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New Models for Agricultural Research and Extension: The Need to Integrate Women

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Introduction

Investments in agricultural research and extension systems are currently advocated as a key factor in the success of the new agriculture-led growth strategies of development (Mellor, 1976). A central objective is to redress the inequities arising both from transfer of technology which has proved inappropriate to the needs of many low-income farmers, and from agricultural extension strategies which have concentrated delivery of technical innovations on an elite of "progressive farmers".

Equitable distribution of increases in agricultural productivity requires new styles of adaptive research for the development of technologies appropriate to the agro-socioeconomic conditions facing low-income farmers. In addition new organizational strategies of extension are essential if the majority of low-income farmers are to utilize new technologies rapidly. New strategies for research and extension both depend fundamentally on the increased participation of farmers at all stages of the technology development and extension process (Whyte, 1977; Hildebrand, 1978; Kere, 1978).

This paper suggests that new agricultural research and extension strategies need to be designed explicitly to encompass women as participants in order to meet objectives of increasing agricultural productivity as well as for reasons of equity. The purpose of this paper is to survey in a cross-national framework the current needs, problems and policy measures associated with developing agricultural extension services which include women as beneficiaries of improved agricultural production techniques.

Rural women constitute the majority (70 to 90 percent) of women in developing countries; to varying degrees they are currently significant, if often unrecognized, participants in agricultural production providing an estimated 60 to 80 percent of agricultural labor in Asia and Africa, and 40 percent in Latin America. In the context of this paper the participation of women connotes full access to decision-making, institutional services and resources involved in

improving all aspects of agricultural production, so that women receive the benefits from the labor and skills they contribute.

One point which requires consideration in this context is that a discussion of agricultural extension services is necessarily oriented primarily to concern with a clientele which has control over the productive resources required for agriculture - in particular, land. Agricultural technologies and the organization of extension delivery systems can affect those who contribute only labor to agricultural production by increasing or diminishing their employment opportunities in agriculture. However, their lack of control over other resources such as land and capital means that de facto they are excluded from direct participation as clients of agricultural extension services. The problems of the landless are ones which can be addressed at best, only indirectly by technical improvements in existing modes of agricultural production; other policy measures relevant to the problems of the landless fall outside the mandate of this paper. Hence a discussion of women as a constituency for the delivery of agricultural extension services is necessarily limited to concern with a class or classes of women in households with access to land.

By way of introduction it may be useful to consider what is meant by agricultural extension as discussed in this paper. The functions of agricultural extension are conventionally thought of as primarily the communication of technical information and training of farmers in new agricultural practices. In actuality, the effectiveness of any agricultural extension strategy depends fundamentally on the usefulness to farmers of the technologies which it has to extend (Rice, 1971). As will be discussed in more detail in Section II of the paper, new intervention strategies for improving the flow of appropriate technologies to low-

income farmers imply a blurring of conventional distinctions between research and extension. A first step in these strategies involves the development of improved information systems linking research, extension and agricultural producers.

In this paper priorities for the design of agricultural extension strategies are viewed in the context of the functions of extension in a two-way communication system, in which the delivery of information and training to farmers is complemented by feedback on farmer uses of new technologies to research.

Within this framework, the paper begins by reviewing some of the major features of women's participation in agricultural production and in existing extension services. Second, new directions in the design of agricultural research-extension systems are examined in relation to the problems which used to be addressed if women's effective participation in extension services is to be implemented. Finally, in light of these problems and of the characteristics of women's contribution to agricultural production, some of the factors likely to determine the efficacy of alternative policy strategies are discussed.

I. Women and Agricultural Extension: A Review of the Current Situation

This section of the paper begins by briefly reviewing why the delivery of agricultural extension services specifically to women is a matter of concern in the light of current rural development objectives. Second, ways in which the design of extension services for rural women have neglected ~~their~~ women's roles as participants in agricultural production are considered. Thirdly, evidence suggesting that the design and implementation of agricultural extension has militated against the access of women

agricultural producers to agricultural services is examined, and the implications for goals of increasing agricultural productivity are considered.

1. Why are women a target group for delivery of agricultural extension services?

In order to understand why and in what social contexts the access of women to agricultural extension services is an issue, it is first of all necessary to identify their roles in agricultural production. In any given country or region of the world a classification of women's economic contribution to agricultural production has to be made with reference to cross-cutting distinctions of social class, marital status, ethnic or religious identity. Some of the main features of such a classification are outlined here to provide a framework for exploring some fundamental policy questions later in the paper.

One of the basic considerations for determining women's roles in agricultural production is the extent of agricultural work done by women. In Sub-Saharan Africa, women undertake the major part of cultivation in more than half of all societies (estimated at 60 to 80 percent of the total (UN, 1972)), and an equal part in a further quarter of these societies. Only in one-fifth of all societies do men play the major role (Goody and Buckley, 1973). In other systems of agriculture although men are more likely to be involved in the cultivation aspects of agriculture than is the case in many African societies, women are significant contributors to field labour: Boserup (1970 estimates female labour accounts for about one-fifth of family labor, and as much as one-third of wage labour in Asian agriculture. Case studies of rural women in India suggest however, that women who work in agriculture contribute not less than 50 percent of all labor, and that this

estimate would be much higher if their work in animal husbandry and farm support activities at home were taken into account (Chakravorty, 1975).

Even in cultures where there are norms of female seclusion, women and children are not prohibited from field labour and may be recruited for planting, weeding and harvesting activities: one study estimates that agriculture employs more than a third of economically active women in Moslem countries (Merjhssi, 1976). For example, a field survey in Egypt indicates that 44 percent of rural women are engaged in agricultural production; in the ~~Indian~~ Sudan 78 percent of the female labor force is estimated as working in agriculture, forestry and fishing; in India census data show 80 percent of the female labour force engaged in agriculture (Ahdab-Yehia, 1977; Chahil, 1977). Whether or not women contribute extensively to field labor, in almost all farming systems women are engaged in unpaid "household" labor which is not counted in statistical estimates, but which contributes to agricultural production: for example, post harvest processing, food preservation and storage, water carrying, fuel and fodder collection, vegetable gardening and care of livestock.

However, aggregate statistics tend to obscure the different patterns of female labor participation in agriculture which occur within a given sexual division of labor, depending on patterns of socio-economic stratification. Women from low-income households are found working full-time in field labor, particularly as hired labor, in societies where socio-economically advantaged women may withdraw seasonally or completely from such work (Boserup, 1970; Hull, 1977; Stoler, 1976; Hark, 1978). Boserup (1970) identifies four types of rural female work patterns which may be correlated with social class position: (1) socio-economically advantaged women who may be purely domestic, sometimes

secluded; (2) primarily domestic women, who participate in agricultural labor to a limited extent on a family small-holding; (3) active women farm workers, who contribute to a larger proportion of family agricultural production and income in poor families, and may work as hired labor for others; (4) independent women farm workers or farm managers, who cannot expect to be supported by a husband, and are responsible for almost all aspects of production. Although these types are generalizations abstracted from a complex reality, they indicate the kinds of cultural and class-related variations in the sexual division of labor in agriculture which have to be considered in the design of extension strategies to include women.

The sexual division of labor does not, however necessarily indicate where authority over production processes within the farm household resides. Women are now widely recognized as important contributors to decision-making and farm management in traditional agriculture. Again the extent of women's decision-making powers with respect to different aspects of production processes, types of crop or inputs, varies enormously across farming systems, and across social classes within a farming system. A correlation between the sexual division of labor and decision-making responsibilities is clearest in the case of African societies where each wife in the domestic ~~country~~ economy of the polygymous family tends to constitute a separate unit of production (Levine, 1970). However one survey of farm decision-making comparing seven African and Latin American countries finds that women's influence is significant in all aspects of agricultural production. The same survey finds that even where women's active participation in farming appears to be at a relatively low level, there are cases where women have the deciding influence over farming matters (Riegelman, et. al.

1976). In Asian households for example, although males traditionally mediate between the household and the outside world, women may manage family finances and dominate decision-making processes (Stoler, 1976 (Indonesia); Reining, 1977 (Philippines); Hisch, 1975 (Korea); Jayasat, 1977 (Thailand)).

Moreover, the declining viability of small-scale agriculture in many low income countries means that increasingly, women are bearing primary responsibility for farm management decisions and all aspects of production. Population pressure on the land and out-migration of male labor in search of off-farm employment result in increasing members of actual or de facto female-headed households in rural areas.

Recent estimates of the number of "potential" female household heads (i.e., widowed, divorced, separated or single mothers which does not include de facto female household heads) for 74 developing countries range from 10 to 48 percent of all households, and suggest that this phenomenon is widespread with no distinct geographical or cultural clusterings (Buvinic and Youssef, 1978). Estimates for selected African countries, where farming is predominantly female activity, indicate that the proportion of rural female headed households are as high as one-third to 40 percent of all households. This phenomenon appears to be most pronounced in African countries where a common pattern is for men to migrate for wage employment away from the farm. But studies in Asia and Latin America suggest that the emergence of large scale commercial agriculture, seasonal agricultural wage labor, opportunities for male non-farm employment and population pressure on subsistence small holdings all encourage a situation in which many more women are involved in running small holdings in the absence of male family members. Increasingly in rural areas where outmigration is predominantly male, traditional patterns of labor division

among the sexes break down and women are responsible for almost all agricultural tasks. Pressures towards the outmigration of male family members and the breakdown of traditional family structures tend to concentrate and increase the incidence of female-headed households among low-income groups in rural areas. Unstable marital unions appear to be an adaptive means whereby rural women cope with severe poverty (Brown, 1975). Finally, there is some evidence to suggest that extensive outmigration of males may be selective, those men remaining in the agricultural sector being of low levels of ability, skills and education, so that resources of skill and knowledge may tend to be concentrated among women farmers (Moock, 1976). A rising proportion of female farm managers among the poorer segments of a rural population makes it all the more imperative that agricultural extension services be designed to explicitly encompass women if efforts to distribute benefits of improved agricultural practices to low-income farm families are to be effective.

