

**A Study of Women's Access to Agricultural Production Inputs in
Murang'a District, Kenya**

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A Study of
Women's Access to
Agricultural
Production Inputs in
Murang'a District,
Kenya


**A thesis submitted in partial fulfillment for the degree of Master of
Science in Agricultural Economics at the University of Nairobi, 1988**

This thesis is my original work and has not been presented in another university

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Abstract

This study looks at women's access to agricultural production inputs in the small scale sector. Field work was carried out in Murang'a District. It was postulated, as a basis for research, that among the factors causing low farm inputs is inequalities in access to production inputs by the women. This postulation was investigated.

The study found that women face differential access to production inputs of credit and purchased inputs, relative to men, while female managers obtain less amounts of extension, purchased inputs and credit than joint managers. Female-Managed farms have been found to produce less output than jointly managed farms.

The findings reveal that separating families leads to low output levels and women managed farms are disfavoured in the delivery of inputs factors, which if corrected, may help raise food production.

Women were found to be active in agricultural production. They were the major participants in contact farm demonstrations and also formed numerous strong informal credit groups.

Chapter One

BACKGROUND TO THE STUDY

1.1 The Importance of Women in Agriculture

Agriculture is the backbone of Kenya's economy. Its contribution to Gross Domestic Product in the last decade averaged 30 per cent. Agricultural products constitute about 70 per cent of our exports and are the major foreign exchange earners. About 75 per cent of the labour force is engaged in the agricultural sector, and derives its livelihood from there. (ROK, 1983) The vast majority of Kenyan women, some 88 per cent of the total, reside in rural areas and most of them are economically active (CBS, 1983). Agriculture will therefore remain the main focus for Kenya's development for quite some time.

The World Conference on Agrarian Reform and Rural development (WCARRD, 1979) has referred to the urgent need to expand knowledge and statistics about women's roles in this important sector. Much of women's work is unlikely to be enumerated because it falls outside the cash economy, or is home-based, or seasonal. However, estimates of the time rural women spend on a variety of production activities in Africa show that women contribute two-thirds of all hours in traditional African agriculture (ECA, 1975; AFRACA, 1984), and three-fifths of hours spent in marketing (ECA, 1975).

According to Omondi and Standa (1984) Kenyan women provide 60 - 80 per cent of the labour required in food and cash crop production. The fifth development plan (CBS, 1983) acknowledges that women traditionally contribute most of the labour required for cultivation of food crops on family holdings, and increasingly on cash crops' production.

Women in Sub-Saharan Africa are the primary labour force on small scale farms. Men tend to do the heavier jobs of land clearing, fencing, preparation and trimming crops. Women share equally in planting and in the care of domestic animals. Women, however, hoe, weed, harvest, transport, store, process and market much more than men do (see table 1-1).

Farm women use few of any modern tools or implements. While technology raises the productivity of male tasks such as ploughing, women's work load in weeding, harvesting and post-harvest processing increases disproportionately. Moreover, tasks that are typical for men become more acceptable for women to do when men migrate to find work and when children spend more time in school. Their work load thus increases as "development" takes place. (Boserup, 1970; Mead, 1976)

Table 1.1 Division of Rural Labour by Task and Sex - All Africa
Percentage of total hours spent on each task

Activity	Men	Women
Cuts down forest; stakes out fields	95	5
Turns the soil	70	30
Plants the seeds and cuttings	50	50
Hoes and weeds	30	70
Harvests	40	60
Transports crops home from the fields	20	80
Stores the crops	20	80
Processes the food crops	10	90
Markets the excess	40	60
Carries the water and the fuel	10	90
Markets the excess	40	60
Cares for the domestic animals	50	50
Hunts	90	10
Feeds and cares for the family	9	95

Source: "UN Handbook on Women in Africa - Today and Tomorrow". ECA Addis Ababa, 1975

Women provide the labour involved in small-scale animal production which is important in improving the diet of the rural poor. They have most responsibilities in poultry, goats, pigs and rabbit keeping. Studies in Egypt, Pakistan and Swaziland show that 80 - 100 per cent of village women keep poultry, while in Egypt and Jordan it has been estimated that 70 - 75 per cent of the women care for goats (FAO, 1985a). Women also collect feeds and fodder for animals. They often milk animals, process the milk and market it locally.

Women play a major role in food storage and processing. They make decisions on when, where and how to store grain. They process food, especially for family consumption, with few or no modern aids. Typical work includes cleaning, threshing and grinding grains or drying fish. In some places, the village

women share these tasks. Sometimes it can take hours to process grains for cooking. In addition, women also process food exports and cash crops. They may be involved in drying coffee beans or packaging french beans as is done in Kenya.

Rural women are traders almost everywhere. Erozer (1983) points out that commodity transportation, storage, processing and marketing are virtually women activities in Sub-Saharan Africa. Under subsistence conditions, as prevails in many small holdings in Kenya, most of the marketing responsibility is taken by women (Ackello-Ogutu, 1987). Kenyan women trade in maize, beans, fish and bananas, among others. The participation of women in marketing is

generally greatest where trade is traditional and not highly commercialized or industrialized. However, in cases where households are headed by married women, marketing is done entirely by them (Ackello-Ogutu, 1987).

The rural women's contribution to development is greatest in the household. The women have become directly responsible in ensuring a continued and healthy labour force. Schumacher *et. al.* (1980) have argued that increase in women's productivity and income, much more than men's, result in increased family welfare. Women's household roles include food preparation and often provision, domestic cleanliness, collecting fuel, and child and husband care, among others. This is also noted in the fifth development plan which says that even when women are not busy with outside economic activities, they are occupied in household duties which also contribute to the living standards of the households (CBS, 1983). Schumacher (1980) further argues that the men's economic responsibility has diminished over time. With marital dissolution and abandonment, rising poverty, male unemployment and male labour migration, the economic responsibility for poor households in many cases has been thrust wholly on women.

1.2 Government Recognition of the Role of Women

The Kenya government has recognized the important role women play in the country's development. This is manifest in its establishment of the Women's Bureau in the Ministry of Culture and Social Services. The bureau was established in 1975 with the broad objective of ensuring equality of opportunity for women in the development process. Today it is charged with the work of co-ordinating various women's groups and projects, and addressing various other needs of women in the country. Its other objectives include mobilizing women for socio-economic activities, and creating awareness of the potential and actual position of women in national development and obstacles to their advancement in society.

A number of other women's movements are affiliated to the government, notably Maendeleo Ya Wanawake. This is the apex non-governmental organisation that brings together most women's organisations, while working in liaison with the Women's Bureau. It has been directly responsible for the establishment of various women groups all over the country. There are also a number of other non-governmental organisations which support the cause of women. These include the National Council of Women of Kenya and the Kenya Energy and Environmental Organisations Association, among others. Of much importance also is the recently established Kenya Women Finance Trust that is expected to help women obtain credit.

Women, however, remain a discriminated majority in Kenya and in many other parts of the world. The current and past practice of land ownership and inheritance is exclusively by males in most parts of the country. The government recognizes customary laws, which often relegate to women an inferior position in property ownership. In addition, land adjudication has resulted in men obtaining title to land while women are left without any right of ownership.

In education, the ratio of males to females reveals that men get an early advantage over their female counterparts. Table 1-2 shows the ratio of males to females in the country's major educational institutions. It reveals that the ratio progressively moves in favour of males as level of education rises.

In the modern sector jobs, there are few women as one goes up the ladder, even in government ministries. Indeed there is only one woman Permanent Secretary and none in the Cabinet. Although not reflected in the written laws, such government bias on women reflects the view of the society as a whole, and even reinforces it, at a time when women are fighting for changes.

**Table 1.2 Number of Students in Major Educational Institutions
-1986**

	Male	Female
	'000	'000
Primary Schools	2,512	2,330
Government Maintained Secondary Schools	269	189
University	7	2

Source: C.B.S. Economic Survey - 1987

Women's exclusion from the administrative and political mainstream may reduce government accountability to them and even lessen commitments to deliver services equitably.

Government discriminatory tendencies towards women existed even in pre-independent Africa. According to Boserup (1970), European settlers, colonial administrators, and technical advisors are largely responsible for the deterioration in the status of women in the agricultural sector in developing countries. It was they who neglected the female agricultural labour force when they helped to introduce

modern commercial agriculture to the overseas world and promoted the productivity of male labour. Through their discriminatory policy in education and training, the Europeans created a productivity gap between males and females, a gap that has persisted to this day.

1.3 Statement of the Problem

1.3.1 Introduction

The major concerns of development policies in Kenya are increased economic growth, and reduction in poverty, unemployment and inequalities (CBS, 1978; CBS, 1983; ROK, 1965). The government has put emphasis on the development of rural areas, where most people live, so as to achieve these objectives. Some of the stated government policies to this end include attempts to facilitate women's self-employment activities (CBS, 1983). It is in this context that the role of women in development is gaining significance. Special focus in this study is on improvement of women's productivity in food production. It is worth noting, as did Pala (1974), that the important point in women studies is the serious loss of potential brought about by neglecting the role of women in agriculture and food production.

