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Is a Turnaround in Africa Possible without Helping African Women to Farm?*

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It is widely but mistakenly assumed that “traditional” systems are necessarily passed on from one generation to the next without ever undergoing changes either in techniques or in the division of labor between the sexes. In historic times, tribes with female farming systems have been known to change over to male systems, and—less frequently—tribes with male farming systems have been known to adopt a female system of farming.¹

Some Africanists now claim that small farmers (including women farmers) cannot feed sub-Saharan Africa. They therefore advocate the increased commercialization of sub-Saharan African agriculture via a “bimodal” or “multimodal” strategy, that is, the development of large-scale private farms, often owned by urban elites, which would complement the smallholder sector and feed the burgeoning urban populations.² They claim that commercialization is necessary in order to get the forces of production “moving” again. The historical self-sufficiency of African peasants has made them “uncaptured” and autonomous to such an extent that development has been blocked. A “dynamic, capital-intensive sector aimed at home consumption needs . . . ,” however, “. . . would become the engine driving the small-scale rural and urban sectors.”³

Opposed to this position are advocates of a broad-based smallholder “unimodal” strategy of development, advocates of long-term investments on the part of donor agencies and governments in location-specific, appropriate technology transference, and advocates of farming systems projects as a way to bring both of the above strategies down to the local conditions of the African peasantry.⁴

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This debate has motivated the present article, which asks whether a turnaround in African agriculture can be achieved without helping African women farmers—mostly smallholders in the traditional sector—to farm.⁵ Note that this question is completely different from the equity question, which asks whether an increased commercialization of sub-Saharan African agriculture would hurt or help women farmers. The latter question is itself the subject of an ever-expanding body of literature.⁶ Instead, the question addressed in this article is whether a turnaround is possible without giving African women farmers the access to inputs and the incentives they need to produce. In other words, if the changes required by a turnaround (long-run investments in location-specific technological changes and human capital development, changes in pricing policies that “get prices right,” and improvements in infrastructure, delivery of yield-increasing inputs, credit, and extension advice) bypass women farmers, can a real turnaround occur?⁷

In fact, this question is harder to answer than anticipated, in part because the answer depends on whether we are talking about a turnaround in the short run (e.g., 1 decade) or the long run (e.g., 5 decades). Section I of this article presents evidence supporting the position that a turnaround in the short run is not possible without helping African women farmers to farm, simply because there are too many women farming to ignore them. Section II, however, presents evidence supporting the counterargument, that yes, a turnaround is possible in the long run without helping women farmers. According to Boserup, what is needed for a turnaround to occur is intensification of agricultural production, and this causes women’s participation in farming to decrease relative to men’s. Technological change in Africa often displaces women farmers, that is, separates them from their means of production. Development planning fails to include women. As a result, African women farmers are now being differentiated out of agricultural production—just as black farmers in the southeastern United States were displaced in the 1950s to 1970s, and mid-size U.S. family farms are now being displaced from full-time farming.

These arguments are by now commonplace, although supported here by new data from Burkina Faso and Malawi. A new argument in Section III, by contrast, qualifies the argument of Section II and claims that the rate of displacement of women farmers will be extremely uneven both within and between African countries. Based on the recent Food and Agriculture Organization (FAO) report, which shows that population pressure and land scarcity are quite unevenly distributed in sub-Saharan Africa, in Section III we argue that the intensification process that displaces women will be more urgent in some sub-Saharan African countries than in others.⁸ The displacement of women farmers will thus be blocked or slowed down in regions with lower population

densities due to the high incidence of human or animal diseases, which have historically discouraged settlement. Other factors that will negatively affect the rate of female displacement include male out-migration and the presence of gender neutral incentives to produce, such as getting prices right. In Section IV, we conclude that in the short run, a turnaround cannot be achieved without helping women farmers with hand-hoe agriculture. In the long run, however, women farmers will be displaced in some regions but will continue to be the norm in others.

I. “No, a Turnaround Is Not Possible without Helping Women Farm”

Women, in nearly all the cases recorded, were found to do more than half of the agricultural work; in some cases they were found to do around 70 per cent and in one case nearly 80 per cent of the total. . . . Even today village production in Africa south of the Sahara continues to be predominantly female farming.⁹

At first blush, the answer to the question posed in this paper is an unequivocal “No.” Data first collected by H. Baumann in the 1930s and summarized by E. Boserup show that there are just too many African women farming for a turnaround in agricultural production to occur without their now taking an active part. Boserup notes that “even at the most primitive stages of family autarky there is some division of labour within the family, the main criteria for the division being that of age and sex.”¹⁰ Social scientists’ explanations of sex roles within the family are often ethnocentric, however; even the experienced anthropologist Margaret Mead assumed that, universally, “men bring the food and women prepare it.”¹¹ The assumption that the provision of food is a man’s prerogative is unwarranted, according to Boserup, who claims that there are two patterns of subsistence agriculture. Cross-culturally, there is “male farming,” in which food is produced by men with little help from women, and “female farming” in which food production is taken care of by women with little help from men. The latter is prevalent in African societies with shifting cultivation (or slash-and-burn agriculture). Using hours of work data from subsistence societies in 10 African countries, she shows that, first, virtually all rural women in sub-Saharan Africa take part in farm work and, second, more agricultural work in the family is performed by women than men.

R. Dixon provides complementary evidence by deriving new estimates of the sex composition of the farm labor force for 82 countries of sub-Saharan Africa, North Africa and the Middle East, Asia, and the Caribbean.¹² She revises the 1977 International Labour Office (ILO) standardized estimates of the percent of women in the farm labor force for over 100 developing countries by regressing those estimates on

comparable data from the 1970 FAO agricultural census, which tends to be more inclusive. She claims that

the labor force concept used in the . . . 1970 FAO . . . agricultural census is more inclusive than that used in population censuses in at least six important respects: subsistence production is counted as economic activity; unpaid family helpers are routinely included; minimum hours of work are not specified; all agricultural work (whether primary or secondary to some other activity) is recorded; the survey is usually taken in the peak season; and the definition of agricultural work includes kitchen gardening, raising poultry, and transporting crops to market.¹³

As Dixon expected, the revised estimates show a higher female percentage of the agricultural labor force. For all 82 countries, the proportion of women in the farm labor force increases from 30% to 42%. Although intraregional differences exist, on average women are a high 46% of the agricultural labor force in sub-Saharan Africa and 31% in North Africa and the Middle East.

Given these numbers, it is questionable whether a turnaround in African agricultural production would be possible without including women as explicit targets of an agricultural development project.¹⁴ However, problems with accepting this simple, straightforward answer—there are just too many women farming to ignore them—come from many studies. Summarized below, these show that women's participation in farming decreases: first, with intensification, second, with most kinds of technological change, and, third, with Western-funded development projects, which limit women's access to inputs.

II. Evidence Supporting the Counterargument

A. The Intensification Hypothesis

However prevalent female farming was and is in African societies with shifting cultivation, it declines with agricultural intensification.¹⁵ Female farming systems can predominate in societies with low population densities and an ample land/person ratio, such that families can produce their food with very small inputs of labor and no fertilization by leaving exhausted, low-yielding lands fallow. "It is precisely because such labour-extensive farming systems can be used in most of Africa that it is possible for African villagers to leave most of the farming work to women, while the men work very short hours in agriculture, in comparison to male farmers in densely populated regions of subsistence agriculture."¹⁶

Population pressure, however, causes shortening of the fallow cycle and the introduction of the plow. The plow, in turn, leads to an increase in male farming systems, in which food is produced by men with relatively little help from women. It is almost universal for men to do the actual plowing, in part because the plow increases the number of

hired laborers who tend to be male and in part because it reduces the amount of weeding women do, whereas it introduces the new job of collecting feed for draft animals, which either men or women may do.

