, for instance, where women's participation in farm work is

traditional and well recognized, and female farming systems in a sense still survive, there are "female crops" (i.e., cassava and other roots and tubers) and "male crops" (maize and cotton). But the division of farm tasks is more rigid in cultural convention than in reality. It breaks down easily in response to changes in demand for farm wage labor and household labor. Rural poverty and the shortage of farm labor expand women's participation into "male" ascribed farm tasks; for example, they plant tobacco in commercial farms in Honduras, pick coffee in Colombia, and harvest subsistence crops in nearly landless households in the Peruvian sierra.

Variations in women's participation in agricultural work depend on supply and demand factors linked to economic growth and agricultural modernization. Countries with high rates of urbanization and female-dominated rural-to-urban migration, like Latin American nations in the last two decades, experience shortages in the supply of female farm labor. Conversely, countries with low rates of urbanization (like many in sub-Saharan Africa) have an abundant supply of female farm workers. The demand for female farm work varies with land tenure patterns, the commodity being produced, and the degree of integration of agriculture into the market economy. Women's participation in agriculture is greater, as is their contribution to farm income, in small farms oriented to local rather than export markets (Dixon 1983). The demand for female farm labor has also increased with male labor migration and with agricultural policies that foster the development of agribusiness, in which women comprise the bulk of the work force. The time women spend in farm activities supplementing male labor as well as farming their own plots has increased notably among small farmers who grow groundnuts and cotton for export in Senegal, snowpeas for an agribusiness firm in Guatemala, and flowers for export in Ecuador. Export fruit companies in Chile and Costa Rica rely almost exclusively on female labor for harvesting, processing, and packing fruits.

Despite women's extensive and varied participation in agriculture, they continue to have less access than do men to modern agricultural inputs. As a result, their farm work is labor intensive and yields meager economic returns. This work pattern of high female participation with low productivity and low earnings has been documented across regions and is especially evident among women who head farm households with absent spouses.

The Nature and Contributions of Rural Women's Home and Subsistence Work

The unpaid home and farm activities of women are very time consuming; nevertheless, these activities make vital contributions to the economy of poor rural households in Third World countries. The poorer the country, the more hours women work and the greater are their contributions to the economy and family welfare. Rural women in developing economies work longer hours than both their urban female counterparts and rural men.

In parts of East Africa women work up to 16 hours a day doing housework, caring for children, preparing food, and growing between 60 and 80 percent of the food for the family (Fagley 1976). Rural Javanese women work 11 hours a day, compared to 8 1/2 hours for men (Nag, White, and Peet 1978). Home production includes some activities that can be called housework proper, such as cooking, child care, and sweeping, and a host of other tasks that in industrial economies would fall under agricultural or agroindustrial production or services. They include collecting water and firewood, storing and processing grains for home consumption, managing household wastes, and building floors and walls, among others. Because this is unpaid work, these activities have remained outside of official statistics that measure economic and agricultural output.

Recently, however, economists have begun to measure the economic contribution of women to family income. To quantify this contribution, economic activities, such as housework, that can be delegated to a paid outsider have been measured, by the number of hours women spend doing them (from time-use studies), the economic value of this time (what wage a person would earn if hired to do the work), the volume of production (e.g., the amount of firewood collected), or the value of what a woman produces (the price of the cassava that women process). Numerous studies have obtained valuable information on the allocation of work and leisure time in poor households by sex and age. Table 1 summarizes the results of twelve rural time allocation studies and shows that, women's daily work, including production, marketing, and household activities ranges from a low of 5.79 hours per day to a high of 12.49 hours per day. The corresponding figures for men range between 5.17 and 10.8 daily work hours. Men do significantly more market work than women but substantially less home work.

Women's time allocation patterns are less fixed than those of men. Men's use of time does not vary much during their adult working lives. In contrast, time allocation by women and children is flexible, changing with the number and ages of children in the household and the annual cycle of agriculture and schooling (if children go to school at all). As the demand for childrearing time and for cash income increases over the household's life cycle, the burden of meeting this demand falls primarily on the wife and, as they grow older, on the children.

In the rural Philippines, fathers' time spent in domestic chores is 1 to 2 hours daily, whether there is one child or seven. Filipino women spend about 2 1/2 hours per day in market production (wage employment, farming, fishing, and income-earning work at home) and 7 to 8 hours in home production. Older children often substitute for father's time in home chores and care of siblings. When there are seven or more children, men actually reduce their child care time (to about 10 minutes a day) and increase their leisure time (King and Evenson 1983). In rural Peru as well, it is mothers and children who substitute for each other in cooking, hauling water, and animal care (Deere 1983).

