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WOMEN'S PRODUCTIVITY IN AGRICULTURAL SYSTEMS:

CONSIDERATIONS FOR PROJECT DESIGN

This paper was prepared by Kathleen Cloud of the Harvard Institute for International Development Case Study and Training Project funded by the U.S. Agency for International Development.

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I. INTRODUCTION

This paper is intended to help development professionals think systematically about the work that women do in agricultural systems, and how projects can help women improve their productivity, both for their own benefit and that of the larger society. Because increasing the productivity of agricultural systems is a key concern of developing countries and international development agencies, many development projects are directed to this end. Effective project design requires identification of the key economic actors and understanding their incentives and constraints. Failure to do so increases the risk of ineffective project interventions.

Evidence has mounted over the past decade that women are important actors in most agricultural production systems, that many responsibilities are gender specific, and that failure to address women's roles within a specific system undercuts the degree of project success. In some cases, such omission may contribute directly to project failure. Because women are so deeply involved in agricultural production, it is important to think systematically about factors that affect their functioning not only for equity reasons, but also for the sake of efficiency. The AID Women and Development policy paper notes that though there is now sufficient evidence of women's contribution to agriculture:

> "there is equal proof that women are often farming without benefit of the improved inputs and services required for a more productive and renumeration agriculture. The paradox is most obvious in the African setting, where it is estimated females do 60-80 percent of all agricultural work. Yet these same females are rarely systematically targeted for training, extension, research, technology, or improved inputs. It is predictable, then, that efforts to improve access to resources and thereby to increase productivity in the agricultural sector will need to be better directed to the female population, if goals for growth are to be achieved." p3

The analysis of women's contribution of agricultural systems set forth in this paper depends heavily on efficiency arguments in justifying the value of attention to their role in agricultural projects. It is increasingly clear that gender-specific economic analysis of food production and distribution systems can contribute significantly to improving system performance. Such economic analysis also has strategic value. While many development professionals are sensitive to cultural differences and unwilling to be accused of cultural imperialism for proposing change in the social relationships between the sexes, it is commonly accepted that development projects can appropriately attempt to intensify economic change and move it in desired directions. Therefore moving the discussion of farm women's roles from a social to an economic

basis has the advantage of permitting rational discussion using commonly accepted analytic tools and arguments. It pays to deliver resources to women in agricultural systems. This argument is easily understood, and one hopes, persuasive. Agricultural systems throughout the world are changing, for better or worse, under the pressure of increasing populations. As systems change, it is possible to use efficiency arguments honestly for promoting change in inequitable situations, as well for increasing productivity.

II. An Analytic Framework for Agricultural Projects

This paper will provide tools for improving the correspondence between current knowledge of women's roles in agricultural production and the programming designed to increase agricultural production. The framework for agricultural projects runs parallel to that outlined in "Women and Project Analysis: An Analytic Framework". The basic elements are:

- analysis of women's productive activities within the agricultural system
- identification of factors influencing women's productivity
- application of this knowledge to each stage in the project process

Each of these elements is addressed in turn by the paper. A discussion of the major patterns of activities undertaken by rural women is followed by a discussion of the factors influencing women's productivity in agricultural systems. Such factors include women's relative size and strength, their reproductive roles, their access to productive resources and the incentive structures they face. In the final section, the paper provides an agriculturally focused adaption of the project cycle analysis.

III. IDENTIFYING WOMEN'S ACTIVITIES IN AGRICULTURAL PRODUCTION SYSTEMS

A. Macro Data on Women's Agricultural Activities

Although there is increasing recognition that women are involved in the world's agriculture, until recently it has been difficult to gain a clear picture of where, when, and under what circumstances women participate in farm work. Although the number of micro studies documenting the importance of women's roles has risen steadily, national statistics have tended to undercount women's agricultural labor due to of their definition of economic activity, their sampling patterns and their interviewing procedures.

As the number of detailed empirical studies of women's roles in local production systems has grown, there has been increasing pressure for more accurate estimates of women's contributions to national production systems. A number of such efforts have been undertaken. The latest, largest and most reliable is that of Dixon (1982), who estimated females percentages of the agricultural labor force for 82 developing countries. She used regression analysis on three types of national data (the 1977 ILO labor force estimates and projections 1950-2000, FAO's 1970 agricultural censuses and national population census data) to arrive at the most reliable figures for each country. For the 82 countries combined, she found the proportion of women in the agricultural labor force to be 42%, for Sub Saharan Africa the regional average was 46%, for North Africa and the Middle East 31% and Asia 45%. Latin American data were not adequate for analysis. There were important differences between countries within each region, and indeed, within each country. Her comments on the differences between data sets are useful in considering data collection strategies for project purposes as well as for understanding patterns of women's participation.

> Of the three major sources of agricultural labor force data reviewed..., the population censuses..., generally yield the lowest proportions of female in the agricultural labor force, whereas the censuses of agriculture conducted under the sponsorship of FAO yield the highest proportions. As unpaid family helpers and seasonal workers become progressively incorporated into definitions of the labor force, the sex composition changes. More specifically, contrasts between sources confirm that the total farm labor force is generally larger, and women (and children) form a higher proportion of the total, when the definition of economic activity includes:
>
> - farm production for subsistence only, as well as production intended in whole or in part for sale or exchange;
> - unpaid work by family helpers
> - homestead-based crop processing, preparation of crops for storage, transport to markets, raising small animals and poultry, and cultivating kitchen gardens, in addition to field-based production and processing activities.
>
> The proportion of females is also generally higher when:
>
> - a low minimum of days or hours of work is specified as a criterion for inclusion in the labor force;
> - a longer reference period is defined during which economic activity is to be assessed, for example, during the preceding cropping season or year rather than the preceding day or week;

- the survey is conducted during the peak season of agricultural activity, especially if the reference period is brief;
- respondents are asked for a secondary activity or occupation as well as a main activity, and a usual activity as well as a current one;
- the interviewer probes the specific activities, based on knowledge of the crops and animals raised, rather than accepting without question the woman's definition of herself as housewife, or her possible assumption that farm work refers only to wage-earning employment;
- the interviewer questions women in the household directly rather than asking male household members to report women's activities; and
- the work of children between the ages of 10 and 15 is routinely included. (pp. 561-562)

The picture that emerges from this comparison of macro data sets is not a complete description of women's agricultural work, but some inferences can be made. In addition to the substantial number of women documented in national agricultural labor force data, many additional women and girls work as unpaid family labor, many are primarily involved in production of the family food supply, many work intensively in the fields only during the peak labor season, many girls between 10 and 15 do substantial amounts of agricultural labor, particularly in North Africa and the Middle East. Finally, many women consider their work in agricultural production to be subsidary to other roles.

B. Women's Roles in Agricultural Households

Rural women do play multiple roles in the world's agricultural systems. They may be mothers, housekeepers, wage laborers, agricultural processors, market women, and entrepreneurs as well as agricultural producers. Most rural women make constant tradeoffs in allocating labor time and productive resources among their roles and obligations. Most farming systems display mixed patterns of women's agricultural responsibilities, combining production cycles for which one sex is primarily responsible with crops where responsibility is shared.

Women are often responsible for the livestock, vegetables and tree crops cared for near their dwellings. They are more likely to be involved in cereal production in hoe cultures and irrigated rice systems than in extensive plow cultures. Class also influences women's participation in agricultural production. Studies in Bangladesh, Indonesia, and Peru all found that women in more affluent farm families devoted less time to field work and more time cooking for hired laborers. Although in low technology systems poor women are likely to do more field work than more prosperous women, in highly mechanized systems such as Japan, Eastern and Western Europe and North America, women in many prosperous farm households with more household technology do substantial amounts of field work.

1. Agricultural Household Production Models

Few people live alone in rural societies. Agricultural production is intrinsically a collaborative endeavor, with the agricultural household as the most common unit of production and consumption. Because of this, we suggest that project analysis of women's productive work be undertaken within the household context, taking account of the activities and demands of household members of all ages. The agricultural household, as the term is used here, is a kinship based group engaged in both production and consumption with corporate ownership of some resources and a degree of joint decision-making among members. Its boundaries are assumed to be permeable and to change over time, as well as under different macro-economic conditions. Such a definition can include monagamous, polygamous, and women-headed households as well as compounds or extended families.

