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## Gendered impacts of fertilizer subsidy removal programs in Malawi and Cameroon

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### ABSTRACT

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Since the early 1980s, development experts and donor agencies have agreed on the importance of structural adjustment programs (SAPs) aimed at ‘getting prices right’. Adoption of reforms were made preconditions for new loans or grants in many sub-Saharan African countries. In both Malawi and Cameroon, one such required reform was government’s eliminating fertilizer subsidies to the small farm sector, previously used to increase the profitability of intensive agriculture while keeping food prices artificially low. The aim of this paper is to review fertilizer subsidy removal programs for their impact on farmers, who in sub-Saharan Africa are women. In theory, SAP programs should benefit women producers, because much emphasis is placed on renewing agricultural production and aligning farmgate prices with world prices. But in practice, will they benefit? Are SAPs gender-neutral and affect men and women equally, or merely gender-blind?

### INTRODUCTION

Since the early 1980s, development experts and donor agencies have agreed on the importance of structural adjustment programs (SAPs) aimed at ‘getting prices right’. Adoption of reforms – devaluation of overvalued currencies, increases in artificially low food prices and interest rates, privatization policies, wage and hiring freezes, removal of subsidies, and the switching of resources from the production of non-tradables to tradables – were made preconditions for new loans or grants in many sub-

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Saharan African countries. In both Malawi and Cameroon, one such required reform was government's eliminating fertilizer subsidies to the small farm sector <sup>1</sup>, previously used to increase the profitability of intensive agriculture while keeping food prices artificially low (Timmer, Falcon and Pearson, p. 288). The argument was that only when total fertilizer use is low and the ratio of incremental grain yield to fertilizer application is high can such subsidies be cost-effective, relative to higher output prices or greater food imports.

The aim of this paper is to review fertilizer subsidy removal programs for their impact on farmers, who in sub-Saharan Africa are women who provide 46% of agricultural labor, on average, and produce most of the food crops (Dixon, 1982). In theory, SAP programs should benefit women producers, because much emphasis is placed on renewing agricultural production and aligning farmgate prices with world prices. But in practice, will they benefit? The question is: are SAPs gender-neutral (i.e., affecting men and women equally), or merely gender-blind (i.e., ignoring the impacts on women and assuming them to be the same as on men)?

Elson (1991) claims there is a male bias in the macroeconomic thinking behind SAPs because the focus on monetary aggregates masks a hidden set of assumptions concerning human resources and their allocation to production. Human resources are treated as if they were costlessly transferable between different activities and different crops. This ignores the sexual division of labor which determines that some sorts of work are suitable for women but unsuitable for men, expressed in rules which require African women to provision the household with food while men control export crop production. This can present a barrier to SAP goals of reallocating resources – women's labor and land in Africa – from the production of non-tradable subsistence crops to tradable export crops. To the extent that SAPS are successful in switching resources from non-tradables to trad-

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<sup>1</sup> In Malawi, USAID negotiated a 1985 Economic Policy Reform Program (EPRP) with two reforms (subsidy removal and substitution of high analysis for low analysis fertilizers) and \$15 million to be disbursed over three years (USAID, 1990). After initially cutting the subsidy from 29% to 17%, in 1987/88 the government refused to cut the subsidy further, claiming that transportation cost increases, the infusion of hungry Mozambique refugees, and lagging maize production required an increase in subsidy to moderate fertilizer price increases. USAID then cancelled the EPRP without releasing \$5 million. Subsequently, the price of fertilizer has increased 50%, although the subsidy has remained at 24% of delivered cost. Cameroon started a Fertilizer Subsector Removal Program (FSSRP) in 1988, when the subsidy was cut from 65 to 45%, decreasing government expenditures from 6 to 2.4 billion (10<sup>9</sup>) CFA. It was projected that the subsidy would decrease to 30% in 1989, 10% in 1990, and 0 in 1991. Because it takes a while for fertilizer to filter down to the farmer, however, fertilizer price increases had not yet occurred in December 1989, when this study started.

ables, women lose out as more powerful men control the profits that result from the added incentives to produce tradables or export crops.

