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HOUSEHOLD FOOD SECURITY AND THE ROLE OF WOMEN IN AFRICA

Rosemary A. McCarney*

I. Household Food and Security and the Role of Women: Introduction and Overview

One quarter of Africa's population (more than 100 million people) do not consume enough food to allow for an active, working life. More than one-half of Africa's "food insecure" live in seven countries — Ethiopia, Nigeria, Zaire, Tanzania, Kenya, Uganda and Mozambique (World Bank, 1988).

"Food security" comprises two main requirements: (1) assuring the availability of food; and (2) assuring the ability of households to acquire food through income.

Most African countries are primarily agrarian. However, with respect to food security, Africa suffers both a production gap and a revenue gap. There is neither enough food being produced nor enough revenue to purchase the food surplus existing in world markets, so there are implications for both consumer credit and production/enterprise credit.

Why focus on women when the issue is food security? Women in Africa are integral participants to the success of the agriculture sector. We know that African women:

- provide 60-90% of subsistence agricultural labour;
- dominate food production with labour contributions of 50-85% of total agricultural labour;
- engage in a high percentage of cash crop labour, thereby generating household income for food purchases;
- have substantial decision-making power concerning timing, location of crops, use of inputs and intensity of crop management;

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-provide 90% of the labour for collecting household water and fuel, 80% of the work in food storage and transport from farm to village, 90% of the work in hoeing and weeding and 60% of the work in hawking and marketing.

Ironically, it is often these food *producers* who go hungry. While women are responsible for growing the vast majority of the food crops in developing countries, when available credit and technology and financial training are given they are given first to men and often only to men, who own almost all of the land and grow most of the cash crops. Women are left to grow food for the children and family on the poorest land, with the poorest tools, the poorest knowledge and no access to credit or training with which to improve their skills or the soil they are farming.

Public policy interventions to date have focused on food *self-sufficiency*. Many of the same countries with large food-insecure populations have achieved aggregate food security. China is an example, as is India. True food security, however, is achieved only if, at the household level, individuals can acquire this food *by buying it or producing it*.

Excessive emphasis on national food self-sufficiency has often undermined per capita income growth and food security, and in turn food self-sufficiency itself. Increasingly, the concept of food security is being recognized to be better conceived at the household level. Policy objectives appear to be more appropriately directed at the ability of each household to produce and/or purchase an adequate amount of food to meet its biological needs.

Women's role in agriculture is highly variable. While they dominate food production, the form of that involvement is a factor of many interacting variables that have a differential impact on men and women: historical and sociocultural variables; national and international policy and economic processes; imitation and role models. These variables are dynamic and in the context of modern Africa, many traditional assumptions and practices are changing as agriculture becomes increasingly mechanized and modernized, wage employment grows in rural areas, rural outmigration, particularly by men, continues and population pressure on traditional lands affects negatively both the quantity and quality of the land available for food crops.

As a result, any intervention to promote and enhance the role of women in food production must be multi-disciplinary and examine the entire public policy framework as it affects the rights and obligations of women in all of their activities. Simply focusing on the extension of technology or inputs is not enough without understanding and tackling the public policy framework as a whole.

II. Household Food Security and the Role of Women: Nutrition and Income Considerations

Women's critical role in ensuring household food security begins with their own situation of being in poor health, undernourished and often pregnant, which in turn affects their production efficiency and their ability to nourish the family. Efforts to improve household food security must begin with the state and condition of this key factor of production and examine her own consumption habits.

Systematic data and analyses on women's diet and nutritional status is rare. Gender desegregated data is almost non-existent in most countries. Without data for planning, anecdotal evidence is all that is available. Women's food security is a larger development issue since their strength and efficiency in market, household and child care activities are instrumental in ensuring household food security.

A mere production-oriented approach to food availability will not solve the problem nor will a single sector approach. Food security policies must be aimed not only at increasing the productivity of land and labour through high yielding crops but also at encouraging self sufficiency and nutritional food intake at the community level. The problem of nutrition is multi-faceted and can be traced to economic factors such as poverty, unemployment, high food prices, inflation, sociocultural and environmental factors, low literacy, macro-economic policies in the capital city, etc.

Coordination is necessary to ensure that productive activities aimed at raising the availability of food, at the same time facilitate a fair distribution to ensure equitable accessibility to food consumption at the household level.

In rural Africa, formal wage employment, non-food crops and improved livestock are innovations of the 20th century. Economic disequilibrium prevails in most countries because rates of return differ systematically between rural and urban activities. Food production rests at the bottom of this economic hierarchy. Formal sector wage employment and new technical agricultural investments are at the top. Women are almost exclusively represented at the bottom. On a purely economic rationale, as returns to non-food activities rise, constraining women's labour and land to food production is really a misallocation of this factor of production. The implications for household food security are serious if purely economic rationales are pursued.