Recent economic models of the agricultural household have made women's productive work much more visible, both because they have enlarged the definition of farm production and because they have viewed women's labor time as a rationally allocated productive resource. As it becomes increasingly clear that the home and the fields compete for allocations of capital resources and family labor, the definition of the "products" of the farm enterprise has expanded. Without a definition of output that includes all the productive uses of household time, it is impossible to understand correctly the opportunity costs of member's time, and the underlying rationality of the tradeoffs they make in allocating their time and other productive resources among activities. Fortunately, this research is increasingly convergent in its definition of the output of the family farm firm. Studies in Nepal, Java, the Phillipines, Malaysia, Bangladesh, Kenya, Romania, and the United States have used somewhat different categories for classifying the goods and services produced by the agricultural household, but taken together they include the following:

- agricultural production: the output of crops and livestock for home consumption or market sale; (cereals, vegetables, tree crops, livestock, dairy products, poultry)

- household production: goods and services produced within the household for home consumption or market sale; (food processing and preparation, provision of household water and cooking fuels, laundry, cleaning, health care, house building and maintenance)

- human capital production: childbearing, child care and the transmission of skills and knowledge

- self-employment in the informal market sector: off-farm activities such as marketing and personal services

- wage labor: paid employment whether in agriculture or other sectors

Much of the recent farming system research also reflects interactions of production and consumption behaviors as well as the trade-offs between on-farm and off-farm labor. However this research has been much slower to incorporate explicitly the costs of household and human capital production in their analysis. (See Figure 1)

2. Household Resource Allocation Strategies

Several kinds of models have been developed to understand the resource allocation choices made by farm households. Small farmers are no longer viewed as ignorant, tradition bound and resistant to change. They are now seen to be allocating scarce resources of capital and labor rationally to achieve the greater benefit (utility) for the household. In this view they are "efficient by necessity," responsive to prices, and willing to adopt improved technology when it pays to do so. The most recent household models (Barnum and Squire 1979, Huffman and Lang 1982, Evanson 1981) also acknowledge that because farm families consume part of what they produce, production and consumption behaviors are closely entwined and that distinctions between the two are not always clear. Much farm household consumption could also be seen as productivity increasing investments in the health, education and nutrition of the household's human capital. Allocative choices are constantly being made about the levels of time and resource that will be devoted to each area of household activity. Produce is processed and consumed by the household, or sold, and the profits used to purchase inputs or to pay school fees. Such choices are affected by the level of resources the household possesses, the size and age structure of the household, the availability and cost of technology, and the prices in local markets as well as the cropping systems possible in the environment.

Most household models assume that farm households, and the people within them, will do first the things that are necessary for survival. To provide their basic needs for food, water, shelter, and clothing a kind of "safety first" strategy is used by most small farms in allocating their resources. Risk reduction strategies are used to assure the household a supply of the things necessary for survival. Many cropping strategies are chosen for their reliability rather than for maximum productivity. If it is necessary to walk long distances to obtain drinking water, or cooking fuel, hours of labor time may be taken from agricultural and household production and locked into these essential activities.

A second assumption is that work is organized and resources are deployed in such a way that the tasks with the highest returns are undertaken first. Ben White, in his study of poor Javanese households describes it this way:

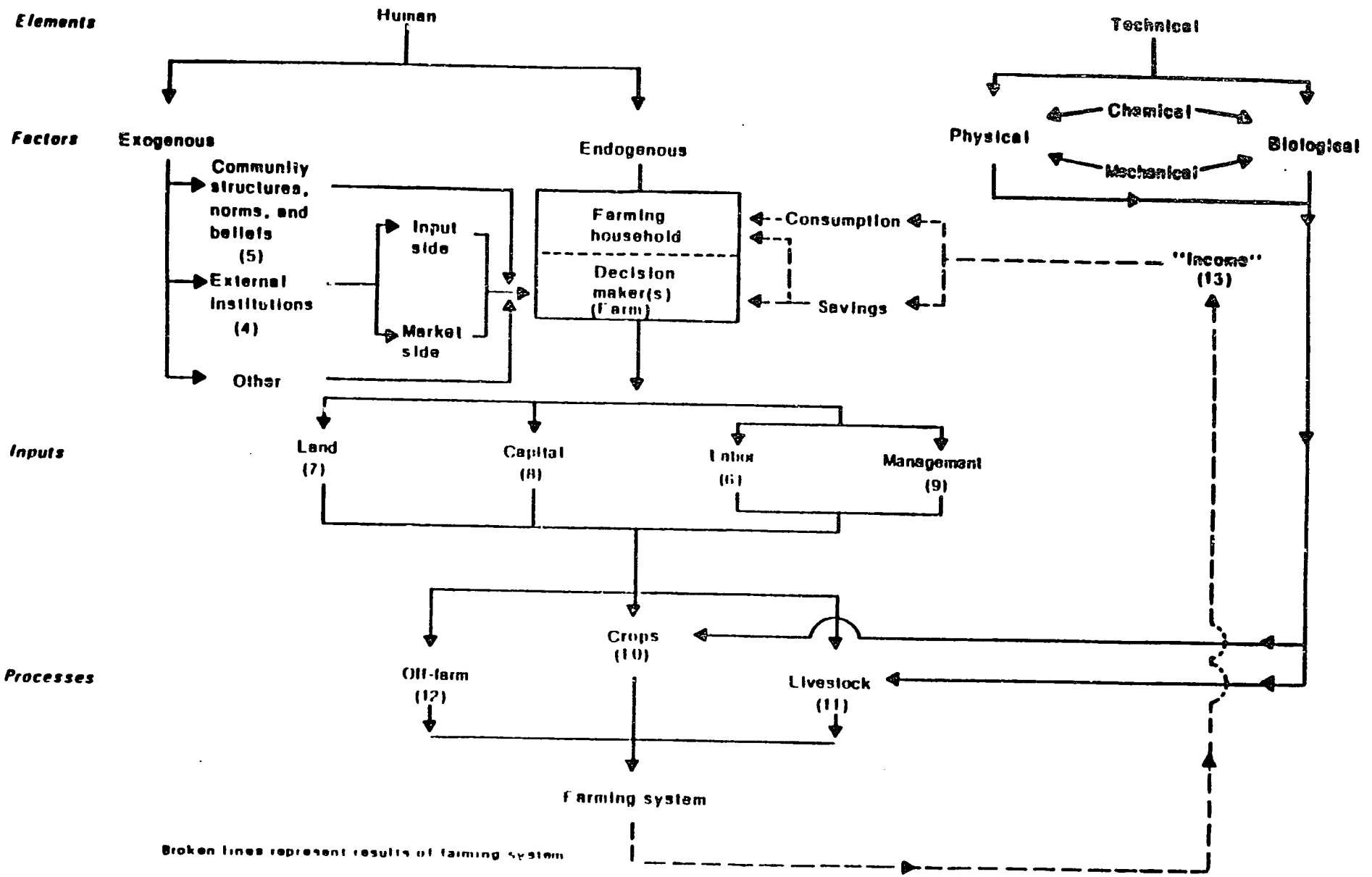

Figure 1. *Schematic representation of some determinants of the farming system.*

From: Norman, David W., Mark D. Newman, Ismael Ouedraogo.1981. Farm and Village Production Systems in the Semi-Arid Tropics of West Africa. ICRISAT, Research Bulletin No.4 Voll.

> "If we were to rank the various productive opportunities in order of their returns to labor...we would expect to find that households would whenever possible choose the available combination of activities with the highest total returns to labor. Thus, for example women will often stop or reduce their trading or mat-weaving activity during harvest time to take advantage of the better returns in harvesting. Men may remain at home, cooking and babysitting to free their wives for the harvest; young children may herd livestock or cut fodder when there are wage-labor opportunities for their fathers, or they may cook and baby sit while their father cuts fodder and their mother is planting rice. Each household survives on a basis of extreme occupational multiplicity and highly flexible division of labor among household members. Since the returns to labor in most occupations can scarcely support an adult, let alone an entire household, the burden of subsistance is shared by men, women and children together. Each household's income is derived from a great variety of sources which change constantly in response to available opportunities according to the season, the state of the market, and even the time of day." (p.280)

It is clear that allocative choices are also effected by the power relationships within the household and the community. The economic convention of assuming a household utility function in which a household acts in its own best interest given its resources, its economic environment and its technology obscures the fact that what is in the best interests of the household may not be in the best interest of the particular members. The unpaid family labor of women or its younger members may increase the income, status and living standard of the household, yet they may not receive an equitable share of the benefits.

