

GENESYS

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***Gender and Agriculture and
Natural Resource Management
in Latin America and the Caribbean***
An Overview of the Literature

Prepared for the U.S. Agency
for International Development

Office of Women in Development
and Bureau for Latin America and the
Caribbean

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**GENDER AND AGRICULTURE &
NATURAL RESOURCE MANAGEMENT
IN LATIN AMERICA AND THE CARIBBEAN:
AN OVERVIEW OF THE LITERATURE**

The GENESYS Project

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GENESYS (Gender in Economic and Social Systems) is an A.I.D. funded project supporting A.I.D.'s efforts to integrate women into the national economies of developing countries around the world. The project provides assistance to A.I.D. staff worldwide in reviewing, initiating, or expanding gender considerations in development activities for sustainable economic and social development. Project components include technical assistance, training, policy research and evaluation, and information dissemination and communications. The sectoral foci are private enterprise, agriculture and rural development, democratization, and environment/natural resource management.

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EXECUTIVE SUMMARY

Extensive review of the literature and consultations with experts in the fields of agriculture and natural resource management (A&NRM) reveal a strong consensus that little is known relative to what, in operational development terms, still needs to be known about the respective roles, responsibilities, interactions, impacts, etc. of women and men in A&NRM across Latin American and the Caribbean (LAC). As development thinking on A&NRM progresses, the need to understand gender-differentiated roles, responsibilities, constraints, and opportunities becomes increasingly obvious. The present report represents an update of existing knowledge on the subject, based on an overview of development literature on gender published during the 1980s.

The first section summarizes some of the empirical findings and examples of women's (and to a lesser extent, men's) roles in A&NRM within LAC's three subregions: the Caribbean, Mexico and Central America, and South America. For each region, it provides a discussion of research gaps, suggesting areas where further work is needed to expand our knowledge base. Section II synthesizes and relates these findings and research gaps to four main areas of focus under the LAC Bureau's Agriculture and Natural Resource Management strategies: promotion of sustainable agriculture, prevention/reduction of deforestation, conservation of biodiversity, and water conservation and quality. It includes a discussion of the programmatic implications of the research gaps, briefly delineating the relevance of the research suggestions for the LAC Bureau's programs in A&NRM.

The third and final section highlights three general recommendations for research in gender and A&NRM along with several suggestions for specific activities that might be considered for support by the LAC Bureau. The recommendations include research on and collection of the following.

General

- data to clarify the causal link between gender-related variables and the adoption of new technology and practices;
- women's roles and responsibilities vis-à-vis the productive use and management of natural resources;
- how gender concerns have been integrated into A&NRM development projects, programs, and policies in the region;

Specific

- the linkages between gender, use of chemical versus natural pesticides, use of labor-intensive versus technology-intensive farming techniques, and environmental degradation;
- the effects of male migration on rural women's agricultural patterns (and subsequently on household nutritional levels and the environment);
- the gender composition of the work force in various stages of the agribusiness cycle;
- household needs and resources with respect to forest products, production levels, goals, decision making patterns, incentives and constraints, gathered via, e.g., rural household surveys;
- gender-based responsibilities for forest products, including incentives for and benefits of more productive and sustainable forestry practices; and
- information on who protects individual species, by gender, race and ethnicity.

**Gender and Agriculture &
Natural Resource Management
in Latin America and the Caribbean:
An Overview of the Literature**

I. INTRODUCTION

Extensive review of the literature and consultations with experts in the fields of agriculture and natural resource management (A&NRM) reveal a strong consensus that little is known relative to what, in operational development terms, still needs to be known about the respective roles, responsibilities, interactions, impacts, etc. of women and men in A&NRM across Latin American and the Caribbean (LAC).

Compared with other world regions, the empirical base for confirming a causal link between gender-related variables and the adoption of new technology and practices for use in A&NRM is weak (Ashby 1985), although evidence from Africa and Asia tends to support the findings that do exist for LAC. Further data to clarify this relationship would be extremely valuable for the effective development and dissemination of new A&NRM technology and information to both women and men producers and resource managers.

Relatedly, an especially glaring gap is the virtually complete absence of empirical research on women's roles and responsibilities vis-à-vis the productive use and management of natural resources in the LAC region (Schmink 1991). Many authorities agree that LAC has the least developed knowledge base on this issue -- an assessment supported by the extensive literature review conducted for this report.

Information on how gender concerns have been integrated into development projects, programs, and policies in the region is also scarce. LAC is usually under-represented in collections of case studies on this subject from around the world. Although there may indeed be a significant volume of unpublished "grey" literature on gender issues in A&NRM for LAC, until it is widely disseminated, most researchers and development practitioners cannot access it (Ashby 1985).

Outline of this report

As development thinking on A&NRM progresses, the need to understand gender-differentiated roles, responsibilities, constraints, and opportunities becomes increasingly obvious. The present report represents an update of existing knowledge on the subject, based on an overview of development literature on gender published during the 1980s.

The first section below summarizes some of the empirical findings and examples of women's (and to a lesser extent, men's) roles in A&NRM within LAC's three subregions: the Caribbean, Mexico and Central America, and South America. For each region, it provides a discussion of research gaps, suggesting areas where further work is needed to expand our knowledge base. Section II synthesizes and relates these findings and research gaps to four main areas of focus under the LAC Bureau's Agriculture and Natural Resource Management strategies:

- * Promotion of Sustainable Agriculture,
- * Prevention/Reduction of Deforestation,
- * Conservation of Biodiversity, and
- * Water Conservation and Quality.