Table 1

HOURS PER DAY SPENT ON PRODUCTIVE ACTIVITY IN RURAL AREAS IN THE THIRD WORLD
(WOMEN AND MEN)

COUNTRY (YR OF STUDY)	REFERENCE	GENDER	HOME PRODUCTION ¹	AGRICULTURE MARKET & NON-MARKET WORK ²	OTHER MARKET WORK ³	UNSPECIFIED WAGE WORK	TOTAL HOURS WORK ⁴
<u>Latin America</u>							
Peru (1975)	Johnson: 1975	women men	4.07 .53	1.72 4.43	0.00 .21	- -	5.79 5.17
<u>South and Southeast Asia</u>							
Bangladesh (1976) Char Gopalpur District	Cain: 1980	women men	7.65 .90	.55 4.25	.05 1.20	.45 2.40	8.70 8.75
Bangladesh (1976) Char Gopalpur District	Cain, Khanam, & Nalbar: 1979	women men	5.40 1.27	1.71 2.80	.35 1.01	.84 3.24	8.30 8.32
Indonesia (1972-73) Java	Nag, White, & Peet: 1978	women men	5.61 .69	1.50 4.29	4.54 2.64	- -	11.65 7.62
Indonesia (1972) Java, Jogjakarta	White: 1975	women men	4.13 .75	2.17 4.24	5.67 3.36	- -	11.97 8.35
Nepal (1972-73)	Nag et al.: 1978	women men	4.86 2.17	7.23 6.13	.40 1.88	- -	12.49 10.18
Nepal (nd)	Acharya & Bennett: 1981	women men	6.13 1.53	3.76 4.33	.91 1.66	- -	10.80 7.52
Philippines (1977) Laguna	Folbre: 1983	women men	7.37 .49	- -	2.41 7.06	- -	9.78 7.55
Philippines (1977) Laguna	King & Eveson: 1983	women men	5.20 1.08	1.85 3.59	1.89 3.99	- -	8.94 8.66
<u>Africa</u>							
Tanzania (1976) Busoba District	Kamuzora: 1980	women men	3.47 1.13	4.24 4.20	.01 .82	- -	7.72 6.15
Cote d'Ivoire (1979)	FAO: 1983	women men	6.89 .75	1.64 3.14	.13 .04	- -	8.66 3.93
Burkina Faso (1979)	McSweeney & Freedman: 1980	women men	3.28 .12	7.43 3.48	.82 2.60	- -	11.53 6.20
AVERAGE		WOMEN MEN	5.34 .95	3.07 4.08	1.43 2.21	Not applicable	9.69 7.37

1 Home Production includes activities such as food preparation, childcare, hygiene, firewood collection, water collection, house construction, attending the sick, and food collection.

2 Agriculture Market and Non-Market Work includes activities such as bunting and gathering, garden labor, animal care, fishing, crop production, and processing crops for storage/sale.

3 Other Market Work includes activities such as trading, handicraft production, and food preparation for market sale.

4 NOTE: Reciprocal labor exchange has not been included in this chart.

Women's subsistence activities in some rural areas of Botswana, Cameroon, and Nepal amount to 54 to 70 percent of total household income; domestic activities contribute another 30 percent. In rural Malaysia, subsistence and domestic activities, contribute 56 percent of household monetary income (Goldschmidt Clermont 1983). The estimated mean value of home production for a farm wife in a polygamous household in Burkina Faso is 61 percent of the income generated through crop production. This value increases with the number of young children at home and the use of animal traction technology in the farm. It decreases in households that have many wives or older female children, who substitute in the wife's work at home (Singh and Morey 1987).

Studies have repeatedly shown that the earnings of adult women are proportionately more important in poor than in better-off families. In Indonesia, women and girls of poor landless families devote almost as much time to wage labor as men and boys (Hart 1980). In the sierra region of Peru, women from landless peasant households provide 35 percent of the total number of family labor days devoted to agricultural production, while women from the middle-class and rich peasantry provide only 21 percent. Furthermore, the poor peasant household is affected prejudicially by the differential returns to male and female labor, for it is primarily the women of the near landless and smallholder households who work as wage laborers or artisans to generate income (Deere 1983).

Households and Household Structures

Women's work throughout the world is more strongly affected by family arrangements than men's work. Household structure (that is, male-headed, woman-headed, or jointly-headed) and household dynamics, or the distribution of labor and resources within the household by sex and age, intervene and affect women's economic behavior. The life stage of the household, including the numbers and ages of children, is also a powerful determinant of women's economic participation, as is, in many cases, women's marital status and the access to resources correlated with their status. In turn, women's work, and their access to earnings, have powerful and direct effects on family welfare.

Household models. The reality of families and households in the Third World is very different from the constructs surrounding families and households in development theory and research. The latter have used an ideal family model with a pater familias as the head of household. Along with this notion of a male head has been the convenient assumption in microeconomic theory that he is the single decision maker in the household and that other household members share his interests and follow his decisions. Neither assumption is true, as recent research has revealed. Women heading households or compounds has been traditional in some African societies and has emerged recently in many others, as a result of economic pressures and labor migration. Jointly-headed households are also increasingly common; they are the result of modernization and women's

integration into the modern work force as well as of poverty and the need for multiple sources of household income.

Throughout the world, household members have differing interests that cannot be subsumed by the interests of the head. Inequalities within the household in the distribution of work and resources by sex and age are pervasive. Overall, men and boys have the upper hand over women and girls in the distribution of household resources, particularly when these are scarce (Sen 1985). In addition, there are both cultural and economic variations in spending patterns and responsibilities by sex. In some societies there are distinctive and separate male and female economies, while, in others, resources are pooled. In many parts of West Africa, men and women have independent sources of income and independent spending responsibilities. In parts of South Asia, on the other hand, households behave more like the ideal model of one purse and one decision maker, although these households often exhibit significant intrahousehold inequalities in the distribution of resources (Dwyer and Bruce 1988).