Despite their important role in agricultural production, women have continued to be ignored by statistics and thus development planners in developing countries. According to an FAO (1985b) article, better information about women's situations and their multiple

roles would help agricultural policies, programmes and projects achieve greater agricultural productivity and national food self-reliance while also supporting socio-economic goals. Several other studies have called for increased statistics on women in agriculture (WCARRD, 1979; Jaquette, 1985; FAO, 1983).

1.3.2 Access to Inputs

“Differential Access” is the World Bank’s description of the situation where women enjoy fewer opportunities than their male counterparts, and do not share equally in project benefits (ACC, 1985). It also includes the situation where women cannot take advantage of existing opportunities due to problems inherent on gender, like time constraints, among others.

Moock (1973) and Staudt (1976) found that women farmers received less extension services and used less fertilizers than the men did. Their studies were carried on in the Western Province of Kenya. Boserup (1970), in analysing several data from various countries, concluded that women’s relative productivity was likely to fall as a result of using less mechanized inputs than the men. Differential access is therefore believed to exist in several countries. This study examines a sample of farmers in Kenya’s Central Province to find out whether differential access to various inputs does indeed exist, and if it does, what its effect on relative productivity is in this particular area.

Differential Access to farm inputs may be related to the fact that most Kenyan women do not hold title to land. They are likely to obtain relatively less credit than the men, although there are hardly any studies that give the relevant details about this. This study looks at exactly how much credit is available to all farmers, and to women in particular, in the area of study. It also enquires as to how women deal with the problems of differential access to various inputs, where they are found to exist, and suggests how these can be dealt with from a policy point of view.

Along with credit, this study looks at the extent of women's access to extension education and purchased inputs of hybrid seed, fertilizer and pesticides, all of which are hypothesized to increase agricultural output and food production in particular.

1.3.3 Female - Managed Households

Female-managed households, in this study, refer to all those households where women are in charge because husbands live away from the farms and only go home periodically, usually at the end of the month, or where women are divorced, widowed or not married. Further we have used the terms female-managed and female-headed interchangeably. We have also defined jointly managed farms as those farms where both husband and wife are resident on the farm on a regular basis.

About 33 per cent of households in Kenya are headed by women (Women of Kenya, 1985). This may be a result of widowed or unmarried women, but more so a result of male emigration to the urban areas. If women are discriminated against in access to production inputs, female headed households are likely to have lower agricultural productivity of both food and cash crops than male headed ones. Another likely problem is that female headed households lose an important source of labour and income as a result of male migration. They are also left as sole decision makers, where decision making by both husband and wife may be beneficial. Male migration could therefore leave the rural female managers poorer than other people. It is for these reasons, and the likely problems implied that this study examines a sample of women headed-households.

1.3.4 The Advent of Cash Cropping

The introduction of cash cropping as a means of development has contributed to lowering the woman's productivity, relative to man's, and could possibly undermine development programs (Tinker and Bramsen, 1975). The introduction of cash crops into Kenya has tended to divide agriculture into two sectors, subsistence and commercial farming, even in small holdings. According to Smock (1981), despite the food crops area being assigned to the woman, and the cash crop area to the man, women actually contribute most of the labour for both food and cash crop production. Men often retain the income from the sale of cash crops regardless of their wife's labour input, and can use

such earnings to invest in the improvement of cash crop production. According to Monsted (1977), women still retain the responsibility for providing for their families through the production of food crops, and men rarely contribute income from the cultivation of cash crops for this purpose.

This study attempts to find out whether this is actually the situation and whether sole women managers have equal access to farm inputs as do the joint managers. Where this is the situation their productivity and incomes will continue to rise while those of women managers continue to decline. This study, however, concentrates on women in food production, since this is where their efforts are concentrated.

Chapter Two

LITERATURE REVIEW

The role women play in agricultural development is gaining importance as a discussion topic, but little empirical work has been done on it. In Kenya, the few studies that have been carried out include works by Hanger (1973), Pala (1975), and Staudt (1976).

2.1 Local Literature

In 1973, Hanger completed a study that was primarily concerned with female labour shortages and female participation in the farm household. Her main assumption was that the part women could play in the development of the rural areas had been an undervalued and almost untapped resource. She says that because of limited access to inputs in agriculture, where they make the bulk of the labour force, women might be a hindrance to development.

Hanger's research was carried out in two areas, Buganda in Central Uganda and Embu in Eastern Kenya. A small number of households, twenty in each area, were studied in detail particularly with regard to women's time allocation and their place in decision making. The case study approach was used so that the depth and intensity of knowledge gained would compensate for the lack of an extensive sample.

Hanger found that the women's labour supply was not unlimited, contrary to the then held view that labour was abundant in developing countries. While women were not under pressure of work at all times of the year, during the planting and weeding seasons and in some instances during harvest time, there was more work to be done than the female labour force could cope with.

Women farm workers in Hanger's study did not see farming as their only responsibility, and cash crop work was often regarded as less important than other demands on their time. Work on food crops was much more important to them and took precedence over some household tasks. During periods when pressure of farm work was high, some non-essential household and farm tasks were postponed or left undone.

In the areas studied, women had an important place in farm decision-making. The presence or absence of the husband seemed to affect whether they had control only in household and food crop affairs, or were also responsible for the cash crops, and other farm matters concerned with income. According to Hanger, a woman's decision-making is governed, to a certain extent, by what she herself or her children will receive from each of the alternative choices. When the wife and her children will not benefit from the work done or the decision made, even indirectly, she will be less willing to agree to such a course of action.

The women's actions were found not to be governed by economic considerations. They sold surplus food crops as soon as they were harvested, even though prices would improve later in the season, and they hardly tried to save for the future. However, what seemed to be uneconomic action often turned out to be the only course possible because of debts to be repaid and other immediate cash needs.

Hanger found that very few of the farms had been affected by agricultural extension services. Most farmers had not implemented recommended farming methods. However, in Embu it was found that coffee husbandry tended to be better than that of the rest of the enterprises on the farms because extension advice concentrated on the cash crop. She felt that improvements in techniques used in food production would not only benefit the family in terms of nutrition and thereon better health, but would also bring in more cash to the farm family.

Due to time constraint, the present study has not included a detailed study of women's time allocation and their role in decision making. Yet these are important factors in understanding the role of women in development. Indeed, they may be important contributing factors to the present state of women's access to agricultural inputs. We therefore draw heavily on Hanger's work by accepting her conclusions on time allocation and decision making. We also hope we have complemented her work by studying women's access to agricultural inputs, as an attempt to throw light on one possible area where, as she

says, changes in policy might help bring women more into the development process, by making them a vehicle rather than a hindrance to development.

Hanger's study was carried out in 1973. Many changes have taken place since and it should therefore be updated. Besides, hanger sampled only twenty households, and only those within walking distance from the chief's camp. It is possible that farmers who were further from the chief's camp were also far from the change agents and were therefore significantly different from those sampled. She calls for similar studies in other parts of the country.

Pala (1975), in her paper, "Avenues for and Constraints on Women in the Development Process in Kenya," says that women heads of households who are land owners with substantial acreage can make independent decisions concerning land use, can use the income derived from their land as they see fit and can receive credit from government agencies. However, in situations where women are de facto heads of households, but not land owners, they tend to be bound to a large degree by the decisions of the men who have title to the land. Widowed, divorced or son less, and especially childless, women who are heads of households have a much more insecure status with regard to land questions.

In discussing rural women's reactions to social transformation, Pala points out that women are not resistant to change, as has been alleged. Women, she says, have had to experiment with different seeds

without benefit of outside assistance. And experience in Kenya has shown that women's participation in the functional literacy classes and self-help projects is very high, and that women contribute considerable labour and money to various types of collective projects both in town and in the countryside. Such activities clearly show that women are not resistant to development and new ideas. However, Pala also found that on many occasions women will choose, not out of ignorance or any special resistance to technological change, not to participate in particular development projects when they judge that the disadvantages to them outweigh the advantages. Pala argues that the reasons for their lack of participation in particular projects should be considered by government agents, rather than writing them off as an unreachable group. ✓

On decision making in the rural sector, Pala noted that women in Nyanza can sell farm produce in small quantities freely without consulting their husbands. They also control the income from their own efforts, especially from the sale of produce from their own fields. ✓ However, they have to consult their husbands when large sales are concerned or when sales on jointly controlled farms are concerned. If they happen to trade and make substantial amounts of money, the women have to consult the husbands on how to spend the money, and are expected to contribute to school and hospital fees, and any other emergencies. women may not sell cattle, sheep or goats, although they may sell chicken that belong to them.