Not only the extent of women's participation in agriculutral production, but the types of production for which they may bear primary responsibility require consideration. Increased production of basic food crops and technical improvements in crop storage and food processing are two critical areas of intervention for increasing available food supplies vital to solution of the world food problem (Wortman, 1978). Typically in sub-Saharan Africa, increased production of cash/export crops promoted by colonial agricultural policy, progressively relegated subsistence food crop production almost exclusively to women (Boserup, 1970; Rening, 1975). Large-scale commercial or plantation agriculture which extracts primarily male labor, or the outmigration of male labor for non-agricultural employment as discussed above, also concentrate

the maintenance of subsistence-sector food production in the domain of women's agricultural activity (Deere, 1976; Borque and Warren, n.d.). But even this pattern is by no means universal: in Asian wet rice cultivation for example, male and female labor are required for subsistence production, and female labor accounts for a significant proportion of that involved in commercial export production (Buchanan, 1968; Boserup, 1970). However in Asian agriculture women are often primarily responsible for food crops other than rice, particularly in systems involving dry land farming.

Moreover, women's primary role in post-harvest production processes in the vast majority of farming systems is an important consideration in the context of the need to increase available food supplies. This is not purely a question of improving the home economics of crop processing and storage, but relates to the whole gamut of technology development and extension strategies. In Nepal for example, high-yielding varieties of maize have been rejected because of inferior milling and storage qualities--primarily due to the influence of women who do this work (IADS, 1976). In this instance, failure to consider characteristics of a technology related to women's work resulted in what was viewed for sometime as an irrational rejection of a superior variety which could be overcome by improved extension efforts.

To summarize then, the extent of women's labour participation in agricultural production, their influence in decision-making and farm-management, and in particular their responsibility for basic food crop production as well as post harvest production processes make it imperative that agricultural research-extension services take into account women's roles in agricultural production. The enormous diversity and complexity of cross-cultural and class-related patterns of women's participation in

agriculture pose considerable problems for program design which will be considered later in this paper. First, however, it is apparent that in order to integrate women into agricultural services a major reorientation of extension strategies is required.

2. Extension services for rural women

An overview of extension programs for rural women shows that historically the vast majority have failed to recognize the extent to which women are involved in agricultural production and management of farm enterprises. As a result extension strategies have been designed for women as a separate clientele distinct from men. Farming has been viewed as a male activity, whereas concern for women in rural development has focused primarily on their reproductive, child care and homemaker activities.

The persistence of sex-segregated models of extension programs is shown by UNESCO surveys of the access of women to education in rural areas. A 1964 survey found that in out-of-school programs for women in low-income countries, home economics subject matter predominated, with health education second, and rural economy, accounting, and cooperative management as subsidiary activities. No specific agricultural content other than kitchen gardening was identified (UNESCO, 1964). A subsequent survey in 1973 found similarly that home economics-hygiene, nutrition, child care and sewing was the type of education most often offered by extension programs for women (UNESCO, 1973).[1]

The world-wide pervasiveness of the focus of extension education for rural women on their domestic role to the detriment of their training in agriculture is evidenced by numerous country case studies of extension programs (Ahmed and Coombs, 1975; Lele, 1975; Sheffield, 1972). Indeed one study argues that in Africa "the goal of extension services has frequently

been not the increase in farm level productivity of women but rather finding ways to reduce their participation in agriculture through promotion of more homebound activities." (Lele, 1975: 77) Often the exclusion of women from agricultural training is not necessarily the outcome of failure to include women in the target population, but is the result of program design which militates against the attendance of women at training courses. In East Africa for example the majority of farmer training centres have a general policy of offering training to the whole farm family, including wives, but find that women are seldom able to leave the responsibilities of household work and child care to attend residential courses (Barwell, 1975). A recent survey of farm training centres in Asia shows that out of nine countries which provided for female enrollment only one, Sri Lanka, had actually succeeded in recruiting women for farmer training (UNESCO, 1975). In general extension training for women tends to be relegated to a non-agricultural sphere. Even in contemporary Cuba, where efforts to integrate women into all sectors of the economy have been exceptional, training courses for rural women, run by the Cuban Federation of Womens Clubs (FMC), emphasize primarily "traditional" female subjects such as dress-making, cooking and hygiene (Purcell, 1973).

In Sub-Saharan Africa, where female farming is of major importance, extension programs for rural women have historically concentrated almost exclusively on women's homemaking activities (Heatman, 1966). One recent estimate of rural women's access to non-formal education in Africa indicates that few women have the opportunity for training in agriculture as Table 1 shows:

Table 1: Estimated access of women to non-formal education in Africa

Area of Training	Units of Participation[a]
Agriculture	0.15
Animal husbandry	0.20
Cooperatives	0.10
Arts and crafts	0.50
Nutrition	0.90
Home economics	1.00

a. percentage of training time allocated to women

Source: "Women, population and rural development - Africa" ECA/FAO, 1976.

The perception of agricultural training as important primarily to males (in a farming system where women do over 70 percent of all crop work) is illustrated by the data on participation in a rural training centre in Botswana presented in Table 2.

Table 2 about here

Of all courses offered, 70 percent were agriculture-related; in all but one of these (for young people) the 4 H courses which represent only 5 percent of all courses offered, women participants were a significant minority. Moreover only 50 percent of women trainees were in agriculture-related courses compared with 88 percent of men trainees. A similar example is the farmer training courses in Kenya, in which approximately one-third of the trainees have been women. However, lessons for women concentrate on a wide range of home economics topics, and agricultural aspects comprise at most, 30 percent of the course (Staudt, 1975).

In societies where the inferior status of women is institutionalized

Table 2: Male and female enrollment at Rural Training Centre Courses, (Botswania, 1973)

A. Type of course	B. (A) as percent of all courses	C. Percent of Participants: Male	Female
	% (N)	% (N)	% (N)
Farmer Courses	35	68	32
Family Welfare	9	0	100
Home Economics	9	0	100
Co-ops	25	82	18
4-B (youth)	5	29	73
Agriculture in-service	5	100	0
School teachers	4	85	15
Other	6	32	68
Total	100(75)	60(1149)	40(752)

Source: adapted from C.A. Bond (1974).

in traditions of female seclusion or purdah, a focus of extension services for women on their domestic role might appear more pertinent. However, conceptions of this domestic role derive largely from western notions and typically neglect the agriculture production processes that occupy a large component of women's time in the home. For example, a study of Muslim village women in Comilla district, Bangladesh found that in seven out of twelve months the major proportion of women's time was devoted to threshing, drying, cleaning and husking of rice; jute processing; care of poultry and livestock; fruit and vegetable gardening; fishing, and food preservation (Sattar, 1975). Yet extension programs for women such as these include almost no training related to these activities. Table 3 shows the percent of

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Table 3 about here

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courses and course participants by type of course offered from 1966-1973 for rural women in Comilla district by the Women's Education and Home Development pilot project. The discontinuity between the agriculture-related activities which occupy women's time and the type of training offered is apparent.

The sex-segregated model for extension programs has relegated "women's programs" to low status. These are often viewed as token programs which are allocated low budgets and little encouragement by government bureaucracies, donor agencies and as a result, by local leadership at the community level. Failure to take into account the importance of women's income generating activities in the rural economy and the proportion of their time spent in farming has meant that many of these programs were poorly adapted to the economic needs of rural women and to the constraints on their time. This in turn has tended to limit extension programs' effectiveness in reaching the mass of low-income rural women even in the home economics sphere (UNICEF,

Table 3: Women's Education and Home Development Pilot Project, Comilla, Bangladesh

Type of Course	Years: 1. 1966-1969 (a) percent courses % (N)	1. 1966-1969 (b) percent participants % (N)	2. 1969-1970 (a) percent courses % (N)	2. 1969-1970 (b) percent participants % (N)	3. 1971-1973 (a) percent courses % (N)	3. 1971-1973 (b) percent participants % (N)
1. Health and family related	48	31	34	49	86	64
2. Handicrafts	5	10	5	15	12	30
3. Poultry/kitchen gardening	1	5	0	0	2	6
4. Other-adult education (including literacy)	46	54	61	36	0	0
TOTAL	100(244)	100(674)	100(305)	100(646)	100(190)	100(665)

Source: Annual Reports 1966- 1973, Academy for Rural Development, Comilla.

1975). For example, a study of village women in rural Java found that women whose primary activity was "housewife" (according to census classifications), were in 27 percent of cases, working at other jobs as well, the most frequent being farming. These women had little time or incentive for participation in educational activities of local women's organizations which focused on domestic roles, emphasizing child care, cooking, flower arranging and similar activities (Hull, 1977).

The implication is that conventional extension programs for rural women have in the past tended to serve primarily an elite clientele, comparable to the male "progressive farmer." Nonetheless, there are instances of programs for women which despite their emphasis on women's domestic role, have experimented with extension strategies which serve as valuable models for efforts to deliver agricultural services to women. Some of these will be considered in the light of policy alternatives in the concluding section of the paper.

Women's Access to Agricultural Extension Services: Case Studies from Sub-Saharan Africa

We have seen that extension services for rural women do not typically involve any substantive recognition of their role in agriculture. Conversely, for a number of reasons there has been a widespread orientation of agricultural extension towards serving a primarily male clientele. First, traditional norms of male-female interaction in many societies inhibit women's contacts with unrelated members of the opposite sex, including male extension agents. Second, where women's agricultural production is concentrated in the subsistence food crop sector they are less "visible" to agricultural extension services concerned with commercial crop production. Third, female farm

managers whose husbands engage in labor migration are most likely to be low-income and least likely to be sought out by extension services following a "progressive farmer" strategy. Fourth, extension staff, even if cognizant of local women's agricultural production activities, are often trained in western ideas of male farmer systems, and are not oriented towards actively seeking contacts with women farmers.