Variations in household headship and household dynamics affect who gains and who loses during the introduction of technological change in agriculture. Unfortunately, most farming systems researchers and extension workers consider the household as a homogeneous unit of production and consumption and ignore differing household arrangements and interests (Poats et al. 1988). For example, extension schemes often do not assist women who head farm households.

Woman-headed households: empirical evidence from Africa. "Left behind" women, de facto heads of farm households (whether they are farm owners or not), are increasingly common in rural areas with high rates of male migration. Unfortunately, census and household survey data have not yielded reliable assessments of the incidence and prevalence of these households. But, in Africa in particular, household surveys illustrate the interplay between household structures, women's work in agriculture, and family welfare.

Estimates of woman-headed households in Kenya vary from 22 to 40 percent in rural areas (Clark 1984). Staudt (1978) found that 40 percent of the farms in two areas of western Kenya were female-managed farms where the male was absent. Women both worked on the farm and functioned as the de facto household heads. In comparing female-managed with jointly-managed farms (that is, farms with a man present and sharing farm management decisions), Staudt found that jointly-managed farms were 4 times more likely to have a household member trained by an extensionist and 14 times more likely to have detailed loan information. Over time, the extension services' preference for targeting male over female farmers negatively affected the productivity of females and increased the income gap between the sexes.

In Botswana, the largest proportion of woman-headed households is in the rural areas; they are also poorer than male-headed households. Kossoudji and Mueller (1983) found that 36 percent of the households in a rural income distribution survey were female-headed with no man present, because males had migrated to work in the South African mines. The female-headed households were smaller and had a higher child dependency burden; lacking a second adult (male) worker, they faced acute shortages of labor; and their income was less than half that of male-headed households, even when transfer payments were included in total income. Male-headed households owned three times more cattle than female-headed households. Having fewer oxen for plowing, female-headed households had less than half the value of equipment and cultivated less land than male-headed households. The lower income of female-headed household in this study was not due to educational differences between the sexes, women's higher preference for leisure (in fact, women worked 20 percent more than men and had 20 percent less leisure time), or greater inefficiency at work. Women were poorer because they had similar economic burdens but less access to the productive assets (land, cattle, labor) needed to increase agricultural production and income.

The Botswana study also found that girls and boys in woman-headed households received more education than in male-headed households (Kossoudji and Mueller 1983). Using the same data set, Chernichovsky and Smith (1979) had earlier found that this effect persisted after allowance was made for differences in income, number of school age children, and location. Similarly, Kumar (1985) found a significantly higher level of child nutrition in Zambia at any given income level in woman-headed households than in jointly-headed and polygamous households. In southwestern Kenya, Kennedy and Cogill (1987) report that children from woman-headed households did significantly better on long-term measures of nutritional status (height-for-age and weight-for-age). Greer and Thorbecke (1986) found in rural Kenya that, after controlling for land size and household composition, female-headed households still allocated a greater proportion of income toward high calorie foods.

The unexpected positive findings from resource-poor woman-headed households stress the importance of understanding intrahousehold dynamics and variations by sex in the use of labor and resources. The results are best explained by hypothesizing that there are gender differences in expenditure preferences and that women's greater preference to invest in children can be realized more effectively or easily in a household situation where women make more decisions (or are the sole decision makers) and face fewer intrahousehold conflicts (between men and women) over the use of household resources. The next section illustrates the role of household variables in mediating the effects of technological change in agriculture.

The Impact of New Technology on Women Farmers

Following Boserup's lead, a number of researchers showed that technological change increased women's workload, displaced women wage earners, reduced women's income, and, indirectly, lowered family nutritional status. More recent research has shifted to analyzing how the inclusion of gender in technological change can help bring about improved output, economic growth, and household welfare. Many of the empirical studies are on rice and smallholder production systems in Asia and Africa. Methodologically, the studies are more descriptive than analytical and rely primarily on qualitative analysis and descriptive statistics. Only 6 of 21 studies reviewed for this chapter used statistical methods to test hypotheses. The major findings are summarized in Table 2 and discussed below.

Labor Use and Employment

The empirical evidence on the effects of technological change on labor use and employment is mixed, and it depends on, among other things, the crop and the technology, the household's access to land, women's socioeconomic standing, and intrahousehold dynamics. In examining the effects of high-yielding rice varieties (HYVs), it is important to distinguish between seed-fertilizer technology packages and mechanical field, harvest, and post-harvest operations that often accompany the new technology. Agarwal (1984) and Ghosh and Mukhopadhyay (1988) found that the adoption of HYVs in India increased total labor use and raised the demand for women's labor relatively more than for that of men. But Agarwal also found that the increased income from HYVs enabled women in larger landholding households to withdraw from field work. Where mechanical operations were adopted along with the HYVs, women's work intensity decreased, as did wage employment opportunities, both in rice (Acharya and Patkar 1985) and non-rice production (Rassam and Tully 1988).

Two studies in South and East Asia examined the effects of mechanical milling on the demand for labor in rice processing. Both Begum (1985) and Scott and Carr (1985) found that mechanization of post-harvest operations in Bangladesh reduced women's labor input in large- and small-landed households, increasing leisure time in the first case and reducing the work burden in the second. However, mechanization also displaced landless female labor from wage employment. The few mill jobs were not sufficient to meet the work demands of displaced women workers and, in any case, the mills either exclusively hired or gave preference to men. Unlike men, women displaced as workers or farmers were not offered training for alternative employment.