Even more importantly for project design, the concept of the household utility function ignores the question of how decisions are made within the households. Women and men may have different production priorities. One may wish to invest more resources in subsistance production while the other favors cash crops, or wishes to invest more in the nutrition or education of the children. Purchases of household production technology such as improved stoves may compete for capital with purchases of agricultural technology. The relative bargaining power of the two sexes within the household will influence the allocation of productive resources as much as purely economic considerations.

In placing women within the household context therefore, we must emphasize that although individuals in households have shared interests, they also have separate interests, and they may sometimes have opposing interests. The separate and opposing interests of women and men may be either acknowledged and institutionalized within the community, or they may be vigorously denied.

In many systems there are gender specific responsibilities for producing certain crops, or supplying certain kinds of household income, as well as responsibilities for making certain kinds of household expenditures. Many rural households utilize both pooled and non-pooled income streams.

> "Research findings for Sub-Saharan Africa, the Carribean, South and South East Asia indicate... a pattern of separate and distinct income streams and expenditures, where males and females meet financial responsibilities to the family individually with little or no access to each other's cash or other resources." (AID/WID Policy paper, p.3)

In intervening in such systems it is important tnat projects do not unknowingly undercut women's income sources, or lessen the economic base of their bargaining power in other ways. In systems where public norms restrict women to unpaid labor in household and human capital production, and define their role as economic dependents whose interests are cared for by the men in their household, women's defense of their own interests is likely to be more subtle and difficult to perceive. Nevertheless it can generate profound impacts on the agricultural economy. Jones' study of a rice production project in Camaroons clearly demonstrates women's strategy of withholding labor needed for household rice production in order to force an improvement in returns to their labor. As another example, consider the consequence of dependent women's need for sons who will support them in their old age.

We would caution project analysts that while it is often a useful assumption that households act in a relatively rational and equitable manner to maximize benefits to their members, it is also important to be alert for situations of separate or conflicting interests within the household which may effect project functioning.

C. Patterns of Women's Participation in Agricultural Production

Possible arrangements of agricultural responsibilities and tasks are almost limitless. Fortunately for project analysis there do seem to be patterns. During the past decade one of the liveliest fields of research on women has centered on factors that influence these patterns of rural women's work. Economic rationality, culture, demography, colonialism, capitalism, capitalist exploitation, patriarchy, the physical safety of women and children, and the type of cropping system have all been cited as influences.

One of the most influential explanations was offered by Boserup in 1970. She noted that in sparsely populated areas such as Africa where shifting hoe cultivation is the rule, men take part in cultivation, primarily in land clearing, but women do most of it. Such areas were contrasted with more densely populated areas of Asia where the agricultural system is that of extensive plow cultivation. Here men perform the farm tasks associated with the plow, and the hand operations-or some of them-are left for women to perform. In regions of intensive cultivation of irrigated lands both men and women must work in the fields to support a family on small holdings. In linking population density and the consequent differences in modes of production to women's roles within the production system she makes an implicitly evolutionary argument which identifies population pressure as the engine that propels agricultural intensification and technical change. The unfolding of this scenario removes women from control of land and other productive resources, thus marginalizing them, and constraining their productivity.

> "As agriculture becomes less dependent on human muscular power, differences in productivity between the sexes might be expected to fall. In actual fact, this is far from the case. Men monopolize the use of new equipment and modern methods...In all developing countries and most industrialized countries women perform simple manual tasks in agriculture while more efficient types of equipment, operated by animal or mechanical power, are used primarily by men. Often men apply modern scientific methods of cultivation to cash crops while wives continue to cultivate food crops by traditional methods. Thus, in the course of agricultural development, men's labor productivity tends to increase while women's remain more or less static...The tendency toward a widening gap is exacerbated by the fact that it is cash crops men are taught to cultivate...because men can use part of the earnings to invest in improvement of production, while women producing food crops for the family have no cash income for improving their farming techniques.

Her thesis has stimulated considerable debate. As more and better information becomes available, the picture seems more complex, with a larger number of factors at play. Traditional systems present more variation, and the dynamics of change are more variable than her arguments reflect. Nevertheless, it does seem clear, that there are systematic underlying regularities although they are not yet well understood.

Because current generalizations are tentative, and have numerous exceptions, it is important to understand the reality of the specific

systems the project is intended to affect. Five common patterns of women's agricultural responsibilities are described briefly below.

1. Separate Crops. In this pattern women and men are responsible for production and disposal of different crops within the household production system. Alternatively women may specialize in certain crops as well as participating with men in the production of others. There may be a division between:

- women's subsistance crops and mens cash crops
- women horticultural crops and mens cash crops
- between two cereal crops such as millet and rice
- women's swamp rice and men's irrigated rice
- between women's goats and men's cattle

Alternatively, women may specialize in:

- poultry
- vegetable or tree crops
- small ruminants
- gathering of wild crops
- beans, cowpeas and other legumes

2. Separate Fields. In this pattern women produce the same crps as those controlled by men but in different fields. Such crops are usually for household consumption, but some may also be marketed. This pattern is found in West African systems where women's fields are usually part of a larger system in which labor of both sexes is also contributed to the communal fields of the extended household. In these cases there may be three interlocking production systems, the fields of each wife, the husband's field and the joint field of the extended family. (Morris, Norman)

3. Separate Tasks. In this pattern, some or all of the tasks within a single cycle are assigned by gender. Common tasks assignments include the following:

- men prepare the ground; women plant or transplant the crop. This pattern is particularly prevalant in rice production and in African hoe culture.

- seed selection and storage is done by women in many systems

- plowing is done by men in most systems

- certain types of plant protection may be assigned to women

- certain kinds of harvesting tasks may be assigned by gender. Climbing trees to harvest crops is usually male.

- post harvest processing and storage of cereals, vegetables, tree crops and dairy products are often women's tasks.
- care of animals when they are young or sick is often women's work.
- men and boys often supervise grazing of herds far from home.
- milking is often assigned to one sex or the other. Sometimes this differs by animal. Among the Tuareg men milk camels, women milk goats, both may milk cattle.

4. Shared Tasks. In this pattern, which overlaps with the other patterns to varying degrees, men and women undertake the same tasks on the same crops. Some systems are marked by jointness in most tasks, in other systems, only labor intensive tasks such as weeding and harvesting are shared.

5. Women Managed Farms. These are two types, de facto and de jure. In de facto systems men work away from the farms for days, weeks on even years, leaving the women to manage in their absence. In some situations, as in the Indonesian example, men work off-farm but return each evening. Kenyan and Japanese women manage farms during the week while their husbands work in the city. In Nepal, absences extend for several months. In Jamaica, Lesotho, Botswana, Yemen, Zimbabwe and the Senegal river basin, male migration abroad may last for years. While in some highly patriarchial systems farm management and the investment of remittances may remain in the hands of older men, in many systems, women become the effective farm managers. Many of these farms command significant resources but women managers may lack legal authority to sign credit agreements and commit resources.

De jure women headed households are increasing on a world wide basis. Such women may be widowed, divorced, abandoned or simply have never married. Such women-headed households may represent as much as a third of the households in some rural communities. They tend to be among the poorest farming households, underresourced and suffering serious labor constraints. Yet there are many who depend on them for survival.

In patterns of separate crops, and separate fields, women are likely to be responsible for the management, labor, and disposal of production. Often the produce is primarily for household consumption, but there may be significant surplus for sale. Labor exchange is common in these systems, paid labor less so. In patterns of separate tasks and shared tasks, women's labor may be either unpaid family labor or paid wage labor. On family farms, management of this labor is likely to be a shared household responsibility. Control of the proceeds is variable and usually complex. In cases of plantation agriculture or communal farms, management rests further afield and control of wages may rest either with the

individual worker or the household head. For women managed production systems women are more likely to control proceeds and usually provide most of the labor, though they may also hire labor or supervise the labor of younger household males. Most agricultural households display mixed patterns of responsibility and control, combining production cycles for which one sex is primarily responsible with those where responsibility is shared or interlaced.