The extent to which systematic inequalities arise in terms of women agricultural producers' access to agricultural services when agricultural extension is oriented primarily towards a male clientele is sparsely documented. Studies of agricultural extension impact typically assume that farmers are male and do not distinguish clients by sex. The assumption is that women's needs in relation to agricultural production--if they are recognized at all--are identified with and served by extension contacts with men. The shakiness of this assumption is demonstrated by data on women agricultural producers' access to agricultural services in three case studies of farming areas in which a substantial proportion of farms were managed by women or in which women performed the major proportion of agricultural tasks. [2]

Table 4 presents in summary form the major findings of each case study on the access of women to different types of extension contact. In each case the data show a general tendency for women to obtain lower levels of contact with and knowledge of extension services. In the case of Botswana however, extension contacts with women relative to men are probably overestimated, since most extension contact is confined to a pupil farmer scheme and women registered in the scheme tend to be widows whose husbands joined the scheme when alive (Bond, 1974:50). A small number of women are registered in the scheme in their own right. Data from the Kenyan case study show more pronounced inequalities between female managed and joint managed farms.

TABLE 4: Agricultural Extension Contacts with Males and Females: Findings From Three African Case Studies

Type of Extension Contact	Contact Recipient	CASE STUDY 1. Kenya:[a] Percent each type farm contacted		2. Botswana:[b] Percent of contacts with each type farm		3. Tanzania:[c] Percent of contacts with husband or wife		
		Female Managed Farms %	Joint Managed Farms %	Female Managed Farms %	Male Present Farms %	Husbands only %	Wife only %	Both %
1. Extension agent visit		51	72	41	59	24	0	76
2. Attend demonstration plot or meeting		52	59	44	56	52	7	40
3. Received extension training		5	20	44	55	--	--	--
4. Knew of or applied for credit		1	15	--	--	--	--	--
5. Received credit		0	3	--	--	--	--	--
6. Acquired seed from extension agent		--	--	24	76	--	--	--
7. Knows of extension agent		--	--	48	52	53	2	44
8. Discussed recommendation		--	--	--	--	38	7	55
9. Listens to extension radio program		--	--	42	58	50	15	35

Sources: [a]K.A. Sta dt (1976) Tables 1, 2, 3.

[b]C. A. Bond (1974) Tables 23, 24, 26, 29.

[c]L. Fortmann (1977) Table 7.

Women farm managers were found to be particularly disadvantaged with respect to more valuable services, training and loans (Staudt, 1976).

Not only independent women farm managers experience lower levels of contact with agricultural services. Even within the same family, women depend to a large extent on extension contacts with male family members for access to agricultural information, as the data from the Tanzanian case study show. In households which had contacts with extension services, only a tiny proportion of all types of contact were directly with the wife, in all instances less than 15 percent of households. Moreover, the study found that in households where a given recommendation was known, the percent of husbands knowing it ranged from 1 to 5 times the percent of wives knowing it (Fortmann, 1977:16) Apparently, extension contact with husbands in no way ensures that information is transmitted to wives. This is particularly inappropriate where, as shown in this study, women in a substantial proportion of households are solely responsible for applying improved practices such as fertilizer (in 80.4 percent of households) or insecticides (in 58.6 percent of households) (Fortmann, 1977: Table 4)

Possible explanations for sex-related differences in receipt of agricultural extension services are that women farmers lack resources to adopt new practices, are more subsistence-oriented, and are inherently less innovative. However Staudt (1975, 1976) shows that in the Kenyan sample sex-related differences persist under a number of controls for land size, subsistence orientation and timeliness of adoption of new varieties.

These studies show that in the context of agricultural extension services oriented towards a male clientele, significant inequalities in extension contacts and levels of information occured between the sexes. To what extent are differences like these detrimental to objectives of increasing

agricultural productivity? In the Tanzanian case, women were found to be heavily underrepresented in a program to promote an improved maize package: women purchasers constituted only 8 percent of participants compared with 30 percent male purchasers. In general women had significantly lower levels of knowledge of how to utilize the maize package (Fortmann, 1976). In the Kenyan case, 27 percent of farms with a man present were early adopters of hybrid maize compared with 19 percent of female managed farms (Staudt, 1976: Table 4). There are numerous similar examples where the extension of new agricultural technologies to a primarily male clientele and/or the introduction of technology "inappropriate" for women's agricultural activities resulted in consequences negative for women's agricultural productivity.

One result is that men learn to operate new types of equipment so that women lose control over production processes and income from them, or experience a decline in employment opportunities as their labor is displaced (Rubbo, 1975, Colombia; Hoskins, 1978; Upper Volta; Barres, 1977, Niger; Tinker, 1976, Kenya, Nigeria, Mexico, Sarawak; Stoler, 1976, Indonesia). In other instances new farming practices have led to increase in cash crops, depriving women of land previously farmed by them for food, or diminishing their access to the returns to their own labor when cash-cropping becomes a male-controlled enterprise (Palmer, 1977, Ivory Coast; Cloud, 1977, Sahael; Hoskins, 1978, Upper Volta; Stavrakis, 1978, Belize).

In addition, new agricultural practices may add to the burden on women's labor where increased acreages or labor-intensive practices demand more female labor,often reducing female production of other crops or ability to engage in other income-earning activities (Hanger and Morris, 1973, Kenya; Stoler, 1976, Indonesia; Palmer, 1977, Gambia, Sierra Leone; Boserup, 1970; UNICEF, 1972, Central and West Africa). One result is increased hardship among low-income households which may depend on female earning capacity for as much as one-third of their income, and for the provision of food staples.

A recent study shows that there is considerable evidence that in low-income countries, changing conditions of women's work affect in turn the availability of food and nutritional levels in their families and communities (PAG, 1977).

Although the evidence is fragmentary and it is unwise to generalize given the tremendous diversity of conditions in which agricultural modernization is occurring, these case studies indicate a trend towards restricted or declining productivity on the part of women relative to men in some areas of the developing world. There is also evidence of a trend in which women's labor is increasingly relegated to the subsistence sector, exacerbating inequalities between the sexes in the productivity of labor. The net effect of inequalities in productivity between the sexes is to reinforce the contradictions of the vicious cycle of rural poverty and over-population.

The mechanisms by which this process occurs can be related to a theory of wages which postulates that workers have to be paid at least a subsistence minimum in order to survive and reproduce. Maintenance of the subsistence sector via the labor of women and children means that wages can be collapsed by an amount equal to the net value of production in the subsistence sector (de Janvry, 1975). As women and children become the main productive agents in subsistence agriculture, while men work in the cash economy, low male wage rates are reinforced since women's labor and the subsistence sector provide cheap services which low wage males could not otherwise afford. As a result purchasing power in the rural population is depressed and efforts to stimulate aggregate demand in the non-agricultural sector of the rural economy are undercut because purchasing power is so low. This cycle of poverty is reinforced by the need for the labor of children in the subsistence sector and for children to support the aged in poverty conditions, leading to increased family size in order to face poverty. Thus, the relegation of women and children to marginal subsistence production perpetuates

the problems of increasing population and low purchasing power in rural areas which development efforts are intended to mitigate. Lack of attention to women's roles in agricultural production in the research and extension process, as the case studies cited earlier demonstrate, often results in women being excluded from the benefits of new agricultural practices and serves to exacerbate the typical pattern of development which increases inequities and accentuates poverty.

II. Problems of Increasing Women's Participation in Agricultural Research and Extension Services

This section of the paper begins with a summary overview of new directions in agricultural research and extension strategies and of the implications of the notion of "appropriate" technologies. Next some of the problems which have to be addressed if new research-extension strategies are to be implemented with the effective participation of women, including their access to the benefits of improved farming practices, are considered. These are categorized into three areas of policy intervention: (1) problems relating to the design of appropriate technology and extension strategies at the farm level, (2) issues related to the integration of women at the institutional level and in particular as extension staff and (3) problems related to education and training at all levels, or investments in women's human capital.

New Directions in Agricultural Research and Extension Strategies

Goals of increasing the agricultural productivity and welfare of low-

income farmers require immediate and short-run improvements in their capacity to produce enough food to support their families. In this context, one definition of "appropriate technology" is improved practices which can be adopted rapidly and under farmers' present agro-socioeconomic conditions (Hildebrand, 1978). The enormous diversity of local agro-socioeconomic conditions among traditional farming systems is now recognized as a significant constraint to the transfer of borrowed agricultural technology. As a result, a major reorientation of international agricultural research now emphasizes the importance of adaptive research in developing technology suitable for diverse local conditions (Moseman, 1970). Central to the identification of adaptive research priorities is the need to institutionalize a flow of information between the farm and the research station. Firstly information about the diversity of farm-level constraints to which technology must be adapted is a precondition for the development of appropriate technology. Secondly, the farmers are an important link in the technology development system, in that they test the viability of recommended technologies and also modify and adapt technology to specific conditions (Hildebrand, 1978; Evenson, 1974). Continuous "feed forward" and "feedback" of information on farm level constraints and farmers experience with new technologies is therefore of critical importance to efforts to deliver appropriate technology rapidly to the majority of farmers.

One implication of the requirements of adaptive research for the design of extension strategies is that research and extension efforts need to be organized as a continuum (Hildebrand, 1978). Ideally, the function of extension agents to learn from farmers in the sense of identifying farm level constraints, is as essential as their traditional role of delivering technical information to producers (Lele, 1975). The notion of "feed forward" of information on local conditions is seen as central to attempts to

devise alternatives to the "progressive farmer" strategy, in that extension programs need to be tailored to specific local needs (Roling, 1976).

In the context of adaptive research and extension program design, it is essential to recognize that the variety of conditions and customs which determine the characteristics of women's participation in agriculture are an integral component of the location-specific constraints to which technology and extension require to be adapted. In other words, the definition of an appropriate technology or extension program must include considerations of "appropriate for whom" not only at the level of the household unit but must concern itself with production relations and access to assets between the sexes as well. As was noted earlier in discussion of the negative consequences of male-oriented extension strategies, failure to incorporate into technology design and extension strategies information about the sexual division of labor and control over agricultural production may diminish the agricultural productivity of women and ultimately limit productivity in the agricultural sector as a whole. Recognizing that the conditions in which women contribute to agricultural production and to farm management constitute a significant dimension of the farm-level constraints which determine the appropriateness of technology and of extension strategies, what are some of the problems which need to be addressed?