Table 2

Agricultural Innovation	Country/Region	Farm Size	Sample Size	Methodology	Description of Study	Effect on Women	Other Findings	Source
<u>Rice</u>								
HYV	India/Andhra, Orissa, Tamil Nadu	Very small, small, medium, large HH	354 HH	MV	Compares labor use intensity in 3 states between HYV & traditional variety rice by F/M, farm size, type of labor (family, casual, permanent)	<ul style="list-style-type: none"> - Increase in total labor use - Increase in wage employment for F/M casual labor - Impact on F family labor ambiguous 	<ul style="list-style-type: none"> - Possibly no real benefit to wage labor because real wages declined - F benefitted less as they earn less 	Agarwal (1984)
HYV	India/Nadia, West Bengal	SH; LL	78 HH	MV	Differential impact on F/M labor use	<ul style="list-style-type: none"> - Total labor use increased, but F relatively more, of type unrecorded & unmeasured - Increase in processing activities at home 	Impact of technological change most significant in differential labor use	G h o s h & Mukhopadhyay (1988)
HYV	Indonesia/East Java	SH; LL	NS	CS	Impact on F rights to land ownership and income earning opportunities	<ul style="list-style-type: none"> - Did not change land-ownership rights - Changed some rights in share-cropping - Shift from knife to sickle harvest reduced F harvest opportunities 	<ul style="list-style-type: none"> - Use of sickle raised M harvest work opportunities - Price of land & rental increased due to multiple cropping 	Wijaya (1985)
HYV mechanical operations	India/Kerala, Tamil Nadu, Andhra, Orissa, West Bengal	SH	NS	DS	Analyzes changes in F/M labor use, employment, & wages prior to new technology (1964-65) & post-new technology (1977-78).	<ul style="list-style-type: none"> - Employment instability increased - Work intensity decreased (more idle time) - Slight reduction in gap between F/M wages 	<ul style="list-style-type: none"> - Social relations of production & labor market structure dominated over impact of technology 	Acharya & Patkar (1985)
Mechanical operations	Philippines/Camarines Sur	SH; LL	200 HH	CS; DS	Examines differential employment effects of mechanization on F of varying social classes	<ul style="list-style-type: none"> - Above subsistence, F choose self-employment over wage work - Poor & landless F increase labor supply with declining wage rates 	<ul style="list-style-type: none"> - Perverse result of increase in labor supply with declining wage is to meet subsistence needs 	Ilo (1985)

Agricultural Innovation	Country/Region	Farm Size	Sample Size	Methodology	Description of Study	Effect on Women	Other Findings	Source
HYV mechanical operations	Philippines/Iloilo Province	SH	25 HH	CS; DS	Examines differential effects of new technologies on F/M labor use	- Labor use declined - Wage labor opportunities & income declined, especially for poor F - Productivity declined - still relied on old technologies	- M labor use increased with double cropping	Res (1985)
Mechanical milling	Bangladesh/Comilla, Modhupur	SH; LL	100 HH	CS; DS	Effects on F employment	- Large landed HH, F increase leisure time - SH benefit to F in reduced labor - LL wage labor displaced	- Mill jobs exclusively M - Decrease in labor use & costs - Increase in profit	Begum (1985)
Mechanical hulling	Indonesia/Java	SH; LL	NS	CS	Impact on employment and income of LL F: traditional harvesters & processors	- Greatly reduced wage employment - Removed redistributive welfare benefits	- M labor gangs hired to harvest - Lowered harvest time & costs	Cain (1981)
Mechanized hulling	Bangladesh	LH; SH; LL	NS	CS; DS	Considers impact of processing technologies on displacement of LL F & potential for employment generation through appropriate technologies	- Labor use declines: time benefits to LH & SH F - LL workers displaced; loss of 55% of annual Y for poorest 5% - Mill employment for F limited - Poor F establish small businesses	- Cost reduction from technology use due to decrease in F labor - Focus should be on labor-using, low-capital technology	Scott & Carr (1985)
Irrigation/mechanized milling	India/South, Northeast	SH	96 districts	MV	Examines regional dimensions of paddy cultivation & processing	- Irrigation strongly related to increase in use of F laborers (for transplanting) - Rice milling displaced F handpounders	- Rice milling more cost-effective - Relative to F, less M displaced due to milling	Sen (1985)