As market incentives increase, women working at home often diversify their agricultural and non-agricultural output and market an increasing share of both food and non-food crops. However, the same set of prices

on agricultural products may affect producer incentives for men and women differently. Women need what producers in general need but factor and product markets may impact differently or work more imperfectly for women because culture and the effects of child bearing limit their access. For example, social expectations and norms may keep them in traditional endeavours, therefore women's greater responsibilities for household and children may encourage more home-based work to accommodate split responsibilities. A rise in prices for a particular product under structural adjustment may be an appropriate incentive but women may not respond for other reasons. Both men and women may control the income from different products, therefore women may work on men's crops only for a significant differential in prices or wages. For example, in Cameroon where men and women control income from different crops, women prefer to work on their own crops even when the value of their marginal output on new crops falls short of what they could produce on their husband's crops. This impacts their ability to accumulate savings, which in turn limits their ability to access credit.

For example, the cash activities in which women tend to specialize — beer brewing and the production of vegetables, poultry, eggs, grains and prepared foods — generate products that are all sold in decentralized markets for cash through a multiplicity of small sales that husbands cannot control. Tree crops, major cash crops and large livestock are often sold through marketing cooperatives and boards and credited to an account generally in the name of the male head of household. While women may have made a major contribution to the production, they never handle the proceeds. We have observed how women will remain in their specialized, traditional areas, even at lower rates of return in order to control their own earnings.

We also know that men respond more quickly to changing economic opportunities and conditions. Women have been displaced from traditional women's crops when price liberalization has made it profitable for men to enter these areas. For example, horticultural crops were introduced specifically to women to improve their income and nutritional status. As their potential profitability has increased, more ownership by men of horticultural farm lands is being observed. Women generally take care of the food needs of the family first and sell only the surplus. We have observed that male farmers view the horticultural crops primarily for their income effect.

The general practice of not pooling resources for household needs by husband and wife impacts household nutrition negatively. Since more nutritious food crops such as legumes often command higher prices than

other less nutritious-rich food, women may sell the former and either keep or purchase the latter for household consumption.

In some countries, such as Nigeria, the production of food crops has been on the rise. The increases may be in response to enhanced commercialization, industrial and export incentives and demand. However, the actual quantity of the staples left for domestic consumption has in fact decreased, resulting in increased malnutrition in the past three years particularly among children. The trend towards the export of food crops due to incentives offered by foreign exchange poses a great danger for the nutritional well-being of vulnerable groups. Foreign exchange policies encouraging cash crops over food crops become acute when domestic currencies are devaluating. In turn, the scarcity of foreign exchange to purchase food no longer produced domestically raises consumer prices for food, contributing to nutritional inadequacy, which in turn depresses production levels leading to a vicious cycle of malnutrition, ill health and poverty.

The livelihood of the smallholder farm is derived from a number of sources: land, wage employment and informal rural enterprises. There are few, true subsistence farmers. For example, in Kenya only one-fifth of farmers retain 90% of what is produced on the farm. Rural women's income is primarily derived from household activities related to food and beverages, trade, cottage crafts, sales of surplus agricultural produce from individual plots, agricultural labour on other farms and remittances. Allocating some part of even small holdings to cash crops becomes necessary as a source of income.

The increasing monetarization of the rural economy has caused a necessary increase in the non-domestic activities of women. While household activities provide for partial subsistence, no family is completely self-sufficient in providing for food needs. Fish, salt and meat are generally purchased and no longer bartered, while cooking oil and luxuries like sugar, tea and bread inevitably require cash. Household production is seldom enough to feed a family through the year. Income earning activities both on-farm and off-farm are increasingly important to food security.

Off-farm earnings in particular are critical. On average, one-third of smallholder family income is derived from off-farm sources. (In Malawi 75% of cash income comes from off-farm sources). Revenues generated from women's individual lands from sales of surplus food crops are too small to buy household necessities, including food. The revenues are therefore inadequate in turn to invest in the inputs necessary to improve farm productivity (such as tools, fertilizers and new seeds). While desirable and necessary from the standpoint of helping to increase smallholder

yields and raising incomes, the growth of off-farm income generating opportunities for women in rural areas faces a number of major constraints: low purchasing power, lack of transportation, communication and marketing infrastructure in the rural area, limited development of technology appropriate to small scale entrepreneurs, lack of relevant training opportunities in small business management and poor credit availability especially for small unsecured loans for working capital purposes.

Aggravating these problems are the added enormous demands on women's time and energy to produce on the farm, in the household and increasingly off the farm in a market where low mobility and relative educational levels place women at an immediate competitive disadvantage. They have fewer opportunities and limited time for off-farm self employment to earn the cash necessary to purchase inputs. As a result, women must generally continue to look to income from farm and other household-based activities for income. As a consequence, improvements in agricultural productivity will continue to be a major factor in improving women's income.

The conflict between cultivation requirements on her own smallholdings and the necessity to earn off-farm income during the growing season to meet family food needs has a serious impact on the availability of food in low income households. Programmes that could provide smallholders with consumption credit during cultivation would help.