Design of "Appropriate" Research-Extension Strategies: Special Problems of Women at the Farm Level

The extent to which women engaged in agriculture face special opportunity structures defined by sex-related divisions of rights and responsibilities necessarily affects their strategies for allocating resources to farming. Consideration of the special problems faced by women is clearly pertinent where a significant number of women are autonomous farmers or

farm managers. However, within other types of family structure the sexual division of labor, of the disposal of income, or of responsibilities for providing certain types of produce or material goods to the family all materially affect women's incentives and ability to benefit from agricultural services.

Sexual divisions within the household unit of control over resources and production processes in agriculture also needs to be viewed within the context of class divisions between households. In general, the division between the sexes within a household and the special problems this may create for women as agricultural producers appear most clear cut in African societies where women play essential and semi-autonomous roles as cultivators or traders (Levine, 1970). In rural Asia and in other peasant societies, the sexual division of labor and control over resources appear more often to be a function of class position, associated with greater autonomy among poorer women. Sex roles appear to be flexible or adaptive depending on the income generating opportunities available to members of either sex (see for example, Moses, 1977, West Indies; Kandyoti, 1977, Turkey; Hull, 1977; Stoler, 1977, Indonesia).

The diversity of customary modes of allocating resources and rights between the sexes in agricultural production means that each agricultural production system has unique implications for the resource allocation strategies women are likely to pursue, and the benefits (or costs) they are likely to incur from a particular agricultural innovation or extension strategy. The implications are that design of research-extension strategies which are cognizant of women's special problems have to be location-specific, each society designing its own according to local conditions and even then, making adaptions to render them suitable for application in specific areas. General

categories of problems which need to be addressed can be identified, and these will be discussed under the following four topics:

1. In production relations between the sexes, who controls strategic resources--land, labor or capital--with respect to making allocative decisions? What is the relevant unit for communication of information pertinent to decisions to adopt new practices--husband and wife? woman alone? or man alone?
2. Who is likely to receive the benefits of new practices, and therefore have the incentive to adopt? This may not be identical with control over strategic resources. How must the communication process be adapted to distribute information to beneficiaries as well as decision-makers?
3. Who is likely to implement new practices - i.e., who actually does the work? For whom should the technology be usable in terms of time and energy contraints? And therefore, for whom should practical training in the use of new farming techniques be designed?
4. Who is likely to be penalized by the introduction of an innovation? What compensatory adjustments need to be made in the farming system or in production relations between the sexes?

Each of these points will now be discussed in turn.

1. In production relations between the sexes, who controls strategic assets--land, labor capital--in the sense of making allocative decisions? What is the relevant unit for communication purposes and decision making?

For example, in some areas of Africa women may be solely responsible for production on land over which they have usufructory rights but not rights of disposal. Decisions to plant new crops or to purchase agricultural inputs can in some cases be made only with permission of the husband. In this respect women may face special problems analogous to those of tenants of sharecroppers whose ability to adopt new agricultural practices is constrained by relationships with landowners who control the allocation of land and other inputs.

Although women contribute labor, they may often have only limited rights over produce (Boserup, 1970; Barres, 1977; Hoskins, 1978; Borque and Warren, n.d.). Even where women control personal income from farming or trading, they may have financial obligations for household support such as food, clothing or schooling for children, which curtail their resources for investment in agriculture. For example, data on farmers' expenditure of income from cattle sales from a sample of farms in south-eastern Botswana show that women managers spent almost 100 percent of this income on food or education, and none in agriculture;

whereas male respondents spent up to one-third of this income in agriculture. Data from this study also suggest that lack of cash for seed, hiring of labor or oxen for ploughing often delayed women managers' planting decisions; other farms were less subject to these constraints (Bond, 1974). Control over income from agricultural production, and the kinds of expenditures for which women are responsible thus affect their ability to accumulate capital and the kinds of investment decisions they can make with respect to farming. It is essential therefore to identify the special decision-making constraints which affect women's agricultural production activities as a result of their control over production resources.

2. Who is likely to receive the benefits--and therefore have the incentive to adopt new practices? This may not be identical with control over strategic resources or with who actually uses new practices.

Where women have only usufructory rights over land, they may be dissuaded from substantial cash investments or investments in crops which only yield an economic return over a number of years. For example, the Animation Project in Niger found that women refused to plant fruit trees because these would belong to their husband. Women's investment decisions were dictated by concern for security within the context of marital instability: thus they preferred to invest cash in livestock which they owned rather than in field crop production. In contrast women were the initiators in the adoption of improved planting tools, although men traditionally use the tools for planting, because women were more motivated to maximize yields on their small food plots (Barres, 1976). In this instance, there was a strategic distinction between communicating information about a new practice to women who could benefit in contrast to men who utilized it. Where cash crops are traditionally controlled by men, the incentive for women to plant cash crops is minimal. In this kind of situation, women have been found to be unwilling to contribute labor to new cash crops because they share only peripherally in the benefits (DeWilde, 1967; Apthorpe, 1971).

3. Who is likely to implement new practices - i.e., who actually does the work? For whom should the technology be usable in the sense of time and energy constraints? And therefore, for whom should practical training in the use of new farming techniques be designed?

Firstly, patterns of women's time allocation may be a critical constraint in this respect. It should be recalled that women from low-income households are most likely to work long hours per day, more days per year in agricultural and domestic tasks, so that their ability to benefit from labor intensive technologies or to participate in extension services which require an investment of time is likely to be especially constrained. Secondly, although women may not participate in decisions about the adoption of new practices, the sexual division of labor may be such that they actually implement them. In this case communication of practical knowledge about the use of new practices needs to directly involve women.

4. Who is likely to be penalized by the introduction of an innovation? What compensatory adjustments need to be made in the farming system or in production relations between the sexes?

An illustration of the types of problems which require consideration with respect to these questions is the case of the introduction of an hydraulic oil press into a Nigerian village. Traditionally the extraction of oil was done by women. However, the daily time schedule for using the press did not coincide with women's work routines; the press was designed for use by men, so that women could use it only with an increased labor force; all the oil extracted belonged to the men. As a result the majority of women ceased using the press (Janelid, 1975). In this case the design of the technology and the extension procedure were faulty in several respects owing to disregard of the customary division of labor and rights over produce between the sexes. The introduction of labor-saving technologies for women's work--in post harvest processing, or water carrying for example--is often advocated to

free women's time for more productive tasks. However, even such apparently simple tasks as water carrying can involve a hierarchical division of labor among women which is related to social class position. One study describes four types of women involved in fetching water from the village well: the socio-economically advantaged who draw and carry their own water or who carry their own, but pay other women to draw it; the socio-economically disadvantaged--those who are paid for drawing water and those who are paid for both drawing and carrying water (Barnes, 1977). Labor-saving technology in situations where the task is one that provides income to socio-economically disadvantaged women may benefit one group of women at the expense of another (see Stoler, 1977 for a similar example involving displacement of rice pounding labor of low-income women). In the water-carrying example it proved impossible to organize concerted action among women to improve the water supply system for this reason. A viable extension strategy in each of these cases would have required some compensatory innovation for the women who stood to incur losses of income. In summary, many of the problems covered in this discussion relating to women's control over factors of production in agriculture are not amenable to technical solutions, nor can they be solved by adjusting communication strategies depending on where authority over production processes resides between the sexes. But unless and until such problems are tackled by legal-political reforms, they represent constraints to women's capacity to participate in and benefit from agricultural services, and as such have to be considered in defining appropriate research and extension strategies. Moreover, the examples discussed here are illustrative rather than representative. The socio-cultural specificity of problems of this type underlines the importance of involving women as participants in the information "feed forward" and "feedback" processes which are

integral to efforts to extend the benefits of improved farming practices rapidly and equitably. This in turn poses a different set of problems which are discussed in relation to the need to facilitate effective extension communication with women.

Need for Women Extension Agents

The provision of equal access to agricultural information to women and the implementation of effective communication with women requires major change in current staffing patterns of agricultural extension services to include trained female workers. The need for female extension field staff has two bases.

First, traditional barriers to communication between the sexes which prevail in many cultures mean that men may not be reliable transmitters of information either to or about women. Numerous ethnologies document the existence of distinct communication channels for members of each sex in rural societies. This pattern seems to prevail not only in the obvious cases where women are traditionally secluded (Stirling, 1965; Fernea, 19) but wherever traditional low female status inhibits interaction between the sexes (Harding, 19 ; Wolf, 1974). That communication between husband and wife is not necessarily an effective means of disseminating agricultural information to women was suggested by the findings of the Tanzanian case study discussed earlier. Similarly the animation project in Niger, found that "women may know what men discuss but they may choose to disregard this knowledge explicitly because it was not directed to them. They do not necessarily regard information reaching them through men as having passed through 'legitimate' channels." (Roberts 1977:66). For agricultural information to reach women it may be essential to tap directly into women's networks of communication through the provision of female extension workers.

Research on the dynamics of communication processes shows that "the most effective extension agents are those who are most like their clients in all respects except for technical competence about the recommended innovation." (Rogers, 1973:58). Communication about new practices with extension agents appears moreover, to be most important in determining the credibility and reliability of information and in convincing potential adopters of the utility of new practices. Research shows that the credibility of extension agents as a source of information depends not only on technical competence, but on the degree of similarity between the agent and client. In particular when adoption of new practices entails uncertainty and economic risk, individuals tend to seek information from peers or like-individuals. Moreover, the trustworthiness of the information source is greatly enhanced if perceived as being in a similar situation to potential adopters, and if the informant has actually tried the new practice in question. One obvious implication is that women extension agents should be recruited to work with women. In addition, new agricultural technologies are often high-risk undertakings and communication with women about such technologies should be much more effective if women extension staff are not only rural women, but women with practical experience in farming. There is currently growing recognition of the need to train women for agricultural extension purposes. Recent examples are the Farm Women's Agricultural Extension in the Ministry of Agriculture, Sri Lanka; the training of women as agricultural extension agents by the Ministry of Agriculture, Botswana; and plans for a special women's extension section in the Ministry of Agriculture, Iraq. Several African countries (Kenya, Nigeria, Tanzania, Sierra Leone and Uganda for example) have training programs for women as agricultural extension agents. There is however a significant lack of systematic data on different approaches to integrating women into agricultural extension services, and where infor-

mation is available it is fragmentary. Regional, cultural and socio-economic variation in the roles of women as agricultural producers make it difficult to compare one approach with another in terms of effectiveness. Moreover many efforts in this direction are too recent for meaningful evaluation to have occurred, or in other cases questions of effectiveness cannot be disentangled from the basic problem of the inadequacy of new practices which were extended. Nonetheless, a brief overview of some examples of agricultural extension efforts involving women extension staff serves to make the point that there is a not inconsiderable history of experimentation with this idea.