In the area of agricultural production, Pala found that women make basic decisions concerning the planting and cultivating of the crops until harvest time. One significant outcome that she, like Hanger, noted is that in situations where a cash crop such as cotton competes for labour with food crops, the cash crop tends to be neglected until work on the food crops is finished. She found that in many cases, women will refuse to work on a crop such as tobacco when they know that they will receive no share of the income earned by the crop.

Pala's work is one of the few empirical works that have been carried out on the topic of women in the development process in Kenya. She has looked at decision making, time allocation and issues on agricultural production in Nyanza. She says of her work that it will be confirmed by findings from other parts of the country. Ecological conditions and levels of development of productive forces in various parts of the country would make the decision making and time allocation to vary. There is therefore, need for further research on these particular issues in other districts. Her important conclusion that women are actually innovative if given the chance, leaves discrimination as a possible reason for the differential access to inputs between males and females and, has been an important starting point for our study.

Staudt (1985) compares female managed farmers with jointly managed farmers' access to agricultural services, to determine whether there are inequities in the delivery of services. Jointly managed farms

are those farms that have a man present. They have not been termed "male managed" because of women's substantial involvement in farm work and decision making, even with husbands present. The women in female managed farms were either widowed or separated from their husbands, who had migrated outside the area for wage employment.

Staudt's study is based on field research carried on in Western Kenya from 1974 to 1975. Survey data is drawn from two hundred and twelve households in two sub-locations of Idakho, Kakamega district. Data on farm diversification are compared for both sub-locations to assess the impact of inequitable delivery of agricultural services. In the study, Staudt compares three levels of extension implementation; ordinary, intensified and saturated. Ordinary services were to be found in Shikulu location only. Participant observation stemmed from her residence in kakamega district for seven months.

Staudt found that forty per cent of her households were headed by females, a figure that is above the national figure of thirty three per cent (Women of Kenya, 1985). She found that under the ordinary implementation, female managed farms were significantly less well served than jointly managed farms on home visits. About half the female managed farms had never been visited, in contrast to only a quarter of the jointly managed farms. Moreover, she observed that women in jointly managed farms had more frequent and direct contact with agricultural instructors than women managing farms alone. She also noted that there were lower attendance rates by women managers

at demonstrations plots than joint managers. However, among jointly managed farms, equal numbers of men and women attended demonstrations.

Staudt's study found that great disparities existed in training at the local Farmers' Training Centre at Bukura. Jointly managed households were four times more likely to have a member trained than female managed farms. In her sample, all acquired loans went to jointly managed farms. These loans were Guaranteed Minimum Returns and Agricultural Finance Corporation loans. However, only two per cent of the farmers had acquired loans.

On the supply of information about hybrid maize and cash crops, female managers received considerably less information from agricultural staff than did joint managers. Less than half of the female managers had direct access to technical information from those trained in agriculture, in contrast to the almost three fourths of persons from jointly managed farms with such access. Most female managers found out about hybrid maize practices from second hand sources.

Similar results were found under the intensified extension area. While both types of farms received more extension visits in the intensified area, disparities still remained between farm management types. This seems to imply that it is not the extension kind that causes disparities among farm management types, rather it is the extension agents themselves who do not reach the female managers.

The present study is similar to Staudt's study in objectives, that is in comparing female managed farms with jointly managed farms' access to agricultural inputs, to determine whether there are inequities in the delivery of services. We have adopted Staudt's term of "jointly managed" rather than "male managed" because of women's involvement in the management of these farms. The study is, however, different from Staudt's study, because her study is eleven years old, and changes in access to inputs have taken place in what is a fast changing society. In eleven years the effects of land adjudication which had just been completed a year before Staudt's study have become more visible. Different extension methods have been tried and different loan schemes have come up. And, the situation may have improved or even deteriorated for women headed households. In addition, Staudt has called for similar studies in other parts of the country to supplement her study. This study has, therefore, been conducted in a different ecological zone and in an area where cash crops are given more prominence than food crops.

Staudt's study was conducted in Kakamega District, Western Province, while the present study is based in Murang'a district, Central Province. While the two districts are similar in that they have high male out-migration and high population density with small parcels of land, differences do occur in the attitudes of men and women and their economic and social relationships, as a result of differing ethnic and cultural backgrounds.

One criticism on Staudt's study which she too acknowledges is on her sampling method. She sampled those farmers that were near the road for ease of travelling. This may have resulted in biased results because the farms near the roads may be the ones the extension agents visit. It is therefore possible that more inland farms, be they female or jointly managed, received significantly less services. There might be no significant difference in access to inputs between the two types of farms in places that are far from the major roads. this study has tried to use a more representative sample.

Moock (1973) studied managerial ability in small-farm production in Vihiga division of Western Kenya. He found that yields are not significantly different between farms managed by men and farms managed by women. However, he concluded that women farm managers are more productive than joint managers, because the male managers are disproportionately well endowed with physical inputs, relative to female managers.

Moock's study is not representative as his sample contained farmers who had been classified as innovative. His whole sample was above average on a number of indicators of innovativeness and wealth.

2.2 International Perspective

Inequalities in access to production inputs and discriminatory policies which burden women with most agricultural work are not confined to Kenya alone. Women in third world countries suffer such inequalities in differing degrees, depending on region.

In Ghana, Bukh (1979) observes that women are tied down in the struggle for day to day survival, and suffer social and economic subordination. She says that women carry out subsistence activities fighting on two fronts: Firstly against the strenuous demands of their productive activities, and then against difficulties in their access to strategic resources such as land, labour, cash, education and know-how, in relation to which men are privileged compared to women from their own social group.

Bukh, however, notes that by combining small scale farming with numerous activities within the flexible frame of the informal sector, women still manage to fulfil their role as providers of family subsistence.

Bukh records the following statement from an interview with a male farmer in her study, and it is one where Kenyan rural women can easily identify with.

“The women are working too hard. In the morning, first they cook, then they go with the refuse, then they clean, wash, make the children ready. Then they go to

farm and work, carry back fire-wood and food crops - which is very heavy work. Then they go for water, then they pound 'fufu' - all the time pregnant or with children on their back. And also the selling at the market for hours. Then the men just come back from the farm and take their bath and sit down. And even if one asks them to go for some water, they will refuse. But if a man doesn't have a wife, he has to do the things by himself, and then he says: 'Oh, the women, they know work'."

Ghanaian women, Bukh writes, do not personally accept their double subordination, but their means of defence are few and limited in scope. Their reactions manifest themselves mostly on an individual basis as personal protests, although there are signs of more organised action.

Sarathy and Rao (1981) discuss the relationship between male wage rates and female wages, and also the association between these wage rates and growth in the Indian Agricultural sector. They point out that there exist a systematic difference in male and female earnings per capita in agriculture and related activities, although the difference varies from region to region. Average earnings of female agricultural labourers are lower than those of male agricultural labourers, but the difference narrows down in districts which are relatively better developed. Operations that fetch higher wages (like ploughing, for

instance) are virtually male preserves and those like transplanting in which women are a higher proportion of the work force bring lower wages.

The authors note that the impact of economic growth on improvement of wage rates of females and on female-male wage differentials depends upon the nature of the development process. Where development results in marginalisation of females by displacing and pushing them into already low-wage crowded sectors while the males are incorporated into the market system and highly productive occupations, the differentials tend to increase. This is the case found in Maharashtra area, and is comparable to the Kenyan case where men migrate to take up better paying urban jobs while leaving the women in the generally unprofitable small-scale agricultural sector.

However, they say, where the process of development is through a shift by raising the rates of irrigation and consequently the overall demand for labour during the peak periods, there is a reduction in the differential.

Wilson (1982) points out that women's position in Mexico has declined due to the penetration of capitalist relations of production. She notes the changing composition of the labour force in agriculture according to gender. Prior to 1965, very few women or children undertook work on the fields. Since 1965, both supply and demand conditions have been changing. With the swelling of domestic labour, a result of socio-economic conditions in Mexico, peasant families have

sent men as migrant workers to the United States of America, and women and children to seek wage work in order to survive. An increasing number of women have thus entered the labour market.

In the strawberry plantations, Wilson notes a marked preference for a female labour force. She writes that “for the laborious, back-breaking job of harvesting, women are considered more efficient than men. More crucially, they can be hired for much lower cost.” The 1974 wage for a day’s work was 35 pesos for a man, and 25 for a woman.

Wilson further points out that the substitution of coffee for cotton cloth weaving exacerbated the women’s dependence on the subordination to their menfolk. Firstly, the labour process was completely altered and women could no longer organise their own schedules so that household and other tasks could be neatly integrated. Coffee, the author writes, depends on intensive inputs of female labour during a third of the year which in restructuring women’s annual rhythm, made child and house care more burdensome. Secondly, women’s relation to the familiar unit was changed. As coffee pickers on the household plot, and unlike cotton weavers, their labour was unremunerated. Women who once enjoyed the status of skilled craftsmen fell to the insecure status of non-skilled manual labourers. The cash or goods paid for the coffee went to the person who initiated the labour process and controlled the land - the man. The author notes that having lost the autonomy of their weaver grandmothers, women appear to be more firmly categorized as domestic slaves. Yet, as she

notes, without the labour of these women in the coffee harvest, the small-scale coffee producing families would not be able to produce. Also, low cost coffee is one of Mexico's principal exports.