Finally, food security policies consistently focus on improved seeds, credit, extension and training, marketing and access to water. As we all know, the public policy environment affecting ownership and use of land is seldom a subject of analysis notwithstanding the fact that land is a key determinant of rural wealth and income. Women's access to land for farming is generally restricted to discretionary allocation of plots by husbands or mothers-in-law. The allocation will often be made after prime land has been divided among other family members. The land may be productively marginal and may consist of too small and scattered plots. The right to the land is restricted to a possessory or usufructuary right, since land in Africa generally passes by patrilineal inheritance. In addition the commercial market in rural lands is limited because lands are often held commercially and women generally would not have the financial resources to purchase land in any event.

Lack of marketable title to land has negative implications on several fronts. The primary form of collateral to access bank credit in all cultures (developed and developing) is land. (See below: Issues Affecting Access to Agricultural Credit). Secure title to land is a prerequisite to women's

ability to leverage meagre resources through credit networks. As importantly, lack of security in land may affect productivity choices. For example, in some areas where seeds and fertilizers were provided at no cost to tenant farmers, aid agencies found the farmers not taking the donations. Farmers feared that if they visibly improved the land and its output, the owners would displace them for their own use or increase the rents they charged. In a situation where female farmers are making scarce resource allocation decisions regarding purchases of fertilizers and other inputs, if they are not confident that they will continue to be able to farm a particular plot of land for a sufficient number of years to get a return on that investment, they are unlikely to invest in improving the long-term quality of the land.

In Africa, it is currently being observed that women are losing access to traditional lands they have farmed due to population pressures and decreasing productivity of land yields. This has other significant implications since with the loss of control over her land, she also loses the power to choose which crops to grow, a choice that has traditionally been in favour of food crops. This trend has serious implications for household food security and nutrition. The land tenure issue is complex and multi-faceted and our efforts in making it part of the donor's agenda must be positioned in many ways, including women's nutrition and their capacity for income generation for household food security.

III. Household Food Security and the Role of Women: Issues Affecting Access to Agricultural Credit

Financial inputs, credit and savings, available to farm women are consistently cited among the key constraints to the development of small scale enterprises and agricultural productivity.

Without access to the financial inputs necessary to leverage meagre cash holdings and labour and purchase farm inputs, women will continue to work hard in agriculture at inefficient levels.

Women are at a significant disadvantage both in their ability to *mobilize private savings* and to *access private credit* to finance investment for a number of reasons: Access to credit is constrained by (1) the inability to save (generally a prerequisite to credit); (2) lack of marketable title to land and other forms of conventional collateral required by commercial banks; and (3) lack of independent credit histories and reputations for credit-worthiness. These are all due to social and cultural reasons, reasons that are inextricably linked.

A. *The Role of Savings*

Women generally face higher savings costs due to minimum transaction levels in banks and fixed travel costs of transactions, particularly in rural areas, which are generally inadequately served by branch banking facilities. In addition, since women's income is generally lower than men's, they would need to have a higher propensity to save than the average male to be able to leverage savings to the same effect.

Too often in project and programme planning for women and credit, savings mobilization is ignored. We know from the wide prevalence of informal savings clubs that even the very low income person can save. Savings are a prerequisite and a corollary to credit availability. However, capital accumulation (savings) by women is discouraged (1) for cultural reasons where it is sometimes considered equivalent to hoarding in traditional communal societies; and (2) due to the lack of secure, accessible depositories in rural areas.

We know that women predominate in the informal savings markets (osusus, tontines, merry-go-rounds, etc.). Yet, public interventions in rural financial markets have been on the credit side rather than the savings market side. Studies show that while *borrowing is male biased, savings may be female biased*. The savings market can serve a variety of purposes: (1) to act as a substitute for collateral; (2) to finance long-term investment in the agricultural sectors in which women specialize and which are traditionally undercapitalized by the conventional commercial financial institutions; (3) to provide a cushion for economic downturns and income gaps due to the seasonability of food crops; (4) to serve a function similar to a credit line to provide for liquidity; and (5) to provide women with tangible assets which increase their status and bargaining position. Since financial assets are a relatively new phenomenon in many rural cultures, they are not bound by customs of male ownership in the way land and livestock have evolved. As such, they may offer a significant culturally unencumbered vehicle to provide farm women with a range of economic choices.

B. *The Role of Land*

Traditional factors of production in the agricultural sector are the same as in any economic sector — land, labour and capital. Land tenure is determined by a number of socio-cultural practices. Most of Africa is comprised of patrilineal societies — land is inherited by the male line. Notwithstanding that women constitute a large proportion of the farming population, access to marketable land rights is a major impediment to (1)

collateral for agricultural credit and (2) the benefits of capital accumulation.

Agricultural credit is generally based on registered title to land as collateral. In Kenya, banks still require, in practice, that land certificates be presented with an application for credit. Often women have only a usufructuary right to the land, insufficient as a form of security for collateral. In Kenya while women manage 40% of the small farms, they receive only 10% of the loans in the formal credit market. Kenya is not unique in this regard. In addition, some cooperatives require title to land for membership. In areas where only men hold title women are excluded from the advice, credit, lower input prices and marketing assistance that often come with cooperative association.