Section II highlights the programmatic implications of the research gaps, briefly delineating the relevance of the research suggestions for the LAC Bureau's programs in A&NRM. The third and final section highlights three general recommendations for research in gender and A&NRM along with several suggestions for specific activities that might be considered for support by the LAC Bureau.

II. LAC WOMEN'S ROLES IN A&NRM: AN OVERVIEW OF THE LITERATURE

Throughout Latin America and the Caribbean, along with men, women clearly play critical roles in agriculture and natural resources management. For agriculture, there is some debate in the literature as to whether, overall, women's participation has been increasing or decreasing. Most experts agree that censuses and other national-level databases clearly undercount women in the agricultural labor force (albeit less so in the Caribbean). Hence, such sources may not be reliable for discerning trends (Dixon 1982). Ashby (1985) argues that a "feminization of farming" has taken place in LAC, with women carrying out more and more of the agricultural work. On the other hand, while acknowledging the problem of under counting, Bonilla (1990) cites data collected by the Inter-American Development Bank that show Latin American women leaving farming more rapidly than men. Because of the region's tremendous diversity, it is likely that opposite trends are occurring simultaneously in different parts of LAC, as examples below indicate.

Although women may work as wage laborers on large estates or depend mainly on forest gathering and/or small scale gardening, perhaps a majority of women directly involved in A&NRM are found in low-resource farming systems. Their level of participation depends largely on the physical and economic status of their farms. A general rule appears to be that, the poorer and more marginal the farm, the higher females' labor inputs (Blumberg 1981). In addition to their field work and domestic duties, women throughout LAC typically engage in A&NRM-based income-generating activities such as home gardening, aquaculture, brewing, baking, dairying, shearing and spinning, cloth or basket weaving. Many of these activities rely on the availability of basic natural resources such as water, wood, forage and other flora (Clarke 1987, Hoskins 1983).

The following sections illustrate the nature of women's and -- where comparative data are available -- men's participation in A&NRM within each of the LAC subregions. Information gaps and emerging patterns or principles in the literature that suggest important directions for future research on gender issues are signalled by bold lettering.

A. The Caribbean

1. Agriculture

Women's contribution to agriculture varies significantly across the Caribbean. According to UN statistics, the proportion of women in the agricultural labor force ranges from 10% in the Dominican Republic to nearly 40% in Barbados (United Nations 1991). The gender division of labor in Caribbean agriculture appears to be closely linked to the type of household and family arrangement: nuclear, multi-generational, visiting, common-law, or, especially, single-parent. The incidence of female-headed households in the Caribbean varies between 20% and 75%, with rates slightly higher in urban areas.

Regardless of household organization, however, rural women throughout the Caribbean are active in agriculture. For one thing, **a tradition of home gardening is almost universal**. Women are heavily involved in the production and sale of fruits, vegetables, and root crops. In Jamaica, for instance, women supply 80% of all fruits and vegetables on the national market, in addition to working 80% of the farmland as sole or joint managers (Bonilla 1990, Gill 1984). In most jointly headed households in the eastern Caribbean, women have primary responsibility for producing and processing vegetables, legumes, and root crops grown for home consumption and sale in local markets, while men have decision-making authority over cash cropping and stockraising (A.I.D. 1988).

However, everywhere in the Caribbean, **women also typically contribute large amounts of labor to the planting, weeding, harvesting, storage, and marketing of cash crops; yet decisions about the allocation of labor to these tasks are often made by the husband or other males** (Chase 1988). Men's primary agricultural work includes land preparation, planting, and pest control (e.g. A.I.D. 1989a). In female-headed households, a woman is usually the main farm manager, but she does not necessarily assume sole responsibility for all decisions. For example, among eastern Caribbean households where no husband is present, another male relative who resides elsewhere may make decisions concerning cash crop production on the household plot (Chase 1988). Older women may leave farm decision-making to their sons (Norton et al. n.d.).

Published information about women's roles in Caribbean agribusiness is scant. Buvinic and Lycette (1988) report on women hired to cultivate and pack flowers for export in the Dominican Republic. Researchers in Barbados found that, in contrast to jointly headed households, **female-headed farm households rely more heavily on root crops for subsistence, and on local rather than export sales of produce** (Norton et al. n.d.). Studies elsewhere in the Caribbean (e.g. St. Lucia's Mabouya Valley) support this conclusion.

Although both female- and male-headed farms often produce the same array of crops, women may grow larger proportions of vegetables, tubers, and other foodcrops with short growing cycles and/or relatively low labor requirements. This choice of crop mix appears to correlate with female farm-heads' greater reliance on family labor, which is not always regularly available. **Women lack sufficient capital to hire workers; thus many cannot cultivate all the land accessible to them.**

Often, **yields on women-headed farms are lower than on farms headed by men; researchers have attributed this to women's lack of capital, lower literacy levels, and poor access to extension services** (e.g. Chase 1988). In illustration of the last factor, an evaluation of the Caribbean Agricultural Extension Project (CAEP) found that only 15% of women in the St. Lucia project area had ever

received any information from an extension worker, and more than 50% cited relatives as their main source of technical advice (A.I.D. 1989a).

Although Caribbean women clearly play a critical role in agricultural production and farm management, **the majority of women farmers do not hold title to any land.** The case of Jamaica is illustrative; there, only 12% have title (Bonilla 1990). In Dominica as elsewhere in the Caribbean, women mainly access land via husbands or male relatives, and they often sharecrop land owned by men. **Lack of title prevents women from obtaining credit** with which to purchase inputs to increase farm output. For example, only 8% of CAEP loan recipients in St. Lucia were women, and they received less than 1% of the total amount disbursed (A.I.D. 1989a). In some areas, however, women have been able to borrow from NGOs and community development funds (Watson and Drayton 1990).