If this is true, then what macroeconomic policies and SAP reforms should be changed? In this paper, I argue against the removal of fertilizer subsidies, at least for women farmers growing food crops. Section 1 shows that even with fertilizer subsidies, fertilizer use is very low and women are just starting to use it on food crops in Malawi and Cameroon. A further decrease of the fertilizer subsidy would eliminate its use on food crops, because lack of cash and imperfect credit markets are the main constraints limiting women farmers' use of chemical fertilizer. Section 2 explores government's other options to allow women access to fertilizer, e.g., an increase in food product prices to offset the increased price of fertilizer after subsidy removal and/or an expansion of women's credit clubs; and finds that women farmers, especially female headed households, are often net buyers of food and too poor to want credit. Section 3 concludes that these options, while desirable in the long run, are not substitutes for making fertilizer cheaper now via a subsidy targeted at women. If government wants to preserve food security and encourage more fertilizer use on food crops, then it should target fertilizer subsidies at women farmers who produce food crops.

## 1. CONSTRAINTS TO FERTILIZER USE

Data on fertilizer use from both Malawi and Cameroon show that it is very low: on average one 50-kg bag per hectare is applied. Malawi data in Table 1 from 501 households show that female-headed households use significantly less fertilizer (34.4 vs. 51.3 kg/ha) and have smaller farm size (0.8 vs. 1.33 ha) than male-headed households. Data personally collected from 36 households in Anglophone and Francophone Cameroon agree: average fertilizer use is 52 kg/ha, still lower on maize (30 kg/ha), because

TABLE 1

Differences between male and female-headed households, Blantyre, Lilongwe, and Kasungu Districts, 1986/87

	Male H/Heads	Female H/Heads	<i>t</i> value	Prob.
Number farmers	349	152	—	—
Total fertilizer (kg)	72.41	30.24	5.18	0.0001
Fertilizer use (kg/ha)	51.28	34.41	2.29	0.011
Landholding size (ha)	1.33	0.80	7.84	0.0001

Source: Malawi Rapid Fertilizer Survey, 1987.

two-thirds of the women interviewed (in the Anglophone North-West province) use no fertilizer at all.

One reason farmers apply such low levels of fertilizer is that they increase its use until the ratio of the marginal product of fertilizer to its real price ( $p_{\text{fert}}/p_{\text{maize}}$ ) is not 1 but greater than or equal to 2 (Timmer, 1974, p. 200). The ratio is usually 2 or more because farmers cannot base their decisions to use or increase fertilizer on the criterion of profit maximization alone. They also face constraints such as lack of cash, credit, knowledge of how to apply fertilizer, and risk. Another reason stems from the nature of the sexual division of agricultural labor in the African household (Gladwin and McMillan, 1989). Although allocation of labor rules vary across regions, even within the same country, in Malawi and North-West Cameroon women produce the subsistence crop maize, and men produce a cash crop: tobacco and hybrid maize in Malawi, and coffee and cocoa in Cameroon. In Malawi, women produce 'local' maize which is 90% of total maize production and groundnuts as a cash crop; in Cameroon, women produce only the food crops of maize, yams and beans. The very nature of this division of labor often leaves women without any cash with which to buy fertilizer for subsistence maize. Either they are dependent on their husbands or sons to buy fertilizer for them, or they must take some food away from the family to sell, to buy fertilizer for the next season. This is very hard for women to do; it is impossible in a maize-deficit household, i.e. one which regularly produces less maize than it consumes. The result is that men buy fertilizer for women's maize if they have the money after buying fertilizer for their own cash crop, and women apply little or no fertilizer on subsistence maize.

### *Constraints limiting fertilizer use*

It is necessary to show a link between imperfect credit markets and women farmers' low use of fertilizer. Multiple regression analysis, with results shown in Table 2, shows the link between smallholders' lack of cash and/or credit and their individual fertilizer use. The data set was from Malawi's Rapid Fertilizer Survey of 1986/87, carried out as a supplement to the Annual Survey of Agriculture, and consisted 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).