Boserup (1970) in "Woman's Role in Economic Development", says that an important distinction can be made between two patterns of subsistence agriculture; one in which food production is taken care of by women, with little help from men, and the other where food is produced by the men with relatively little help from the women. She calls them female and male systems of farming, respectively. And of Africa, she says that it is the region of female farming 'par excellence'.

Boserup's study found that as agriculture becomes less dependent on human muscular power, the difference in labour productivity between the two sexes actually widens; quite contrary to what might be expected. The situation is such that the men learn to operate the new types of equipment while women continue to work with the old hand tools. Men monopolise the use of new and more efficient types of equipment, operated by animal or mechanical power, like tractors and ploughs. They apply modern scientific methods in the cultivation of cash crops, while their wives continue to cultivate food crops by traditional methods. Thus in the course of agricultural development, men's labour productivity tends to increase while the women's relative status within agriculture declines.

The present study looks at another probable cause of the declining position of women's productivity. In addition to machinery use, use of purchased inputs of hybrid seed, fertilizers and pesticides, among other farm inputs are hypothesized to lead to an increasing gap between male and female productivity.

While Boserup's study has remained an outstanding piece, it is over sixteen years old, and therefore needs updating. In particular, Boserup generalizes too much on the case of the developing countries, yet these are diverse with differing cultures and even agriculture. It is, therefore, fitting that more work be done in the specific countries to see if Boserup's findings hold, and whether there has been significant change since completion of her study.

2.3 Theoretical Issues

Two relevant theories in this study touch on adoption of modern agricultural technology and stratification in society.

Leagans (1981) lists several aspects of Adoption of Modern Technology by small farm operators. He associates the adoption process with environmental influences. He says that while adoption behaviour is adult behaviour, and as such, idiosyncratic, the individuality with which agricultural innovations are considered and decided upon is the ultimate manifestation of numerous environmental influences.

He lists communication as a component of adoption behaviour. This is often weak, he says, even when productive technology is its central message. Communication is defined as the process by which one person recommends an innovation to another, with the intent of favourably influencing his behaviour.

He further says that traditional socio-economic factors such as size of farm, owner's age, education, income and family size generally influence adoption behaviour only indirectly. However, he cites money and personalised information as the most significant of the socio-economic factors.

Leagans says that recent researchers reveal a fourth general area - socio psychological factors - which significantly influence the adoption of agricultural innovations. They say that a farmers' incentives and disincentives to adopt are determined by his personal beliefs about the permissiveness of his environment. Optimum adoption of agricultural production innovations is achieved only when a farmer perceives the recommended practices to be, for him, technically sound, economically feasible, physically possible, and socially compatible.

Stratification theory makes a number of assumptions about families; namely, that the family, rather than the individual is the unit of analysis; that the social position of the family is determined by the status of the male; and that the family is a unit of equivalent evaluation and members share the same status rank (Watson and Barth).

Objections to stratification theory that implies that the social position of the family is determined by the status of the male and that family members share the same rank can be raised. Firstly, over 30 per cent of Kenyan households are female headed (women of Kenya, 1985). The social position of such families, and of the women in particular, may therefore not be determined by the men's position.

The assumption of equivalent status between husband and wife is also questionable in the context of the female headed households because of differing occupations, rewards and resource management between husband and wife, which would also imply differing economic standing, or class.

Chapter Three

METHODOLOGY

3.1 Objectives of the Study

A central objective of this study has been to assess whether or not there is significant difference in access to inputs by small scale farmers under different management types. We have also looked at the performance of these farmers and tried to determine whether women farmers have peculiar agricultural production problems inherent on gender as often alleged. The following are the specific objectives of the study.

1. To study the extent of acquisition of extension education, purchased inputs, and credit by small-scale farmers with particular reference to women farmers in Murang'a district.
2. To compare the productivity of female managed farms with that of jointly managed farms, so as to establish whether differential access to inputs, if it does exist, affects output.

3. To establish the role played by the various inputs for the two groups of farmers.

3.2 Questions to be Answered

Answers to the following questions are sought in the study.

1. What is the extent of acquisition of extension education by Murang'a farmers and is there differential access by management type?
2. What is the extent of acquisition of purchased inputs of certified seed, fertilizer and pesticides and is there differential access in the acquisition of these inputs in the area of study?
3. How much credit do Murang'a farmers have access to and is there differential access in this?
4. Do female managed farms yield less output than jointly managed farms?
5. Is there significant effect of extension education, purchased inputs and credit on farm output?

3.3 Area of Study

The area of study is Kandara division of Murang'a district in Kenya. This is one of five divisions in Murang'a district, and it contains six locations and thirty two sub-locations. This study was carried out in two of seven sub-locations in Muruka location.

Most of the land in Murang'a district is high and medium potential farming land suited to cultivation of such crops as tea, coffee, and maize, and livestock rearing. Kandara division, where the study is concentrated, has 33,164 hectares of high potential land while the remaining 3,684 hectares are medium potential areas. (C.B.S., 1983)

The population of Murang'a was 648,333 persons in 1979. Kandara had 181,721 people while Muruka location had 51,668 people. (C.B.S., 1979b) The district population growth rate is 3.83 per cent per annum.

Population pressure on the land has given rise to high male emigration, leaving a large number of female managed farms or households. About 41 per cent of the households in Murang'a are female managed (Women of Kenya, 1985).

Intensive mixed farming consisting of crop and livestock production is the main source of income for about 90 per cent of the people of the district, which is essentially composed of small farms. The main crops are coffee, maize, beans, potatoes and bananas.



3.4 Sampling

The district of study concentration, Murang'a district, has been chosen because it has a high rate of male emigration and therefore, a high percentage of female managed farms. It is representative of Central Province and the coffee zone in particular in terms of levels of agricultural production and output. It is a high potential agricultural area and yet an area with various problems in relation to food production. For instance, it is a net importer of maize which is the staple food. The area has also been chosen because it is relatively far from Western Province where the previous similar studies have been concentrated.

Scientific sampling techniques pose numerous problems when applied to rural Kenya and to many other parts of the developing world. There exist no records of households or farms with adequate farm information that could be used for study. One alternative, therefore, would be to handle these sampling techniques with care and considerable alterations to fit the needs of the various countries.

Choice of respondents in this study faced such circumstances. Multistage sampling was used to first choose the sample areas, and then the respondents themselves. We sampled a total of 64 female managed farms and 64 jointly managed farms. Half of each of these two categories were chosen from each of the two sub-locations.

In the first stage, two sub-locations were chosen randomly out of the seven sub-locations in the division. This was done by mixing the seven names written on evenly folded pieces of paper in a box, shaking them and drawing two names. In the second stage, two of the six contact farmers in each extension area were also randomly chosen in a similar method. Each sub-location contains eight extension areas, with six contact farmers in each such area. Thus a total of sixteen contact farmers were chosen in each sub-location. The respondents were to be chosen around these contact farmers.

The extension personnel collected the names of all farmers around each of the sixteen contact farmers who were assigned to them for follow-up. They also indicated whether these farms were female-managed or jointly-managed. They were thus able to provide information which even the sub-chiefs did not have.

From these names and around each chosen contact farmer, four female managed farms were chosen randomly from all the given names for female managed farms, in the third stage of sampling. The same random procedure as in choosing of sub-locations was followed. Four jointly managed farms were also similarly chosen as respondents in the study. Thus, eight farmers were chosen from each extension area, and sixty four farmers were chosen from each sub-location, half of whom were female managers and the other half joint managers. These formed the study sample.

3.5 Variables in the Study

(a) Extension

Agricultural Extension is the means by which new knowledge and ideas are introduced to farm communities so as to improve their agricultural production. It often involves agricultural personnel teaching farmers new farming methods. It is an important development input because it often determines the level of use of other farm inputs. Extension personnel often advice on better use of land, fertilizers and seed, among others. Other inputs, if acquired, may not be put to optimal use if extension services are inadequate.

The extension approach that is currently in practice in Murang'a district is the Training and Visit method. It consists of extension areas, farmer groups, contact farmers and extension agents. The extension agent chooses a contact farmer in each extension sub-area and uses his farm as a demonstration unit. He should teach all farmers of that area in this farm and the knowledge is expected to spread and be practiced on all farms. The training and visit approach here follows the guidelines developed by Benor. (See Benor, 1977)

Currently, at the sub-location level in Muruka location, there is one Technical Assistant who is expected to visit each contact farm once in a fortnight. He should also visit women group meetings, 4-K clubs or any farmer who may seek specific advice on his farm, one day in a fortnight.