Apart from labor, land, and credit, women farmers have limited access to social networks and formal institutions that would provide them information about export risks and prices, market infrastructure, or agricultural policies. **Also, women are paid less for agricultural work than men, and female-headed households tend to have few other sources of supplementary income** (A.I.D. 1988).

2. Natural Resource Management

Outside of agriculture, very little is known of the nature and magnitude of Caribbean women's roles in natural resource management. It is apparent, however, that **both men and women rely on tree products for a wide variety of household and trade goods.** In St. Lucia, for instance, broom-making is one of the major occupations for women; they use a timber species that has been identified as "vulnerable" because of its rapid depletion (Watson and Drayton 1990). In Jamaica, women represent a third of the owners of small scale enterprises based on forest products (Fisseha 1985). In the Dominican sierra, women collect wood for fuel and also weave palm leaves into material for mats, bags, and light construction (Flora and Santos 1986). Both women and men in the eastern Caribbean cut wood for charcoal production; men also clear forests for banana production, while women collect forest materials for handicrafts.

The case from the Dominican sierra illustrates how **women's and men's uses of a resource can conflict if both are not considered in project planning.** Women in the area utilize palm fiber for handicrafts while men use palm wood for construction. Women also rely on trees for fuelwood to meet domestic needs and to bake cassava bread for sale. Depending on the species, location, and the parts and products sought from the tree, women and men have different access to and management responsibility for this resource. Women are the sole maintainers and users of trees located near the home. Men have primary control over trees in pastures and more distant areas; but women also harvest palm fronds from these trees. For palms growing on cropland, women and men typically divide the labor and responsibility. The former maintain the trees and harvest the fronds, while the latter cut the wood and retain actual control over this resource. The Plan Sierra, a regional integrated development project, emphasized planting non-palm species for watershed management and timber, but not for fuelwood or handicrafts. As a result, men began cutting greater numbers of palms for cash. Since women relied heavily on trees in fields, pastures, and woodlands, their handicraft income suffered as a result. As fuelwood became more and more scarce, many women were forced to abandon bread-baking as well, even though trees were being planted in large numbers under the Plan (Clarke 1987, Fortmann and Rocheleau 1989).

Examples of women's successful and unsuccessful collective action in resource management further illustrate the complex roles they play in this area. In response to severe soil erosion from deforestation, women in parts of Jamaica have endeavored to protect and improve forestry and watershed resources by cultivating Caribbean pines, and they have helped convince men of the value of reforestation (Clarke 1987). But elsewhere in the country, a project to promote women's gardens collapsed after four years. A similar effort in the Dominican Republic thrived, however, and resulted in over 5000 gardens. The main difference between the two cases was that, unlike in Jamaica, established women's groups in the DR were able to negotiate for what they needed, and their plans were promoted by the local government as a means of soil and water conservation (Baxter 1985).

3. Changes and Trends

In some Caribbean countries, the proportion of women in the agricultural labor force has declined significantly over the past two decades, while in others it has remained fairly stable. **Male migration, which has steadily accelerated in recent decades, has had major impacts on agriculture and on women's participation and roles in farming.** In Haiti, for example, an estimated 70% of all adult males migrate seasonally or permanently from rural areas (Nash 1983). However, Haitian women's involvement in agriculture has been declining as well -- from about 80% of the female labor force in 1950 to 60% in 1980 (Bonilla 1990). At the same time, Haitian women's employment in industry and services expanded. This implies female migration to urban areas, which in turn may have been accelerated by male migration. In contrast to Haiti, when males migrate in the Dominican Republic, females (and children) stay behind to do the farming. The result has been changing land use patterns in the DR, as women have shifted from cropping to the less labor-intensive option of stockraising (Tavares 1983).

As agriculture has become more commercialized, significant changes in nutritional status have occurred among some populations. Whereas traditional food production systems in the eastern Caribbean maintained a variety of staple and non-staple food crops, cash cropping has changed consumption patterns and led to poorer nutrition among farm families. Household productivity and income have improved at the expense of members' health. This pattern is reportedly spreading as more households are integrated into national and international markets (Chase 1988).

4. Research Issues

Women's roles in agriculture, their major constraints in general, and the dominant trends are fairly well understood in much of the Caribbean. In order to translate this information into practical interventions, further research into the specific mix of factors in project successes or failures is needed. For instance, to improve women's farm productivity and income, an important question to answer is: **What constellation of constraints prevents women from obtaining access to, e.g., credit, extension services, and information about export markets, prices, and risks?** In the case of credit, lack of land title might be the overriding problem; or, it may be only one of several obstacles. **In countries where rural poverty, male migration, and population pressure on land and other natural resources is great, research into non-A&NRM income-earning opportunities for rural women is indicated.** Of course, such opportunities must offer better returns than other available options. Otherwise women, like men, will simply migrate out of farming areas. Research on the kinds of jobs and benefits that women currently receive on plantations or in cities (or of the expectations upon which they base migration decisions) would be useful for assessing possible income alternatives and their attractiveness to women. In some cases, removal of a simple constraint such

as child care may allow women to take advantage of already-existing opportunities. In others, new jobs may have to be created. In selecting employment opportunities to promote for women, developers should **first investigate sectors and locales that already offer the most promising jobs, opportunities, and conditions within the context of national development priorities.**

While the effects of gender-specific constraints and male migration on land-use patterns have been fairly well documented for many parts of the Caribbean, their impacts on the quality of the natural resource base have not been explored. Because female-headed households are typically among the poorest rural families, they may be forced to cultivate marginal lands. But this correlation has not been confirmed for the Caribbean. If it indeed holds, then women must be targeted for programs that convert such lands to more sustainable uses.