Regression analysis is not used here to show causality, but merely the link between the quantity of fertilizer,  $CFERT$  (or quantity per hectare,  $CFHA$ ) and five independent variables. These include: the quantity of land

TABLE 2

Regression on quantity of fertilizer per hectare (CFHA), Blantyre, Lilongwe and Kasungu, 1986/87

Indepandant variables	<i>B</i>	<i>t</i>	<i>P</i> -value
Intercept	100.97	12.37	0.0001
AREA	-0.19	-5.25	0.0001
CURCLUB1	36.33	4.50	0.0001
NOCASH	-85.99	-12.33	0.0001
GENDER	0.73	0.11	0.91
CMANURE	21.25	2.45	0.0146
<i>N</i>	498		
<i>F</i>	57.79		
<i>R</i> square	0.369		
Signif. <i>F</i>	0.0001		

Source: Rapid Fertilizer Survey, 1987.

cultivated (AREA), a dummy variable representing the farmer's participation in a credit club described in the next section (CURCLUB1), a dummy variable which 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 which is 1 if the farmer is male and 0 if female, and a variable CMANURE representing application of manure/compost which may either be a substitute or complement for 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 parastatal 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 (Nyondo, 1987, pp. 116-126).

Results in Table 2 show that, as expected, access to credit has a very significant and positive effect 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, probably for two reasons. First, wealthier smallholders can afford to buy chemical fertilizer and also enough animals to make manure. Second, farmers report that their soils need both chemical and organic fertilizers: chemical to provide nitrogen and organic to help soil structure. The amount of land cultivated is linked positively with the total quantity of fertilizer (CFERT); while it 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. An alternative explanation for this result is that farmers try to overcome smaller landholdings by using more fertilizer, given they can overcome the NOCASH constraint.

Note that all variables except gender are highly significant ( $P = 0.0001$ ). Then why have we included gender as an independent variable? Just to show it has no *direct* effect on fertilizer use: 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. But without access to credit or cash, women household heads apply less fertilizer than men, and get lower yields and incomes as a result (Due, 1991).

## 2. ALTERNATIVE POLICIES TO A FERTILIZER SUBSIDY: WILL THEY WORK FOR WOMEN?

With fertilizer subsidy removal, there will be little or no fertilizer bought by women farmers who are the smallest of the smallholders, because lack of cash and credit are the main constraints limiting their use of chemical fertilizers. Women's lack of fertilizer use means they cannot now intensify subsistence maize production and raise factor productivity; in the future, this may jeopardize the high level of food self-sufficiency traditionally enjoyed in both Malawi and Cameroon (Goheen, 1991). Government will then have to import maize, the main subsistence crop, or suffer greater levels of malnutrition, and the cost of importing maize may be greater than the cost of subsidizing fertilizer.

But, counter the subsidy removal advocates – usually found in the World Bank, USAID, and Ministries of Finance – one way to offset the rising price of fertilizer after subsidy removal is to increase producer prices of food and cash crops which are kept artificially low. It is true that producer prices are kept artificially low: in Malawi in 1986/87, maize prices had been low relative to other cash crops, e.g., tobacco, cotton, groundnuts. In Cameroon in 1989, farmgate prices of coffee, used by smallholders to buy fertilizer for maize and coffee, were one-third to one-half of world coffee prices.

Unfortunately, governments are more likely to decrease fertilizer subsidies than to increase artificially low producer prices, because since colonial times, paying farmers less than the world price has been the way African governments tax farmers (Bates, 1981). In 1989, for example, the Cameroon government was in the 2nd year of a Fertilizer Subsector Subsidy Removal

Program, but it also cut farmgate coffee prices in half in December, to keep them at one-third the world price. Thus farmers were faced with a double whammy: a 100% decrease in producer prices and a 50% increase in the price of fertilizer.