Systems vary both not only in the tasks they assign by gender, but also the flexibility with which the tasks can be shifted. Children may take over tasks of the parents as they mature, sons replacing mothers in field work or milking. Seasonal shifts in the labor devoted to different kinds of production are often linked to the agricultural cycle. During seasonal labor bottlenecks such as harvesting every able bodied person may be drawn into agricultural work while other work is put aside. Sometimes this means that everyone goes into the fields. In other systems women work to process the harvest and prepare meals for field workers. Women's field labor may also be divided by class. Poorer women may work in the fields for pay while women in more prosperous households process and cook the food.

Figure 2 provides a particularly striking example of household time tradeoffs in Upper Volta. During the July peak agricultural labor period, the average mean hours of domestic labor per fortnight drops from 200 to 50 and then to 25 as the agricultural labor climbs from 250 to 550 hours. Later, as the agricultural labor hours drop back to 100 the average domestic labor returns to 200, with two sharp dips in October and November mirroring brief upswings in agricultural labor demand. Non-agricultural work-time is very low during the agricultural season and increases during the dry season, while livestock work continues steadily at a low level straight through the year.

Such a pattern clearly reflects women's transfer of labor time from household production to agricultural production during periods of peak labor demand, together with a burst of "catch up" household production time immediately after each agricultural peak subsides. Because the data is not disaggregated by sex, the other gender related shifts in labor allocation patterns within the household are less visible, although certainly present.

D. Women's Roles in Management of Agricultural Production

Because increased productivity is related to management decisions, it is important to understand not only who is doing the work, but who is making the decisions about cropping patterns, seed selection, use of purchased inputs, use of family and hired labor and crop disposal. It is also important to understand who is implementing the decisions, with what resources and at what level of skill. Unfortunately, the burgeoning literature on farm management and farming systems have given scant attention to issues of gender influence on intra-household decision making and resource allocation.

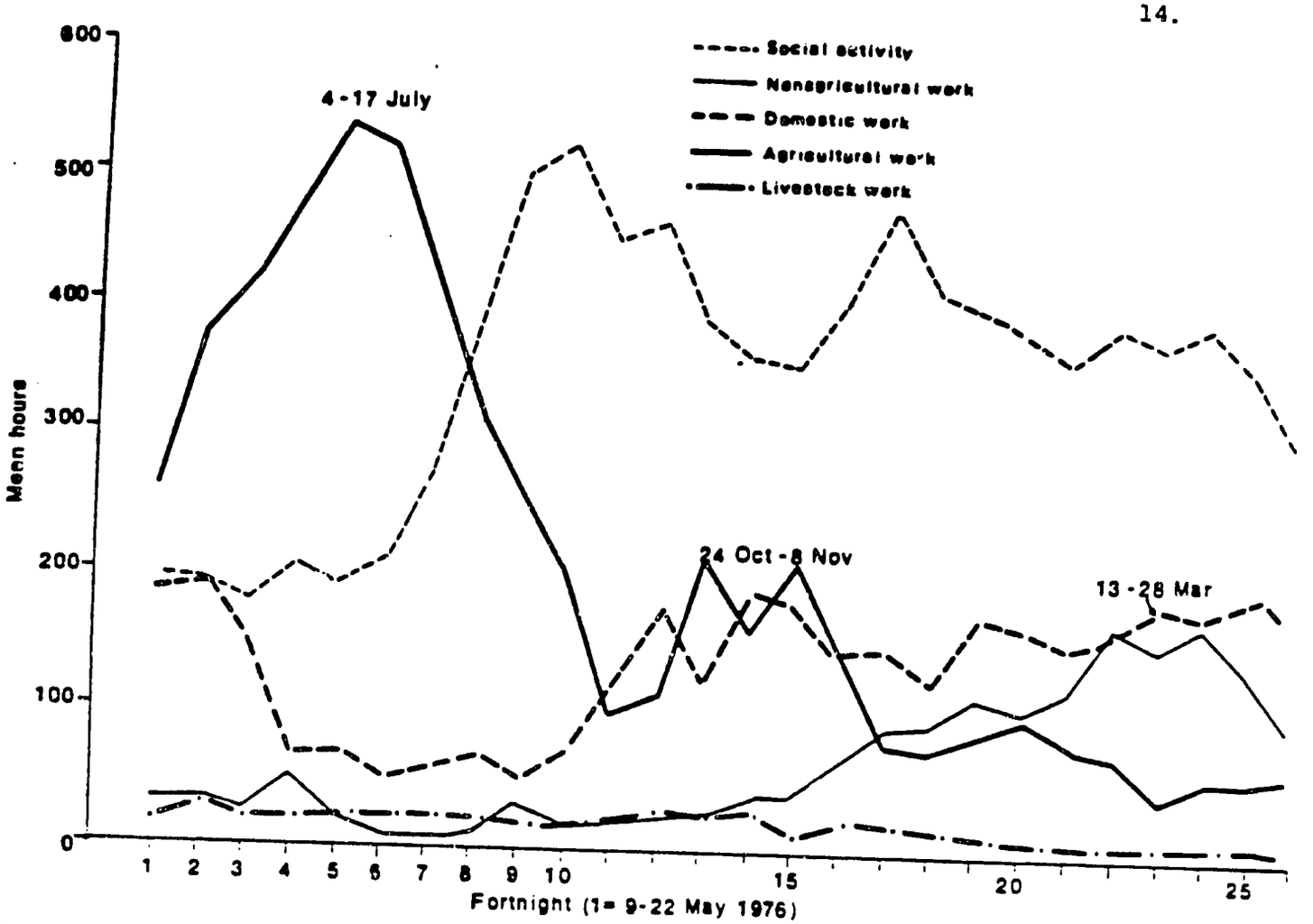

Figure 1. Mean total household labor hours each fortnight by category of work, Upper Volta.

From- Norman, Farm and Village Production Systems in the Semi Arid Tropics of West Africa, ICRISAT, 1979.

By contrast, anthropological studies have consistently documented omen's responsibilities for management of their own animals and crops in any traditional cultures. Systematic studies of male and female influence n management decisions in integrated systems are increasing in a number of ocial science literatures. Acharya and Bennet, in an elegant study of omen's time use and decision making in eight Nepalese villages, concluded hat:

> "Nepalese women are not just silent workers who take directions from men, on the contrary, their managerial role in the agricultural production appears to be commensurate with the level of their labor input into the family farm enterprise (which is 57% for all villages averaged)...In decisions..., about the disposal of what is produced, and the management of household assets, we find that in these later types of decisions women's labor input into subsistance production no longer seems to have a consistently positive effect across communities. Instead what appears to be more important is the degree to which women in a given community participate in the market economy...and the home production of crafts for sale...Moreover it appears that cultural factors affect both the structure of female economic participation and female input into the decision making process...there are, however, a number of other factors acting at the household and individual levels such as the economic rstatus of the household, the individual womens age, the availability of child care, which also effect the structure of female economic participation and decision making in the household." pg. 21, 23.

White and Hatusi in studying decision making in Javanese seholds, make the following observations:

> Women are often involved in production decisions, and in significant number of cases they are the dominant influence in these decisions. Since we are dealing with households whose primary source of income is from agriculture, we find no confirmation of the notion that production decisions are firmly in the hands of "male farmers." Any researcher who carries out farm management surveys in rural Java quickly learns that men do not monopolize the details of production management. Normally the interviewer sits in the front room and addresses questions to the (male) "farmer" in implicit

> endorsement of the general norm that farming is "men's business." However, detailed questions on fertilizer or labor use, yields and so on, seem very often to require prior consultation with the "housewife" (who may be crouching modestly out of sight in the back room) before they can be answered: Mak (mother) how much fertilizer did we use? Where did we get the seed? How many laborers helped in the planting and how much did you pay them? and so on." pgs. 32-33

They also note that for some households the involvement of women on production decisions is a necessity because their nusbands are physically absent. Either the men are working in the fields of others or in another type of wage labor.

E. Importance of Identifying the Gender Related Responsibilities

Identifying the gender division of responsibility for labor, management, and disposal of all types of households production is crucial to project analysis because the segmentation of control and responsibility has practical effects. Technical assistance given to one family member does not assure its use in all the household's landholdings. Increasing household income will not necessarily make productivity increasing inputs available for all activities, if household income is not completely pooled. Targeting improved technologies efficiently demands an understanding of who is likely to use the technology. When labor is segmented by gender, care must be taken in project analysis that labor supply estimates reflect this to avoid creating gender specific labor bottlenecks.