If poor land quality does not prove an important factor in women's lower productivity, then a **systematic comparison of the environmental impacts of male and female farming patterns should be undertaken.** If women lack access to agrochemicals, it is likely that their plots contribute little to agricultural pollution, such as hazardous run-off of toxins and wastes into local water systems. Because women farmers seldom reap the high (but short term) productivity gains of chemical and mechanical inputs, they might be more inclined than men to participate in low- and/or no-input farming alternatives such as IPM (integrated pest management) that promote environmentally sound and sustainable production while also improving long term productivity. Particularly where agricultural inputs are subsidized (and in conjunction with policy reforms), **female-headed farms might provide an especially visible and ready context in which to test and demonstrate the benefits of alternative, environmentally sound agricultural technology.**

Just as the environmental consequences of women's and men's land use patterns may differ, so may nutritional consequences -- as the effects of agricultural commercialization in the eastern Caribbean suggest. If women farmers grow a smaller proportion of cash crops, household nutrition may be better even though income is lower. Where cash-cropping is a major pursuit and nutrition is poor, women's home gardens may potentially provide dietary supplements to purchased foods. Although these issues do not directly relate to household productivity, they should be addressed as one of the four key parts of agriculture -- production, transformation (i.e. processing), distribution (marketing and other forms of exchange), and, here, consumption.

Since Caribbean women and men rely heavily on forest products for income, **research on how to support and maintain the long term viability of forest production for both genders is essential.** Careful study of various alternatives and product mixes that will reduce deforestation should be conducted. For example, how to reduce the negative impacts of burgeoning demand for fuelwood or charcoal on forests -- and thus also declines in women's income from collection of tree products - - while yet satisfying men's need for income from forests? In certain contexts, a combination of approaches might prove most appropriate and cost-effective: reforestation plus improved fuel utilization efficiency and/or partial switching to other fuels, along with carefully controlled cutting of forests. In another context, however, only one or two of these options may suffice to meet the needs of both women and men.

B. Mexico and Central America

1. Agriculture

According to UN statistics, women's participation in agriculture is extremely low in this region, ranging from 2% of the agricultural labor force in Guatemala to 22% in El Salvador (United Nations 1991). For most of Central America, however, field studies suggest much higher figures. Although women's involvement in agriculture may not be so great as in the Caribbean, flaws in the definition and measurement of women's agricultural work create highly misleading statistics.

Gender divisions in agricultural tasks vary somewhat across the region. In Honduras, 50% of all rural women plant of both food and cash crops; more than 33% apply fertilizers and do harvesting; and over 20% do weeding (White et al. 1986). Mexican women generally participate in these same tasks; but they also are active in soil preparation and conservation, as well as in stockraising for production of both domestic and market goods such as organic fertilizer, wool, and weavings (Perezgrovas in progress, Schmink 1984). In contrast, Mayan women of Belize rarely work in the fields, although they traditionally carry out all preparation, storage, and distribution of foodcrops (Nash 1983). In some highland communities of Guatemala, women have primary responsibility for post-harvest processing and the care of smallstock, although they also assist their husbands in planting and harvesting. However, single, divorced, or widowed women in these communities carry out all farm tasks themselves, including land preparation, which normally is performed by men (Engle 1982). Throughout the region, women cultivate home gardens for household consumption. **Their garden products may contribute a significant portion of household income** (Gliesman 1990).

Women represent a large share of the paid work force on plantations and in agro-processing facilities. In Costa Rica (Buvinić and Mehra 1990) and Mexico (Arizpe and Aranda 1986), for example, export fruit companies rely almost exclusively on female labor for harvesting, processing, and packing. In Honduras, women supply 90% and 40% of the wage labor for coffee and tobacco production, respectively (White et al. 1986); yet **women's wages are typically 70% of men's, even though they perform the same tasks** (Buvinić and Lycette 1988).

Despite wage and other inequities, the importance to the household of female members' work and income can be great. A survey conducted in rural Guatemala is instructive. There, 66% of the women interviewed contributed up to 50% of their household's needs in both cash and kind, while another 13% were the sole supporters of their families; agriculture was the main source of income for all but 20% (Johnson and Castillo 1990).

2. Natural Resource Management

Again, as in the Caribbean, Central American women rely on a variety of natural resources to produce products for sale and home consumption. **In most of the region, women are responsible for fuelwood, fodder, and water collection.** In a few places, they also run enterprises based on forest products. In Honduras, for example, women own 10% of all such enterprises (Fisseha 1985). In the Maya Biosphere region of Guatemala, women collect, process, and sell a number of tree products, which they may sell on contract to local traders. Consequently, women maintain knowledge of the varieties and properties of a number of tree species (Schmink 1990). Likewise for these and other species that women grow in their gardens. In parts of Costa Rica, for example, women raise 60 to 70 plant species in their gardens, including foodcrops, trees, herbaceous and ornamental plants. Many

of these serve multiple purposes as food, fuel, medicine, raw materials for handicrafts, etc. (Gliessman 1990). **Women's home gardens may well be a store of local biodiversity.**

3. Changes and Trends

As in the Caribbean, in many parts of Central America, agricultural commercialization appears to have adversely affected farming communities and especially farm women. In Guatemala, for example, when small farms shifted to growing profitable vegetable crops for export, women's participation in unpaid field work increased dramatically. Added time for agricultural work was robbed from other income-earning activities. As a result, **women have lost much of their economic independence**, since income from the new vegetable enterprises was generally controlled by men (ICRW 1987, von Braun 1989). In Belize, as sugarcane production was commercialized in the 1970s, production of foodcrops and smallstock declined and families had to rely increasingly on purchased food. Cash from sugarcane, which was in the hands of men, was usually inadequate to meet family needs. And as women lost control of food distribution, they became completely dependent on men (Nash 1983, Waring 1988).