Even when government does increase producer prices, as the Malawi government has done with maize prices since 1987, increasing the price of maize cannot by itself substitute for keeping the price of fertilizer low, as most smallholders do not sell maize and are in fact net buyers of maize. Peters and Herrera (1988) claim that less than 15% of Malawi's smallholders are fully self-sufficient in maize production. Lele (1989, p. 16) terms the structure of Malawi's agriculture a "dualism-within-dualism" structure, whereby the small farm sector is distinct from the large "estate" sector and smallholders are split into two groups: a minority who have a farm size large enough "to produce a marketable surplus and capable of taking risks and a preponderant majority experiencing stagnation or near economic paralysis." Increasing the producer price of maize will thus be detrimental not only to the urban poor but also to the rural majority who buy maize. According to Harrigon (1987), the only hope of increasing their incomes is to encourage their use of fertilizer on subsistence (local) maize varieties, so that more of their land can be taken out of subsistence and planted to cash crops. Is this being done? No, 1984–1990 data show hectareage is stable in local maize varieties and the supply inelastic (0.07) (USAID, 1990). For farmers unable to "withdraw" into autarky or an "economy of affection," higher food prices can hurt (Hyden and Peters, 1991).

#### *Expansion of credit facilities: a policy alternative?*

Similarly, government's expansion of credit facilities, desirable in the long run, is not a good policy alternative to a fertilizer subsidy targeted at women in the short run. Why not? To answer this question, smallholders' decisions to join a credit club were modeled with discrete, deterministic 'decision tree models' after personal interviews with 39 farmers in Malawi in 1987 (Figs. 1 and 2) and 36 farmers in Cameroon in 1989 (Fig. 3) <sup>2</sup>. The tree model is a qualitative research method which combines in a logical order the reasons – decision criteria (< >) – why some farmers choose one

<sup>2</sup> The samples personally interviewed in both countries were chosen by snowball sampling and are fairly representative. In Lilongwe, Kasungu and Salima districts, Malawi, 33 of 40 were household heads, 26 farmers were credit club members, and 14 were not; 22 farmers got credit for fertilizer in 1986/87, while 18 did not; 17 farmers were women household heads, 20 were male heads, and three were couples interviewed together. The Cameroon sample included 21 women, 14 men, and 1 couple in both Anglophone (Kom area) and Francophone (Dschang area) Cameroon.



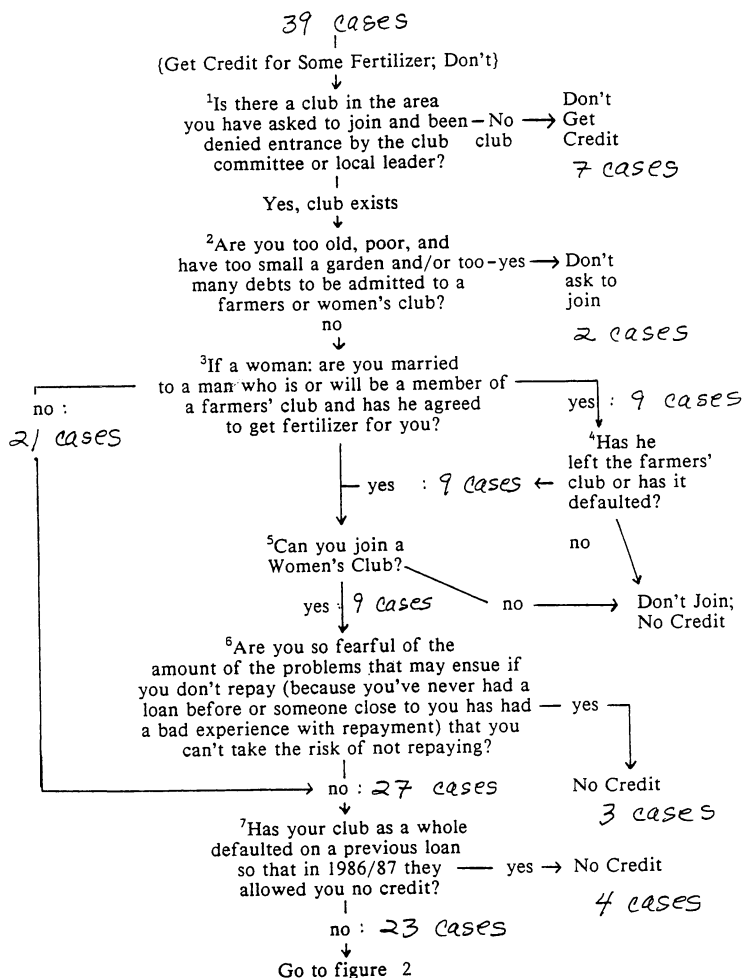


Fig. 1. Malawi farmer's decision to get credit for some fertilizer.