Both collaboration and modification of the Boserup hypothesis comes from the cross-cultural research of anthropologists who are interested in explaining the relatively low status of women, and so test theories about the sexual division of labor on data from the Standard Cross-Cultural Sample, which is composed of 137 agricultural societies.¹⁷ In explaining the sexual division of labor for 50 tasks encoded for this sample, G. Murdock et al. claim there is a masculine advantage for strenuous tasks requiring “brief bursts of excessive energy,” and a feminine advantage for tasks that are compatible with child care. The latter tasks are usually not dangerous, do not require distant travel, and are interruptible. M. Burton, L. Brudner, and D. White emphasize that child-care constraints result in a reduction in women’s geographical mobility and a tendency for women not to engage in dangerous tasks.¹⁸ They claim this causes men to initiate production sequences involving livestock production, fishing, and agriculture and women to complete the sequences. Using entailment analysis, they find that if women in a society engage in a task at the beginning of the production sequence, for example, preparing the soil, then they will also engage in the tasks at the end of the production sequence, for example, planting the crops, tending them, and harvesting them.

C. Ember, however, objects to the notion that women are “pushed out” of agriculture because men take over the plowing and irrigation.¹⁹ Instead, she offers evidence that women are “pulled into” additional domestic work with the intensification of agriculture because more time must be spent on weeding, harvesting, marketing, storage, and food processing with the new cereal crops than with the old root crops, collecting fuel and water in the new permanent household, and raising more children with the increased human fertility made possible by the increase in nutrition from intensification. This additional work explains why women’s contribution to agriculture declines in relative but not in absolute terms, results also found in Boserup.

Burton and White extend Murdock’s definition of intensive agriculture from “agriculture using the plow or irrigation or both” to a more economic definition.²⁰ Holding land constant, intensification results from labor intensification, capital intensification, and/or technological change. Population pressure causes labor intensification, which then decreases women’s participation if it requires very high labor inputs per day on a seasonal basis, as it does with cereal crops (versus root or tree crops with less seasonal time pressures) and in environments with a short growing season and a long dry season. Capital intensification increases male participation in certain tasks “to the extent that men monopolize ownership of draft animals and agricultural

implements . . . , and seek to perpetuate that control by keeping the use of those productive factors out of the hands of women."²¹ Changes in agricultural technology may include changes from slash-and-burn systems to intensive farming systems with the plow or, alternatively, changes in the importance of domestic animals in the farming system. Women's participation in crop production decreases with the importance of domesticated animals in the farming system because domestic animals spend more of their time close to the household, where they are more likely to be cared for by women who provide fodder by weeding. Again, this decrease may be relative rather than absolute, as more recent data suggest that as hired tractors or ox implements are utilized, acreage is expanded and women, who do most of the weeding and harvesting, have increased labor demands. Women may lose access to income as more of the production is marketed by men, as labor inputs increase absolutely but decrease as a percentage of total labor inputs.

B. Most Technological Change Displaces Women Farmers

Although there is a growing consensus that African women play a very important role in food production, designers of new technology fail to recognize women as semi-autonomous producers and consumers within the larger extended family household.²² This is true in spite of much recent research, which shows that African households cannot be treated as homogeneous, unified decision-making units whose internal relationships can be taken as given. Indeed, the behavioral assumption that the household is a husband-wife team maximizing a jointly held utility function to attain shared goals obscures both the conflicts and complex complementarities that occur within and divide the household.²³ Evidence of separate interests of household members comes from many studies that show husbands and wives lending each other money at rates only slightly less usurious than the prevailing market rate, the payment of wages inside households, wives selling water to husbands in the fields, husbands selling firewood to wives, and wives and husbands selling each other animals that are consumed by the family on feasts and special occasions.²⁴ The conventional assumption of a single household utility function ignores the fact that in each of these exchanges the best interests of the household may not coincide with those of particular members.²⁵ It also ignores the questions of how decisions are made within the household, and whether men and women have different production priorities. More realistic models of household behavior are exemplified by C. Jones's formal model of intra-household conflict and husband's and wife's gain from cooperation, C. Mukhopadhyay's decision model of the sexual division of labor for specific household tasks, P. Hill's description of Fante women's entrepreneurial behavior, and C. Gladwin's models of women's marketing and farming decisions.²⁶

As in these models, farming households in many African societies should be characterized as farm firms with overlapping but semi-autonomous production and consumption units within the firm. The units are semi-autonomous because they are managed by the household head, wife or wives, or married sons who are associated with the household via labor-, food-, and/or income-pooling arrangements.²⁷ In many agrarian societies, each wife and married son is responsible for cultivation of a private field and has the right to what the field produces. The units are overlapping because the wives and married sons must also provide labor to cooperative fields managed by the household head.²⁸ In other societies without private fields, the husband and wife may jointly cultivate food and cash crops, some of which are women's crops and some of which are men's crops.²⁹

For example, D. McMillan's study of Mossi families who migrate from home villages in the Central Plateau region of Burkina Faso to the Volta Valley Authority's resettlement scheme in the country's river basins shows that an average of 33% of the total area planted in the settlers' home villages in 1979 was cultivated as private fields; 64% of those private fields were supervised by women. Private fields accounted for an estimated 27% of the area planted and 28% of the total production in the basic food grains, sorghum and millet. An estimated 15% of the total area planted and 13% of the total production of sorghum and millet were on women's private fields. In addition, an average of 12% of the area planted in corn, 66% in peanuts and groundpeas, 16% in rice, and 58% in vegetables was on women's private fields. In all, women's production traditionally accounts for 20%–25% of the total food produced by the Mossi family.

Although this percentage may not seem significant, the role of that 25% is vital to the survival of the extended (polygamous) family. Traditionally, the majority of the food produced on a woman's fields is used to provide supplementary food for herself and her children during the dry period when food supplies from the cooperative fields are depleted. Without such private food stores, a woman cannot adequately feed her children, especially during rain-deficit periods like the 1983, 1984, and 1987 cropping years. Further, the income from a woman's cash crop production is used to satisfy requirements of school fees, clothing, and medical supplies, as well as to pay for additional condiments for meals.

Besides being responsible for providing the family with food during the dry period, Mossi women also contribute a significant percentage of the labor required on both cooperative and private fields. Women work an average of 47.5% of the recorded hours worked on cooperative fields, 43.5% of the hours worked on men's private fields, and 79% of the hours worked on women's private fields (see table 1).