However, **women have become involved in non-traditional and/or expanded areas of natural resource management as they find new ways to meet agroeconomic needs.** For example, a project in El Salvador helped women to expand their home gardens and to plant soybeans as a means of supplementing the family diet while also conserving and restoring soil and soil fertility (Solis and Trejos 1990). Members of a women's weaving cooperative in the Guatemalan highlands expanded into aquaculture once they learned a few simple techniques. This provided them a stable source of protein for their families and income for the entire community (Engle 1982). In addition to vegetable and livestock projects, the Pinabetal Women's Organization in Mexico carries out water management and soil conservation activities (Dankeiman and Davidson 1988). Both formal and informal women's groups have started soil-and-water conservation and reforestation initiatives in El Salvador and Honduras (Hoskins 1983). In one Honduran project, women overcame men's skepticism about terracing and reforestation, and were able to secure the necessary land from the men. The women succeeded not only with their terraces and trees, but were also able to grow and market several vegetable crops. More as-yet-undocumented cases like the foregoing appear to exist in other countries as well.

4. Research Issues

Few studies of gender roles in A&NRM in Central America treat issues of women's decision-making, access, and control over key productive resources. Most studies of gender roles in this region have primarily addressed the gender division of labor -- typically in a very static or descriptive way. As a "bottom line" in development action, labor needs to be examined from other perspectives, as well. For example, if it is discovered that heavy domestic demands prevent women from taking advantage of existing income-earning opportunities, then simple labor-saving devices may be the most appropriate means of meeting women's needs. Conversely, it may be that case that women's free time is abundant but that income-generating opportunities are lacking.

In areas where male migration is common (e.g. the Mexican border area), the consequences must be analyzed not only for issues of women's labor but also for women's access to and use of land and for family well-being. In a number of countries where long term and/or permanent migration is widespread (e.g. El Salvador, Guatemala), research has yet to spell out the most frequent migration

patterns and their respective impacts on women and men. In many areas, the number of female-headed households is undoubtedly increasing. Again, research is needed on the context-specific constellation of constraints that such households face in labor, assets, extension services, suitable off-farm jobs, or still other, unknown factors that impinge upon their agriculture and natural resource management.

Land is of course another critical variable. Wherever landlessness is increasing, it is important to know whether women head a disproportionately large number of landless households. Other questions still requiring empirical answers are: Do landless families typically move farming to marginal lands? Or do they migrate to cities? The answers have development implications for all programs aimed at enhancing agricultural production, alleviating poverty, or ensuring the productive yet sustainable use of natural resources.

A review of the literature on the effects of agricultural commercialization highlights women's loss of income and autonomy, and in some cases a decline in overall family well-being. However, this may not be the only scenario. If counter examples exist, they should be analyzed to reveal why commercialization is more advantageous in some settings than others.

The environmental impacts of the "technification" and commercialization of agricultural products and natural resources must also be considered vis-à-vis women's roles in A&NRM, because women are increasingly the ones left behind on the farm or in the forests. For example, where traditional water supplies have become contaminated with pesticide run-off, women have been forced to devote more time to water collection (Paolisso and Yudelman 1991). With shifts from diversified systems of production to monocropping for cash, women's diversified forest and garden strategies may be curtailed, with negative impacts for women's, families', and the environment's long term well-being.

Throughout rural Central America -- but especially in areas like the Guatemalan highlands and the coastal mangrove forests -- the effects of rampant deforestation on women's income and time use need to be carefully assessed. Many NGOs and other local organizations have successfully mobilized women to participate in forestry and watershed management projects. Analyzing the elements behind their success is crucial if such efforts are to be replicated and expanded to a point where they can really make a difference in halting the region's environmental degradation. In some instances, women have been motivated by the prospect of spending less time on fuelwood and water collection; in others, environmental and income-generation activities have been coupled. Research should identify what conditions determine the type of incentives that best motivate women's (and men's) effective participation in productive natural resource management.

C. South America

1. Agriculture

For most South American countries, UN statistics report levels of 20% or less for female participation in the agricultural labor force, e.g.: Colombia 17%; Peru 15%; Chile, Ecuador, and Uruguay 7%; Paraguay 5%; Venezuela 4%. The notable exception is French Guiana, with a reported share of 35% (United Nations 1991). However, field research indicates that in most of rural South America, women's contribution to agriculture is much higher -- on the order of 30% to 40% (Blumberg 1981). For certain ecozones and/or ethnic groups, this figure is probably even greater. The three main

subregions for which a significant body of information exists on gender roles in agriculture are the Andes, the western coast, and the Amazon. There are also some data on the involvement of women in largescale agribusiness.