Extension effort in Muruka location is currently concentrated on methods of improving soil conservation, on coffee husbandry and on food crop farming. However, the extension agents look around the farms and address any apparent problems, while farmers may also ask questions.

The other extension education dissemination points are the Chief's Baraza and the Farmers' Training Centre. In all these places, extension agents address farmers and try to advice on appropriate and profitable farming methods.

This study does not seek to examine the quality of extension delivered, as such. Rather, it examines the farmers' access to extension education, and whether there is differential access to extension services between the female and jointly managed farms. It accepts findings by Mugerwa (1983) and Ascroft *et. al.* (1973) that farmer training is an important factor in determining the level of farm output in Kenya.

(b) Purchased Farm Inputs

Technological progress refers to increased application of new scientific knowledge in the form of inventions and innovations with regard to capital, both physical and human (Todaro, 1982).

Zuvekas (1979) says that population pressures have forced farmers to adopt practices that deplete the fertility of the soil, thus lowering its productivity. He says that in such cases, production

increases depend mainly on the adoption of new technology. Muruka is one such area where population pressure is depleting the soil's fertility, and there is great need for adoption of new technologies.

Under purchased farm inputs and as one aspect of technology, the use of fertilizers, pesticides and certified seed have been investigated. These are looked at in relation to their use in cash and food crop production.

(c) Credit

Credit here refers to loans which are lent to farmers as cash or other farm inputs, to be repaid with or without interest, over a specified period of time.

It is generally acknowledged that credit to farmers is a most important instrument in improving farm productivity (Vasthoff, 1968). Credit is needed to acquire new technology, to pay for labour and to market farm output. Farmers are unlikely to adopt new methods of production if they do not have the means to do so. Basically this requires credit. Zuvekas (1979) says that "the "green revolution" in rice and wheat production was not based only on "miracle seeds", but on a package of new practices, including land levelling, irrigation, timely fertilizer application and proper weeding. These require a great deal of credit..

This study investigates the various types of credit available in Muruka location, and the constraints to acquisition of such credit.

3.6 Data Analysis

Research data has been organised, summarised and presented in tables to show the extent of acquisition of the various inputs by the heads of households. Frequency tables have been used to show the percentage of farmers who have acquired inputs. These help answer the questions on whether women headed households use less of each of the inputs than do jointly-managed households.

To compare the productivity of female managed farms with that of jointly managed farms, the means of the output of the various crops grown in the two types of farms have been compared. This helps determine whether or not it is reasonable to conclude that the means of the two types of farms differ significantly.

Two population means are commonly compared by forming their difference $U_1 - U_2$, whose point estimate is reasonably, $\bar{X}_1 - \bar{X}_2$, the corresponding difference in sample means. Assuming equal population variance, the 95 per cent confidence interval in independent samples is

$$(U_1 - U_2) = (\bar{X}_1 - \bar{X}_2) \pm t_{.025} \text{ sp} \sqrt{1/n_1 + 1/n_2} \dots (1)$$

with t having $n_1 + n_2 - 2$ degrees of freedom. The appropriate test statistic for testing hypotheses about the difference between the means of two normally distributed populations is based on

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (U_1 - U_2)}{\sqrt{\frac{Sp^2}{n_1} + \frac{Sp^2}{n_2}}} \dots \dots (2)$$

where

$$Sp^2 = \frac{1}{n_1 + n_2 - 2} \left[\begin{matrix} n_1 & n_2 \\ \sum (X_1 - \bar{X}_1)^2 + \sum (X_2 - \bar{X}_2)^2 \end{matrix} \right] \dots \dots (3)$$

is the pooled estimate of the common population variance.

n = Sample size

\bar{X} = Sample mean

X = Sample observation

U = Population mean

Subscript 1 refers to female-managed farms

Subscript 2 refers to jointly-managed farms

t indicates the student t distribution with $n_1 + n_2 - 2$ degrees of freedom.

The t formula above assumes that the two population means are normally distributed with unknown but equal population variance. It also assumes no difference in true means. (Ref: Terrell, 1979; Wonacott & Wonacott 1977).

To determine whether or not it is reasonable to conclude that the two population means are not equal, we test the hypotheses:-

$$H_0: U_1 - U_2 = 0$$

$$H_1: U_1 - U_2 \neq 0$$

using the above test statistic.

A linearised Cobb-Douglas production function has been used to quantitatively examine the influence of labour and capital inputs on farm output, in an attempt to establish the role played by various inputs for the two groups of farmers.

The Cobb-Douglas function has been chosen for use because of its computational manageability. In its log linear form, it is an efficient user of degrees of freedom in comparison to the quadratic function.

It has also been chosen because of its compliance with a priori notions about economic laws of production. For instance, in the Cobb-Douglas function, the marginal product of any factor generally declines as the level of input of that factor increases. Also, the marginal product of any factor i rises with an increase in any other factor j , $j \neq i$. In the linear production function, the marginal product of X_i does not vary as X_i varies relative to other inputs, and would only be realistic where production is restricted within a very small range.

In the Cobb-Douglas production function, the regression parameters measure the elasticities of output with respect to labour and capital. The sum of the regression parameters gives information about returns to scale, that is, the response of output to a proportionate change in the inputs.

Variables in the Function

The function being estimated is of the following form.

$$Q = AX_1^{B1}X_2^{B2}e^u \quad \dots \quad (4)$$

Its log linear form is

$$\ln Q = \ln A + B_1 \ln X_1 + B_2 \ln X_2 + u \quad \dots \quad (5)$$

Where

Q = Output

X₁ = Purchased inputs

X₂ = Labour

B_i = Regression parameters

u = Error term - Its randomly and independently distributed between farmers with zero mean and finite variance

e = Base of Natural logarithm

Output (Q), is entered as value of total kilograms produced per acre in Ksh.

Purchased inputs (X₁), refer to the total value of inputs of fertilizer, insecticides and certified seed. These inputs are all converted to Ksh per acre, with the total value forming the term X₁.

Labour (X_2), is measured in work days per acre per year. Labour provided by children under fifteen years is considered as 0.5 workday and as 1 workday for persons above fifteen years of age.

The regression coefficients in the above equation are expected to be positive for both inputs; purchased inputs and labour. This is because the two inputs are thought to be limiting factors to agricultural production in the area of study, and thus additions of each group of inputs is expected to raise output. Purchased inputs are thought to be particularly limiting and the exact regression coefficients are therefore of particular interest.

A common problem in estimating multiple regression equations is multicollinearity, which is the situation where the independent variables are highly correlated. The individual inputs of fertilizer, certified seed and pesticides are likely to move together for two reasons. Firstly, only persons with sufficient cash can afford these inputs, and also because use of hybrid seed is only beneficial when used with fertilizers and pesticides. The purchased inputs are combined to form one variable input X_1 , to reduce the likelihood of the multicollinearity problem.

However, the extent of multicollinearity in the regression analysis is ascertained by examining the table of auxiliary correlation coefficients that is obtained from the computer analysis.

Another common problem in regression analysis is omission of relevant variables. This may lead to biased estimators. If the omitted input variables are correlated with the included ones, the result would be to overestimate or underestimate one or more of the coefficients of the included variables. One relevant variable that has been left out in the above equation is management or entrepreneurial ability. In this study, good management is assumed to be determined by extension education, formal education, and management type.

Since we are interested in the factors that affect use or acquisition of purchased inputs, and in order to strengthen the above equation, another log linear power function is estimated. This is a generalised Cobb-Douglas function and has similar strengths and weaknesses to the two-variable function. Purchased inputs X_1 , have been regressed on extension, education and management type. The model is of the following form

$$X_1 = A_2 X_3^{B_3} e^{B_4 D_4} e^{B_5 D_5} u \quad \dots \quad (6)$$

In log linear form

$$\ln X_1 = \ln A_2 + B_3 \ln X_3 + B_4 D_4 + B_5 D_5 + u \quad \dots \quad (7)$$

where

X_1 = Purchased inputs

B_i = Regression coefficients

A_2 = Intercept

X_3 = Formal Education (years spent in school)

D_4 = Dummy for extension; $D = 1$ for contact farm demonstration attendants and $D = 0$ for non attendants

D_5 = Dummy for Management type: $D = 1$ for female managers and $D = 0$ for joint managers

u = Error term

Extension education and formal education are expected to raise use of purchased inputs, which are expected to raise output. It is of major importance here to investigate whether management type determines use of inputs, and therefore output. Correlation analysis is important in showing the relationship between management type and both extension and formal education.

Chapter Four

ACQUISITION OF FARM INPUTS BY FARMERS IN MURANG'A DISTRICT: EXTENSION, PURCHASED INPUTS AND CREDIT

4.1 Extension

An analysis of collected data shows that virtually all women in Muruka location have access to extension education in one form or other. The extension sources are the local agricultural extension officer, the contact farmers and neighbours. There is, however, discrepancy in the quantity and quality of education received depending on the chosen extension source, on the farmers initiative and on farm management type.