F. Developing Activity Profiles of Agricultural Households

Table 1 provides an outline for developing a gender specific profile of agricultural household activities. It should be recognized that although some faming systems project are beginning to collect detailed micro-level data, existing data would seldom be sufficient to complete such a profile. Nonetheless, it is important to know what information is missing so that a decision can be reached whether to invest additional resources in gathering data, or proceed with project design based on certain tentative assumptions regarding the missing data pieces. Perhaps the major value of an attempt to develop such a profile at the micro level is to make programers aware of what they are assuming and somewhat more cautious in proceeding.

Such household level analysis is only useful to the degree that is intergrated into project level planning and implementation. The particular aspects of the household production system likely to be affected by the project should receive the most attention in data collection, and the findings should be explicitly related to proejct level analysis throughout the project cycle. For example, if household level analysis shows seed

Table 1

ACTIVITY PROFILE OF AN AGRICULTURAL HOUSEHOLD

% of Total Household Time	Type of Production	Who Acquires Inputs	Who Manages Production	With What Labor	With What Resources[2]	Who Controls Disposal
	AGRICULTURAL					
	Separate Crops*					
	Crop 1					
	Crop 2					
	Separate Fields					
	Crop 1					
	Crop 2					
	Separate Tasks					
	*Crop					
	Task 1					
	Task 2					
	*Crop					
	Task 1					
	Shared Tasks					
	Crop					
	Task 1					
	Task 2					
	Women Managed Farm					
	*Crop 1					
	*Crop 2					
	HOUSEHOLD					
	Task 1					
	Task 2					
	Task 3					
	HUMAN CAPITAL					
	Task 1					
	Task 2					
	INFORMAL MARKET SECTOR					
	Task 1					
	Task 2					
	WAGE LABOR					
	Task 1					
	Task 2					

1) FA=Female Adult, MA=Male Adult, FC=Female Child, MC=Male Child
2) land, water, fuel, capital, credit, technology, information, reproductive rights

*Crops indclude agricultural, horticultural and animal products

selection and preservation to be women's responsibility, then institutional interventions to develop or disseminate new seeds should take this into account. If household level analysis shows women to be responsible for production and marketing of poultry, dairy products or vegetables, interventions in these areas should address this reality.

Such attention does not demand that traditional roles are to be preserved at any costs. It does demand that the analysis of the costs and benefits of differing project strategies explicitly attend to gender roles, as well as to the gender differences in control over resources and benefits that will be addressed in the following section.

IV. FACTORS INFLUENCING WOMEN'S PRODUCTIVITY IN AGRICULTURAL SYSTEMS

There are a number of factors which influence rural women's productivity. They can be seen as three overlapping constellations, the physical factors associated with size, strength and reproduction, the socio-cultural factors influencing role ascriptions and family incentive structures and the institutional structures which affect access to factors of production, and to public incentive structures. Although institutional factors are most amenable to project intervention, and will occupy the major share of this discussion, it is useful to begin by discussing the influence of physical and social factors connected to women's size, strength, and nurturing responsibilities, since so many discussions not only begin, but end, there.

A. Women's Relative Size and Strength

Women's relatively smaller size and strength are often cited as reasons for assuming their productivity is lower than men's in farm labor and off-farm employment. There is a tradition in farming systems work of weighting women's productivity at .75 or .8 of a man's (Collinson, 1972; Chaynov, 1966). Recent empirical analysis of input-ouput data does not support these weights. In Kenya women's overall productivity was found to be as high as men's in agricultural labor, while in Sri Lanka women's rice transplanting, in Upper Volta women's weeding and in West Africa women's cotton picking were all found to be as productive as men's labor in the same activity.

In Bangladesh, by contrast, women's productivity was lower than men's when carrying earth and rocks for road building. It seems likely that women's and men's productivity differences based on size and strength vary by task, and are greatest for tasks that demand the most body mass and strength in the upper torso. This view is reflected in a survey of Peruvian peasant farmers where over 70 percent of the respondents considered the time of men and women equally productive in planting, weeding and harvesting by hand, while only 33 percent felt women to be as productive in hoeing, digging with a pick or harvesting with a sickle, tasks which do require both tools and greater strength (Deere, 1977). The

problem is of more than passing interest in farming systems research. Norman (1979) recommends more rigorous data collection and analysis to establish realistic weight ranges for tasks.

> "There is difficulty in measuring work by different family members and reducing it to a common denominator in terms of productivity. Different approaches to this problem have led to the actif concept in Francaphone countries, and the male equivalent concept in Anglaphone Africa. The male equivalent approach is often used in situations where labor flow data is being collected...the system need only reflect differences in productivity per unit of time of labor. Arbitrary weights by task is rarely done, an unfortunate fact which could result in spurious conclusions. The weighting systems employed are critical in determining the validity of the results. Unfortunately, it's not always clear what weighting system was employed, and why specific weights were chosen... Weights have been used that reflect differences in levels of consumption rather than in terms of work productivity. It is important to distinguish ...between consumption units and work units since such weighting systems are useful for different purposes...Relevant weights are further complicated by the facts that productivity of individuals of different sex and age will vary according to the task and its urgency....This is a major problem and makes comparison of studies difficult."

B. Women and the Production of Human Capital

Women have a clear comparative advantage in the production of human capital due to their unique capacity to produce new human beings through pregnancy. Without this capacity societies could not continue to exist. In many cultures women achieve both power and status by exercising this capacity, while at the same time carrying out a great deal of other productive work. After childbirth, women continue to carry out this productive work while simultaneously attending to the needs of their children.

Although increasing amounts of child care can be delegated to others as children grow older, a stream of joint productive work is characteristic for many women in farm households, particularly during periods when they are pregnant and nursing. On the one hand, woman's agricultural or market time may be shortened by the need to nurse a baby (Nerlove, 1974), or the need to attend to children while working may increase the time needed to complete a task (DaVanzo and Lee, 1978). Yet, at the same time women are also producing in human capital. This joint

productivity seems particularly difficult for economists to handle with standard economic procedures. Despite the methodological problems, economists studying American farm households are beginning to develop models that reflect joint production, arguing:

> "For farm households, the possibilities for joint production are much greater than for wage earning households....The wife's household time may simultaneously be spent preparing dinner and listening to farm market and weather information. Farm records can be prepared while supervising children, and farm and household inputs can be purchased on the same trip to town.

Much of women's work in agricultural households involves this kind of double or triple layer of simultaneous productive activities. It is characteristic of mother-child interactions that they are pulsed, occuring in brief bursts, separated by attention to other tasks on the part of both mother and child. Such an activity pattern demands both skill and judgement in coordinating a great variety of different activities. Mead Cain (1980) in his discussion of Asian households notes:

> "The particular work activities of females are of shorter duration and are more integrally linked than those of males. Thus managerial skills must be applied more frequently and efficiency is best judged overall rather than for specific activities." (p. 243)

C. The Issue of Time

Discussion of time and its relationship to women's productivity are threaded through this paper. We have alluded to short run, daily allocations of time, medium run seasonal cycles of time use, and long run effects of major changes in the economic, political or physical environments.

The Short Run

Because labor time is the primary productive resource for many of the rural poor, we have assumed that both sexes allocate it rationally, given the constraints they face. Women in most agricultural systems have different patterns of time use than men, both day by day and across the seasons. As noted above, women are more often engaged in joint production, managing two or three activities simultaneously, changing activities more often in the course of the day. Across the world, rural as well as urban women work three to four hours a day more than men in the same society (UW, Szalzi, 1975). At least three reasons have been advanced to account for this.

Many household and human capital production tasks must be done repeatedly and consistently in order to sustain life at an acceptable level. Food processing and cooking, supplying fuel and water, caring for children and the sick are all activities which must be done daily no matter what other work is undertaken. Since these tasks are assigned overwhelmingly to women in rural societies, they consume large amounts of women's time, and add to the length of her work day. A second explanation is that labor-reducing technology is less available to women in all areas of their production; therefore, women's labor hours are longer, though their total production may be no greater than that of men in their households. These two arguments are not mutually exclusive, and are often assumed to be interactive.