Under these circumstances, the farm household is more appropriately defined as "those individuals who farm a communal field under the jurisdiction of the household head, and who eat from the same

TABLE 1
ALLOCATION OF HOUSEHOLD LAND, LABOR, AND PRODUCTION BETWEEN PRIVATE AND COOPERATIVE FIELDS (%)

TYPE OF FIELD	LAND AREA CULTIVATED		RECORDED LABOR HOURS		KG PRODUCTION SORGHUM AND MILLET		CASH VALUE OF PRODUCTION	
	Home	Project	Home	Project	Home	Project	Home	Project
	Sample size	35	26	35	9	35	26	35	26
Fields farmed cooperatively:	67*	89	66	92	72	92	75	92
Male workers	...	...	(52.5)	(52.5)	...	...	...	...
Female workers	...	...	(47.5)	(47.5)	...	...	...	...
Fields farmed privately:								
Men's private fields:	12	3	16	1	15	4	10	5
Male workers	...	...	(56.5)	(64)	...	...	...	...
Female workers	...	...	(43.5)	(36)	...	...	...	...
Women's private fields:	21	8	18	7	13	4	15	3
Male workers	...	...	(21)	(27)	...	...	...	...
Female workers	...	...	(79)	(73)	...	...	...	...

SOURCE.—Christina Gladwin, Kathleen Staudt, and Della McMillan, "Providing Africa's Women Farmers Access: One Solution to the Food Crisis," *Journal of African Studies* 13 (Winter 1986-87): 133.

NOTE.—Numbers in parentheses sum to 100% of the preceding percentage. Labor hours on which percentages are based are unweighted.

* Data are based on a sample of settler households (9 in 1979 and 26 in 1983) living in the same AVV village. The home village figures are based on a sample of 35 households in the settlers' home area during 1979.

cooking pot” or, quite simply, “the individuals who eat and work together *most* of the time.”³⁰ The family is usually extended rather than nuclear and headed by the eldest male in the family.

The extent to which household labor is allocated to the collective fields instead of the private fields, and the choice of food versus cash crops grown on each type of field has usually been determined by traditional rules and rights, as is the distribution of cash income from cash cropping. As a general rule, men clear the forest, climb the trees, burn the bush, while the owner or operator of the field does the seeding and weeding. Usually, the household head has rights to the labor of all household members, who must work on cooperative fields at given times. However, women and other (younger) men in the household do not have these rights over other household members’ labor.³¹ As labor is usually the most scarce resource for the sub-Saharan farm and thus the factor that most prevents expansion of farming, traditional rules about labor allocation determine total production and incomes generated by different household members. Because men have greater control over scarce resources (such as household labor), they have greater production and profit. This was not always the case in the precolonial period in Africa. For example, among the pastoral Pokot in west-central Kenya, there was no community of property between husband and wife. Spouses cooperated, however, via a set of reciprocal rights and responsibilities necessary for survival. Men traveled with their cattle while women had virtual autonomy over the cropping sphere, “deciding what to grow, when to plant, and to whom to distribute grain from their stores.”³² A woman’s autonomy depended in part on her ability to fulfill her economic responsibilities to her husband’s satisfaction; and a husband had no right to interfere with the work of an industrious wife.

With an intervention from the outside, however, such as a new cash crop or a new land resettlement scheme or the sedentarization of a previously nomadic population, traditional rules or rights were suddenly questioned and subject to negotiation. Conflicts often developed between household members determined to take advantage of the new, enlarged set of economic resources. When the Pokot, for example, began to settle in the early 1930s, the British registered land and channeled agricultural inputs to men rather than women. The result was that Pokot men had greater access to cash than did Pokot women, which changed the men’s value for cultivatable land. Because wives had no clear traditional rights to the husband’s cash income, they found their autonomy and incomes decreased with male involvement in farming. Conflicts developed over which crops were grown, how much of the harvest was surplus, and how cash returns should be shared. In colonial times, many such conflicts were resolved at the expense of the women with no clear traditional rights to the husbands’ cash income,

leading some researchers to claim that the development process itself had a negative impact on women's autonomy and status.³³

Unfortunately, development projects continue to ignore the implications of the semi-autonomous nature of African women producers who have a stake in protecting their own farm income and an obligation to their children to do so. For example, in 1987 Gladwin found that extension agents and development officers in Salima district, Malawi, started a groundnut seed multiplication project with male household heads instead of their wives, even though groundnuts is clearly a women's crop in Central Malawi. Tobacco, cotton, and hybrid maize are men's cash crops. Both men and women claim to work together in all their fields. The result of the seed multiplication project was that the wives of program participants lost their cash crop (and income) for the year. When Gladwin asked the agents why they didn't ask the male heads for permission to work with their wives, they argued that the program was "too complicated" for the women to understand.

Similarly, McMillan's study of the Volta Valley Authority (AVV) land resettlement project in Burkina Faso shows there was no consideration of women's semi-autonomous production in the initial stage of the project. The AVV extension service did not permit the subdivision of bush areas into private and cooperative fields, even though the settlers were accustomed to allocating 33% of their land and 34% of their labor to private fields in the home village (table 1).

By the fifth year of the project, restrictions were relaxed so that an average of 11% of the total area planted was cultivated as private fields with 8% of the total labor available (table 1). Even so, this was a substantial decrease from the traditional allocation of land and labor to private fields in the settlers' home area. As a result, women's control over cultivatable land decreased in the land resettlement scheme from 21% to 8% of the total. Subsequently, their control over food grain production fell from 13% to 4%, while their cash returns from all production fell from 15% to 3% (table 1). At the same time that women relinquished control over production in the AVV resettlement scheme, their contributions of labor remained constant relative to men's, although their hours of work doubled in absolute terms from 622 to 1,256 hours per unit labor.³⁴

The end result of little or no change in their relative labor patterns, coupled with a concentration of production on cooperative rather than private fields, was a loss of autonomy by the women. Whereas in the home villages, women had rights to the produce of their private fields, in the AVV project, women had no rights to the fruits of their labor on cooperative fields and in fact were paid via a complex interfamilial reciprocal arrangement of gift-giving. However, this loss of autonomy was not without compensation. Yields in the AVV project were two to three times the recorded production in the home area and an average of

0.9 metric tons per unit labor. Net agricultural income in the AVV project was roughly three times the average for the home area.

Nevertheless, due to the project's neglect of private fields and other factors such as the increased length of the agricultural work season (from 7 to 10 months due to the large-scale cultivation of cotton), the increase in the absolute number of hours worked, the much greater distances to regional markets, and their removal from their extended families, many women felt marginal to the program. This sense of marginality was reflected in the higher rate of women drop-outs, an increased incidence of divorce, and a declining interest in nutrition and housekeeping. But given the large increases in yields and net income to the household as a whole, one may ask, so what? Isn't the increase in family welfare worth the loss of private land, income, and autonomy of the women in the family? On the other hand, maybe those increases in yields would have happened anyway, if women were allowed to keep control over their private fields, since the new settlement was on virgin forest land much richer than the deteriorated land in the home villages. Further, one of the unintended results of ignoring women's private fields was to corrupt the crop rotation system, which was the heart of the technological package initially prescribed; in 1987, it had been dropped by all.

Unfortunately, the case of the AVV resettlement scheme and its early negative impact on Mossi women farmers is not a unique one. Other not so capital-intensive interventions have similar results of decreasing women's participation in farming. This is shown by R. Cohen's study of a mixed sample of Kanuri and Bolewa in the Borno Accelerated Development Area Project (BOADAP) in northern Nigeria, which gives smallholders access to fertilizer, improved seeds, extension advice, and tractor hire services.³⁵ Data show that small farms of 1–2 ha have an active woman farmer on 65% of the farms, whereas only 50% of the larger farms of roughly 10 ha in the same program have an active woman farmer. Further, in the large-farm sector outside the BOADAP program, with farms of 25 ha managed by urban elites who have more access to modern inputs and credit, only 7% of the farms in the sample have women doing some of the farming. As development increases the size of farm, women decrease their participation in farming.