With regard to rural women's work in agriculture, variability seems to be the norm across the continent. On small farms in the Andes, women carry out seed selection, planting, weeding, processing, and marketing of plant crops. They typically also play a large or even major role in the feeding, grazing, milking, shearing, and health care of livestock and in the processing and marketing of animal products (A.I.D. 1982; Bonilla 1990; Fernández 1988). Agriculture on South America's western coast appears to rely far less on female labor, and women's productive activities are much more restricted in these areas. They have little or no responsibility in farm production, which tends to be highly commercialized (e.g. Phillips 1987) and often run as a cooperative along male lines. In the Amazon, where forest extraction and colonist agriculture are viewed as exclusively male activities, women often process, store, and market commodities such as rubber or pepper, even though men control their production. Other food staples (e.g. manioc) or cash crops and forest products (e.g. brazil nuts, *babassu*, *acai*) rely heavily on the labor of women and children, who are generally tasked with their processing. In some cases, women may contribute substantially to decisions concerning productive activities that are carried out by men.

Wherever males engage in seasonal migration, women manage all farm operations for at least part of the year. In the Cotopaxi area of the Ecuadorian Andes, for example, women manage about 80% of the farms (Phillips 1987). This pattern has been well studied for traditional communities in Colombia (Leon de Leal and Deere 1979), the Bolivian and Peruvian Andes (e.g. Harman 1984), and northeast Brazil (e.g. Blumberg 1981, Paulson 1991). In newly colonized areas of Amazonia, too, longterm male migration is common. Consequently, women form a large portion of household heads. Little is known about the resulting effects on land use and family well-being in this zone, however (Schmink et al. 1991).

In many areas from which male migration is high, women are forced into low-paying, insecure seasonal employment on plantations. On Brazilian coffee plantations, for example, women represent 80% to 90% of the seasonal labor force, working at piece rates with no social security or other benefits (Nash 1983). Women provide most of the labor for harvesting, processing, and packing fruit in Chile and for flower cultivation and packing in Colombia and Ecuador (Buvinić and Lycette 1988). The number of rural women who are permanent laborers in agribusiness is relatively small, though it has been increasing in recent years.

Ecuador illustrates constraints common to women in agriculture throughout the continent. The literature shows that Ecuadorian women are all but ignored by official extension and technology transfer efforts, despite women's high participation in agriculture (Bonilla 1990). Throughout the country, female agricultural laborers earn about half the wages of their male counterparts (Phillips 1987).

2. Natural Resource Management

Very little is known about how women contribute to natural resources management outside of agriculture. However, women are usually the main collectors of water, wood, forage, and other plants for domestic use. Women's knowledge and use of forest resources varies depending on factors such

as age, social status, regional economic system, type and extent of forest resources, and the retention of traditional forestry knowledge and practices.

However, there is evidence that South American women's gardening and stockraising contributes to maintenance of biodiversity. In the Peruvian highlands, rural women almost universally maintain kitchen gardens in which they raise special herbs, try out new crops, and maintain ancient ones. On the Ucayali River in the Amazon, women collect and cultivate herbs for food and medicine on "raft gardens"; routinely washed away by floods, the rafts redistribute species along the length of the river (Padoch and Pinedo-Vasquez 1991). Genetic biodiversity is also maintained in the flocks of rustic sheep and native camelids that women care for, due to cultural values placed on special coat colors, horn shapes, and unique body conformations.

3. Changes and Trends

Historically, much of South American agriculture falls into a *latifundia/minifundia* pattern, in which the majority of the farm population lives at a subsistence level, with half of the rural poor cultivating small *minifundia* plots while the other half works as wage laborers for large *latifundia* plantations or ranches. Along with other factors, the increasing commercialization of agriculture in recent decades has led to the breakdown of traditional arrangements that afforded the poor some stable access to the means of production, with women often suffering the worst consequences. Certainly, women have been disproportionately displaced from permanent employment on large estates (Blumberg 1981). An example is Chile's Central Valley, where nearly all permanent female workers had been eliminated by 1965 (Garrett 1976). Women are frequently left with no role in the rural economy. In such situations, they seek out marginal employment in urban areas. In fact, the rural-to-urban migration stream in South America is predominantly female.

At the same time, the number of women working as unpaid family laborers on *minifundias* has increased in both relative and absolute terms. Meanwhile, the average *minifundia* has become smaller and poorer. In many areas, family farms are now too small even to meet subsistence requirements. Thus, men are required to migrate to large estates and plantations. Women who remain in the countryside are forced into jobs with the least security and lowest returns, such as seasonal employment on coffee plantations (Blumberg 1981).

The net effect of these changes on the percentage of women engaged in agriculture appears to vary across time and space. For Peru, Scott (n.d.) has convincingly argued that the steep drop in women's agricultural participation evidenced between the 1940 and 1972 censuses may well be real and not due to faulty census definitions. In coastal Peru, women have been forced out of agriculture as mechanization proceeded. In the Andes, they have been steadily forced out of cottage industries that complemented their farming, and indeed, out of the sierra, as minifundist agriculture disintegrated. Census data in fact show high outmigration for both women and men from highland areas formerly typified by subsistence farming and cottage industry (Chaney and Lewis 1985). In contrast, Brazilian women's participation in agriculture more than doubled between 1970 and 1980, mainly due to their greater involvement in seasonal work. During the same period, men's participation increased by only 5% (Baxter 1985). However, the total percentage of workers in agriculture versus other sectors decreased for both men and women in every South American country except Bolivia.

The proportion of female-headed households is increasing throughout much of rural South America, particularly as males who migrate seasonally fail to return. In some of these regions, women were always involved in the majority of farming tasks; but in others, the division of labor was quite

rigid. For example, women in the Peruvian Andes traditionally carried out hoeing, sowing, weeding, seed selection, crop processing, and herding. Men were responsible for irrigation and plowing; in many communities, women did not touch the plow because of cultural taboos (Bourque and Warren 1981). Whether such distinctions have weakened in the face of widespread male migration has not been clearly documented.