The two following examples deserve mention because they illustrate the point that the principle of providing agricultural services as an integral component of extension for rural women has been recognized in isolated instances and tested in field situations for quite some period of time.

Over a decade ago, a small project of the Department of Agriculture in Sarawak trained an experimental group of rural women in agriculture and animal husbandry as well as the usual home economics curriculum. After 18 months training, the women worked in teams with a male agricultural extension officer and his wife in villages, participating in extension effotts related to rural women's agricultural activities including rice production, rubber processing, fish pond development, small livestock and vegetable gardening (Wallis, 1966). A similar, but well established program utilizing women field workers for agricultural extension which is cognizant of the role of rural women in agriculture is the Venezuelan home demonstrator program. Two schools supervised by the Ministry of Agriculture recruit primarily rural women and give them a three year course including special training in agriculture. Approximately 120 students are graduated annually. For over a decade women demonstrators have been active in training village women in

improved agricultural techniques, including use of new varieties of garden and field crops (Ruddle, 1974).

Although operating on a very small scale with only 13 women trainees graduated from 1974-77, the Botswana Ministry of Agriculture's employment of women in agricultural extension is of interest because it represents an explicit shift away from the home economics conception of women extension staff roles and an attempt to integrate women fully into the normal operation of agricultural extension services. Women have been trained in exactly the same courses as men, and have been posted and assigned duties in the same way as men in these positions. A recent evaluation of female agricultural field staff concluded that women could do all the agricultural work involved in their positions, and that there were no serious differences between male and female officers. Moreover most women agricultural staff appeared to work with basically the same group of farmers as male staff, although this implied a perpetuation of the conventional "progressive" farmer approach. Nonetheless the capacity of women field staff in Botswana to work with farmers of both sexes and under conditions of work in the field similar to men appears to have been established (Bond, 1976).

A contrasting approach is the training of women animators by the Rural Women's Animation project in Niger, 1966-1975. Staff members were selected by villagers from among village women, who had no specific professional preparation. Specialized training took place as part of their daily work, in the field and in connection with concrete village problems and women's agricultural activities, supplemented with periodic intensive in-service training as the need arose. A total of 136 village women workers trained in agriculture and livestock worked in 23 districts in the course of the project. Extension activities of women animators were planned on the basis

of data from surveys of village women (conducted through informal or formal meetings); in general their role was to relay technical information and demonstrate the use of new practices. The effectiveness of the extension program appears to have been limited by technical problems with new inputs, many of which were unsuitable to local agro-socioeconomic conditions (Roberts, 1977). However, evaluation of the project indicates that women animators were a key factor in arousing interest and disseminating information about new types of agricultural investments among village women which had been hampered previously by traditional barriers to communication between the sexes (Barnes, 1976).

These examples demonstrate that women have worked effectively in the field as agricultural extension agents in a variety of socio-cultural settings. Although there is unquestionably a need for more systematic data on different approaches to integrating women staff into extension services, as a policy measure which requires implementation it requires more than tentative experimentation. Major institutional changes are required both in staffing patterns and in the organization of extension systems to integrate women at all levels. These will be discussed in the concluding section which deals with policy implications.

Problems of Education and Training

A critical problem area affecting the creation of a supply of women extension agents, the training of women at the farmer level, and the efficiency with which women agricultural producers are able to utilize new agricultural techniques is the limited access of rural women to education of all types, including training in basic literacy skills.

Investment in farmers human capital - their literacy, schooling and non-formal training - has been shown to be a key factor in effective dissemination

of new agricultural technologies. Human capital skills contribute to farmers' ability to acquire accurate information, to evaluate new production processes, and to learn how to use new techniques efficiently. Particularly in a modernizing agriculture, the complexities of adjusting to new technical possibilities and new market forces make it difficult for farmers to make optimal allocations of resources (Schultz, 1975). Theories of the allocative functions of human capital suggest that investments in farmers' human capital skills improve their ability to allocate resources efficiently, this contributing to rapid adoption and higher levels of productivity (Welch, 1970). To the extent that human capital skills such as literacy and schooling influence farmers' capacity to benefit fully from agricultural extension services (see Lockheed et. al., 1977 for a review of the empirical evidence) women agricultural producers are likely to be severely handicapped.

Recent statistics indicate that at the aggregate level, the disparity between male and female illiteracy is increasing (Tinker, 1976). Table 5 shows the proportion of women who are without schooling and who are illiterate in various countries by region of the world. As these data indicate, a significant proportion of the human resources in the agricultural sector of developing countries are illiterate women. This presents a serious obstacle to conventional extension strategies which rely on minimum levels of literacy for communication with farmers. In addition, generally a minimum requirement for admission to farmer training courses is a certain degree of literacy or in addition some level of formal schooling (UNESCO, 1975; Barwell, 1977; UNESCO, 1973). In the short run, participation of women in farmer training must continue to be severely curtailed unless communication and training methods are drastically revised to meet the needs of illiterates.

Low rates of literacy and restricted access to schooling at all levels

TABLE 5. Percent of Female Population Without Schooling and Illiterate for Selected Countries by Region of the World.

Africa	(A) Total Female[a] Population With no Schooling	(B) Rural Female[b] Population Illiterate	South and Central America	(A) Total Female[a] Population With no Schooling	(B) Rural Female[b] Population Illiterate	Asia	(A) Total Female[a] Population With no Schooling	(B) Rural Female[b] Population Illiterate
	(%)	(%)		(%)	(%)		(%)	(%)
Algeria	99[c]	94	Brazil	46	73	Bangladesh	--	92
Botswana	68	65	Colombia	41[c]	37	India	92[c]	87
Egypt	--	88[d]	Costa Rica	24[c]	17	Indonesia	70[c]	60
Kenya	89[c]	90	Ecuador	43	51	Korea	94[c]	27
Malawi	79	88	El Salvador	67	71	Malaysia	72[c]	52
Morocco	--	99	Guatemala	95	78	Pakistan	95	92
Nigeria	--	94[d]	Honduras	68[c]	57	Philippines	22	23
Sudan	99	96[d]	Peru	70	69	Sri Lanka	45[c]	35
Tanzania	--	85[d]	Venezuela	56	39	Thailand	43	32
Tunisia	99[c]	89						
Uganda	86	74[d]						
Upper Volta	--	99[d]						
Zaire	99	86[d]						
Zambia	79	78[d]						

Source: UNESCO, Statistical Yearbook, 1977, Tables 1.3, 1.4.

Notes: [a]25 years +; [b]15 years +; [c]percent of rural female population; [d]percent of total female population.

also represent a problem with respect to the recruitment of rural women as agricultural extension staff. Low rates of enrollment of girls resident in rural areas at all levels of schooling indicate a very restricted pool of potential recruits particularly in view of the requirement in almost all countries that extension staff complete one or more years of training beyond the secondary level (UNESCO, 1975; 1972).

There is moreover an acute shortage of women with agricultural training. Very few countries provide agricultural training at the secondary vocational level which includes girls (UNESCO, 1973) and women enrolled in university level agricultural training form only a small percentage of all students enrolled, and an even smaller proportion of graduates as Table 6 shows. Moreover, women enrolled in agricultural training constitute a negligible proportion of the total female enrollment. These data demonstrate that the definition of agriculture as a male occupation is pervasive in the provision of higher level agricultural training. Ironically, this phenomenon is pronounced in the African countries where the majority of farmers are women. Hence the problem of training women in agriculture at advanced levels is not only one of access to schooling at all levels, but also the prevalence of sex-stereotyping of agriculture as an occupational role.

Another facet of the training problem is that in many countries higher education, and even post-primary education is strongly associated with upward mobility and mobility out of rural areas. This appears to be especially true for rural women (UNESCO, 1973). In most developing countries institutions for secondary vocational and agricultural training tend to be located in urban areas and thus require migration from rural areas. Urban-trained students tend to lose their roots in and familiarity with local farming practices, and moreover are often trained in western ideas of agriculture

TABLE 6: Female Enrollment in Agricultural Training at the Third Level for Selected Countries by Region of the World

Africa	(A) Females as Percent of Total Enrollment	(B) Females in Agriculture as Percent of Female Enrollment	(C) Females as Percent of Agriculture Graduates	South and Central America	(A) Females as Percent of Total Enrollment	(B) Females in Agriculture as Percent of Female Enrollment	(C) Females as Percent of Agriculture Graduates	Asia	(A) Females as Percent of Total Enrollment	(B) Females in Agriculture as Percent of Female Enrollment	(C) Females as Percent of Agriculture Graduates
	(%)	(%)	(%) (n)		(%)	(%)	(%) (n)		(%)	(%)	(%) (n)
Algeria(1976)	15.0	1.0	11.0 (5)	Argentina (1976)	22	2.7	8.5 (62)	Afghanistan (1975)	2.3	1.4	0
Egypt(1974)	22.2	8.0	26.0(1639)	Brazil(1974)	12	0.4	9.7(315)	Bangladesh (1970)	19	2.0	0
Ethiopia(1973)	4.2	3.6	3.2(3)	Costa Rica (1970)	3.5	0.2	--	India (1968)	0.7	0.07	5.2(49)
Ghana(1975)	15.0	5.9	5.0(5)	Cuba(1970)	25	7.7	25(115)	Indonesia (1972)	19.8	3.7	13.4(353)
Malawi(1975)	8.4	13.7	7.8(5)	Ecuador(1972)	7.0	1.0	4.0(5)	Korea(1976)	7.6	2.6	5.9(288)
Morocco(1975)	2.3	0.4	--	El Salvador(1975)	5.4	1.1	4.0(5)	Pakistan (1974)	0.8	0.2	0.9(6)
Nigeria(1975)	9.3	5.0	9.6(29)	Guatemala(1970)	3.1	0.8	4.6(2)	Sri Lanka (1974)	30.9	2.5	30.0(19)
Sudan(1975)	11.5	5.5	6.8(20)	Honduras(1975)	3.8	0.8	--	Thailand (1975)	25.7	1.9	28.9(250)
Tunisia(1976)	8.2	1.3	--	Peru(1973)	28.9	4.4	8.9(100)				
Uganda(1975)	13.0	6.6	9.6(12)	Uruguay(1974)	21.7	5.2	--				
Tanzania(1975)	14.6	8.8	--								

Source: UNESCO, Statistical Yearbook, 1977 Tables 5.2, 5.4

which diminishes their respect for and ability to communicate with local farmers. Thus recruitment of women extension staff with advanced training and a commitment to remaining in rural areas is likely to pose a problem. Moreover, socio-economically advantaged women are most likely to have access to schooling or even acquisition of literacy skills, and in many societies are least likely to have practical experience in or commitment to farming as an occupation.