C. Other Issues

Functional illiteracy and the lack of a "banking culture" in most rural areas means that basic understanding of how to handle a savings account, the significance of compound interest rates on savings, the benefits of borrowing to invest in productive assets, the management of debt, etc. are unknown. When saving and borrowing take place on an informal basis (through tontines, etc.) there is little if any leveraging effect and generally borrowing is done to meet short-term consumptive needs. However, interventions in rural financial markets could use these informal networks as early stages of capital formation and strengthen their ability to deliver low cost credit to hard to reach groups. The next stage of capital formation is generally the financial cooperative or credit union, which is a more formalized, more sophisticated form of savings club where group deposits and individual and group loans can be undertaken. In some African countries (e.g., Ghana) the credit union is the major source of agricultural credit for women.

Credit and savings alone are seldom sufficient and should be coupled with training to ensure "credit success," that is the ability to use credit to generate additional income beyond repayment obligations. Credit delivery initiatives in the rural areas should include assistance with rudimentary feasibility studies for farm and non-farm production planning, farm and non-farm management training and technical training and the ability to objectively assess the marketability of products.

D. Some Innovations

Some credit institutions are prepared to try innovative approaches to extend credit if given technical support or partial guarantees. For example,

in Nigeria, the United Bank for Africa, the third largest financial institution in the country, has instigated a credit scheme for rural women that provides loans at the prime interest rate to women who have formed themselves into a cooperative. In lieu of collateral, the members are jointly and separately liable for the individual loans of each other member. The programme has been in operation about eighteen months and has loaned about \$US 1 million.

Other initiatives are possible to address the issue of women's access to agricultural credit: (1) expansion of bank branches and mobile banking facilities by commercial banks; (2) encouragement of credit union/financial cooperative formation at the village level; (3) communicating available credit schemes to women through women's traditional channels; (4) encouraging informal, solidarity group formation for collective or "in-seriatim" borrowing, leading eventually to credit union status; (5) encouraging other types of credit and collateral arrangements such as guarantee funds, group guarantees, agricultural or crop liens, hire purchase arrangements for food processing equipment, etc.; (6) testing and refining of the pilot mutualist credit guarantee schemes for microenterprises that have been provided for under the World Bank's Private Small and Medium Enterprise Projects in Ghana and Nigeria; (7) provision of technical assistance to women in record keeping, management, marketing, and training in related small business skills that will strengthen their bargaining position both within and beyond the household.

Initiatives such as these are being tried across the developing countries in small, scattered pilot projects by a range of executing agencies, both private and public sector as well as non-governmental organizations.

There has been little rigorous analysis of these efforts. While credit schemes correctly structured and administered should theoretically have an indefinite life cycle, in fact many are operated more closely like traditional grant programmes. Many executing agencies have little if any familiarity themselves with issues of credit, appropriate interest rate structures relative to inflation rates and administrative questions. They in turn are attempting to cultivate a "banking culture" where none before may have existed among commercially unsophisticated rural communities. The result is that many of the "revolving" loan funds as originally conceived have no capacity to revolve and within short time frames are seeking fresh inputs of capital from donors and governments.

This should not discourage these pilot efforts. In fact, from the investments made in these first efforts of the past few years in Africa, many lessons should have been learned both by the NGOs which have acquired banking experience and by the first time borrowers. It is impor-

tant to ensure that these lessons have in fact been learned and are reflected in project documents. The original projects need to be carefully evaluated to determine: who borrowed and how often, how much was loaned on average, what was the money in fact used for, did the money have a growth impact on the borrowers activities, if not what else is needed (training, monitoring, etc.), was a savings component part of the project, what was the effect on savings, etc. As these efforts begin second generation activities there is a need to insist upon stronger preliminary analysis in project proposals, including credit demand assessments, local community economic profiles, uses to which credit will be put and projected economic impacts as well as a critical analysis of national economic conditions (prime rates, inflation rates, competitive situations, marketing bottlenecks, etc.) that will impact the individuals in the targeted borrowing community.

IV. Household Food Security and the Role of Women: Issues of Agricultural Technologies Including Food Storage

The objective of increasing food security through increased food production will only be achieved if women are able to produce more with the same, or preferably less, effort through increasing skills and knowledge, improving existing technologies or providing access to new productive resources.

Increased access to agricultural technologies is significant at two levels: to preserve what is produced, and to increase output. The introduction of these new technologies brings with it certain risks and raises a number of new issues, which are discussed below.