Agricultural Innovation	Country/Region	Farm Size	Sample Size	Methodology	Description of Study	Effect on Women	Other Findings	Source
Irrigation/ production technologies	The Gambia, Ivory Coast, Burkina Faso, Senegal, Mauritania, Zanzibar, Madagascar	SH	NA	LR	Examines the consequences on F & economic development of introducing new technologies that are technically & socially inappropriate	<ul style="list-style-type: none"> - Loss of traditional rights to land - Inability to meet family food provision obligations; may result in malnutrition - Loss of economic independence & social status - Increase in labor demand - Unable to benefit from new technologies & extension targetted to M 	<ul style="list-style-type: none"> - Negative consequences arise from failure of planners to take account of F's roles & knowledge, differential F/M access to resources & family power 	Dey (1985)
Irrigation/ Commercialization	The Gambia/ MacCarthy Island Division	SH	NS	CS	Examines consequences of falsely assuming production is controlled by unified M-headed household	<ul style="list-style-type: none"> - Excluded from owning irrigated land, credit & other inputs - Paid wages to work on M irrigated rice but wage low relative to M - Lost autonomy--became dependent on M for inputs 	<ul style="list-style-type: none"> - M claimed ownership of land through project; increased income - Production increase not as significant as potential if F expertise had been tapped 	Dey (1981)
Irrigation/ Commercialization	Cameroon/ Yagoua	SH	24 married F	MV	Examines change in intra-household contractual arrangements & income distribution	<ul style="list-style-type: none"> - Labor on husband's rice field increased - Income-earning activity declined - Obtained opportunity wage from husbands - Had more disposable income 	<ul style="list-style-type: none"> - New institutional arrangement emerged: wage payment to wives 	Jones (1986)
Irrigation/ Commercialization	The Gambia/ MacCarthy Island Division	SH	200 HH; 1414 F; 1395 M	MV	Impact on F/M labor use- -project consciously designed to maintain F in rice lands	<ul style="list-style-type: none"> - Labor input declined in rice - Switched to cash crop production - Productivity & returns lower than M - Autonomy as independent producers declined 	<ul style="list-style-type: none"> - Rice became communal crop; less marketed, more retained for food - Increased F & M calorie consumption 	Von Braun & Webb (1989)

Agricultural Innovation	Country/Region	Farm Size	Sample Size	Methodology	Description of Study	Effect on Women	Other Findings	Source
<u>Non-rice</u>								
Milk processing centres/cooperatives/technical assistance	Developing countries	LL; SH	NA	LR	Examines the effects of providing TA to F (owners & marketers of livestock) when F provide labor & expertise	<ul style="list-style-type: none"> - Workload increases - Excluded from cooperatives - Lose control of product & income 	<ul style="list-style-type: none"> - Family nutrition may decline if F's income is displaced - When income goes to M, price incentives don't reach F; don't effect productivity to M 	Chavangi & Hanssen (1983)
Snowpeas/commercialization	Guatemala	SH	40 HH / 250 individuals	CS; DS	Examines effects on labor use by sex, F control over income & decision making	<ul style="list-style-type: none"> - Increase participation in unpaid field work - Substitute time away from other income-earning activities which provide independent income - Lose economic independence 	<ul style="list-style-type: none"> - F control food expenditures on allocations made by M 	ICRW (1987)
Mechanical operations	Syria/Northwest Aleppo	SH	47 HH	CS; DS	Impact of mechanization on farm operations on F/M labor use	HH & hired labor displaced by mechanization	M labor dominates use of new technologies or secures off-farm employment	Rassam & Tully (1988)
Export crops/mechanization	Senegal/Sine Saloum	Plantations; SH	NS	CS	Examines effects of integration into world market and mechanization on social stratification, F, work and income.	<ul style="list-style-type: none"> - Highly mechanized plantations: F labor declines & income increases - Partial mechanization, F labor use increases 	F gains mediated through husband's social status: high-income F accumulate capital, low-income F earn for HH subsistence	Savané (1986)
HYV maize/commercialization	Zaire/Sheba	SH	77 HH	CS	Examines effects of cash-crop production on F labor allocation between food & cash crops, & nutritional impact on F & children in a matrilineal/matriarchal society	<ul style="list-style-type: none"> - No nutritional differences between F/M - Retained economic & political power & autonomy in private & public domains 	<ul style="list-style-type: none"> - F substituted time from food to cash crops cautiously - Only limited acceptance of technology both F/M 	Schoepf (1985)

Agricultural Innovation	Country/Region	Farm Size	Sample Size	Methodology	Description of Study	Effect on Women	Other Findings	Source
Export crops/commercialization	Guatemala	SH	399 individuals	MV	Evaluates impact of nontraditional vegetable production on HH division of labor, decision-making power, & child nutrition	- 78% increase in agricultural work - Substitute on-farm for off-farm work - Loss of autonomy	- Export crops more profitable - HH spend more on food but less of incremental income controlled by M	Von Braun (1989)
HYV/export crops	Indonesia/Central Kalimantan	SH	60 HH	CS; DS	Potential impacts of improved technologies & management techniques on F labor allocation, decision-making, & control of production in region where F traditionally have high participation	- Potential for F labor to increase - Potential for F to benefit	- Extension services focused on M - Improved coconut production techniques to M - No attention to F secondary crops - Need to incorporate F roles in planning to achieve maximum benefits	Watson (1985)

Key Methodology: CS = Case Study; DS = Descriptive Statistics; MV = Multivariate Analysis; LR = Literature Review

Terms: F = Female; HH = Household; HYV = High-yielding variety; LL = Landless; M = Male; NA = Not Applicable; NS = Not Stated; SH = Smallholders

In the Gambia in West Africa, women worked on male-owned or communal plots rather than on their own plots when time constraints were introduced by new rice technologies and the allocation of irrigated land to men (Dey 1981, 1985). This substitution effect appeared in situations where women traditionally engaged in rainfed rice production on their own plots and where the development project consciously made an effort to encourage women to retain their own production (von Braun and Webb 1989). Similar increased farm labor and substitution effects have been found with the introduction of other crops, such as high-value vegetables and commercialized dairy production.

Only a few studies have addressed changes in women's roles associated with technological innovations and farm output. Dey (1981) concluded that the production increase due to irrigation in the Gambia was not as significant as it might have been if women's expertise in dryland rice production had been tapped.