Spencer's study of labor-using, nonmechanical interventions in the Integrated Agricultural Development Project (IADP) in Sierra Leone similarly shows a decrease in women's relative labor hours within the project sample.³⁶ By comparing hours of work (disaggregated by sex and age) of a group of nonparticipants to those of two groups of participants, Spencer shows that a labor-using shift to a higher-valued cropping pattern does not necessarily increase women's work hours. In the IADP project, the work load of women was hardly

affected, while that of the men and male children was substantially increased. Unfortunately, no similar analysis of the distribution of farm income within the family was also analyzed, so that it is impossible to say whether women were better or worse off as a result of the project.

C. Development Planning Fails to Include Women

Further research substantiates the claim that development limits women's access to basic agricultural inputs and closes opportunities for them when access to inputs, capital, the market, and the political arena is blocked.³⁷ At the same time, attitudinal studies of sub-Saharan African women farmers show they want development interventions. In Zambia, for example, women farmers claimed they needed and wanted help in the form of "farming improvements (most importantly, labor saving devices), credit, clinics, wells, improved transport and roads, and improved extension and farmer training centers."³⁸

Notwithstanding the expressed wishes of African women farmers for farming improvements, study after study also exposes women's limited access to yield-increasing inputs (seeds, fertilizer, credit), government extension services, technological training, education, and land reform.³⁹

Data from K. Staudt's research in western Kenya on 212 households show that women farm managers have experienced a persistent and pervasive bias in the delivery of agricultural services from their governments, and it makes no difference whether the women have high economic status or large farms, or have shown a willingness to adopt innovations.⁴⁰ Specifically, results show that (1) agricultural instructors tend to visit farms jointly managed by men and women more often than farms managed solely by women; (2) more members of a jointly managed farm receive training at a local agricultural center than do members of a female-managed farm; and (3) more members of jointly managed farms know about, have applied for, and acquire agricultural loans than do female farmers. Why?

Male technicians and extension agents usually communicate with men and, thus, tend to provide information, technology, and credit to men. This usually means that married women farmers receive advice and credit indirectly if at all; and unmarried women household heads suffer especially. For example, Gladwin found that although 69% of Malawi's full-time farmers are women, and 50% of agricultural labor is performed by women, and women-headed households make up 28% of all households, women accounted for only 25% of credit club members in 1986–87.⁴¹ The disparity between women's participation in farming and in credit clubs is unfortunate because it means that credit for fertilizer, improved seeds, and pesticides reaches only a small minority of the farmers in the country. Only 16% of the 1.3 million farmers and 6% of the cultivated acreage now receive credit through "farmers'

clubs” of both men and women or “women’s clubs” administered separately by the Women’s Programme.

The disparity between who farms and who receives credit is due to institutional barriers and social constraints. Few women farmers are “full” members of farmers’ clubs in the sense that they receive credit directly and attend extension meetings because, by law, married women are “automatic” members, receiving credit indirectly through their husbands. The few women who are full members are thus unmarried women (never married or divorced), or women in a polygamous union whose husband is giving fertilizer to the other wife. They are there by necessity, because they do not have a man to be their intermediary. It is thus a social stigma rather than a privilege for these women to attend the farmers’ club’s meetings, and they sit apart from the men, silent and embarrassed. For women in polygamous unions, it is a signal to the whole community that the husband is favoring the other wife. Other women claim that men do not want them at meetings where the men are acting as “household heads.”

The women are all too aware of the loss of social status that “full” membership implies and would prefer to belong to a women’s club of both married and unmarried women. Unfortunately, the number of women’s clubs at the village level is few, and the amount of credit they now receive is minuscule, although their default rates are lower than those of the farmers’ clubs. Also limiting the number of women’s clubs is the scarcity of female extension agents serving the Women’s Programme. In 1985, there were 1,800 women farmers per female extension agent, as contrasted with only 461 male farmers per male extension agent.⁴²

An additional constraint to female household heads’ access to credit is their small farm (“garden”) size: almost half (42%) of the women heads have farms of less than 0.5 ha. And one of the criteria by which local farmers’ clubs admit or reject members is a “reasonably-sized garden,” which varies from 0.5 to 2 ha. Hence almost half of women household heads are excluded from full membership in a farmers’ club due to their small size of land holding.

What is the impact of this gender bias in access to credit? Data in table 2 show that the total amount of fertilizer—the main yield-increasing input to cash and food crops—used by female household heads is half that used by male heads;⁴³ and the difference is significant ($P = .0001$). Data also show that fertilizer per hectare used by women is significantly less than that used by men, at the .01 level.

But if access to credit and cash were also held constant, would gender have a significant direct effect on fertilizer use? Regression analysis is used to show that it does not. Although women household heads apply uniformly less fertilizer per hectare than men heads, gender does not matter when one holds constant access to credit and cash.

TABLE 2
DIFFERENCES BETWEEN MALE- AND FEMALE-HEADED HOUSEHOLDS IN BLANTYRE,
LILONGWE, AND KASUNGU, 1986-87

	Male Household Heads	Female Household Heads	T Value	Probability
Number of farmers	349	152	...	...
Total fertilizer (kg)	72.41	30.24	5.18	.0001
Fertilizer use (kg/ha)	51.28	34.41	2.29	.011
Landholding size (ha)	1.33	.80	7.84	.0001

SOURCE.—*Rapid Fertilizer Survey, 1987* (Lilongwe, Malawi: Ministry of Agriculture, 1987).

But without access to credit or cash, women household heads apply less fertilizer than do men. Regression is not used here to show causality, but merely the link between the quantity of fertilizer per hectare (CFHA) and five independent variables. These include: the quantity of land cultivated (AREA), a dummy variable representing the farmer's participation in a credit club (CURCLUB1), a dummy variable that equals 1 if the farmer said his reason for nonuse of fertilizer was "insufficient money" (NOCASH), a dummy variable representing the gender of the farmer that is 1 if the farmer is a male, and a variable (CMANURE) representing application of manure/compost that may either be a substitute for or complement to chemical fertilizer. The price paid by farmers for fertilizer is omitted because it is constant across Malawi due to the monopsonistic control of ADMARC, the state marketing board. In fact, previous studies that tested for a price response have shown no significant effect of fertilizer price on quantity demanded and even found the wrong sign.⁴⁴

Results in table 3 show that, as expected, access to cash and credit have very significant and positive effects on the quantity of fertilizer applied by an individual smallholder. The signs on the significant variables say that the cash constraint decreases fertilizer use significantly but membership in a farmers' credit club increases it significantly. In addition, the positive sign on manure application shows it is a complement to chemical fertilizer in Malawi because soils need both chemical and organic fertilizers. The amount of land cultivated is linked negatively with the quantity of fertilizer per hectare (CFHA). This is because the smaller the area cultivated, the more fertilizer is poured on—holding other variables (access to cash/credit) constant. The latter result is not a surprise when fertilizer comes as an indivisible input of 50-kg bags to most smallholders. Note that all variables except gender are highly significant ($P = .0001$). Gender thus has no direct effect on