III. Policy Implications

The policy measures which need to be considered if women are to achieve direct access and full benefits from agricultural research and extension services can be considered under three broad headings: (1) general principles of organizational design of research-extension systems; (2) training needs; and (3) communication strategies to reach women at the field level.

General Principles

One important consideration in designing policies to effect the delivery of agricultural extension services to women is that women are not an homogeneous target group. The cross-cultural and intra-cultural complexity of sexual divisions of labor and decision-making in agricultural production which are cross-cut by class distinctions mean that no single policy strategy can be applicable in all cases. Hence any assessment of policy alternatives requires identification of women's different sex role and class-related situations which define distinct target populations among women, and which may necessitate alternate extension strategies. A first step must be to identify the characteristics of women's situations in the agricultural sector in question by considering (1) what is the nature of women's labor

participation; (2) what access and control do women have over strategic resources--land, labor and capital, what is their role in decision-making; (3) what benefits do they receive. This information must be an integral component of any efforts to design "appropriate" technology or strategies to extend it. In this context it must be recognized that farming is not an isolated activity for women in traditional production systems, but is necessarily related to the allocation of time to domestic activities. In fact so-called domestic activities, such as carrying water, preparation of feed for livestoc, or post-harvest processing done in the home are often integral to the agricultural productivity of the household. If agricultural research-extension systems are to deliver technologies which enhance women's productivity, the whole range of activities in which women's labor is engaged need to be considered.

One implication of the point that farming is not an activity isolated from women's other work responsibilities is that the purview of existing agricultural extension services needs to be expanded into an integrated package which includes agricultural information, health-related, nutritional and other activities conventionally considered the domain of women's programs. A first step in this direction should be to integrate agricultural services into existing extension programs for women.

However, as was noted earlier, women's programs tend to suffer from low status associated with a welfare-orientation while existing agricultural extension services are overwhelmingly male-oriented. In the long run integration of agricultural services with other extension programs in a single organizational entity may be necessary if women are to be included equitably in a broad range of extension services, and at the very least, if costly duplication of agricultural services valuable to both men and women

is to be avoided. Considerations of cost-effectiveness are particularly relevant to the implementation of field-level research and extension activities. Clearly, a comprehensive understanding of women's situations in agricultural production cannot be established in isolation from those in which men are engaged. Communication of technical information to the farming population also involves cross-cutting lines of communication between men and women, whether at the decision-making or implementation stage of adoption. Both these considerations indicate that male and female extension staff need to work in tandem in the field, rather than in separate programs if costly duplication of efforts is to be avoided. An example of this integrated approach is the Integrated Family Life Education project of the Ethiopian Women's Association. Agricultural training concerned with animal health, soil erosion, use of fertilizers, selection of seeds for example is included with programs for literacy, health and nutrition. The program includes both men and women (Pettit, 1977).

Training

If agricultural extension services are to serve women effectively, recruitment of women into agricultural training at all levels is essential. At training levels involving formal vocational secondary and higher education, the acute shortage of women in agriculture reflects as much sex-stereotyping of agriculture as a male subject area as the restricted access of women to higher levels of education in general. With respect to the former, reorientation of stereotyped perceptions of female vs. male fields in education at the admissions level as well as via vocational counseling of women students is clearly needed. With respect to women's access to higher levels of agricultural training a number of measures require

serious consideration. Ideally women training for staff positions in agricultural research and extension should come from rural backgrounds and have practical experience in farming as well as a commitment to work in rural areas. Yet women from this type of background are least likely to obtain higher education or if they do, are unlikely to have a commitment to remain in rural areas. The provision of scholarships based on economic need for rural women, the establishment of quotas at training institutions, and the expansion of training facilities in rural areas are all needed. However the problems of upward and outward mobility associated with higher education are likely to persist so long as wage and status differentials between urban employment and rural extension positions continue.

It is questionable whether the recruitment of women as agricultural extension staff should, in the short run depend on the supply of women with formal education who can be given advanced training. Firstly, the evidence that formal education of extension field workers necessarily enhances their effectiveness is not conclusive: some studies indicate that more highly educated extension workers are less effective in promoting innovations since the more educated tend to come from urban backgrounds and to view farming as an inferior occupation (Leonard, 1973). Women with little or no schooling and even illiterates have been trained as field aids and found to be effective in a number of large-scale extension programs concerned with family planning, literacy and health care (Rogers, 1973--Indonesia, Philippines, Pakistan; Ahmed, 1977, Bangladesh). In this way, mature women who may have low levels of literacy or schooling but who are less likely to be mobile out of rural areas, can be recruited. This was for example the staffing approach used in the Rural Women's Animation Project, Niger (Barnes, 1977). Secondly, the supply of women agricultural extension staff can be rapidly

supplemented by in-service training courses in agriculture for women extension agents currently working in health, nutrition, family planning or other "women's" programs. In the long run the integration of women at all staffing levels of agricultural extension services requires rapid expansion of enrollment of women in advanced agricultural training.

Agricultural training for women at the farmer level poses a different set of needs. First, training courses need to be designed in accordance with women's work schedules and limited time; residential courses appear to be impractical in this respect. Some countries (Lesotho, Mali for example) have begun to experiment with day courses for women. Second, training methods for women need to be designed for the illiterate or semi-literate if they are to reach any but a small elite of rural women. This implies that practical field demonstrations rather than classroom centered approaches to training need to be emphasized. (An example is the field training done on home plots by the Venezuelan women home demonstrators (Ruddle, 1974).) Third, projects involving training for rural women consistently find that an explicit income generating component is critical for success--this is comparable in agriculture to the point that new practices must be profitable for farmers to adopt them. An example is a project of the Philippines Rural Reconstruction Movement which utilized innovative audio-visual learning techniques centered around the interest of low educated rural women in pig-raising (Crone, 1976).

Communication Strategies at the Field Level

Contact with and training of women at the farmer level requires a number of reorientations in the design of agricultural extension strategies for several reason First, the constraints on women's time (particularly among low-income women)

which limit their ability to participate in group meetings, demonstrations or training courses; second, high levels of illiteracy and little schooling among rural women and third, the shortage of women extension staff mean that creative communication strategies are particularly important if large numbers of women are to be reached.

One approach might be to graft agricultural extension activities onto existing women's groups. Women's groups have been observed to play an important role in mobilizing local support, disseminating information, legitimizing proposed changes, and in reinforcing participants' motivation and commitment to change (Rogers, 1975, Korea; Misch, 1975, Colombia; Crone, 1976, Philippines). Firstly, women's groups provide a social context for peer-group support in decision making and taking action which may be especially important for mobilizing women in societies where women's activities in public places are curtailed, and where norms of public deference of women to men prevail. Women's participation in mixed groups is often restricted, and to the extent that they do participate women tend to be channelled into concerns typically considered women's domain. For example, data on women's participation in Tanzania's village Ujaama committees shows that women are minority of committee members; those who did serve on committees were concentrated in education, health and culture; women rarely attend committee meetings and often did not dare to speak except to agree with their husbands (see also Roberts, 1977; Fortman, 1977: 8-10). Secondly, group activities can be an important resource when financial and manpower constraints mean that field extension staff are responsible for contacting a large number of individual clients. A case study of the dissemination of family planning methods by the Korean Mother's Clubs (of which there were over 22,000 in 1973 with average membership of 30) found

that field worker contacts with individual women were less extensive in the case where family planning methods were most widely adopted (Ro gers, 1975). An active women's group can enhance the effectiveness of extension services by diminishing field workers' need to invest time in contacting individuals. Finally, effective group activities may generate local organizational capacity to make demands on central planning agencies and to sustain programs once outside agencies have initiated them.

Numerous studies document the widespread existence of functioning women's groups of varying degrees of formal organization. The majority of formal women's organizations in low income countries tend to be focused on activities oriented to western conceptions of women's domestic role, but several are active in agriculture-related concerns. The prime example in this respect, are the numerous women's groups in Sub-Saharan Africa which have a long historical tradition, and which have become powerful institutions in agriculture and commerce. For example, Ibo villages in Southern Nigeria all have women's councils which

> "...are responsible for everything concerning agriculture... They fix the time-table for all the important agricultural tasks, look after the protection of crops, and regulate all the ceremonies involved. If anyone, man or woman, contravenes any of their decisions they can take sanctions against them and they have great authority in judicial matters." (Lebeuf, 1963:114)

An example of the integration of extension activities with women's groups is the Women's Group Program initiated in 1971 by Ministry of Cooperatives and Social Services, Kenya. This involved the entire network of extension agencies including agriculture, health and nutrition, family planning, home economics, commerce and industry. By 1974 about 5000 group members had been involved in the program (Berger and Krystall, 1975). Existing

women's groups, many of which are actively involved in agriculture in some way, represent a dynamic resource for channelling an integrated package of extension services to women.