A third argument made by an interesting assortment of Chicago School neo-classical economists and feminist scholars, argues that women's joint production is so valuable to the household that it is economically rational for women to work longer hours. The neo-classical explanation begs the question of the intra-household distribution of benefits from women's work, submerging the issue in the household utility function. Feminist scholars cite distortions in labor markets and incentive structures, and women's constrained options as ways of reconciling the high value of joint production and women's relative lack of benefits from this value. Whatever the most convincing explanation, the fact remains that women in rural households work very long hours, trading off the value of time used in one activity against the value in another. Women's time is a scarce resource, and its opportunity costs must be considered in project interventions.

The Medium and Long Run

In the long run, women's activities and productivity will be influenced by the larger forces at work in the environment. Male migration, changes in technology and increase of production for market affect both the control and the allocation of household resources. Demand for women's agricultural labor may increase, decrease, or change in nature. Shifts in allocation may take place smoothly and swiftly, or slowly and with great difficulty. Control over resources of land, labor, capital, tools, and information may shift between the sexes, as new resources become available. Aside from Boserup's pathbreaking work, until recently there had been little attention paid by mainstream economists in the relationships between shifts in the macro context and shifts in the gender-related resource allocation patterns of agricultural households. Recently, however, forward and backward linkages between the national economy and decisions made within farm families are receiving more attention. For example, Nerlove (1978) cites the effect of a shift in allocation of resources to human capital development:

> ...demographic changes which accompany agricultural transformation...are a crucial element in agricultural supply response...Many demographic

> changes have their roots in individual decisions of farm people to make greater investment in human capital in the form of more education and better nutrition...and to have fewer children...As labor markets improve and there is increased awareness of opportunities outside of the agricultural sector, such demographic changes alter the nature of agricultural production, leading to the increased use of non-traditional inputs and to a greater reliance on markets, and thus alter the nature of supply response to prices and other factors. (p. 885)

D. Gender Differences in Access to Productive Resources

One way that agricultural development proceeds is by making resources available for increasing farm productivity. The most common productivity increasing resources are improved seeds, fertilizers, technology, credit and information. In some cases, land may also be redistributed, or new land brought into production. Infrastructure such as irrigation systems, roads and rural health programs are often introduced, and rural industries may be encouraged. Such inputs are intended to increase the productivity of the entire system by increasing the productivity of farm households, and the individuals within them. In land short systems efforts are generally directed toward increasing productivity per acre through the use of "soft" technologies such as improved seed, fertilizers and irrigation. In labor short systems, the efforts generally focus on increasing productivity per labor hour through the use of machinery and tools.

Systems differ in the degree of access to productive resources they permit to various groups. Often, those who control the greatest share of the current resources gain the largest share of the new. The heirarchial distribution of social power, income and productive resources by class has been extensively explored in development literature. There is a second system of stratification present in many societies, that of patriarchial social relations between sexes. Mead Cain defines patriarchy as:

> "a set of social relations with a material base which enables men to dominate women. In Bangladesh, patriarchy describes a distribution of power and resources within families where power and control of resources rests with men, and women are powerless and dependent on men. The material base of patriarchy is men's control of property, income and women's labor. The structure elements of patriarchial control are interlocking and include elements of the kinship system, political system and religion" (p.2 1979)

Systems vary greatly in the equity of their relationships. In many agricultural systems, household resource allocation decisions are relatively equitable. In other systems the strong exploit the weak for their own advantage. To the extent that class or patriarchial stratification characterize an agricultural system, women's access to productivity increasing resources will be constrained either by their household's status, their gender, or both. Since women consistently contribute well over half the labor hours in rural households, (Szalzi 1975) constraints on women's access to resources systematically depress the productivity of half of the available rural labor. This seems shortsighted, yet there is substantial evidence that in many rural systems women have less access to land, capital, credit, technology, wage markets and training than men in the same system. Effective project design must identify which of these barriers to women's access are operative with the project and find ways to deal with them, either by removing them, passing them by, or adjusting project expectations to them.

1. Women's Access to Land

Women's access to land is generally greater in systems of low population density such as Africa where use-rights to land are still in force. Even in such areas, women may lose access to good land as a growing population increases pressure on the land. Cleve's African studies (1974) show women walking further than men to their fields in areas where increased cash cropping makes land more valuable. Palmer in Indonesia (1980), Smale in Mauritania (1980) and Hanger and Morris in Kenya (1973) all document women's loss of secure access to land when the introduction of irrigation increased the productivity of the land. Effective loss is often accompanied by changes in the legal code that register all land in the name of the head of household. Such legal changes have been documented recently in Kenya and Sri Lanka.

The 145 countries attending the 1979 FAO sponsored World Conference of Agrarian Reform and Rural Development (WCARRD) recommended a different course of action. The program of action recommended that countries:

> "Repeal those laws which discriminate against women in respect to rights of inheritance, ownership and control of property and promote understanding of need for such measures...promote ownership and co-ownership of land to effectively give women with absentee husbands the legal right to make decisions on the land they manage (Section IV, A i,ii)."

The government of India has incorporated this recommendation into their sixth Five Year Plan, and AID is exploring with the Indian government possible arrangements for implementing co-registration of land title in the resettlement accompanying the Marharashtra Irrigation Project (Project

Paper Vol. 1 p. 43). Similiar discussions are underway between AID and the participating governments to assure women's access to land (and water) in the Senegal River Basin Development. (Project Paper Vol. II Sect.2, p21)

2. Women's Access to Capital, Credit and Agricultural Technologies.

Women's lack of access to cash assets which results from their role as unpaid family laborers and subsistance producers, when combined with constraints on their access to paid labor markets limits their ability to invest in productivity-enhancing agricultural inputs. Compounding this problem is the reality that where women are responsible for separate crops, separate fields, or management of the total farm enterprise it is often difficult for them to belong to the government sponsored cooperatives and water users associations which control distribution of new seeds, production packages, water and credit. Not only is women's access to credit constrained by their lack of access to membership in farmers' associations and cooperatives but their lack of secure title to property often cuts them off from other sources of credit. Henn (1982) cites this lack of access to capital as a major constraint on African women's use of agricultural inputs. Since African women are major agricultural producers, such a pattern is a serious constraint to increasing African food production.

In spite of all these difficulties women farmers often do surprisingly well with the resources they have. In one of the few empirical investigations of the relative productivity of men and women farmers, Moock (1976) did intensive input-output analysis of maize farms in a Kenyan district where 40% of the farm managers were women. He found women equally productive per hectare in spite of the fact that the women had less capital and used fewer purchased inputs. They substituted additional labor for other inputs, and maintained productivity per hectare, though not per hour. However, in a nearby area with a higher level of government services, all directed to men, women's relative productivity was falling behind men's. Additional time could no longer compensate for improved technologies (Staudt, 1978).

A complicating factor is that packages for improving productivity of "women's crops" often simply do not exist because such crops have low priority in government research and extension. It is noteworthy that when AID asked a panel of international experts to specify agricultural research priorities in areas that would be of greatest benefit to the world's poor, the top priority crops were small ruminants (sheep and goats), millet/sorgum and beans and cowpeas. All of these neglected crops are women's crops in much of the developing world. Collaborative research involving American and developing country institutions is now going forward on all these crops, with specific attention to women's roles in their production.

Among projects targeted specifically to "women's crops", there have been a number of successful vegetable production projects. The Gambian Ministry of Agriculture set up a project to train 30 women in production of onion crops for export. Fertilizer and seed were provided and the government purchased the crop at an agreed price. Within two years the project grew to involve 900 women in 32 different projects, providing women with income and opportunities to join cooperatives (International Womens Tribune Newsletter #10, 1979). In Jamaica, USAID financed a women's vegetable production component as part of a larger integrated rural development project. Here the intention was to improve the nutritional balance in the family food supply of poor hill farmers. The gardens were designed to produce year round with low labor inputs. Thirty young women high school graduates were trained as extension agents, and of these 20 were employed by the larger project. The gardens are rapidly spreading and visitors from a number of Carribean countries have been trained there to develop similiar projects. (Chaney & Lewis 1979)

Common problems with agricultural projects for women are inadequate attention to crop preservation, and lack of markets for sale of excess production. Both of these problems have been successfully addressed in the Indian Project Flood, where women have been successfully integrated into the cooperatives that produce milk for sale in the city. (WFP-1979) Because women traditionally cared for the cows, they were involved in the decisions of villages to join the cooperatives. They have received training about animal care and nutrition, and generally they are the ones who receive payment for the milk because they are the ones responsible for the care and feeding of the animals.