TABLE 3
REGRESSION ON QUANTITY OF FERTILIZER PER HECTARE (CFHA), BLANTYRE,
LILONGWE, AND KASUNGU, 1986–87

Independent Variables	<i>B</i>	<i>t</i>	<i>P</i> -value
Intercept	100.97	12.37	.0001
AREA	–.19	–5.25	.0001
CURCLUB1	36.33	4.50	.0001
NOCASH	–85.99	–12.33	.0001
GENDER	.73	.11	.91
CMANURE	21.25	2.45	.0146
<i>N</i>		498	
<i>R</i> ²		.369	
<i>F</i>		57.79	
Significant <i>F</i>		.0001	

SOURCE.—*Rapid Fertilizer Survey, 1987* (Lilongwe, Malawi: Ministry of Agriculture, 1987).

fertilizer use, but because women lack both cash and access to credit, they apply less fertilizer than men and get lower yields.⁴⁵

Ten years after the introduction of the Percy Amendment, which required a “woman impact” statement in every project design by the Agency for International Development (AID), are donor agencies helping this situation to change? Data collected by Staudt from USAID summaries of agricultural extension and credit projects show that in all regions (Latin America, Asia, Africa, and the Near East), .1% or less of projects specifically mention women as targets, along with men.⁴⁶

Based on this evidence, we conclude that on the way to a turnaround, African women will be differentiated out of production, just as black farmers were displaced from agricultural production in the southeastern United States in the 1950s to 1970s, and the mid-size U.S. family farm is now being displaced from the mainstream of agricultural production. Via what A. de Janvry has dubbed the “farmer road” to development, African women farmers will lose control over the means of production (land, equipment, income), although their labor input in agriculture may not decrease and may even increase in absolute terms.⁴⁷ For policy planners concerned only with the supply of food to feed the politically savvy urban population, the question of who produces the agricultural surplus is not an issue, and the loss of land, income, and autonomy by women farmers is not a problem.

III. Evidence Qualifying the Counterargument

Is the situation as dismal for women farmers as the evidence in Section II suggests? Maybe not, because in the long run (e.g., 40–50 years) the following factors may qualify or even negate the factors causing women’s participation in African farming to decrease.

First, women's farming decreases in relative but not in absolute terms, except in societies that adopt plow agriculture and annual cropping systems. Then, Boserup notes, the number of women actively engaged in agriculture decreases, although the number of hours worked by women still engaged in agriculture may not decrease in absolute terms.⁴⁸

Second, many African farmers are not now switching and may not in the future switch from hand-hoe agriculture to plow agriculture, and for good reasons. One of these is that the plow is not economically advantageous in forest and bush fallow systems because "it is only relative to the [heavy] labor requirements of the short fallow and permanent cultivation system that the plow is labor-saving."⁴⁹ The plow is not labor-saving in forest and bush fallow systems when population densities are very low and labor is very scarce. In these systems, hand-hoe cultivation is capable of producing output at the lowest cost per unit of output. To use the plow under this system would require an increase in the number of operations performed and thus an increase in overall labor requirements. As population pressures increase and the length of fallow decreases, however, cultivation and weeding requirements increase with annual cultivation, and because labor demand increases faster than labor supply, it becomes economically attractive to switch to the plow.

Another reason for the persistence of hand-hoes is that intensification is itself sometimes constrained by the agroclimatic environment, and so extensive farming systems are preferred: "Soils in the humid lowlands generally tend to have poor physical structures and are therefore susceptible to erosion and excessive leaching when cultivated continuously. Forest and bush vegetation protect the soil from such degradation hazards."⁵⁰ In addition, location-specific soil types (sandy soils) and terrain (steep mountain slopes) may make hand-hoes preferable to plows, even under permanent cultivation.⁵¹

A further explanation, according to Boserup, is that the more the work of hoeing is done by women, the more men in shifting agricultural systems will resist as long as possible the introduction of the plow. They have little desire to change to the plow as long as they have land enough to apply shifting cultivation and can cover their protein supply from hunting and fishing or grazing cattle. "Agricultural change is being held back because men refuse to do work which according to prevailing custom should be done by persons of the other sex."⁵²

Third, the intensification process, linked here to the displacement of women farmers, is not likely to proceed at the same rate or in the same pattern in all sub-Saharan African countries. According to the FAO report that assesses the potential for food production within each country from its own lands and based on estimates of present and projected populations, the potentials of land to produce food are lim-

ited but vary considerably between and within countries.⁵³ The land resource project places the area of underutilized and potentially arable rain-fed land at over four times the presently cultivated area (800 million vs. 185 million ha). This is supported by an earlier World Bank study that shows that Africa possesses vast tracts of potentially arable land not now under cultivation.⁵⁴ The utilization of this land has usually been constrained by adverse factors such as disease, isolation from major markets, lack of potable water, and inappropriate land quality for existing levels of production technology. With the advent of new disease control methods, production techniques, and transportation and communication networks, some of the earlier constraints to new lands settlement are being removed. These land reserves, however, are very unevenly distributed: central African countries are favorably placed while many countries in North Africa, the Sahel, and East Africa are already using a very high proportion of their potentially cultivatable lands.

The policy implications of the FAO land resource report are substantial. In countries like Nigeria, Senegal, Sierra Leone, Benin, Burkina Faso, Togo, Mali, Ethiopia, Uganda, Malawi, Zimbabwe, Botswana, Swaziland, and Namibia, it will not be possible to increase production through expanding the total area cultivated to offset projected population increases. Priority must therefore be given to raising input levels from "low" to "medium" input levels.⁵⁵ The FAO report estimates that still other countries like Mauritania, Niger, Somalia, Kenya, Burundi, and Lesotho must raise input levels to "high" levels if they are to avoid massive food imports or famines by the year 2000.

By contrast, in the more sparsely populated countries, including Ghana, Tanzania, Gambia, Chad, Guinea, Mozambique, Sudan, Guinea-Bissau, Liberia, Ivory Coast, Madagascar, Angola, Zambia, Cameroon, Zaire, Equatorial Guinea, Central African Republic, Congo, and Gabon, increases in productivity may be obtained either by the expansion of the total area under cultivation or by intensification methods resulting in increased yields per hectare. G. Higgins and A. Kassam note, however, that much of the "new" land remaining for potential expansion is in the humid tropics and has remained sparsely inhabited for good reasons: special clearing, fertility and conservation requirements, a lack of infrastructure and services, and poor health conditions.⁵⁶

The implications of these results for this article should be clear. Because the intensification process will not occur uniformly across Africa, the displacement of women farmers will also not occur uniformly. In countries or regions that can afford the luxury of expanding production via new lands settlement and/or land-extensive farming systems, women farmers with hand-hoes will still be the norm in the long run and a turnaround in these regions will require their participation.

A fourth factor negating the decrease in African women's farming is the extensive male out-migration from rural areas in traditional African mining areas (e.g., Malawi, Kenya, Senegal, Zambia, Zaire, Mozambique, Zimbabwe). In these areas, women are the largest source of labor (albeit unpaid). In marginal farming areas (e.g., parts of Burkina Faso), men also now migrate out of the region, leaving women to farm. With future development efforts, male out-migration may increase rather than decrease, leaving women to do more of the farming, as is now the case on part-time farms in the southeastern United States.⁵⁷ Recommendations to assist these female-headed households include labor-saving devices, credit for their purchase or hire, extension information, and credit for inputs.