Formal group activities for women are not however a substitute for individual contact. Regular group membership tends to be elite and thus may exclude numbers of women for whom direct contact must continue to be important. In this respect informal women's groups--such as those which form around common work activities--can provide a resource for extension activities. An example of communication of extension information through the median of an informal women's group is a project in Guatemala, which used the pila-or laundering group--found all over Guatemala, at which rural women usually spent several hours daily washing clothes, drawing water, washing dishes and children. Research on local women's daily routine showed that the pila provided one of the few opportunities of the day when women could be conveniently contacted. A locally recruited assistant distributed small inexpensive audio-cassette equipment at the pilas replaying a 30 minute program four or five times a day. The flexibility of the cassette system meant that contact with women could be adjusted to changes in their schedule due to seasonal labor demands. According to field worker records the number of people listening to the program per day averaged 200. Evaluation showed that listeners were more accurately informed, and utilized more recommended innovations than non-listeners (Colle, 1978). This project illustrates the potential of extension communication strategies combining informal groups, simple mass-media technology with a low staff or staff-training input for reaching illiterate rural women who are too busy for formal extension activities.

In addition to informal group activities, information networks among

women in rural areas may be a valuable resource for effective communication of agricultural information. Firstly, because these networks appear to function as a key channel for passing around vital information rapidly, and second, because control of information is a resource whereby women appear to exercise considerable power in forming local opinion and influencing behavior. Bond (1974) found that women appeared to discuss farming matters with others more often than men (61 percent of women reported doing so; 19 percent of men) and suggests that ideas might as a consequence diffuse faster through women than through men.

Establishing direct communication linkages with women may also be critical to enlisting support of men for innovations in agriculture. Anthropological studies of women's use of gossip to influence community affairs and to affect the decisions of men within and outside their families suggest that the informal power women have in controlling information and opinion is effectively greater than that of men in this sphere (Harding, 19 ; Wolf, 1964; Lamphere, 1974). Traditional sanctions of gossip, insult and mockery are utilized by women to control community behavior. Leis (1974) cites an instance where west African village women's resentment of a sanitation inspection scheme was expressed by ridicule of inspectors so that they were unable to enlist cooperation in their work. Exercise of these sanctions is central to Ibo women's control over individuals of either sex who violate their regulations concerning planting times, crop protection or marketing (Van Allen, 1976). An example of the explicit utilization of informal communication networks among women for agricultural extension purposes is the strategy developed for use by the Venezuelan home demonstrators. Initial contacts with women are made via informal meetings and participation in

gossip in casual meetings. Often gifts of new seed varieties are made in accordance with visiting practices customary in rural areas. One objective of this approach is for the demonstrator to learn about women's role in the traditional food supply system (Ruddle, 1974).

In summary, a number of policy measures need to be considered if women are to have access to agricultural information and training and to benefit equitably from agricultural research and extension services.

(1) Research-extension information systems need to communicate effectively with women in order to integrate information about women's agricultural needs into design of locally appropriate technology or extension strategies.

(2) Agricultural services need to be included in existing women's extension programs.

(3) Extension services in general need to be integrated at the national level both for planning and implementation of an integrated extension "package" which might link agriculture, nutrition, health and other related concerns at the field level.

(4) Recruitment of women into agricultural training at advanced levels of formal education is essential if agricultural research and extension systems are to incorporate the women staff necessary for effective communication with women.

(5) Para-professional training of rural women in agricultural extension skills is required to supplement the acute shortage of trained women.

(6) In-service supplementary agricultural training should be provided for women extension workers in non-agricultural programs.

(7) Farmer training needs to be organized to enable rural women to attend

on a day basis in accordance with women's daily work routines.

(8) Training methods at the farmer level need to be designed for women with low levels of education and semi- or illiterate women. Audio-visual and other experimental learning techniques, as well as field demonstration training need to be emphasized.

(9) Agricultural extension activities might be grafted onto existing women's groups in rural areas; women's groups also provide a resource for integrated extension approaches.

(10) Informal women's groups and communication networks need to be tapped at the field level. Participation in these by women extension staff needs to be recognized as a valuable extension technique.

Summary and Conclusions

New directions in the planning of agricultural extension services emphasize the need for appropriate channels of feedforward and feedback of information between extension and research systems in order to develop and extend improved agricultural practices which can be rapidly adopted by the majority of small farmers. Communication and direct contact with women in their capacity as important contributors to farm management and production is essential to this strategy. Firstly, the special problems faced by women as participants in agricultural production need to be identified in the process of appropriate technology development if women are to benefit from new agricultural practices. Secondly, women's participation in farm family decision-making and their responsibility for management of specific components of production - such as staple food crops - requires that agricultural extension communication strategies directly involve women who may be either allocating resources, implementing new techniques or

both.

Existing extension services for rural women have focused on women's domestic role to the detriment of their training in agriculture and have tended to serve primarily an elite class of women. Agricultural extension services have on the other hand been predominantly male-staffed and oriented towards a male clientele. The inequalities between the sexes in access to agricultural services and information which result are often compounded by the extension of new agricultural practices which have negative consequences for women's agricultural productivity. A reorganization of staffing patterns, farmer training and field level contact strategies is essential if new agricultural practices are to be disseminated equitably and productively.

In conclusion several points for action need to be emphasized if the required policy measures are to be realized. Rapid improvement of access of women to existing agricultural services could be instigated by identifying rural extension services, women field staff and women's groups which have established contacts with a clientele of rural women. Points which need to be considered are: Can available agricultural information be integrated into existing extension services which reach rural women? Can supplementary training and/or liason between existing women field staff and agricultural extension be institutionalized to effect the transfer of relevant agricultural information to women? Can existing women's groups - formal or informal - be mobilized to include agricultural information in their activities? Can training programs at the farmer level be rescheduled and relocated in an outreach program which would facilitate access of women?

In the long run the fundamental problems of appropriate technology development and the staffing of agricultural extension with women need to

be tackled. Research on women's labor participation, access to strategic resources, and roles in decision-making in agricultural production is needed to provide agricultural researchers and policy makers with a basis for evaluating the possible effects on both women and men of technological innovations and alternate extension strategies. There is in addition a significant lack of systematic data on different approaches currently in process to integrating women staff into agricultural extension services. Basic principles of training and extension communication strategies involving women which may be transferable need to be identified to avoid needless duplication of experimentation.

Notes

1. Third world countries surveyed included Algeria, Burundi, Cameroon, Dahomey, Gabon, Ghana, Ivory Coast, Kenya, Liberia, Madagascar, Mali, Mauritania, Niger, Nigeria, People's Republic of the Congo, Sierra Leone, Indan, Tanzania, Barbados, Costa Rica, Dominican Republic, Guatemala, Mexico, Trinidad and Tobago; Argentinia, Brazil, Colombia, Paraguay, Venezuela; Burria, Sri Lanka, India, Indonesia, Iran, Iraq, Republic of Korea, Thailand, Syria.

2. The case studies comprise a 1975 sample of farms from Kakamega district in Western Kenya in which 40 percent of the sample are female-managed farms (Staudt, 1975, 1976); a 1944 sample of 204 farm households in six areas of South-eastern Botswana; of which 42 percent are female-managed (Bond, 1974); and a 1976 sample of 485 farmers in Morogoro and Arusha regions of Tanzania of which 60 percent of farms are female-managed (Fortmann, 1977, 1976).

REFERENCES

Academy for Rural Development, Comilla. Womens education and home development programme. Annual Reports 1st-5th report, 1962/3-1968/70.

Ahdab-Yehia, M. "Women, employment and fertility trends in the Arab Middle East and North Africa," in Kupinsky (ed):172-183.

Ahmed, Manzoor. BRAC. Building Human Infrastructures to Serve the Rural Poor. Connecticut: ICED, 1977.

Ahmed, M. and P. Coombs. Attacking rural poverty: How nonformal education can help. Baltimore: Johns Hopkins, 1974.

Barres, V. et al. The Participation of Rural Women in Development: A Project of Rural Women's Animation in Niger 1966-75. Paris: IRAM, 1976 (mimeo).

Barwell, C. Farmer training in East Central and Southern Africa. Rome: FAO, 1975.

Berger, I. and A. Krystall. "The women's group program: A strategy for education and rural development." Kenya Education Review, Vol. 2 (Dec.), no. 2, 1975.

Brown, S.E. "Love Unites them and Hunger Separates them: Poor Women in the Dominican Republic." in Reiter (ed). 1975: 322-332

Bond, C. A. Women's Involvement in Agriculture in Botswana. n.d., n.p. November, 1974, (mimeo).

Bond, C.A. "Women's Involvement in Integrated Farming Pilot Project." (mimeo) February, 1977.

Boserup, E. Women's Role in Economic Development. London: Allen and Unwin Ltd., 1970.

Bourque, S. C. and K. B. Warren. "Perceiving the Sexual Division of Work: Economics and Subordination in Two Andean Communities." mimeo (n.d., n.p.)

Buvinic Maud, N. Youssef. "Women Headed Households: The Ignored Factor in Development Planning." Washington: International Center for Research on Women, 1978.

Chahil, Rena. "The Status of Women, Work and Fertility in India." in Krupinsky (ed.) 1977:146-171.

Chakravorty, S. "Farm Woman Labour: Waste and Exploitation." Social Change (March/June) 1975.

Clearinghouse on Development Communication. "Project for Equality of Access to Education for Women and Young Girls, Upper Volta." Washington, DC, 1978.

Cloud, K. "Sex Roles in Food Production and Distribution Systems in the Sahael." in Proceedings and Papers of the International Conference on Women and Food, Tucson, Arizona, 1978:62-89.

Colle, R. D. and S. F. de Colle. "The Communication Factor in Health and Nutrition Programmes: A Case Study from Guatemala." Cajanus Vol. II (3) 1978:151-197.

Crone, Catherine. Research on Innovative Nonformal Education for Rural Women. New York: World Education, 1977.

Deere, C. D. "Rural Women's Subsistence Production in the Capitalist Periphery." Review of Radical Political Economy, 8 (1), 1976.