The current extension dissemination points in Muruka location are contact farms, the chief's barazas, the coffee factories, the women group meetings and Kenyatta Farmers' Training Centre at Mareira.

The study sought the extent of acquisition of extension education, among other farm inputs, by the Murang'a farmers and whether there exists differential access to extension education between management type, and between men and women. These issues are considered under the different extension methods as access has also been found to be determined by dissemination method.

(i) **Contact Farms**

The Training and Visit extension method is the official extension education system in Murang'a district, and has been in practice there for five years. It has, however, not been adequately evaluated for its quality and effectiveness since the trial period is not yet over.

In Muruka location, groups of approximately fifteen families are assigned to one contact farmer on whom information is concentrated by the extension officers, and demonstrations carried out on his farm, as explained in Chapter Three. We have found the attendance at these demonstrations to be poor, falling far below the expected fortnightly attendance for every farmer. Table 4.1 shows the percentage of farmers who participate in the contact farm demonstrations in Muruka location.

Table 4.1 A Summary of Contact Farm Participation

Type of Participation	Female Managed %	Jointly Managed %
Has attended demonstration	20.6	38.6
Attends fortnightly	3.2	5.3
Attends twice a year	14.3	21.1
Follows up twice a year	8.0	12.3
Husband participates	-	5.3

Source: Survey Data

Results show that most farmers do not participate in contact farm demonstrations, and therefore do not directly receive the official extension advice. Only 21 per cent female managers and 39 per cent joint managers have attended demonstrations at contact farms. We thus found that more joint managers than female managers attend demonstrations. One possible explanation for this is the time factor as we found the women managers to be extremely busy. While the two figures are both low, they are significantly different. In addition, 3 per cent female managers and 5 per cent joint managers indicated that they

attend demonstrations fortnightly as expected. These figures speak poorly of the otherwise ambitious Training and Visit extension approach.

We found no evident discrimination by the extension personnel in delivery of information at contact farms. Rather, it is up to the various farm managers to choose whether or not to attend the farm demonstrations. In this study, the majority of the extension clientele were women. In the jointly managed farms, participation is such that only 5 per cent of the men attend while in the rest of the families, it is the women who attend the demonstrations. It is mainly the women, therefore, who have the chance of receiving directly the practical education delivered by the extension officers.

This result points at two issues. Firstly, there is no evident discrimination in extension dissemination through contact farms. This is different from the situation found by Staudt (1976) and Moock (1973). They found women managers to receive less visits where extension education is by farm visits. With Training and Visit extension method, women have become the main extension clientele of the local extension agent, while men hardly attend the meetings. We can, therefore, conclude that Training and Visit has succeeded in breaking various barriers against women in extension education dissemination.

Secondly, women are not resistant to change. They seek out ways to help improve their farming productivity. This has also been found to be the case in several studies. Staudt (1976) concluded from

her research in Western Province that women farmers are just as likely or may even be more likely to be early adopters than men. Pala (1975) also pointed out that women are not resistant to change as has often been alleged.

There is, however, a discrepancy in the choice of contact farmers. About 88 per cent of all contact farmers were found to be joint managers. The local extension agent explained this by stating that the men in female managed farms were not present when choice of contact farmers was made. They are also generally not available for any demonstrations and therefore would make inappropriate choice.

Contact farmers are important because they are bound to benefit more than other farmers from the demonstrations and advice given. This is especially so because contact farmers are usually present during farm demonstrations which are also on their farms while attendance at these demonstrations by neighbouring farmers is very low.

(ii) Chief's Baraza

Another important extension medium is the chief's baraza. The extension personnel are invited by the chief to address and advice the locals on agricultural extension. The advantage of using these meetings is that a significant proportion of people attend them. Attendance at the chief's baraza is compulsory and legal action has occasionally been taken on those adults who fail to attend. The survey

results show that over 89 per cent of all the farmers attend barazas regularly, with 87 per cent female managers and 91 per cent joint managers attending regularly.

While these figures may be slightly higher than actual, given that farmers would fear to disclose that they miss out on meetings, it is evident that most farmers attend the barazas. Also important is the fact that men attend barazas while very few of them attend contact farm demonstrations.

The content of the advice given at the barazas is important. The outbreak of a new crop disease or pest is reason enough to call a baraza, in order to warn the people and teach them how to fight these. In addition, other socio-economic aspects that directly or indirectly affect agriculture and the agricultural people are dealt with in the barazas. The chief and his local staff never tire of teaching the importance of family planning, soil conservation, agroforestry, health and security issues. These were listed by the farmers as the issues constantly addressed at the barazas.

The problem with teaching extension methods at the barazas is that reception is bound to be low, due to the big size of the meetings. Some farmers attend barazas merely because they are compulsory, and therefore may be inattentive of the contents. Many women disclosed that they did not like attending these meetings and always arrived late. There is bound to be lack of individual attention from the officers and lack of continuous sessions on the same subject. Besides, there are no

practical farming examples as are given in contact farm demonstrations. Both agricultural officers and farmers quoted these as problems facing extension education through the barazas.

There is no direct discrimination in the delivery of extension education through the barazas since attendance is open to all farmers. However, as in contact farms, regular attendance by female managers is restricted by the fact that female managers, being sole farm and house managers, may lack the time to attend many important meetings.

(iii) The Coffee Union

A third major channel of extension education in Muruka location is the coffee factory. This is important and has great potential as an effective promoter of better farming methods. Survey results show that economic life in this area revolves around coffee production. Coffee is a major income earner for Muruka farmers and its farming is highly organised, with inputs and marketing being well provided by the Murang'a Coffee Union, through the local coffee factories. All coffee farmers in this area are small scale and are members of the local coffee cooperative society. Farmers who do not own coffee in Muruka are markedly poor people.

The factory officials organise seminars where farmers are invited and various agricultural officers talk to them and advice on better coffee husbandry. Farmers are also free to ask any questions they may have in these meetings and they may also invite the officials

to visit their individual farms to discuss special problems. This would be difficult under Training and Visit because the lone extension officer cannot possibly visit all the farms in his area.

The coffee factories are also important extension points because all coffee farmers visit the coffee factory when they deliver their coffee. Most farmers were found to grow coffee. Table 4.2 shows ownership of coffee by management type. These results indicate that over 72 per cent of the sample farmers own coffee. Thus, a considerable number of people visit the factory. After the farmers take their coffee, it is inspected and they are each advised on its quality and on how to improve on it. They are often advised on appropriate amount, type and timing of fertilizers and pesticides.

The meetings at the coffee factory, however, only dwell on coffee problems and hardly on food crops which are the women's

Table 4.2 Coffee Ownership by Type of Management

Coffee Ownership	Female Managed	Jointly Managed
Own Coffee (%)	69.8	77.2
Do Not Own Coffee (%)	30.2	22.8
Av. No. of Coffee Trees	225	287

Source: Survey Data

mainstay. In addition, many women expressed disinterest in coffee husbandry, claiming as they did, that it belonged to men. They are, on that account, likely to miss important meetings.

The coffee factory is one area where we find differential access to extension education. Coffee is often registered under men's names and the proceeds go to men. Many women, hence, do not pay attention to it's husbandry. They are not motivated to learn about its management because they do not control the cash it earns. Also, more jointly managed farms than female managed farms have coffee. And female managed farms have relatively fewer coffee trees on average than jointly managed ones. In addition, several female managed farms are registered under the husbands' name, as is the coffee therein, and thus these managers do not benefit wholly from facilities offered by the coffee factory. These facilities include credit and extension education. As shown in a later section, most credit is obtained from the coffee factory, and is therefore not open to most women. These issues imply that coffee factory benefits are biased towards jointly managed farms than female managed farms. It is indeed possible that these coffee problems, including the lack of it, have been important push factors to the emigrants from this area.

(iv) Women Groups

Women groups are an important channel of extension education. There are a total of 540 women groups in Murang'a district

with a total membership of 30,350 (C.B.S. 1983). Many groups are inactive and only an average of 11 groups per district in the country receive government aid (C.B.S. 1986). However, the active ones are well used in communicating new methods and ideas to the rural families.

Participation in the registered women groups is low in Muruka location, as shown on the table below. The figures in table 4.3 reveal that only 17 per cent of the sample women belong to registered women groups. About 12 per cent of the members indicated that they receive

Table 4.3 Women Groups' Membership

	Female Managers %	Joint Managers %
Members	20.6	12.3
Non-Members	79.4	87.7
Received Agricultural Advice in group meetings	14.3	8.8

Source: Survey Data

agricultural advice in these meetings. The agricultural officer meets these groups at intervals, and whenever they call him. He also invites specialised agricultural officers to address the group meetings according to the group needs.