A fifth mitigating factor is that women have so many different roles in agricultural production (planting, weeding, harvesting, marketing, processing food) that if men displace them in one task like plowing, they will just transfer their time and energies to other tasks. Whether these tasks are arbitrarily defined as agricultural work as opposed to housework (e.g., marketing, food processing) in a population or agricultural census may solely determine whether their agricultural labor hours are found to increase or decrease.

A sixth mitigating factor is the present lack of control of African animal diseases (trypanosomiasis, rinderpest), which are slowing down the emergence of animal traction and thus the plow. Rinderpest was virtually eradicated by the early 1970s but because of political conflicts in Ethiopia, international efforts to eradicate the disease broke down.⁵⁸ Now rinderpest control efforts are back to the early 1960s; and whether they are controlled in a decade may depend on present biotechnology projects aimed at finding a nonrefrigerable vaccine. The chance of producing a vaccine via biotechnology for control of trypanosomiasis within a decade is, on the other hand, almost nil, and there is more hope for control of the disease via cross-breeding trypana-tolerant N'dama cattle.

Women are therefore going to be doing the hoeing for a number of years because (1) animal diseases will not be controlled in one decade and (2) the direct transition from hand-hoes to tractors is not an answer to this problem because it is not a cost-effective answer at the late bush fallow and early grass fallow stage of intensification.⁵⁹ Because destumping costs are higher for tractor farmers than animal draft farmers, who can work around the stumps, animal-drawn plows can be adopted earlier than tractors, if animal disease control permits. Hence tractors are not likely to directly replace women with hand-hoes but should be used to replace the animal-drawn plow.

A final reason to qualify the counterargument of Section II is that changes other than technological changes required by a turnaround may benefit women farmers. Governments' "getting prices right" will

help all farmers, including women farmers. For that reason R. Bates claims governments do not raise prices to give all producers incentives but instead prefer funding rural development projects to reward an elite group and build a political clientele who (in our view) are most often male.⁶⁰ When “macro” prices are straightened out to reflect actual supply and demand conditions and provide incentives to all producers, women producers may benefit from them more than men producers, who have some hope of being included in the group of political elites. Adjusting distorted macro prices in the form of artificially low food prices, high wage rates, low interest rates, and overvalued exchange rates are thus gender neutral incentives to produce.

The same argument is valid for government support of infrastructure in the form of good roads, research facilities, and market access. All farmers including women farmers would benefit from a government’s reversing priorities in rural and urban expenditures and the costly changes in infrastructural support that a turnaround will necessitate.⁶¹ These changes are gender neutral. Unfortunately, the same argument is not true for governmental provision of credit and extension education and advice. As noted above, women farm managers experience a bias in the delivery of these agricultural services from their governments and, without an explicit governmental policy change, will probably continue to experience this bias.

IV. Conclusion

In our judgment, the answer to the question, “Is a turnaround in Africa possible without helping women farmers?” is “no” in the short run (of 1 decade at least), due to the active participation of so many women in farming. Therefore, a short-run turnaround in African agriculture cannot be achieved without helping women with hand-hoes gain equal access to basic agricultural inputs and resources.

In the long run, however, a turnaround is possible without helping women to farm because women farmers will be displaced as agricultural intensification occurs. But because the intensification process will be extremely uneven both within and between African countries, the displacement of women farmers will also be uneven. The displacement of women farmers will thus be blocked or slowed down in regions with sufficient land resources and land-extensive farming systems, or extensive male out-migration, or lack of control of animal diseases, or the presence of gender-neutral incentives to produce. We conclude that in the long run, women farmers in these regions will still be the norm. In other regions they will be displaced as intensification, required by a turnaround, proceeds.

What can be done to insure that women farmers are not displaced? Policy planners at all levels (international, national, and local) should communicate with technical experts and extension specialists about

the need to incorporate women as agricultural producers with full access to yield-increasing inputs in development projects. This means that women as well as men farmers should be consulted at the design stage of technology development. It means that technicians and extension specialists should be trained to approach the household head to ask permission to work with his wife or wives on new technology for women's crops, women's tasks, and on women's or cooperative fields. Women extension agents who have easy access to women farmers should be given agricultural training and monetary incentives to work with women farmers. Male agricultural agents should be encouraged to work with groups of women farmers. Women should be included as full and not automatic members of farmers' credit clubs, alongside their husbands. Governments should target funds to women's organizations and clubs, as well as use gender-neutral incentives to produce. Donor agencies should be encouraged to target women farmers along with men farmers. In a variety of ways, women farmers can be given access to basic agricultural inputs so that they are not displaced from their traditional means of income as intensification proceeds.

Notes

* We are grateful for the hospitality of farmers interviewed in Burkina Faso and Malawi and for the many helpful comments and criticisms by Susan Almy, Ron Cohen, Hunt Davis, Jean Due, Silvia Lane, David Nygaard, and the journal's four anonymous referees.

1. Ester Boserup, *Woman's Role in Economic Development* (New York: St. Martin's Press, 1970), p. 17.

2. Multimodal strategies for African agriculture were the central theme of the Carter Lectures on Africa, now in R. Cohen, ed., *Satisfying Africa's Food Needs* (Boulder, Colo.: Rienner, 1988); and the keynote speech, "The Unimodal Model: Solution or Cul de Sac for Rural Development," delivered by Ronald Cohen at the 1987 Society of Economic Anthropology meetings (Riverside, Calif., April 1987), now in *Food and Farm: Current Debates and Policies*, ed. C. Gladwin and K. Truman (Lanham, Md.: University Press of America 1989); similar strategies are proposed in Keith Hart, *The Political Economy of West African Agriculture* (Cambridge: Cambridge University Press, 1982); Goran Hyden, *Beyond Ujamaa in Tanzania* (Berkeley and Los Angeles: University of California Press, 1980).

3. Hart, p. 165.

4. Unimodal strategies are described in John Mellor and Bruce F. Johnston, "The World Food Equation: Interrelations among Development, Employment, and Food Consumption," *Journal of Economic Literature* 22, no. 2 (1984): 531-74; Bruce Johnston, "Agricultural Development in Tropical Africa: The Search for Viable Strategies," in *Strategies for African Development*, ed. R. Berg and J. Whitaker (Berkeley and Los Angeles: University of California Press, 1986); long-term transference of technology is advocated by Carl K. Eicher, "Facing Up to Africa's Food Crisis," *Foreign Affairs* 61, no. 1 (1982): 151-74; African farming systems are described in Michael Collinson, *Farming Systems Research in Eastern Africa*, Michigan State University International Development Paper no. 3 (East Lansing: Michigan State Univer-

sity, Department of Agricultural Economics, 1982); D. Norman, E. Simmons, and H. Hays, *Farming Systems in the Nigerian Savanna* (Boulder, Colo.: Westview, 1982).

5. This focus on a "turnaround" was the inspiration of Silvia Lane, who organized a symposium on food policy in Africa at the 1986 meetings of the American Agricultural Economics Association (Reno, Nevada, August 1986). The panel asked, "Is it possible to turn food policies around so as to meet the food requirements of tropical African populations?" Some of the other panelists' replies can be found in Jean M. Due, "Agricultural Policy in Tropical Africa: Is a Turnaround Possible?" *Agricultural Economics* 1 (Fall 1986): 19–34.

6. Boserup; Irene Tinker, "The Adverse Impact of Development on Women," in *Women and World Development*, ed. I. Tinker and M. Bramsen (Washington, D.C.: Overseas Development Council, 1976); Kathleen A. Staudt, "Agricultural Productivity Gaps: A Case Study of Male Preference in Government Policy Implementations," *Development and Change* 9, no. 3 (1978): 439–58.