3. Women's Access to Household Technology

If women's lack of capital and credit is a serious constraint to use of improved agricultural technology, it is an even more serious constraint to use of improved household technology. In developing countries, low levels of household technology for the provision of water, domestic fuel and the milling of grain are particular problems (AID, 1982; Tinker, 1980). Projects for provision of domestic water sources and social forestry are often justified because they release women's time for more productive activities. In labor-short African agricultural systems when labor-saving household technology such as cooperative grinding mills have been introduced, women use them most intensely during peak agricultural periods, investing the saved time into cooking an evening meal after their field work (McSweeney, 1979) or additional time in the fields (Loose, 1979). By contrast, in labor surplus situations such as Indonesia, when mechanical milling has replaced hand pounding by paid labor, the effect has been to deprive poor women of a crucial source of income (Timmer, 1973). Once again it is important to understand the specific system before intervening.

4. Women's Access to Rural Labor Markets

In land short situations, women's participation in rural labor markets may be necessary for family survival. In other cases women may need wage labor to meet certain obligations or to purchase productivity increasing inputs. Studies of such markets show distinct male and female segments. Many tasks are assigned by gender, women's wages are generally lower, and their unemployment rates are higher. Binswanger in citing ICRASAT's village studies in India says:

> "Males would hardly desire to participate in female submarkets; male wages...are roughly 80% higher than female wages, and male possibilities of employment are much higher...The segmentation clearly works in favor of the males and at the expense of the females...Low wages are attributed - by males and females - to the lack of physical strength and stamina of women. One need only see the loads carried by them, and the discipline of their paddy transplanting lines to realize that the large observed wage differentials can hardly be explained this way." (Binswanger et al 1982)

Projects can and should be designed to provide employment at fair wages for women as well as men in areas such as forestry, seed multiplication facilities, professional and paraprofessional service delivery, agroindustries and other rural enterprises.

In some circumstances, women have also worked to improve their own employment opportunities. Many Kenyan women have organized themselves into self-help groups that exchange labor with one another, and also hire out as a group one or two days a week. They often use their wages as capital for group enterprises. In 1950 a small group of Sri Lanken women organized themselves into the Women's Transplanting Society. Every year since then women in the group travel to paddy growing areas to transplant rice for 2-3 months, moving from farm to farm. Because they assure steady reliable work they have been able to bargain for an agreed wage, nutritious free meals, free transport and a separate room for the group to lodge in. "By organizing themselves...the women are able to work with security in areas distant from their homes, to command reasonable working conditions, and to earn important income." (IWTC 1979 p. 12)

5. Women's Access to Education and Training

A major factor influencing women's productivity is the extent to which they have access to education and training. There is general agreement that education increases productivity (Schultz, 1979) and a substantial literature exists documenting the positive effects of women's education on human capital development (DeVanzo and Lee, 1979), paid labor force participation (Lloyd, 1975; Lloyd and Neimi, 1980) and agricultural

production (Moock, 1973; Huffman, 1980). A recent comprehensive Indian study found that formal education of farm wives enhances the productivity of all farm inputs, including husband's time in farm production (Rosenzwieg, p. 48)

Yet according to UNESCO (1977) women compose less than one-third of the primary school students in the low income nations of every region except Latin America. According to Safilious-Rothschild:

> "Rural women have consistently lower literacy than rural men, but also lower literacy then rural women...Educational wastage is higher in rural areas and for girl students...Although girl students show greater rates of educational wastage than boys, their wastage is more often due to repetition of grades...girls attrition from primary school, seems therefore to be less due to a failure to be promoted than to withdrawing from school for non-scholastic reasons. The obstacles to rural women's access to elementary education can be grouped in the following categories: 1) competing household and childcare tasks and responsibilities; 2) competing involvement in productive economic activities; 3) parents', and especially fathers' negative attitudes toward daughters' education; 4) parents' limited financial and educational resources; 5) shortage of schools; 6) shortage of women elementary school teachers combined with male teachers' negative attitudes; 7) dropping out of school because of pregnancy or marriage." (pgs. 2,3,8)

Remedies that have been suggested include rearranging the school schedule to accomodate cropping cycles, policies and programs to decrease the excessive time spent by rural women in household and agricultural work, development of day care and rotating childcare arrangements to free girls' time for school, the increased training of women as teachers and assistant teachers, and increasing the number of paid professional and paraprofessional women in rural programs to establish the economic and social status pay-off of girls education.

Such efforts to increase the number of rural women with a primary education must be supplemented by systematic efforts to increase the number of women receiving higher education. According to AID's policy paper:

> "Women who combine the skills provided by modern education with an understanding of traditional values and local realities affecting women contribute a great deal to successful development programming. Thus, AID must take measures to provide access for women to training programs and

> higher education, especially in management and administration of the sectors...in most countries it is the functional ministries that bear primary responsibility for integrating women into their programs and for insuring the relevance of their program to the particular needs of women and girls." p.8

This concern with the integration of professionally trained women into all aspects of agricultural institutions is particularly relevant to institution building projects that include participant training. Care must be taken that women are actively recruited and supported in a training for a range of professional roles in agriculture, in order to assure that the needs of women in agricultural households will be adequately addressed by agricultural institutions.

E. Access to and Control Over the Benefits of Production: The Problem of Incentive Structures

Much of women's productive work is unpaid. Women subsidize the world's economies through unpaid household and human capital production. Farm women also undertake significant amounts of agricultural labor without pay. What benefits do they receive from this work? How can their labor be accounted for in terms of women's economic rationality? Two expanations are possible. One is that women are altruists. They derive their utility from the satisfaction of others, from seeing their families healthy, well cared for and well fed. The other explanation is that women have little choice. Societies are arranged in such a way that women's independent access to productive resources, to labor markets, to information, to political and legal rights are seriously constrained. Society permits them only limited control of their own reproductive capabilities. The obligations of childbearing and child raising are thrust upon them, and they must labor within households to assure their children's survival as well as their own.

It is reasonable to assume that both explanations contain some truth though their weight certainly varies between societies. In modern American society, where reproductive control is widespread, women devote significant amounts of unpaid time to the care of families, apparently because they derive altruistic satisfaction from doing so. Their access to labor markets and productive resources is great enough so that most North American women also have independent cash incomes. Nevertheless there are significant gender differences in access to the highest paying work, and resources for the most productive investments, which makes womens relatively greater contribution to household production economically rational, at least while their children are young. In most rural societies in the developing world women's alternatives are more sharply constrained and the benefits they receive more limited.

Whatever the range of available inventives, it is safe to say that people will exert more effort, will become more productive in an activity, if they can see benefits flowing from their increased effort. These benefits may be in cash, in-kind, in power, respect, or in the satisfaction of seeing others well cared for. Benefits may also include relief from difficult or unpleasant tasks or from feelings of guilt.

Recent research documents that in societies where women participate in the market economy in some way, where women have direct access to cash, their power is greater in intra-household decision making, and the status of women is higher in the communities (Achayra and Bennet 1982, Sanday 1973). The incidence of wife beating also seems to be lower in such societies (Blumberg 1979). These are all benefits, over and above the value of the cash, yet linked to cash income. Therefore in analyzing agricultural systems for possible project intervention it is useful to think about intra-household income flows.

- which productive work is paid? unpaid?
- who receives the pay? all the family workers individually or the head of household for the whole family?
- who controls disposal of the different household products?
- who receives cash from the sales? the producer? someone else?

Intra-household disbursement patterns are also important. Women's income may all flow to purchase of the household's basic needs, to food and clothing, although her husband may have disposable income to use for productive inputs as well as for consumer goods such as transistor radios and beer. Where this is the case, the targeting of additional income specifically to women may be necessary. Simply "raising family incomes" will not serve.