Von Braun (1989) found that women's farm work increased 78 percent in a nontraditional vegetable production project in Guatemala. Women had to substitute farm work for off-farm income-generating work, losing control over economic resources, since men controlled the income from the highly profitable farm work.

Wages and Incomes

Increases in the demand for women's labor as a result of HYVs are not always associated with improved wages and incomes, although there is the possibility that observed reductions in women's wages could have been greater without the introduction of HYVs. A more relevant measure is how women's real wages changed relative to changes in men's wages. The small amount of available evidence on this issue is mixed. Acharya and Patkar (1985) found that the new technology had a positive income effect for females and slightly reduced the gap between men's and women's wages in each of five states in India represented in their sample. On the other hand, in Cameroon, with the introduction of irrigated rice as a cash crop, women became wage workers on their husband's rice farms; and, while they earned their opportunity wage, this amounted to less than one-fourth of the net increase in household income generated by their labor (Jones 1986). Von Braun and Webb (1989) found that the adoption of irrigated rice by men in the Gambia resulted in less rice marketing and a switch by women into cash crop production. Because women did not have access to labor-saving tools and had less time than men to devote to agriculture, due to competing demands from household work, their labor productivity was consistently lower than men's by an average of roughly 70 percent.

Numerous studies have shown that mechanization has displaced women and reduced their income and employment. Scott and Carr (1985) estimated that the displacement of landless labor due

to rice mechanization in Bangladesh reduced the incomes of the poorest 5 percent of women by 55 percent annually. This represented a loss of 15 percent of family income. In Indonesia, mechanical rice processing eliminated about 1.25 million woman days of labor in Java alone--the equivalent of \$50 million in annual earnings. Von Braun's (1989) study of the production in Guatemala of nontraditional vegetable crops for export showed a loss of economic independence among women as they substituted farm for off-farm income-generating work.

Nutrition and Welfare

There is growing evidence on the nutritional impact of agricultural innovations mediated by changes in women's work roles. Some researchers have postulated, but without empirical evidence, that family nutritional levels have been threatened by women's diversion to cash crop production (Dey 1985). However, von Braun and Webb (1989) have provided evidence that the expansion of rice production under irrigation in the Gambia resulted in higher caloric consumption for both men and women. Although women's incomes fell and women's role in rice production declined, rice became a communal crop and more rice was retained for domestic consumption than for market sale.

Von Braun, Kennedy, and Bouis (1988) summarize the result of five studies, including their research in the Gambia, on the effects of commercialization of smallholder agriculture on consumption and nutrition. While there are variations across settings, they conclude that women's direct control over income from the new cash crops was much less than men's and was often disproportional to their labor input. However, household food expenditures, as well as other expenditures with high welfare content, increased in absolute terms as incomes controlled by men rose; and this increase had a positive, although not large, effect on child nutritional status.

The increases in women's wage rates accompanying technological change in agriculture could have a negative effect on nutritional levels, because the cost of women's time spent on home production (and child rearing) increases. In particular, the concern has been that increased market work might cause women to curtail breastfeeding, as well as other health care activities that are critical to preventing child malnutrition. However, a recent review of the empirical evidence on the relationship of women's market work to infant feeding practices and child nutrition reveals that there is no clear association between women's work status and breastfeeding patterns or child nutritional status. In most studies the prevalence of breastfeeding was not related to women's work status. A few studies found that child nutrition had been negatively affected, but a number of others found a positive association, particularly among children of higher-income working mothers (Leslie 1988).

In summary, the literature shows that technological change in agriculture has specific and highly heterogeneous effects on women's labor, control of income, and child nutrition. These effects are often different from those on men's labor and are uniquely linked to household consumption patterns and child nutritional status. As with men, agricultural technology can either displace or increase women's farm labor, decrease or increase women's wage rates, and can lead to substitution effects between women's off- and on-farm work or between women's and other household members' labor in home production.

A review of the evidence indicates the need for empirical work that disaggregates the effects of technology adoption by sex, measures effects on labor use, wages, and degree of control over income, and integrates the intervening variables of intrahousehold dynamics and social stratification into analyses of the social and economic impacts of technological change.

Projects for Rural Women

The emphasis on income generation, training, and credit projects for poor rural women was a response to the project orientation that dominated development work in 1970s. Projects were then main the units for implementation, analysis, and evaluation (Lewis 1988). The project orientation was compatible with the limited financial resources allocated to studying women's issues, the restricted access of women development workers to policymakers in Third World countries, and the need to build up a concrete record by the end of the Women's Decade in 1985. In the late 1970s, a large percentage of development funds on behalf of women went to NGOs, because these organizations were generally more receptive than government agencies were to addressing the problems of poor women. NGOs were also easier to work with than cumbersome governmental bureaucracies. But this choice restricted the impact that womens' projects had on policy and institutional reforms, which are more easily accomplished by government action than by NGO intervention.

The bulk of the development projects for rural women over the 1976-85 period provided training in traditional female skills (e.g. sewing, cooking, and crafts), credit programs for microenterprises, and income-generation schemes to bring rural women into the market economy. Notably absent were interventions that could develop and provide agricultural technologies, credit, and extension to women farmers, redistribute land to women, or increase the demand for women's paid labor in rural areas. Interventions in these areas could have dramatically strengthened women's roles in agriculture. By failing to support these reforms, donors, NGOs, and governments limited the impact their earmarked funds could have on poor rural women.