7. On long-run investments, see Eicher; Uma Lele, "Rural Africa: Modernization, Equity, and Long-Term Development," *Science* 211 (February 1981): 547–53. On changes in pricing policies, see Robert Bates, *Markets and States in Tropical Africa* (Berkeley and Los Angeles: University of California Press, 1980); Peter Timmer, Walter Falcon, and Scott Pearson, *Food Policy Analysis* (Washington, D.C.: World Bank, 1983); Peter Timmer, *Getting Prices Right* (Ithaca, N.Y.: Cornell University Press, 1986).

8. Food and Agriculture Organization (FAO), *Land, Food, and People* (Rome: FAO, 1984); G. M. Higgins, A. H. Kassam, L. Naiken, G. Fischer, and M. M. Shah, "Potential Population Supporting Capacities of Lands in the Developing World," Technical Report of Project Int/75/P13 (New York: International Institute for Applied Systems Analysis/United Nations Fund for Population Activities, 1982).

9. Boserup, p. 22.

10. *Ibid.*, p. 15.

11. *Ibid.*, p. 16.

12. Ruth Dixon, "Women in Agriculture: Counting the Labor Force in Developing Countries," *Population and Development Review* 8, no. 3 (1982): 558–59.

13. *Ibid.*, p. 553.

14. Kathleen Cloud, "Women Farmers and AID Agricultural Projects: How Efficient Are We?" in *Women Creating Wealth*, ed. R. Gallin and A. Spring (Washington, D.C.: Association for Women in Development, 1985), pp. 163–72; Jean M. Due, "Women Made Visible: Their Contributions to Farming Systems and Household Incomes in Zambia and Tanzania," *Culture and Agriculture* 26 (Spring 1985): 16–19; Kathleen Staudt, "Women Farmers and Inequities in Agricultural Services," *Rural Africana* 29 (Winter 1975): 81–93.

15. Boserup (n. 1 above), pp. 16–36.

16. *Ibid.*, p. 32.

17. George Murdock and Catherine Provost, "Factors in the Division of Labor by Sex: A Cross-Cultural Analysis," *Ethnology* 12 (1973): 203–25; George Murdock and Douglas White, "Standard Cross-Cultural Sample," *Ethnology* 12 (1969): 329–69.

18. Michael Burton, Lilyan Brudner, and Douglas White, "A Model of the Sexual Division of Labor," *American Ethnologist* 4 (1977): 227–51.

19. Carol Ember, "The Relative Decline in Women's Contribution to Agriculture with Intensification," *American Anthropologist* 85 (1983): 285–304.

20. Michael Burton and Douglas White, "Sexual Division of Labor in Agriculture," *American Anthropologist* 86, no. 3 (1984): 568–83.

21. *Ibid.*, p. 571.

22. Many otherwise excellent analyses of the African food crisis have only one sentence mentioning the importance of women to food production in Africa: Elliott Berg, K. Y. Amoako, Rolf Gusten, Jacob Meerman, and Gene Tidrick, *Accelerated Development in Sub-Saharan Africa* (Washington, D.C.: World Bank, 1981), p. 75; Eicher (n. 4 above), p. 173.

23. Jane Guyer, "Household and Community in African Studies," *African Studies Review* 24, no. 2 (1981): 87–137; Angelique Haugerud, "The Limits of Household Analysis in the Study of Agricultural Production: A Central Kenyan Case" (paper presented at the 81st annual meetings of the American Anthropological Association, Washington, D.C., 1982); Daisy H. Dwyer, "Women and Income in the Third World: Implications for Policy," *International Programs Working Paper no. 18* (New York: Population Council, 1983); Miriam Goheen, "The Impact of Women's Access to Land and Household Production in Cameroon," in *Agriculture, Women, and Land: The African Experience*, ed. Jean Davison (Boulder, Colo.: Westview, 1988); Dolores Koenig, "Household Behavior in the Region of Kita, and Its Relationship to Agricultural Change" (Purdue University, Department of Agricultural Economics, West Lafayette, Ind., 1980, mimeographed), and "Women's Work and Social Stratification in the Rural Malian Household" (paper presented at the 81st annual meetings of the American Anthropological Association, Washington, D.C., 1982); Della McMillan, "Monitoring Household Change in Farming Systems Research," *Development and Change* 18, no. 2 (1987): 295–314, and "Social Impacts of Planned Settlement in Burkina Faso," in *Drought and Famine in Africa*, ed. M. H. Glantz (Cambridge: Cambridge University Press, 1987), pp. 297–322; Christine Okali and J. E. Sumberg, "Sheep and Goats, Men and Women: Household Relations and Small Ruminant Production in Southwest Nigeria," in *Understanding Africa's Rural Households and Farming Systems*, ed. Joyce Moock (Boulder, Colo.: Westview, 1986), pp. 166–81.

24. Claire Robertson, "Ga Women and Socioeconomic Change in Accra," in *Women in Africa*, ed. N. Hafkin and E. Bay (Stanford, Calif.: Stanford University Press, 1976); Jennie Dey, "Gambian Women: Unequal Partners in Rice Development Project?" in *African Women in the Development Process*, ed. N. Nelson (London: Frank Cass, 1981).

25. Kathleen Cloud, "Women's Productivity in Agricultural Systems: Considerations for Project Design" (Cambridge, Mass.: Harvard Institute for International Development, AID/WID Training Project, 1983), p. 12.

26. Christine Jones, "The Mobilization of Women's Labor for Cash Crop Production: A Game Theoretic Approach," *American Journal of Agricultural Economics* 65, no. 5 (1983): 1049–54; Carol Mukhopadhyay, "Testing a Decision Process Model of the Sexual Division of Labor in the Family," *Human Organization* 43 (Fall 1984): 227–42; Polly Hill, *Migrant Cocoa Farmers of Southern Ghana* (Cambridge: Cambridge University Press, 1963), and "Food Farming and Migration from Fante Villages," *Africa* 48, no. 3 (1978): 220–30; Christina Gladwin, "A Model of the Supply of Smoked Fish from Cape Coast to Kumasi," in *Formal Methods in Economic Anthropology*, ed. S. Plattner (Washington, D.C.: American Anthropological Association, 1975), pp. 77–127, and "Off-Farm Work and Its Effect on Florida Farm Wives' Contribution to the Family Farm," in *World Development and Women*, ed. Mary Rojas (Blacksburg: Virginia Tech Title XII Women in Development Office, 1982), vol. 2.