A. Preserving What Is Produced

It is estimated that the lack of adequate and effective storage in Africa results in one-fourth of all food produced being lost due to spoilage, insects and rodents. What is not lost but consumed suffers significant nutritional decline and what is not lost but sold is generally at depressed market prices due to excess supply in the market on a seasonal basis and decreased quality of the product due to poor storage. We know that simple storage bins are a more cost effective alternative than increasing crop yields as a way to enhance food security. Currently, for most of Africa, the primary crop storage facility is still the home. The seasonality of food production and in particular crops with synchronous maturity are a particular problem for small scale farmers whose inadequate storage facilities force them either to sell the crop when prices are low or to

assume the risk of high storage loss. Farmers will not produce more if the results of increased production do not result in any perceived gains. Improved access to storage facilities directly influences agricultural production decisions and attempts to increase output.

B. Increasing Output

Increased production levels are inhibited by a range of factors including: (i) dependence on rainfed agriculture which determines crop seasonality; (ii) the rising cost of capital (including simple tools like hoes and cutlasses); (iii) transportation bottlenecks; (iv) storage and processing problems; (v) national pricing policies; (vi) marketing inefficiency; and (vii) other cultural factors:

1. Rainfed Agriculture and Crop Seasonality

The seasonality of food production in large measure due to lack of irrigation capacity and the lack of storage are also important because of the resulting food shortages at cyclical points in the year. Without adequate food storage, the food shortages (the hunger seasons) are both more acute and of longer duration. This in turn affects subsequent food production. The agricultural life cycle means that the hunger season coincides with the period of land preparation for the next planting season, a period when more food is required to provide energy for the next planting season and for the increased physical exertion needed for land preparation.

2. Agricultural Capital

Capital investment in agricultural production in Africa is reflected primarily in individual labour, the use of simple tools such as hoes and cutlasses and too infrequently fertilizers and new seed varieties. Intermediate technology use is at a very early stage. Because production is dominated by small holder peasants, the primary capital input is essentially the labour of individual farmers. For farm women, individual labour is divided daily among child care, household work, complementary assistance to husband's or family agricultural plots, and planting, weeding, harvesting, transportation, processing and marketing of farm products from their own and family plots.

3. Transportation Bottlenecks

The problems of rural transport and distance to market are a major impediment to agricultural productivity. This is dramatically shown in

Cameroon where a study showed that women farmers who live close to a paved road produced three times more than women not on the road. Remote women farmers suffer higher marketing costs and difficult time conflicts. The single most important method of transportation of food crops for women in Nigeria remains head loads. The primary crop storage facility is still the home. In addition, women often face added cultural constraints that impede their mobility and hence their ability to move surplus food crops to market. The organization of agricultural collection routes, increased regularity of pickup, the formation of agricultural transportation and distribution cooperatives are all potential solutions.

4. Storage and Processing Problems

The introduction of small scale technologies to promote rural based agro industries has significance both for encouraging greater farm output and for increased farm income. For example, grinding mills and dehullers are important labour saving technologies of particular significance to women. The time saved on food processing increases agricultural productivity and encourages the sale of food surplus. However, the introduction of these technologies in rural areas raises a complex range of issues. One example of a programme that focuses on the introduction of food processing at the village level is the Nigerian Better Life for Rural Dwellers. The programme gives the technology to the village on a non-interest bearing loan basis. The machine is paid for over time on the basis of the increased output it provides for. The managers of the programme feel that it is necessary to encourage the women to become confident in the benefits of the technology and the income stream that will result from it before they can introduce interest bearing credit on hire-purchase schemes to the village. The longer-term issue is how to expand the introduction of these technologies in a way that is financially viable and ensures sustainability at the village levels. The introduction of, for example, a grinding mill assumes management skills to operate the mill, a maintenance capacity and the availability of spare parts. How many rural villages meet these conditions?

5. National Pricing Policies

The structure of agricultural pricing can affect small farmer output. The orientation of price supports and tax incentives to crops which women are not involved in can undermine women producers' economic base. For farm women, factor markets operate more rigidly than for men. Women's capacity to respond to producer incentives may be hampered by their

earlier shortfalls in education and training, poor health, shortage of assets, lack of information. Women may also have difficulty travelling to reach factor or product markets. As a result, policies instituted in product markets to increase production (such as higher prices or lower taxes) may have a differential gender impact and not elicit the targeted response because of the difficulties with factor markets, human capital and access to the product markets.

C. Introducing Technologies: The Risks

The introduction of agricultural technologies may carry a mixed impact for women. Designed to increase output, they have often unintentionally increased women's workloads, and increased demand for women's labour without additional compensation.

Some examples:

1. Experience with the partial mechanization of agriculture on the introduction of cash crops with more mechanization has shown that they are often taken up more quickly by men (e.g. cotton production experiences in Cote d'Ivoire, Togo and Burkina Faso). This may be due to women's poorer access to information and credit as well as cultural traditions. The effect, however, is that the resulting, more onerous, requirements for complementary labour in related tasks tend to fall to women.