These women might also have benefitted from the general funds assigned to agriculture and rural development. Especially during the 1970s, international donors made large investments in smallholder agriculture and integrated rural development projects. But these projects were designed to raise the welfare of farm and landless families, rather than of individuals, and did not generally succeed in improving women's economic opportunities. Ironically, the existence of funds earmarked for women, and the special women-in-development activities that they encouraged, made it easier not to deal with women's concerns in mainstream development projects. The result was that women were effectively denied access to the resources and expertise that mainstream activities commanded.

Microenterprise Projects

Microenterprise projects became very popular in the 1980s, in part, because they reinforced a private-sector orientation that was much in vogue in development assistance and in part because they targeted a sector that increases in importance in the face of economic crises and modern-sector unemployment.

Microenterprise projects deliver short-term flexible loans with few collateral requirements to entrepreneurs who operate very small scale businesses rural and urban informal markets. A distinctive feature of these projects, which in part accounts for their relative success, is that they are directed to women and men who are already integrated into market production and need only to strengthen their productivity and earnings rather than join the market economy. For instance, microenterprise projects provide working capital to basket weavers, rice huskers, beer brewers, tortilla producers, and others who pursue home-based enterprises of the sort that rural women commonly operate. Success is measured by high repayment rates, ability to reach a relatively large number of beneficiaries, and significant short-term increases in net business earnings. The more successful or better performing projects are run by specialized agencies that focus on a particular task and provide the single missing ingredient rather than integrated services. In these projects individual clients carry out familiar or easily mastered tasks, they are not required to engage in collective production, and they undertake an economic activity for which there is a shortfall in supply and an established demand (Tendler 1989). Densely populated areas help guarantee local demand, so these projects have proliferated in rural Asia and in Latin American cities, areas with high population densities. Sparsely populated rural communities in sub-Saharan Africa and Latin America have had limited success with these types of schemes. In summary, microenterprise projects have proven to be a successful vehicle for helping poor women.

Income-Generation Projects and Their Misbehavior

Why do production- and income-generating projects frequently misbehave and end up pursuing welfare goals? We shall address this question by first examining two project histories. In 1979 a private voluntary agency set up an income generation project for rural women in the western province in Kenya. A group of 50 women was organized into a cooperative to produce potholders from banana fiber rings for sale in Nairobi. Two years later, the women were losing 0.50 Kenyan shillings for every potholder they produced and sold, even before including the implicit cost of their labor (the unit cost of the fiber was 3 shillings and the retail price of the potholders was 2.50 shillings). Moreover, capital that had been donated to finance and replicate the project through a revolving fund had been depleted. The project, nonetheless, continued operating with donated funds and survived its financial misfortunes, because social or community development goals were perceived as appropriate or beneficial for poor women even if the productive component failed.

In Bolivia, a large integrated rural development scheme financed by an international donor agency and implemented by the government was launched in the highlands to increase alpaca and llama wool production and modernize the herd management and shearing practices of Bolivian peasants. But information collected during the appraisal of the project revealed that herding and shearing were women's work and, as a result, the design of the project was revised to include a production-oriented women's component. Project implementation was assigned to a government social welfare agency rather than the Ministry of Agriculture. The social welfare agency redirected the production-oriented component towards something that they were familiar with: developing women's skills in nutrition, cooking, and embroidery. Highland peasant women, whose principal duties were to herd and shear animals, manage household finances, and supervise the day-to-day activities of the household, were instead organized into groups and given training in a number of unfamiliar and (for them) complicated tasks such as nutrition and cooking, embroidery, sewing, knitting and crochet, and paper and papier mache flower making. Women were given what was essentially welfare rather than production-oriented training because it was wrongly assumed that this training would enhance tasks they had traditionally performed.

The experience of these two projects illustrates the typical unfolding of income-generation projects for poor women in the Third World. During implementation, many projects "misbehave" and many of the production goals are gradually replaced by welfare activities, which deliver information or free handouts (food, clothes, or money) to poor women in their roles as wives and mothers (Buvinić 1986). The welfare slant in the execution of women's projects is explained by three specific project characteristics that interfere with the execution of production objectives and cause projects to misbehave. First, there are common misperceptions about women's lives and what is good or appropriate for poor rural women. Projects often concentrate on stereotypical Western female

tasks, such as sewing and embroidery, because they are perceived to be simple and familiar to poor rural women. But in the Third World these activities are largely unfamiliar to poor rural women, who have difficulty performing them effectively. Badly executed activities lead to loss of motivation among project participants and economic failure. Second, most welfare-oriented projects are designed to help groups of women identify their felt needs in a participatory fashion and arrive at group decisions, while economic programs required centralized decisionmaking for successful implementation. The participatory style of women's projects is conducive to the implementation of social rather than economic objectives. The preference for this working style, therefore, helps explain the survival of projects that are financial failures.

The third characteristic of production projects that misbehave is that they are often staffed by female volunteers with limited technical qualifications. Women are usually called to staff these projects because of the largely untested belief that women work best with other women. The lack of technical expertise of women advisers in areas such as agricultural extension, accounting, and marketing is a major hindrance to the success of projects directed toward increasing women's income.