27. Haugerud, p. 1.

28. McMillan, "Monitoring Household Change in Farming Systems Research," p. 300; Jones, p. 1050.
29. Anita Spring, *Agricultural Development in Malawi: A Project for Women in Development* (Boulder, Colo.: Westview, 1989).
30. Koenig, "Women's Work and Social Stratification in the Rural Malian Household"; Norman, Simmons, and Hays; McMillan, "Monitoring Household Change in Farming Systems Research."
31. McMillan, "Monitoring Household Change in Farming Systems Research."
32. Dorene Reynolds, "The Household Divided: Competition for Cash between Husband and Wives in West Pokot, Kenya" (paper presented at the 81st annual meetings of the American Anthropological Association, Washington, D.C., 1982).
33. Boserup (n. 1 above), pp. 15–35; Tinker (n. 6 above).
34. The figures represent a weighted average, which uses the AVV system of labor equivalents discussed in Christina Gladwin, Kathleen Staudt, and Della McMillan, "Providing Africa's Women Farmers Access: One Solution to the Food Crisis," *Journal of African Studies* 13 (Winter 1986–87): 131–41.
35. Cohen (n. 2 above).
36. Dunstan S. Spencer, "African Women in Agricultural Development: A Case Study in Sierra Leone" (Michigan State University, Department of Agricultural Economics, East Lansing, 1976, mimeographed).
37. Jean Ensminger, "Economic and Political Differentiation among Galole Orma Women," *Ethnos* ("Special Issue: Women in Pastoral Production," ed. G. Dahl), 52, nos. 1–2 (July 1987): 28–49.
38. Jean Due, Timothy Mudenda, and Patricia Miller, "How Do Rural Women Perceive Development? A Case Study in Zambia," Report no. 83-E-265 (University of Illinois, Department of Agricultural Economics, Urbana, 1983), p. 12.
39. Jacqueline Ashby, "New Models for Agricultural Research and Extension: The Need to Integrate Women," in her *Invisible Farmers: Women and the Crisis in Agriculture* (Washington, D.C.: United States Agency for International Development, 1981); Jette Bukh, *Village Women in Ghana* (Uppsala: Scandinavian Institute of African Studies, 1979, mimeographed); Jean Due, "Update on Financing Smallholders in Zimbabwe, Zambia, and Tanzania," *Savings and Development*, no. 3 (1983), pp. 261–77; Jean Due and Rebecca Summary, "Constraints to Women and Development in Africa," *Journal of Modern African Studies* 20, no. 1 (1982): 155–66; Louise Fortmann, "The Plight of the Invisible Farmer: The Effect of National Agricultural Policy on Women," in *Women and Technological Change in Developing Countries*, ed. R. Dauber and M. Cain (Boulder, Colo.: Westview, 1981), pp. 205–14, and "Women's Work in a Communal Setting: The Tanzanian Policy of Ujama," in *Women and Work in Africa*, ed. E. Bay (Boulder, Colo.: Westview, 1982); Peter Moock, "The Efficiency of Women as Farm Managers: Kenya," *American Journal of Agricultural Economics* 58 (1976): 831–35; Achola Pala Okeyo, "Daughters of the Lakes and Rivers," in *Women and Colonization*, ed. M. Etienne and E. Leacock (New York: Praeger, 1980); Anita Spring, "Men and Women Participants in a Stallfeeder Livestock Program in Malawi," *Human Organization* 45, no. 1 (1986): 154–62; Staudt (n. 6 above), pp. 439–58.
40. Kathleen Staudt, "Women Farmers and Inequities in Agricultural Services," *Rural Africana* 29 (Winter 1975): 81–93; Jean Due and Marcia White, "Contrasts between Joint and Female-headed Households in Zambia," *Eastern Africa Economic Review* 2, no. 1 (1986): 94–98.

41. Jonathan Kydd and Robert Christiansen, "Structural Change in Malawi since Independence: Consequences of a Development Strategy Based on Large-Scale Agriculture," *World Development* 10, no. 5 (1982): 355-75; Dixon (n. 12 above), p. 558; *National Sample Survey of Agriculture* (Lilongwe, Malawi: Ministry of Agriculture, 1981); other data from Malawi were provided by the Ministry of Agriculture in 1987.

42. International Fund for Agricultural Development (IFAD), "Reconnaissance Mission Report on Rural Credit and Farm Club Development," Report no. 0017-MW (Washington, D.C.: IFAD, 1986).

43. The data set is from the Ministry of Agriculture's Rapid Fertilizer Survey of 1986-87, carried out as a supplement to the Annual Survey of Agriculture, and consists of individual observation data from 185 Blantyre farmers, 145 Lilongwe farmers, and 196 Kasungu farmers. The data set has the advantage that all fields were measured by experienced technicians and is representative of districts with the biggest farmers (Lilongwe, Kasungu) and smallest farmers (Blantyre).

44. Frade Nyondo, "Price Responsiveness of Producers of Basic Food Crops in Malawi" (M.S. diss., University of Florida, 1987), pp. 116-26.

45. Although yield data were not yet available in 1986-87, the 1984-85 Annual Survey of Agriculture yield data show that without credit, women heads have lower yields of the local maize variety than do men in three out of five districts sampled. With credit, women club members receive yields greater than or equal to men with credit; their yields are also greater than those of both men and women without credit.

46. Kathleen Staudt, *Gender and Redistribution within Bureaucracy* (New York: Praeger, 1984).

47. Alain de Janvry, *The Agrarian Question and Reformism in Latin America* (Baltimore: Johns Hopkins University Press, 1981).

48. Boserup (n. 1 above), p. 26.

49. Prabhu Pingali, Yves Bigot, and Hans Binswanger, *Agricultural Mechanization and the Evolution of Farming Systems in Sub-Saharan Africa* (Baltimore: Johns Hopkins University Press, 1987).

50. *Ibid.*, p. 31.

51. *Ibid.*, p. 41.

52. Boserup, pp. 34-35.

53. FAO, *Land, Food, and People* (n. 8 above); Higgins et al. (n. 8 above).

54. FAO, *Land, Food, and People*; Higgins et al.; T. Goering, *Agricultural Land Settlement: A World Bank Issues Paper* (Washington, D.C.: World Bank, January 1978).

55. Because inputs such as fertilizers have such a strong effect on yields, the FAO analysis was made for three levels of inputs. A low level roughly corresponds to use of no fertilizer, pesticide, or herbicide on traditional crop varieties with no long-term conservation measures. An intermediate input level was defined as use of a basic package of fertilizers and biocides on some improved crop varieties, with simple long-term conservation practices and existing crop mixes on half the land and the most productive crop mix (in terms of calorie-protein yield) on the other half. A high input level was defined as full use of fertilizer and biocides, improved crop varieties, conservation measures, and the best of crops on all the land.

56. G. M. Higgins and A. H. Kassam, "Land, Food and Population in Africa," in *Advancing Agricultural Production in Africa*, ed. D. L. Hawksworth (Farnham Royal, United Kingdom: Commonwealth Agricultural Bureau, 1984).

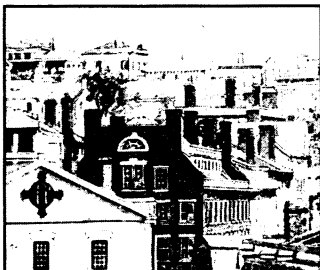
57. Christina Gladwin, "The Increase in Women's Farming: A Response to Structural Change," *Florida Food and Resource Economics* no. 66 (Gainesville: University of Florida, Food and Resource Economics Department, 1985).

58. FAO, *Integrating Crops and Livestock in West Africa* (Rome: FAO, 1983); FAO, "The Resurgence of Rinderpest," *World Animal Review*, special supplementary issue (Rome: FAO, 1983), pp. 5–10.

59. Pingali, Bigot, and Binswanger (n. 49 above), p. 11.

60. Bates (n. 7 above), pp. 45–61.

61. Hart (n. 2 above), pp. 142–45; Due, "Agricultural Policy in Tropical Africa" (n. 5 above).



CITIES AND ECONOMIC DEVELOPMENT

*From the Dawn of
History to the Present*

PAUL BAIROCH

Translated by Christopher Braider

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