2. Experience with the introduction to mechanized techniques of plowing (traditionally men's work in many areas) leads to increased land under cultivation but will also require more non-mechanized transplanting and weeding (traditionally women's work). However, we have seen in rice production efforts in Cameroon that women may in fact not increase their labour as required for increased production, if they do not directly control the income generated and may even withhold some labour. However, if improvements to "men's crops" means increases in family income and is spent in ways that women approve, then women may feel that the benefits outweigh the loss of direct control over income derived from their individual farm activities.

3. Experience has shown that mechanization often displaces farm women who, like any poor and unskilled group, suffer "technological unemployment" when traditional lines of women's work are replaced by new and less labour intensive approaches. Weaker qualifications for new kinds of work because of poor education and training may have the effect of slowing the introduction of needed new technologies because they inadvertently but directly threaten the most destitute women and their families.

4. Experience with the introduction of inputs that require additional labour inputs can in fact result in decreased income available because of the need to hire additional labour or in a polygamous society can result in men taking more wives to increase free family labour. The additional labour necessary to collect more water when fertilizer is used, can also cause a decrease in disposable income since less time is available to devote to crops or livestock controlled by women which traditionally represent an independent source of income. In addition, inputs which increase female labour requirements that strain the time allocations between productive labour and domestic labour can deter women farmers from their use.

While these experiences indicate the need for careful impact assessments, the introduction of technologies is critical for agricultural productivity. In The Gambia, women's productivity levels on average are 35% inferior to those of their male counterparts. This is representative of the situation across Africa — women working too hard at unproductive levels. Low levels of access to technology are key contributors to poor agricultural productivity and incomes.

D. Other Issues

1. Labour Saving Household Technologies

In efforts to increase agricultural output, much more attention needs to be directed at the development and adaptation of labour saving household technologies and to their widespread dissemination. The division of time between household and productive labour can be allocated to enhance productive time with the introduction of labour saving household technologies since the shortage of labour is the single biggest constraint on the income earning potential of women farmers.

For example, the two largest time consumers of rural women on a daily basis are the collection of water and the gathering of fuel wood. The reliability and proximity of water is a key productivity factor in rural Africa by improving women's health, increasing the time available for work and enhancing the ability to use agro-processing technologies that generally rely on a convenient water supply.

Experience has shown that food production is closely related to water technology and availability. Garden plots can be expanded and animals such as poultry can be raised when water is available. In Kenya, tin roofs purchased through traditional credit resulted in both time savings and

income from the sale of water; this was translated into increased vegetable gardening and small stock production.

Local achievements and efforts to develop simple, inexpensive labour saving technology need to be publicized better and supported. Priority needs to be given to testing, producing and marketing these successful pilot efforts.

Issues in the water sector are replicated in the energy sector, where women spend an inordinate amount of time searching for and transporting wood for household uses. The time spent in searching for fuel wood is a non-productive and exhausting part of a women's day. Lack of fuel supplies can lead to changes in consumption patterns: to fewer cooked meals, to shifts towards products which require less cooking time (e.g. away from millet and towards rice in The Gambia) and resistance to new and nutritionally preferable crops, (such as soya beans in Burkina Faso) since they take longer to cook.

2. Sustainable Development

Deforestation, soil erosion and desertification are the most visible forms of environmental degradation affecting Africa. Fuel wood, natural foods and water are essential components of household subsistence and income and are of particular importance to the poorest households.

a. *Deforestation.* Household fuel wood is the source of 90% of the household energy consumed in Africa. In households without adequate firewood for cooking, parasite diseases are more prevalent, and nutritional standards fall as nutritionally preferable foods such as legumes, which require more preparation time, are foregone. In many parts of Africa, such as Sudan, the time required to supply a household with fuel wood has increased four-fold over the past decade. Time spent collecting fuel wood takes women away from productive activities. Reduction in fuel wood supply also undermines traditional income-generating activities such as pottery and the preparation of foods for sale as well as the sale of wood in the urban area. Forests are also an important source of food in emergencies and food crises when wild fruits, medicinal plants, herbs and spices can make the difference between starvation and survival. As the predominant users of the forests, women could be Africa's greatest conservationists.

b. *Soil Erosion and Desertification.* The Food and Agricultural Organization (FAO) estimates that unchecked soil erosion will reduce land productivity in Africa by 25% between 1975 and 2000. Desertification in semi-arid areas has claimed about 65 million hectares of once-productive

land and takes another 6 million each year, mostly in Africa and the Middle East. The seasonability of agriculture is a strong factor in the slash and burn agricultural practice, since it is necessary to time land preparation to coincide with the early rainy season. The practice however has strong environmental implications for deforestation and desertification. While intensification of agriculture is seen as a viable way to increase productivity in poor soils in Africa, it requires an increase in nutrient and organic matter to sustain soil fertility to produce continuous high yields. Ever decreasing fallow periods no longer allow the land to replenish itself naturally. Manure is the major form of fertilizer to replenish the soil in Africa. However, manure is now being increasingly used for domestic fuel in place of wood. When manure is taken for needed fertilizers, increased pressure is put on the forests.