Deere, C. D. "The Differentiation of the Peasantry and Family Structure: A Peruvian Case Study." Journal of Family History, 4(3) 1978: 422-438.

de Janvry A. and C. Garramon. "The Dynamics of Rural Poverty in Latin America." Journal of Peasant Studies 4(3) 1977:206-216.

DeWilde, John. Experiences with Agricultural Development in Tropical Africa. Baltimore: Johns Hopkins, 1967.

ECA/FAO. The Role of Women in Population Dynamics Related to Food and Agriculture. Rome: FAO, 1976.

Evenson, R. and Y. Kisled. Agricultural Research and Productivity. New Haven: Yale U. Press, 1975.

Fernea, E. W. Guest of the Sheik. Garden City, N.J.: Doubleday, 1965.

Fortmann, L. "An Evaluation of the Progress of the National Maize Project. USAID/Tanzania (Mimeo) 1976.

Fortmann, L. "Women and Tanzanian Agricultural Development." Dar es Salaam: Economic Research Bureau, 1977.

Garrett, P. M. "Some Structural Constraints on the Agricultural Activities of Women: The Unlean Hacienda. Madison, Wisconsin: Land Tenure Center Research Papers, No. 70, December, 1976.

Goody, J. and J. Buckley. "Inheritance and Women's Labour in Africa." Africa (43) 1973:108-21.

Hafkin, N. J. and E. G. Bay. Women in Africa. Stanford, Calif.: Stanford University Press, 1976.

Hanger, Jane and J. Moris. "Women and the Household Economy." in Chambers (ed.), MWEA: An Irrigated Rice Settlement in Kenya. Munchen: Weltforum, Vertog, 1973.

Hansell, F. Review of Conditions Affecting the Integration of Rural Women in Development. Rome: FAO Working Paper, September, 1977.

Harding, S. "Women and Words in A Spanish Village." in D.G. Mcguigan (ed.) New Research on Women and Sex Roles Ann Arbor:University of Michigan Press, 1976: 158-182

Heasman, K. "Women and Community Development in Kenya and Uganda." Community Development Journal, 4 (1966):16-22.

Hildebrand, P. "Generating technology for traditional farmers: a Multidisciplinary Methodology." Paper presented at Bellagio Conference on Developing Economies in Agrarian Regions: A Search for Methodology, August, 1976

Hoskins, M. Social and Economic Development in Upper Volta Woman's Perspective. USAID/(REDSO/WA) April, 1978 (Mimeo).

Hull, Valerie. "Fertility, Women's Work and Economic Class: A Case Study From South-east Asia." in S. Kupinsky (ed.), The Fertility of Working Women. New York: Praeger, 1977, pp. 35-80.

IADS. "Integrated Cropping Systems Project Proposal, Nepal." (mimeo)1976

Janelid, I. The Role of Women in Nigerian Agriculture. Rome: FAO, 1975.

Jayasut, N. et al. "Status of Thai Women in Two Rural Areas." Bangkok: National Council of Women of Thiland, 1977 (Mimeo).

Kandiyoti, D. "Sex Roles and Social Change: A Comparative Appraisal of Turkey's Women." in Wellesley Editorial Committee (eds.) Women and National Development. Chicago: University of Chicago Press, 1977: 57-73.

Kearl, B. E. "An Overview of Communication in Agriculture Projects." Development Communication Report, AED, Washington, DC, 1978:1-3.

Krupinsky, S. (ed.), The Fertility of Working Women. New York: Praeger, 1977.

Lebeuf, A.M.D. "The Role of Women in the Political Organization of African Societies." in D. Pauline, Women of Tropical Africa: 93-120.

Leis, N.B. "Women in Groups: Ijaw Women's Associations." in Rosaldo and Lampherd (eds.), Women, Culture and Society:223-242.

Lamphere, L. "Strategies, Cooperation and Conflict Among Women." in Rosaldo and Lamphere (eds.), Women, Culture and Society:97-112, 1974.

Lele, Uma. The Design of Rural Development: Lessons from Africa. Baltimore: Johns Hopkins, 1975.

Leonard, D. K. (ed.). Rural Administration in Kenya, Nairobi: East African Literature Bureau, 1973.

Levine, R. A. "Sex Roles and Economic Change." Ethnology (5) 1966: 186-93.

Lockheed, M.E., Jamison, D.T. and C.J. Lau. "Farmer Education and Farm Efficiency: A Review of the Literature." Unpublished paper, Educational Testing Service, Princeton, N.J., 1977.

Mellor, J. W. The New Economies of Growth: A Strategy for India and the Developing World. Ithaca: Cornell University Press, 1976.

Mernissi, F. "The Moslem World: Women Excluded from Development." in Tinker and Bramsen (eds.), Women and World Development. Washington DC, 1976:35-45.

Ministry of Agriculture, Botswana. "Evaluation of Female Field Staff in the Ministry of Agriculture." (mimeo) 1978.

Misch, M.R. and J. B. Margolin. "Rural Women's Groups as Potential Change Agents: A Study of Colombia, Korea and the Philippines." Washington: USAID Technical Assistance Bureau, May 1975.

Moseman, A. H. Building Agricultural Research Systems in the Developing Nations. New York: ADC, 1970.

Moock, P. R. "The Efficiency of Women as Farm Managers." American Journal of Agricultural Economics, 58 (5) 1976:831-835.

Moses, T. "Female Status, the Family and Male Dominance in a West Indian Community." in Wellesley Editorial Committee (eds.) 1977:142-153.

PAG (Protein Calorie Advisory Group). Women in Food Production, Food Handling and Nutrition. Final Report. New York: UN, 1977.

Palmer, I. "Rural Women and the Basic Needs Approach to Development." International Labor Review, Vol. 115, no. 1 (Jan.-Feb.) 1977:97-107.

Pauline, D. (ed.). Women of Tropical Africa. Berkeley: University of California, 1960.

Pettit, John. Integrated Family Life Education Project. New York: World Education, 1977.

Pescatello, A. (ed.) Female and Male in Latin America: Essays. Pittsburgh: University of Pittsburgh Press, 1973.

Purcell, K. "Modernizing Women for a Modern Society: The Urban Case." in A. Pescatello (ed.), Female and Male in Latin America (1973): 257-272.

Reiter, R. R. (ed.). Toward an Anthropology of Women. New York: Monthly Review Press, 1975.

Rice, E. B. Extension in the Andes: An Evaluation of Official U.S. Assistance. Washington, D.C.: USAID, 1971.

Riegelman, M. et al. A Seven Country Survey on the Roles of Women in Rural Development. USAID, Washington, 1974.

Roberts, P.A. Rural Development in Zinder Department, Niger Republic. An Evaluation. University of Reading, 1977 (mimeo).

Rogers, E. M. Communication Strategies for Family Planning. New York: The Free Press, 1973.

Rogers, E. (Ed.). Communication and Development: Critical Perspectives. Beverly Hills, CA: Sage Publications Inc., 1976.

Rogers, E. and H. J. Park, S. Lee. "Mothers Clubs in the Diffusion of Family Planning Ideas in Korean Villages." Paper presented at the American Association for the Advancement of Science, New York, 1975.

Roling, N. "Adoptions in Development: A Conceptual Guide for the Study of Non-Innovative Responses of Peasant Farmers." EDCC 19, 1, 1970.

Reining, P. et al. Village Women, Their Changing Lives and Fertility: Studies in Kenya, Mexico and the Philippines. Washington: American Association for the Advancement of Science, 1977.

Remy, D. "Underdevelopment and the Experience of Colonialism: A Nigerian Case Study." in Reiter (ed.), Towards an Anthropology of Women, 1975.

Rosaldo, M. Z. and L. Lamphere (eds.). Woman, Culture and Society. Stanford, CA.: Stanford University Press, 1974.

Rubbo , A. "The Spread of Capitalism in Rural Colombia: Effects on Poor Women." in Reiter (ed.) 1975: 333-357

Ruddle, K. and R. Chesterfield. "The Venezuelan 'Demostrador del Hogar': An Example of Women in Nonformal Rural Education." Community Development Journal, Vol. 9, no. 2, 1974:140-44.

Sattar, E. Women in Bangladesh: A Village Study. Dacca: The Ford Foundation, 1974.

Schultz, T.W. "The Value of the Ability to Deal with Disequilibria." Journal of Economic Literature 13 (September, 1975):827-46.

Sheffield, J.R. and V.P. Diejomaoh. Nonformal Education in African Development. New York: African American Institute, 1972.

Stavrakis, O. and M. L. Marshall. "Women, Agriculture and Development in the Maya Lowlands: Profit or Progress." in Proceedings of the International Conference on Women and Food, Tucson, Arizona, 1978: 157-174.

Stirling, P. Turkish Village. London: Weidenfeld and Nicholson, 1965.

Staudt, K. A. "Women Farmers and Inequities in Agricultural Services." Rural Africana, no. 2 (Winter) 1975.

Staudt, K. "Agricultural Productivity Gaps: A Case Study of Male Preference in Government Policy Implementation." Development and Change, Vol. 9, 1978:439-57.

Stoler, Ann. "Class Structure and Female Autonomy in Rural Java." Signs: Journal of Women in Culture and Society, Vol. 3, No. 1 (Autumn), 1977.

Tinker, Irene and M. Bramsen (eds.). Women and World Development. Washington, DC: ODC, 1976.

UN Economic Commission for Africa. "Women the Neglected Human Resources for African Development." Canadian Journal of African Studies, 6(2) 1972:359-70.

UNESCO. Access of Girls and Women to Education in Rural Areas. Paris: UNESCO, 1964.

UNESCO. Agricultural Education in Asia: A Regional Survey, 1971.

UNESCO. Study in the Equality of Access of Girls and Women to Education in the Context of Rural Development. Paris: UNESCO, 1973.

UNESCO/ECA. Reports on Vocational Training Opportunities for Girls and Women. UNESCO, 1975.

UNESCO. Statistical Yearbook. Paris: UNESCO, 1976.

UNICEF. "Children, Youth, Women and Development Plans: The Lome Conference." Abrijan: UNICEF/Regional Office for West and Central Africa, 1972.