With regard to changes and trends in natural resource management, reportedly, women want to be more involved in forestry projects, and to participate in the same activities as men (Paolisso and Yudelman 1991). Yet rarely do forestry projects include women in their planning or implementation. A few community water projects have begun to do so, however.

The case of Maranhao state in Brazil illustrates how policy changes can impact poor families' and, in particular, women's access to natural resources. There, the *babassu* palm provides poor women with raw material for handicrafts, animal feed, and other goods for domestic use and sale. Extracting and processing *babassu* kernels is an important source of income in the area, and women are the vast majority of workers (Hecht et al. 1988). Also, charcoal made from the husks of the palm fruit serves as households' main source of fuel. Thus deforestation has been traditionally held in check (Anderson and Anderson 1983). With policy changes favoring cattle ranching, rice cultivation, and the privatization of *babassu* forests, however, **poor families and women have lost access to traditional forest resources such as *babassu*.** Furthermore, as kernel processing has been mechanized, women's income from this activity has decreased. A local NGO is helping women learn about Brazil's conservation policies laws and how to lobby the government to protect their traditional access to forests (Paolisso and Yudelman 1991).

4. Research Issues

Apart from filling gaps in our knowledge for particular subregions, there is an urgent need for clearer understanding of gender roles where female participation is already known to be high in A&NRM. In this respect, Schmink's (Schmink et al. 1991) observations for Amazonia fit the rest of the continent as well: **there are almost no published studies that document women's agricultural activities, labor costs, contributions to family welfare, and how these and other aspects of women's roles are being affected by development changes.**

This gap is especially worrisome in that two areas in which women of many parts of South America have traditionally been active -- post-harvest processing and marketing -- are current development targets for diversifying production from agriculture and forest extraction, to make for more sustainable systems of resource use and income. **Without more detailed and empirical knowledge of gender parameters, development interventions could unwittingly deprive women and children of vital sources of income and employment, and families of key elements of their diet.**

Also poorly documented for South America are the income-generating constraints and alternatives for female-headed farm households, the effects of male migration, and the factors behind female migration. These last two gaps are especially pertinent for efforts to slow urbanization. In areas where women take on seasonal wage work, research should explore potential alternatives that meet women's needs and offer greater security and benefits. Evidence suggests that, in some subregions and/or among certain socioeconomic or ethnic groups, women's agricultural work is limited. In such settings, time-use studies may reveal opportunities for other income-earning activities. As before, the mix of constraints preventing women for taking these opportunities should be identified, as should other, underlying reasons for their restricted roles in the rural economy.

III. GENDER ISSUES IN A&NRM PROGRAM AREAS

A. Promotion of Sustainable Agriculture

If sustainable agricultural practices are to be introduced successfully throughout LAC, then **the relative roles of women and men at every stage of production, transformation, distribution, and consumption of crop and livestock products must be understood.** If, for example, land preparation techniques are targeted for improvement in a culture where men have exclusive charge of this task, then men should be the primary targets for incentives and extension services aimed at modifying current techniques. However, if the new techniques in turn affect traditional methods of planting, weeding, harvesting, etc. carried out by women, then women will obviously also need to be included in the design and delivery of incentives and information about the new process.

For the Caribbean subregion, at least, it is well documented that female-headed farm households generally do not rely on chemical inputs due to lack of access to credit, in contrast to those headed by men. Such differences may have implications for the testing and dissemination of technologies and practices in sustainable agriculture. Women farmers who cannot afford to buy large amounts of agrochemicals may be more inclined to experiment with low- or no-input alternatives that promise to raise productivity. As such, **female-headed farms may be a good choice for testing out and demonstrating the value of sustainable agricultural methods generally.**

In addition to variation in agricultural practices, there may also be variability in the quality of land to which female- and male-headed farm households have access. Poorer households are typically forced to farm marginal and/or hillside lands that cannot sustain repeated cropping and/or are especially prone to erosion. For some parts of LAC, there is strong reason to suspect that women may head a large portion of such households. Coupled with women's added difficulties in acquiring land titles and credit, manpower shortages may make it especially difficult for female-headed households to adopt longterm and labor-intensive agricultural conservation techniques. **Research to promote more sustainable agriculture must address such gender-based inequities in access to the primary factors of production.**

Where livestock play an important role in the economy, uncontrolled grazing is a common cause of deforestation and erosion. In some parts of LAC (notably South America), women are often the main caretakers of livestock, and especially smallstock. As a result of the loss of household labor through male migration, in many places rural women have been led to shift out of cropping into increased stockraising, which is much less labor-intensive. **In all cases where women are the actual herd or flock managers, livestock development efforts should be especially targeted to them.**

With regard to largescale and/or export agriculture, **analysis of the gender composition of the work force in various stages of the agribusiness cycle is needed.** An overarching question is how to reach different socioeconomic and gender groups of workers with training and technical assistance in sustainable methods of crop and livestock raising, given differences in stakeholderhood in the agricultural enterprise, in literacy levels, in work time and skills, etc.