The interaction of deforestation, soil erosion and desertification is a tragic interplay that results in large measure from food insecurity and in turn leads to increased food insecurity in a continually downward spiral.

V. Household Food Security and The Role of Women: The Role of Agricultural Extension Services

It is now clear that extension services are gender biased against women both indirectly as a result of targeting on particular crops not traditionally grown by women and directly because extension services have generally been targeted at the head of household, traditionally a male.

If women have initially been underrepresented in the reach of extension, this bias becomes self-perpetuating because of the bias of private processes of information. Women's information channels and networks are different from those of men. If they have not been reached formally by extension, the probability of extension information reaching them secondarily and informally is low.

There is little data available yet on extension and women in agriculture. The World Bank is making considerable effort to include women farmers more effectively in regional extension programmes, particularly in Africa (e.g. Kenya, Nigeria, Burkina Faso, Malawi and Zimbabwe) but also in other countries such as Mexico, India and Yemen. These early efforts in the form of action research are aimed at understanding what works to bring extension to women.

Some of the preliminary findings, conclusions and outstanding issues include the following:

1. Available research indicates that women have a broader range of concerns than men. Women grow a wider variety of crops since they are

producing both for family food and often for market. They also need information on small animal husbandry and veterinary information and services for raising small animals.

At the same time, the nature of their family responsibilities means that information on nutrition and household maintenance issues such as handling family drinking water is required, so a home economics component remains necessary. Now, there is increasing demand for extension programmes aimed at women to include functional literacy training and even credit components. The difficulty is that the extension systems suffer delivery overload and for the female recipient, information overload.

2. Extension workers are largely male. In some cultures, to reach farm women, female extension workers are necessary. In some cases (e.g. Kenya) this is by preference, in other cases because of religious principles (e.g. Muslim areas of Nigeria) it is required. At a minimum, women agents can sensitize male colleagues to the specialized needs of women farmers, which in part will improve the reach of extension to women in countries where their economic situation will prevent hiring new, female staff in any significant numbers for some time. In Kenya, women form groups of ten to twenty members to work with extension agents. Since women form the core of Kenyan smallholder agriculture and manage approximately two-fifths of the small farms, targeting such groups makes extension costs, which are high, more effective. There is some resistance to hiring female extension agents just for female farmers, at a time when economies are undergoing budget cuts. The group model provides for effective economies of scale that the smaller number of female agents can target.

3. The content of extension services and the timing and place of delivery often are inappropriately planned to reach women. In some areas, extension information for women remains exclusively focused on home economics and not on the areas of production where women are involved or on marketing and processing techniques. In addition, extension services must be offered near to women's homes and at a time of day that takes into account their many other domestic and productive responsibilities.

4. Training programmes for extension agents reflect traditional perceptions of male and female roles. Extension services have been historically targeted at large scale farmers engaged in highly mechanized non-food crop production. To reach women farmers, training needs to be reoriented to food crop production on small farm holdings which will not have access to high levels of capital or technology. Training needs to emphasize women's issues in agricultural production: their particular problems of access to credit, farm inputs and information. The extension information

will therefore have to be tailored to provide creative, compensating inputs for these deficiencies. Information needs to be aimed not only at increasing the productivity of land and labour through high yielding crops but also at encouraging self-sufficiency and nutritional food intake at the community level.

5. Extension services have traditionally been provided to the male head of household on the assumption that he will pass on the information to his wife. This seems not to have worked. To correct this bias, some propose separate extension services to female farmers. This also is fraught with potential problems. The nature of households as indivisible economic units, even where some income may be exclusively controlled by either spouse, makes the delivery of services to one or the other spouse problematic and potentially destructive of the family unit. A preferred alternative might be to view, where appropriate, the household as dual-headed to ensure that the system reaches both husband and wife as family farmers. Since evidence now suggests that female farmers are in fact decision-makers on a range of issues affecting household food security, bypassing female farmers has a high cost in terms of food security and very high efficiency costs given Africa's heavy reliance on smallholder agricultural production.

6. It has been suggested that structural adjustment programmes (SAP) raise several issues for extension policies: (a) since extension services are an instrument of resource mobilization, they should be extended notwithstanding the fact that other government services are decreasing; (b) since existing extension services are overwhelmingly staffed by men and target current producers rather than new entrants, they may need to be reoriented if women are to be reached. Since SAP generally attempt to allow pure market forces to operate without targeted interventions, this would need to be treated as an appropriate exception to the standard principles of a SAP.

7. A modification of traditional priorities in extension is necessary. Many lessons have been learned from all over Africa and call for a shift in focus to (a) the development of high-yielding crop varieties suited to the consumption needs of small farmers; (b) developing extension messages and agricultural practices that respond to the needs of resource-poor farmers; (c) modifying the training and visitation method to reach more farmers; (d) targeting fertilizer subsidies better, reducing the packaging size of fertilizers and other inputs to make them affordable to smallholders; (e) including information on rural credit, food processing, and improved cooking methods; (f) emphasizing a problem-solving participatory approach to training instead of lectures; (g) establishing small demonstra-

tion plots on farmers' own fields, especially on the farms of resource-poor women; and (h) using women's networks such as women's saving clubs to disseminate agriculture extension messages.