alternative, e.g. [get credit for fertilizer], while others decide to “go down another path” and choose another outcome, e.g. [buy it with cash] (Gladwin, 1989). Because the decision criteria are elicited from farmers in open-ended interviews, they can be used to identify farmers' constraints as perceived by the farmers themselves. A test of the model is provided by comparing the outcome ([ ]) chosen by the farmer with the outcome that the model sends him/her to, based on his/her responses to the questions in the criteria.

The first seven criteria in the tree in Fig. 1 are ‘elimination-by-aspects’ criteria that rapidly eliminate a farmer from getting credit via a farmers’

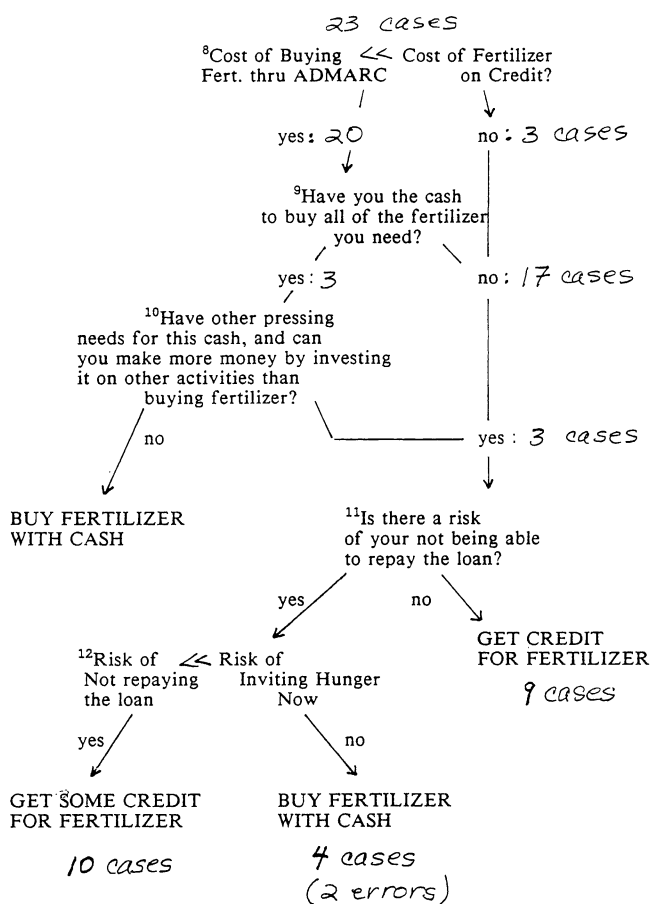


Fig. 2. Stage 2 of Malawi farmer's decision to get credit.

club which reach 25% of Malawi's farmers, or a women's club, organized by the Women's Programme. They include conditions such as: the farmer is rejected for admission to a farmers' club by other club members (criterion 1); the farmer is so hopelessly poor that he/she expects to be denied entrance to the credit club so won't even try to join (criterion 2); the (woman) farmer is married to a member of a farmers' club and he by law must get the fertilizer on credit for her (criterion 3), unless he (or his whole club) has defaulted on a previous loan and now cannot receive credit (criterion 4); there is no women's club in the area which gives credit for fertilizer directly to the women (criterion 5); women lack confidence in or familiarity with credit clubs so that they won't take the risk of not repaying the loan (criterion 6); the farmer or his/her whole club cannot now receive