B. Prevention/Reduction of Deforestation

Driven by forces such as untrammelled population growth, poverty, and landlessness or insecure land tenure, the encroachment of agriculture is a major cause of deforestation (and with it, often soil erosion) in many areas. Part of the solution to this problem lies in programs that offer farm households alternatives to forest encroachment. To create such programs, **prior research and analysis of household needs and resources, production levels, goals, decision-making, incentives, and constraints by gender is key.** As documented throughout this paper, gender typically makes for different demands on women's and men's time, access to and use of resources and information, and so forth. Programs aimed at developing alternative sources of food or income will have to consider not only how the household production system as a whole operates, but also how gender-based subsystems within it differ and how both women's and men's objectives can be met through proposed alternatives. Many landless rural households in LAC are *de facto* headed by women. Members of such households likely have still other sets of constraints and objectives from those where an adult male is present. Thus, programs to reduce deforestation will have to address those distinct conditions, too.

In other settings, forests are cut for income from, e.g., sale of lumber, fuelwood, or charcoal. At the same time, they may be harvested for other cash-generating goods that may represent a more sustainable use of trees. **Since different gender groups usually draw income from different forest activities, incentives for more productive and sustainable forestry practices must be tailored accordingly.** For example, particularly in the Amazon, extractive reserves are receiving considerable donor attention as one alternative to the unsustainable cutting of forests. Such projects often aim to expand collection or semi-domestication and sale of products that local populations traditionally gathered for sale and/or consumption on a smaller scale. For such initiatives to be successful, research on gendered responsibilities for forest products will be important. Whether it is women or men who mainly do the gathering and the processing, project design must ensure that incentives and benefits -- such as control over income from the sale of final products -- are directed to, and reach, the appropriate groups according to their respective input of labor, ecological knowledge, marketing efforts and savvy, etc.

C. Conservation of Biodiversity

Within the development community, emphasis has been appropriately placed on the need for conservation of biodiversity *in situ*, i.e., maintenance of species in their natural habitats, where they thus continue to adapt to changing conditions. This contrasts with *ex situ* conservation in gene banks, where the germplasm is evolutionarily frozen. Evidence from various parts of LAC reveals that women play a crucial role in maintaining biodiversity in a wide variety of plant species, either in home gardens or via their work in seed selection and storage for foodcrops. In South America, indigenous groups have been the primary protectors of biodiversity in livestock germplasm, whether among the native camelids and guinea pigs or in non-native small ruminants such as sheep. As noted in preceding sections, women are often the primary caretakers of these species. **For programs of *in situ* conservation, research should first establish what species different gender groups are already protecting, in what ways and to what extent, in order to determine how best to support their continued maintenance.**

D. Water Conservation and Quality

Perhaps the most basic gender issue for initiatives in water conservation initiatives is to **determine who has the responsibility and thus the incentive for ensuring that adequate quality and quantities of clean water are readily available.** Throughout much of LAC, women are in charge of water collection. Where immediate sources of potable water have been contaminated or depleted, women spend extra time traveling to more distant sources. If men experience no such direct and immediate impacts from problems of water quality and quantity, they have little stake in preventing or mitigating them by participating in conservation schemes.

IV. SUMMARY OF RESEARCH PRIORITIES

The research priorities identified and discussed in section II and III are highlighted here for easy access. The reader is referred to the main text for details of the rationale supporting these recommendations and why they are important in the context of the LAC Bureau's development strategies for agriculture and natural resource management.

General Recommendations

- * Data to clarify the causal link between gender-related variables and the adoption of new technology and practices for use in A&NRM would be extremely valuable for the effective development and dissemination of new A&NRM technology and information to both women and men producers and resource managers.
- * Given the paucity of information specific to the LAC region on women's roles and responsibilities vis-à-vis the productive use and management of natural resources, there is a critical need to support empirical research on this topic.
- * Information on how gender concerns have been integrated into development projects, programs, and policies in the region should be drawn together, published, and made readily available to the development community at large.

Specific Recommendations

- * Evidence from the Caribbean region indicates that female-headed households generally do not rely on chemical inputs in agriculture. Future research addressing the linkages between gender, use of chemical versus natural pesticides, use of labor-intensive versus technology-intensive farming techniques, and environmental degradation should be promoted both in the Caribbean *and in other parts of the LAC region* in order to clarify these relationships. Relatedly, female-headed farms may be a good choice for testing out and demonstrating the value of sustainable agricultural methods in general.
- * The effects of male migration on rural women's agricultural patterns (and subsequently on household nutritional levels and the environment) need to be explored. Preliminary evidence indicates that as men migrate out of rural areas, women shift out of cropping and into increased stockraising. Training and extension programs may need to be adjusted appropriately pending findings that document this trend in any given country or region.
- * In light of A.I.D.'s strong emphasis on export oriented agriculture, analysis of the gender composition of the work force in various stages of the agribusiness cycle is needed. This information will assist A.I.D. in targeting training and technical assistance in sustainable agriculture to the different socioeconomic and gender groups of workers, whose literacy levels and work patterns, for instance, vary.

- * **Programs aimed at reducing deforestation by developing alternative sources of food or income for rural households require information on household needs and resources with respect to forest products, production levels, goals, decision making patterns, incentives and constraints. This information should be collected and analyzed by gender, via rural household surveys for example, and researchers should pay special attention to differences in households headed (*de facto* or otherwise) by women.**
- * **Research is needed on gender-based responsibilities for forest products, in order to facilitate programs to increase income from extractive resources. Since men and women usually draw income from different forest activities, the incentives and benefits of more productive and sustainable forestry practices differ by gender as well. Yet we know very little about these differences in many countries in LAC.**
- * **The conservation of biodiversity will depend in part on knowing who protects individual species, by gender, race and ethnicity. In order to identify the parameters of assistance in biodiversity programs, research should establish what species different gender groups are already protecting, in what ways and to what extent, in order to determine how best to support their continued maintenance.**

Appendix A: *Bibliography*

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