Since there is little research on female farmers by agricultural research institutions, the extension agent is a valuable link back to provide these important institutions with data and information for improved research.

VI. Household Food Security and the Role of Women: Agricultural Research — An Agenda

The majority of African women live in rural areas and while they make a significant contribution to the rural economy and contribute nearly two-thirds of all the time that is put into traditional agriculture, they constitute a largely unknown and hidden productive force in the countryside. Until more research is available to document their contribution, they will continue to be excluded from development planning. Women's role in agriculture is highly variable. While generally women are involved in food production, the form their involvement takes is a function of many interacting variables: historical and socio-cultural variables; national and international political and economic processes; individual motivation, skills and available role models for imitation.

Focusing on these processes is as important as providing descriptive accounts of women's agricultural involvement. It is important to link the macro and micro, the link between productive and reproductive roles and to analyze trends that signal necessary policy shifts. For example, gender impact analysis based on traditional gender roles in agriculture may no longer be accurate as economic necessity increasingly lessens role delineation. The need for and attraction of urban migration, wage sector employment and the effect of far away employment for men in South Africa requiring long absences from home means in some cases women are making all household decisions.

There is much literature on women's contributions to agricultural production (as independent farmers, farm workers and agricultural labourers) and unequal access to productive resources as well as to the products of their labour. However, the specific and complex links of women's access to land with technological adaptation, land use patterns, productivity, employment and with family food security and their ability to alleviate poverty have not received sufficient attention.

A future research agenda should encompass the following:

1. Proposed economic policies must be analyzed not just for aggregate impacts such as total production or net balance of payments effect

but also in terms of impact on individual smallholders and especially those households headed by women. For example, structural adjustment programmes resulting in higher prices for agricultural producers benefit only some parts of the rural farming communities but adversely affect marginal farmers and agricultural labourers who have no surplus to sell but are spending more on inputs.

2. Although much of Africa has fertile lands, the growing intensity of cultivation through improved technologies and mechanization has depleted many soils of essential nutrients and increased the problem of retaining soil fertility. Women's specialist knowledge of food crop production, crop rotation and sustainable, traditional agricultural practices over millennia need to be studied to provide complementary data for technological innovation that will be environmentally sound.

3. Recent preliminary findings suggest that the cash crop versus food crop and women as food producers analyses are inadequate. The increasing commercialization of food crop production especially around urban centres, increasingly under men's production, requires serious research for its implications on household food security.

4. More research is needed to examine the issue of whether women plan the production of food crop surpluses or if they result from hedging against poor yields. The motivation becomes important in targeting agricultural planning and policies to encourage surplus production given the increasingly important role women play in provisioning the urban areas.

5. Research should ascertain how land registration affects women's income, their farming practices, their capital investments in agricultural inputs, their practical control over land.

6. It should be determined how incentives affect women farmers in different cultural groups: what they grow, how they farm, how much they market. Studies should be made of the means whereby women in traditional societies can compensate for their personal lack of mobility to move products to market.

7. It is important to learn how increasing access to inputs, credit and extension affects agricultural production among cultural groups with different levels of education and land holdings.

8. Some studies show that women are at a disadvantage in taking up the economic opportunities which structural adjustment creates in the agricultural export sector. This may be due to discriminatory practices, asymmetric rights and obligations in the household and conflicts between productive and reproductive tasks. The relationship between economic incentives and gender differences in response to incentive frameworks needs to be better understood.

9. Research has traditionally ignored the broad policy framework of laws, regulations and formal and informal practices and how they impact policy implementation. It is important to know which laws on their face treat women differently, which in their application might hinder their productive capacity and which promote their productive capacity and encourage their full economic participation. Less is understood about institutional issues and administrative practices that constrain women. Without an appropriate public policy framework, specific investments and activities that we undertake to assist women will have minimum impact and may be inappropriately designed and targeted.

10. An economic data base is essential to assist researchers and policy makers. For many countries data is non-existent or highly unreliable, based on extrapolations and hypotheses in turn based on inadequate data. Effective policy making requires that at a minimum we know: the numbers and percentage of the population engaged in agriculture; the number of women who are de facto heads of households due to male migration and abandonment; who does which tasks for which crops and with which assets and remuneration; who controls which assets and means of production; who earns and controls what income and from what sources; what types of crops are grown primarily or exclusively by women; what is the seasonal demand for women's agricultural labour; what is the frequency, type and content of agricultural extension to women.

Clearly, much research is required to undertake appropriate development planning by policy makers. At the same time, the urgency of the ever-increasing food security problem in Africa demands immediate responses and interventions. While it is not possible to wait for perfect data and in-depth research, support for continuing research efforts must take place concurrently with policy formation and project activities directed at ensuring household food security in Africa.

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