The women groups are important because they help women acquire practical skills. They are encouraged to run their own economic enterprises, as they do in the groups. These are often agricultural oriented and usually include rearing and marketing chicken and pigs, keeping bees for honey and planting vegetables. Although the proceeds of the group work often go to the group account, the women learn how to run similar enterprises on their own farms.

Women groups differ with other extension media in that information acquired here is tried out by the whole group and often brought to completion after success or definite failure. Their marketing aspect is also important as farmers learn the possible markets for their goods. They also learn about likely sources of credit. These important aspects are often lacking in contact farms, barazas and coffee factory meetings, yet they are important components of agricultural economic development. The meetings are also important because women have a chance of sharing their various experiences on different projects that they have tried out.

Unlike the other extension channels, women group meetings are a relatively more important source of advice for female managers

than joint managers. However, membership in these groups is generally low.

(iv) Farmers' Training Centre

A final important extension channel is the Farmers' Training Centre (FTC). The local FTC, Kenyatta FTC, Mareira, is situated about 27 kilometres from Kandara. The FTCs offer intensive agricultural courses, and these have been found to lead to increased farm output (Mugerwa, 1983). The courses offered usually run for a two-week period and farmers are required to board at the college. Application for participation is done through the local agricultural officer or through the coffee factory.

Attendance at FTC courses by farmers in Muruka location is very low, as shown on the table below.

Table 4.4 FTC Attendance by Type of Management

	Female	Jointly
Attendants	Managed	Managed
	%	%
Women Attended	4.8	15.8
Spouses Attended	9.8	19.3

Source: Survey Data

A number of factors are responsible for the low FTC attendance rates. Kenyatta FTC serves farmers from all over Murang'a district and therefore cannot possibly take in too many people from one particular location. Many farmers therefore do not have the chance to attend. Several farmers indicated that they had requested to take the courses but were informed that there wasn't enough room.

The difference in attendance by farm management type can be explained by the fact that female managers find it difficult to leave their

homes for two weeks. Some joint managers may be lucky enough to have their spouses agree to look after the farm and family for the course period. Many women said that they would not consider leaving their homes for such a long period of time.

Another inhibiting factor may be in choosing of FTC participants. This is done by extension officers and wives often require the permission of their husbands to attend. All these issues imply that female managers have less access to FTC education than joint managers, and women are less likely to attend such meetings than men.

An Overview of Extension Participation

The various extension education channels complement one another. However, it is possible to point out from the survey results that women groups play a unique role in reaching women farmers and should therefore be encouraged. More women should be assisted to join and extension personnel should pay more attention to these groups. Contrarily, Training and Visit extension method has had little success in reaching all farmers as was targeted. The chief's baraza and the coffee factory are important supplementary media.

The sub-location extension officer, officially referred to as Junior Technical Officer, is the major communicator of new ideas to the local populace. Results show that 50 per cent of the sample farmers cite the local extension officer as their major source of extension education. Others consult neighbours, husbands or no one at all.

The extension message that is most often passed on to farmers by the agricultural officers, yet is most often unheeded, is one on timely planting, proper spacing and adequate fertilizer and pesticide usage. As discussed later, this unresponsiveness is mainly due to the high costs involved. There is also constant information on soil conservation, agroforestry and coffee husbandry.

The farmers' initiative in acquiring agricultural education may sometimes be seen by the effort they make in visiting the agricultural office. No more than 5 per cent of female managers and 4 per cent joint managers have visited the agricultural office. Lack of initiative is also shown by the low attendance rates at contact farm demonstrations, follow-up, and women group meetings. Evidence of unwillingness to acquire more agricultural information by both management types is also shown by the farmers' low adoption of new farming methods as recommended by extension personnel.

The major complaint from the farmers was that obtained extension advice was rather difficult to implement. A constant complaint was levelled at advice on planting single stands of maize. The farmers argued that they needed the extra two or three maize stems per hole to feed their cows as there were no more grazing fields. Another big complaint was that fertilizer and pesticide prices were too high for the farmers and they could ill afford to obtain the required amounts.

Several problems face extension dissemination efforts in Kandara division. A number of farmers felt that there was need for

more extension officers, so that they may be able to visit needy farmers. Currently, there is only one officer per sub-location of approximately 1048 households. The extension officers face the frustrating problem of too many farmers missing contact farm demonstrations. They also complained that farmers are too slow or unwilling to try out new farming methods. However, they agreed with the farmers that farm inputs, and fertilizers in particular, are very expensive.

4.2 Purchased Inputs

Fertilizers, pesticides and certified seed are a necessary requirement for any significant farm output to be realised in the area of study. The soils are worn out after years of continued use in this land scarce area and various pests and diseases are common. A considerable amount of money, about 30 per cent of total farm revenue, is spent on these inputs every year. Average farm inputs investments are shown on the table below.

Table 4.5 Average Farm Inputs Investment (Ksh per year)

Farm Inputs	Female Managed	Jointly Managed
Fertilizers	602	753
Pesticides	717	806
Seed	336	364
Total	1655	1923

Source: Survey Data

Most farm inputs are obtained at the coffee factory, be they coffee inputs or food crops inputs. Occasionally, the factory officials announce that they do not have particular inputs, and these have to be purchased elsewhere. This would usually be at the Kenya Grain Growers Cooperative Union stores at Thika or at other appointed dealers.

Extension officers usually advice farmers on the proper inputs to use in this particular area, and many farmers are now aware of the inputs they should purchase. However, as pointed out by over 98 per cent of the farmers, farm inputs are rather costly for the average farmer to afford. Many farmers said that they apply the amounts of inputs they

can afford rather than the recommended amounts. Some indeed said that they do not care for the extension information because they cannot afford to implement these recommendations. The case of the farmers' lack of initiative in practicing new agricultural methods as noted in the previous section may, therefore, be strongly related to the high cost of these inputs.

There is considerable use of each of these inputs; fertilizers, pesticides and certified seed, by most farmers. However, access to these inputs is dependent on ability to purchase and on credit facilities. It is therefore not surprising that female managers purchase less inputs than joint managers. The difference between the two mean input values is significant at the 10 per cent level. Differential access to purchased inputs thus exists as a result of women having less finances and credit facilities, as discussed in the next section.

4.3 Credit

(i) Extent of Acquisition

A major objective of this research was to investigate the extent of acquisition of credit by Muruka farmers, with special reference to women.

Results from the survey reveal that 65 per cent of the families have not obtained any cash credit at any time in the past. These results are summarised on table 4.6 below.

Table 4.6 Credit Acquisition by Type of Management

	Female Managed	Jointly Managed
Persons Obtained Credit (%)	28.6	42.1
Average Credit Obtained (Ksh)	1580	3129

Source: Survey Data

A total of 35 per cent credit recipients is relatively high. In Staudt's study, only 2 per cent of the sample farmers had obtained credit. The received amounts in the present study were, however, low. The average amount received was Ksh 2,500 per recipient. The loans were all applied for, and received, by men.

The agricultural economy in this area revolves around coffee production. It is the major source of credit in cash and in kind, such as fertilizer, for the local population. Over 83 per cent of the credit obtained was from the Coffee Union. About 7 per cent was from the Agricultural Finance Corporation while 5 per cent of the loans were obtained from the Commercial Banks.

(ii) **Constraints to Loan Acquisition**

Several constraints to loan acquisition were cited by farmers. Ranking highest among these was ownership of little coffee, or no coffee at all. The most important local creditor is the Murang'a Coffee Union and people who do not deliver substantial amounts of coffee do not qualify to obtain loans. Table 4.7 below shows registration at the coffee factory.

Table 4.7 Coffee Union Registration by Type of Management

Coffee Union Registration	Female	Jointly
	Managed	Managed
	%	%
Female Registered	20.9	2.2
Husband	53.5	82.6
Husbands' Parents Registered	7	8.7
Jointly Registered	18.6	6.5
Total Registered	100.0	100.0

Source: Survey Data

Most women find it difficult to obtain cash loans. Most of those who are registered at the coffee factory said that they can only obtain credit in kind, but not in cash. So, while loans are open to all coffee farmers, women managers have less access to these loans in comparison to men and to jointly managed farms. This is a case of differential access to credit between women and men, with men having the advantage because they are the coffee owners, and jointly managed farms being better off because the men are present.

Other perceived constraints to credit acquisition include lack of collateral that is necessary to borrow from the major financial institutions. This is a case of landlessness and most farmers said their land was too small to invest on.

Although several farmers were unaware that there existed other loans besides the coffee factory ones, this was not useful information because the farms in this area are too small to provide adequate collateral.

Another constraint to application for bank loans in this area was discouragement from the case of a farmer whose land had been auctioned. Many farmers recalled this case and said that they considered giving their title deeds as loan security to be too risky.