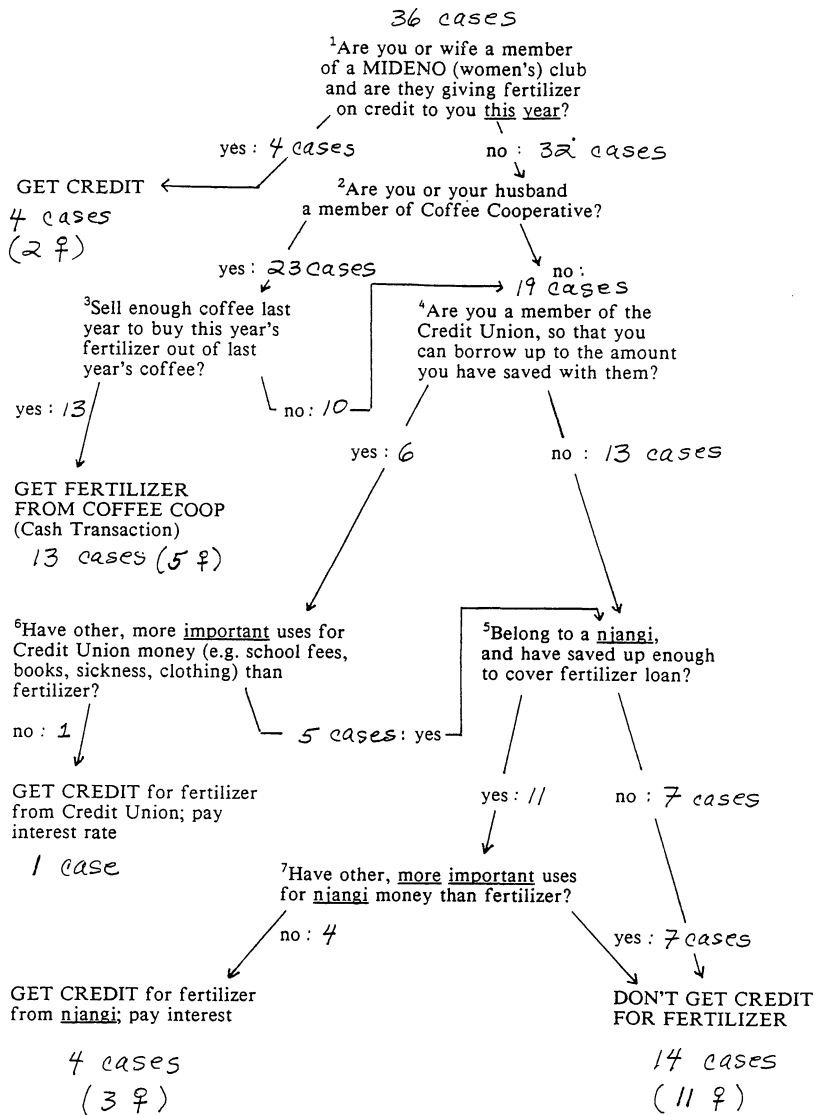


Fig. 3. Cameroon farmer's decision to get credit for fertilizer.

credit due to a previous default on their part (criterion 7). If any of these conditions holds, credit as an option is eliminated for the farmer.

If the farmer 'passes' these constraints successfully, he or she passes to the 'ordering aspect' in criterion 8, on which he or she qualitatively minimizes the cost of acquiring fertilizer. The tree model is thus a discrete version of 'maximization subject to constraints', the common choice princi-

ple of micro-economics. If the cost of buying fertilizer is much less than the cost of getting it on credit, the farmer 'goes down' the left hand path of the tree. The farmer then buys fertilizer if: he/she has enough cash to buy all the fertilizer needed (criterion 9) and he/she hasn't other more pressing needs for the cash such as school fees, clothing, etc. (criterion 10); or he/she has other uses for the cash so needs the credit, but thinks there's a risk of not being able to repay the loan (criterion 11), and this risk of non-repayment is greater than the risk of 'inviting hunger' if you grow maize varieties (local or hybrid) without fertilizer (criterion 12). Why is not repaying a credit loan so risky? Farmers in default report that club members and extension agents steal their animals, oxcarts, and even the doors and roofs to their houses to hold until the farmer or a family member repays the loan.