Project Flood presents one successful way to channel income directly to women. Women's producers are paid directly by the coop. Although this income is channeled back into the family budget, the report notes that the contribution women make enhances their importance. The same effect was described by Cerna in Rumania:

> The organizational and economic structure of the producer coop has had a particular impact...by institutionalizing women's participation and paying them directly for farm work...The previous pattern of the individual family farm prevented a wife's distinct contribution to its welfare from being measured: this favored and strengthened the position of the family head, who was the owner of the fruit of the family's toil. Now on the contrary, each cooperative farm member's output of work and corresponding forms of payment are computed on an individual basis, whatever a person's family status may be...This is a tremendous change which enhances

> the partnership status of the wife, favors more independent behavior of women and creates conditions which will promote, in the long run, their equal status within the house. (Cerna 1979)

Such payment structures have also been used with success in an AID PVO resettlement project in Senegal, where membership in the productive cooperative is by individual rather than by household.

In contrary cases where women are not paid directly for their work, productivity often suffers, especially in systems with little pooled income. Women with high levels of responsibility for the provision of the family's basic needs, and little access to cash are forced to substitute their labor, and that of the children they create for the productivity increasing inputs they cannot afford.

F. Developing Profiles of Gender Access to, and Control over, Resources and Benefits

Table 2 provides an outline for developing a gender specific profile of access to and control over resources and benefits. Such a profile by its very nature has both efficiency and equity implications. The kind and degree of women's access to productive resources conditions the productivity of their labor, as do the incentive structures they face. The degree of control they exercise over resources and benefits affect their ability to increase production and their ability to bargain to protect their own interests. Because each of these factors has implications for project design and implementation, developing such a profile is a useful exercise in clarifying assumptions. It also permits a clearer picture of possible areas of project intervention.

V. ADDRESSING WOMEN'S PRODUCTIVE ACTIVITIES IN AGRICULTURAL PROJECTS

Factors that influence women's productivity have been identified in the previous section to include womens differential access to land, capital, credit, agricultural and household technologies, education and training as well as to rural labor markets. Programmers should try to indentify the nature and seriousness of the barriers to women's access to such productive resources and relieve them wherever possible. We have also noted the importance of identifying distortions in the incentive structures facing women not only for reasons of equity but also because they influence the kinds of activities women undertake and the levels of productivity they can attain. Such analyses provide focal points for project interventions.

Straightforeward economic analysis, when disaggregated by sex, often provides convincing efficiency arguments for removing institutional barriers to women's productivity, but in order to make efficiency arguments

Table 2

GENDER PROFILE OF ACCESS TO, AND CONTROL OVER, RESOURCES AND BENEFITS IN AGRICULTURAL SYSTEMS

	Sources of[1] Access		Degree of[2] Control	
	M	F	M	F
I. RESOURCES				
Land				
Technology				
Labor Production Reproduction				
Capital				
Education/Training				
Rural Labor Markets				
Entrepreneurial/Marketing Resources				
II. BENEFITS				
Outside Income				
Assets Ownership				
In-kind Goods Food, Clothing, Shelter				
Information/Knowledge				
Offspring - Reproduction of the Group				
Social Insurance Care in Disaster and Old Age				
Political Power/Prestige				
Other				

1. I=Inheritance U=Use Rights SP=Sale of Produce WL=Wage Labor GP=Government Programs HT=Household Transfers CI=Community Institutions CT=Community Transfers
2. H=High M=Medium L=Low N=None

it is necessary to have data. The first step is specification of theproductive activities women engage in within agricultural households. It is also necessary to understand the level of resources women command, and the incentives structures that influence their behavior. This understanding can then be applied to each ste in the project process. An outline of questions for addressing women's roles throughout the project cycle is included as Table 3.

Such a project cycle analysis requires a dynamic view of changes over time. Because projecting changes accurately with the present limited knowledge base is a chancy business, the analysis emphasizes the need for regular monitoring of project effects, and flexibility in project implementation. It also emphasized the need to evaluate projects in such a way that the lessons learned can be accumulated and that over time we increase our ability to design equitable and efficient agricultural projects.

Table 3

PROJECT CYCLE ANALYSIS: AGRICULTURE

I WOMEN'S DIMENSION IN PROJECT INDENTIFICATION

A. DEFINING GENERAL PROJECT OBJECTIVES

1. Are the project objectives explicitly related to women's economic and social roles?
2. Do these objectives adequately reflect women's needs?
3. Have women participated in setting those objectives?

B. ASSESSING WOMEN'S NEEDS and OPPORTUNITIES

1. What needs and opportunities exist for increasing women's productivity and/or production?
   a. In agriculture?
   b. In household production?
   c. In human capital production?
   d. In the informal sector?
   e. In wage labor?
2. What needs and opportunities exist for increasing women's access to and control over resources?
3. What needs and opportunities exist for increasing women's access to and control over benefits?
4. How do these needs and opportunities relate to the country's other general and sectoral development needs and opportunities?

5. Have women been directly consulted in identifying such needs and opportunities?

C. IDENTIFYING POSSIBLE NEGATIVE EFFECTS

1. Might the project reduce women's access to or control of resources and benefits?
2. Might it adversely affect women's situation in some other way?
3. What are the potential effects on women in the short run? the longer run?

II WOMEN'S DIMENSION IN PROJECT DESIGN

A. PROJECT IMPACT ON WOMEN'S ACTIVITIES

1. Which activities will the project effect in:
   a. agricultural production?
   b. household production?
   c. human capital production?
   d. informal sector production?
   e. wage labor production?
2. Is the planned component consistent with the current gender denomination for these activity?
3. If it plans to change women's performance of activities is this feasible, and what positive or negative effects would it have on women?
4. Where there are no planned changes in activities, is there a

missed opportunity for improving women's roles in the development process?

B. PROJECT IMPACT ON WOMEN'S ACCESS AND CONTROL

1. How will each of the project components affect women's access to and control over productive resources such as:
   a. land
   b. water (domestic and agricultural)
   c. capital
   d. credit
   e. agricultural technology
   f. household technology
   g. firewood and other fuels
   h. information
   i. rural wage markets
   j. resources in the informal sector
   k. their own labor
   l. the labor of others
2. How will each project component effect women's access to and control over benefits such as:
   a. wages
   b. revenue from sale of goods
   c. revenue from sale of services
   d. subsistance goods
   e. social insurance (care in sickness, old age, etc.)
3. How can project design be adjusted to increase positive effects and eliminate or reduce negative ones?

III WOMEN'S DIMENSION IN PROJECT IMPLEMENTATION

A. ORGANIZATIONAL STRUCTURES

1. Does the organizational form enhance women's access to resources?
2. Does the organization have adequate power to obtain resources needed by women from other organizations?
3. Does the organization have the institutional capability to support and protect women during the change process?

B. OPERATIONS AND LOGISTICS

1. Are the organization's delivery channels accessible to women in terms of personnel, location and timing?
2. Do control procedures exist to ensure dependable delivery of the goods and services?
3. Are there mechanisms to ensure that the project resources or benefits are not usurped by males?

C. FINANCES

1. Are funding levels adequate for proposed tasks?
2. Is preferential access to resources by males avoided?
3. Is it possible to trace funds for women from allocation to delivery with a fair degree of accuracy?
4. Do funding mechanisms exist to ensure program continuity?

D. PERSONNEL

1. Are project personnel sufficiently aware of women's productive activities and sympathetic toward women's needs for resources and benefits?

2. Do personnel have the skills necessary to provide the specific inputs required by women in the project area?
3. Are there appropriate opportunities for female participation in project management positions?

E. FLEXIBILITY

1. Does the project have a management information system which will allow it to detect the effects of the operation on women?
2. Does the organization have enough flexibility to adapt its structures and operations as changes occur and new information is processed?

IV WOMEN'S DIMENSIONS IN FORMATIVE AND SUMMATIVE EVALUATION

A. DATA REQUIREMENTS

1. Does the project's monitoring and evaluation system explicitly measure the project's on-going and end of project effects on women?
2. Are women involved in designating the data requirements?

B. DATA COLLECTION AND ANALYSIS

1. Are the data collected with sufficient frequency so that necessary adjustments could be made during the project?
2. Are the data fed back to project personnel and beneficiaries in an understandable form and on a timely basis to allow project adjustments?
3. Are women involved in the collection and interpretation of data?

4. Are data analyzed so as to provide guidance to the design of other projects?
5. Are key areas for further research on women's roles in agricultural systems identified?

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