The design choices of the typical woman's project are easily explained by some of the organizations that have been most frequently invited to implement them: nongovernmental volunteer organizations that focus on women's issues, along with the social welfare, children's and women's sections of governmental agencies. Most of the women's NGOs have substantial expertise in welfare projects since they were widely utilized by international relief agencies to distribute services and free goods in the 1950-70 period. These organizations, which had acquired large numbers of women volunteers to distribute relief, were asked during the 1970s to revise their charters and implement productive programs for poor women. They did so, but because they knew how to implement welfare rather than productive programs, they transformed productive designs into welfare projects. From an organizational perspective, this was the rational choice for institutions with a welfare history, successful performance in welfare activities, and no technical expertise in productive projects.

These NGOs and the welfare, children's and women's sections of government agencies are both willing to work with poor women and do so more cheaply than does anyone else. The women who volunteer cost nothing and the female government staff are, on average, paid lower salaries than male staff. In an environment where financial resources for development programs are tight, the lower cost of these NGOs and agencies helps explain why they are often chosen to implement women's projects, even if the agencies lack the technical qualifications to do so. The misperception that women can work only with women, combined with the lower costs of women's organizations¹ and the lower status of working on women's issues, often leads to project misbehavior.

Unfortunately, the misbehavior of income-generating projects has led to unjust criticism of women's organizations, skepticism about the effectiveness of directing resources to poor women, and, worst of all, misuse of poor women's valuable and scarce time. Obviously, in some instances the social benefits of projects may outweigh the financial costs to poor women, but the multiplication of this type of project during the Women's Decade did little to improve the economic situation of poor rural women (Flora 1987).

Fortunately, many donor and implementing agencies have become aware of these project pitfalls and, along with replicating their more successful microenterprise projects, are revising their approaches to working with poor rural women. These revisions include a renewed focus on needed institutional and policy reforms and greater attention to technical issues.

An Agenda for the 1990s

Above all, rural women in the Third World need to increase their productivity and income in agriculture and related rural enterprises, to improve their own and their families' welfare. Because of the critical differences in the type of work men and women perform, and in the ways in which they utilize their income, interventions aimed at the family are not effective in alleviating rural women's poverty nor, in most cases, the welfare of children, for whom, almost universally, women are responsible. One of the most effective ways to attack rural poverty and increase rural women's incomes is to increase the productivity of smallholders, provided that such efforts benefit female as well as male farmers. Agricultural projects, therefore, must be oriented toward smallholders and should use a targeted approach within farming systems that takes into account women's roles as farmers and resource managers. This approach should focus on individual farmers (men and women) within farm households rather than on the household as a whole.

The initial step in a chain of events to increase the productivity of female farmers is research that goes beyond the farming system and examines the entire food system of the dominant staple foods in the area. This approach helps identify the constraints on both men and women in production, marketing, processing, and trade (Jiggins 1986).² Research is also needed on the nutritional effects of alternative production technologies (Pinstrup-Anderson et al, 1984). This research needs to be followed by policies that provide women farmers incentives to adopt agricultural innovations and by institutional changes that increase women's access to agricultural services. International donors can influence the nature of investments in agricultural research at international and national levels, the adoption of appropriate national agricultural policies, and the implementation of reforms in agricultural institutions so that women can have access to agricultural technologies, training, credit, and extension. Governments should be encouraged to implement land tenure reforms that will benefit all small farmers, men and women.

Structural adjustment and other policy reform programs worldwide have produced a number of unforeseen problems because the role of women in various economic activities has not been taken into account. To be effective, such reforms must be structured to assist women, not only men, respond to price and other incentives. Agriculture, for instance, is typically targeted by short- and medium-term structural adjustment programs to increase production of exports or import substitutes to improve a country's balance of payments. For example, structural adjustment programs typically include measures to increase price incentives for export crops. But increasing the relative profitability of export crops may force women to work more hours, recruit the help of their children, or accept a decrease in their real incomes. Each of these options may have a negative impact on the family, on national food security, and on the long-term success of structural adjustment policies. Stepping up export-oriented production at the expense of locally grown food may cause a dysfunctional dependence on food imports.

There is a case, therefore, for balancing policy reform with effective sectoral strategies for raising the productivity of women's work in agriculture and microenterprises. Agricultural extension efforts should help women improve food production while allowing them to shift more of their labor to export production. Similarly, changes in legal, financial, and educational systems must be undertaken in order to enhance women's social and economic contributions to rural development in the long term. There is a need to examine carefully the implications of land tenure laws and regulations for women. Financial policies that encourage biases against, or reduce the profitability of, the types of borrowing that poor women seek must be revamped to increase the productivity of women's work. And educational policies and funding must be changed to reflect the very high social and economic returns to women's primary education and literacy.

NOTES

1. However, although the total budgetary cost of female-based NGOs may be lower than other organizations, the unit cost of output (for example, per dollar increase in the income of the poor women being assisted by the project) may be high, because of the low productivity of the projects assisted by the NGO agencies. Low productivity may result from the lack of technical, managerial, and financial expertise of the NGO staff.
2. In Southern Africa, SADCC (Southern African Regional Development Coordination Council) and ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) recently launched a research program on the sorghum food system, including research on household and village processing of sorghum with the assistance of IDRC (International Development Research Centre) and CIDA (Canadian International Development Agency) of Canada.

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