On the other hand, the farmer 'goes down' the right hand branch of the tree and gets the credit for at least some of the needed fertilizer if he/she thinks there is little difference in the costs of acquiring fertilizer or he/she does not have all the cash needed to buy it or has other more pressing needs for this cash and can also pass the risk constraints. The farmer will take the risks of credit, i.e., of not being able to repay the loan, if he/she thinks "you invite hunger if you grow local maize without fertilizer", and judges the danger of hunger to be greater than the danger of not being able to repay the loan (criterion 12).

Of what use is the model? By illustrating the reasoning farmers use to make this decision, the model identifies the main factors limiting credit use, and for the purposes of this paper, the major constraints limiting women's credit use. In this sample, these are: lack of a credit club in the village (4 women), fear of not being able to repay the loan (3 women); and being too old or poor to want credit (2 women). Half of the women in the sample thus eliminate the credit option rapidly, in the first stage of the decision process, without considering aspects of cost or riskiness. I conclude that there are too many constraints on women farmers for much credit expansion to be feasible in the short run. Although desirable in the long run, it is not a good policy substitute for a fertilizer subsidy targeted at women in the short run.

#### *'Credit' decision in the Cameroon*

Cameroon farmers do not process the same decision criteria as do Malawians, when deciding whether or not to get credit, because there are practically no credit clubs in Cameroon. Of 36 farmers interviewed, 32 say no to criterion 1, "Is there a club in your area that you can join," in the information-processing model of Fig. 3. Only four farmers interviewed in

Cameroon reported receiving MIDENO government credit; two of them belonged to a MIDENO women's club. In 1989, they had received their first credit for fertilizer.

But there are other options called credit, supplied through the local coffee cooperative (criterion 2, figure 3), the local credit union (criterion 4), or the indigenous *njangi* or *tontin* systems of saving (criterion 5), to which almost every Cameroonian belongs. Members of the local coffee cooperative sell their harvested coffee in January and receive their next year's fertilizer at the same time, to be applied in February thru April to both coffee and maize (criterion 3). This is called 'credit' but strictly speaking, this is a cash transaction, and the cooperative does not give more fertilizer than can be paid for with last year's coffee. Members of local credit unions save on a monthly basis for a year and borrow against that collateral during the second year; but they cannot borrow more than what they have saved. Members of an *njangi* can do the same, i.e., build up their collateral to borrow during the 2nd year, or put money into a common pot every month to receive twelve times that amount once a year. With these sources of 'credit', more men get credit from the coffee cooperative (8 of a total 13), and more women do not get credit (11 of a total 14). This is because women in some regions (the Northwest) are not allowed to raise coffee for sale, and so do not have a cash crop to save up enough *njangi* money to cover a fertilizer loan.

### 3. CONCLUSION

Policy options are limited for African governments trying to juggle SAP requirements with women farmers' demands for affordable fertilizer as a way to intensify food production. This paper has shown that policy options that work for men farmers – an increase in producer prices, an expansion of credit – do not often work for women farmers, because they tend to be net buyers of food who suffer when food prices rise, producers of subsistence and not cash crops, and too poor to want credit. To the extent that SAPs are successful in switching more resources from non-tradables to tradables, women will be unable to get access to fertilizer to grow their non-tradable crops more intensively. Is there a solution to this dilemma? One solution is to target fertilizer subsidies at women farmers for food production. This can be done via women's credit clubs, like those of MIDENO in Cameroon and the Women's Programme in Malawi. Government can strengthen each women's club's 'revolving credit fund', used to bail out individual defaulting members, by giving the club a small amount when a club member supervises the application of subsidized fertilizer on another's farm. Credit clubs can thus serve not only to expand credit but

also to supervise the proper use of subsidized fertilizer bought with cash. Will there be too much leakage of this subsidy from women's food crops to men's cash crops? The answer comes from one Cameroonian who allows his wife to fertilize her maize while he neglects to fertilize his coffee: "I don't like to be hungry."

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