(iii) Uses of Credit

The use of acquired loans varies with families. About 36 per cent of all loans acquired were to be used for improving agriculture, 33 per cent for school fees, 18 per cent for constructing houses while about 12 per cent were to go to non-farm trading activities. Thus buying farm inputs and paying school fees were the largest stated expenditure items.

(iv) Sources of Loan

The Agricultural Finance Corporation and the Commercial Banks are not important creditors in Muruka location. This is because they usually require collateral in the form of title deeds and these are considered too risky by the farmers. Besides, these loans would only be payable if farmers engaged in profit making business enterprises like growing fruits and vegetables or rearing dairy animals. Most farmers grow maize and beans mainly for subsistence and any extra finances are used to increase the output of these so as to be self sufficient in food production. The most important creditor is the coffee union. Table 4.8 shows the various creditors in the study area.

Another possible, though currently unimportant, source of credit in Muruka location is the Women Groups. About 3 per cent of the sample farmers are in groups that have obtained credit. This credit is always used as group resource and not for individual purposes. It may be used to start a maize mill, build a shop or buy cattle. However,

Table 4.8 Major Creditors in Muruka Location

	Female		Jointly	
	Managed		Managed	
	No.	%	No.	%
Coffee Union	15	23.8	20	35.1
AFC	3	1.6	2	3.5
Commercial Banks	0	0	2	3.5
Husband's Workplace	2	3.2	0	0
Not obtained loans	43	71.4	33	57.9
Total	63	100.0	57	100.0

Source: Survey Data

members hope to eventually share in group proceeds. Group loans have been obtained from the local and central governments.

(v) The Need for Credit: Informal Women Groups

Women realise their need for credit. They often indicated that they did not implement recommended farming methods because they lacked sufficient funds. They can only borrow a minimum of inputs because these are costly and coffee proceeds are required by their husbands or for other family needs.

Evidence of the women's need for credit and awareness of its importance is the fact that about 63 per cent of the women interviewed are members of informal self-help women groups. These are small groups with an average membership of fifteen women each, who contribute money either monthly or fortnightly. They each contribute an average of Ksh 50 a month and rotate the total of each month's contribution to one member at a time. Group membership is shown on table 4.9.

Table 4.9 Membership of Informal Women Groups

	Female		Jointly	
	Managed		Managed	
	No.	%	No.	%
Members	34	64.0	29	60.9
Non - Members	29	36.0	28	39.1
Total	63	100.0	57	100.0

Source: Survey Data

Informal groups are apparently preferred to the registered groups as shown by membership. This is probably because they are strictly credit groups, which is really the farmers' interest, while the registered groups are mainly extension groups. Besides, many registered groups have had no visible accomplishments.

Informal Credit groups are popular, and many women who are not members cited lack of cash as the reason for non-membership. This is due to the fact that every member is required to contribute about Ksh 50 every month.

The actual informal group membership figures may be higher than stated because members are unwilling to disclose that they belong to these groups, as informal groups are actually illegal. Many members are therefore reluctant to discuss their membership in public. Indeed, the groups are constantly discouraged by the local administration because they are not registered, and in order to encourage the women to join the registered groups. However, these groups demonstrate the cooperative unity among the women and their need for credit.

Chapter Five

THE ROLE OF FARM INPUTS

5.1 A Comparison of Output in Female and Jointly Managed Farms

An important objective of this work has been to compare the productivity of female managed and jointly managed farms. This will show the implications of differential access to inputs on productivity, as found in this study. Women managed farms have been found to obtain less amounts of credit, purchased inputs and extension than jointly managed farms.

The female managed farms have been found to produce an average output worth Ksh 5586 per acre per year. Jointly managed farms produce output valued at an average value of Ksh 6453 per acre per year. The two sample means have been compared using the t-statistic test of the difference between two means and this difference has been found to be statistically significant at the 99 and 95 per cent levels of confidence. This result, shown in the calculation below, implies that jointly managed farms produce greater output than female managed farms.

$$\begin{aligned}
 t &= \frac{6453 - 5583}{\sqrt{\frac{402858}{57} + \frac{402858}{63}}} \\
 &= 7.47
 \end{aligned}$$

The calculated t is greater than the critical t (~ 2.00) and therefore we reject the hypothesis $H_0: u_1 - u_2 = 0$ and accept the alternative hypothesis $H_1: u_1 - u_2 \neq 0$, that is, the two means are significantly different.

The result is important because it points at one possible implication of differential access to inputs. It also differs from several previous studies. Staudt (1976), for instance, found no significant difference in the amounts of output produced by female managed and jointly managed farms, despite differential access to farm inputs where jointly managed farms were the favoured ones. Mook (1973) found no significant difference in output between female and jointly managed farms. He, however, controlled for inputs and concluded that women were better managers on average than men.

It is important to note at this stage that figures on output and on inputs are only approximations to the actual situation. Measurement of farm output for small scale farmers in Kenya, based on interviews, is extremely difficult because farmers' answers are based

on memory rather than on records. Besides, all farmers have been relied on to report correct inputs and output. Because of this, results are drawn on the assumption that errors in memory and honesty are randomly distributed between management types. This is necessary for survey results to be meaningful. Seven questionnaires were, however, spoiled and discarded when found incomplete for this study.

5.2 The Relationship Between Output and Inputs

The various farm inputs used by the farmers contribute to the output they receive. The farmers invest as much as they can afford in an effort to achieve maximum output in this densely populated district. Low farm output is generally attributed to the low use of farm inputs. These inputs are usually classified as land, labour, capital and management.

A linearized Cobb-Douglas production function has been fitted to investigate the influence of hired labour and purchased inputs on output. The purchased inputs considered are fertilizers, pesticides and seed. The following model, explained in chapter three has been fitted.

$$Q = AX_1^{B_1}X_2^{B_2}e^u \quad \dots \quad (8)$$

In its log-linear form

$$\ln Q = \ln A + B_1 \ln X_1 + B_2 \ln X_2 + u \quad \dots \quad (9)$$

where

Q = Output per acre (Ksh)

X_1 = Purchased inputs per acre (Ksh)

X_2 = Hired labour per acre (Ksh)

B_i = Regression parameters

u = Error term

Results of the estimation are presented on table 5.1. Along with the regression coefficients, the table gives the standard errors of these coefficients, their t-statistics, the R^2 and adjusted R^2 , and the F statistic.

The t-statistic tests whether or not an independent variable has a statistically significant influence on the dependent variable. Specifically, in the the model below (table 5.1), we test the null hypothesis $H_0: B_i = 0$ against the alternative $H_1: B_i \neq 0$. For large samples, if the standard error is smaller than half the numerical value of the parameter estimate, or equivalently if the t-ratio is approximately equal to 2, we conclude that the estimated coefficient is statistically significant, that is $B_i \neq 0$. In such a case, we say that the explanatory variable has a statistically significant influence on the dependent variable.

Table 5.1 Regression of Output on Labour and Purchased Inputs:

Cobb-Douglas Production Function in Log-Linear Form

Dependent Variable is Q = Farm Output (Ksh) for all 3 Equations.

Obs.	Intercept	X ₁	X ₂	
(1. All Farms)				
120	4.6360	0.7476	0.0393	R ² = 0.6255
		(0.0597)	(0.0176)*	\bar{R}^2 = 0.6191
		12.525	2.2291**	DW = 1.961
				F = 97.7242
(2. Female Managed Farms)				
63	4.2425	0.8244	0.0448	R ² = 0.6613
		(0.0883)	(0.0262)	\bar{R}^2 = 0.6500
		9.3424	1.7604	DW = 1.987
				F = 58.5651
(3. Jointly Managed Farms)				
57	5.1765	0.6392	0.0275	R ² = 0.5632
		(0.0813)	(0.0232)	\bar{R}^2 = 0.5470
		7.8643	1.1841	DW = 1.830
				F = 34.8157

Source: Survey Data

* Figures in brackets are standard errors

** Figures below brackets are t ratios

The t-statistic for \hat{B}_i obtained from a single sample is $t = \frac{\hat{B}_i - B^*}{S^{\hat{B}_i}}$, $n-k$ degrees of freedom and it reduces to $t = \frac{\hat{B}_i}{S\hat{B}_i}$ in testing our hypotheses. Thus, the sample value of t is estimated by dividing the estimate \hat{B}_i by its standard error ($B^* =$ hypothesized value of B_i , $n =$ sample size, $k =$ number of estimated parameters, $S^{\hat{B}_i} =$ estimated variance of B_i , $S\hat{B}_i =$ Standard error). This value is compared to the tabulated values of t which define the critical region in a two-tailed test, with $n-k$ degrees of freedom. If t falls in the critical region we reject the null hypothesis, that is, we accept that the estimate \hat{B}_i is statistically significant, and vice versa.

The F statistic, also given in the table, is used in the ANOVA approach to testing the joint significance of all the independent variables in a multiple regression. It provides a test of the null hypothesis that the slope coefficients are simultaneously zero, i.e. $H_0: B_1 = B_2 = 0$. If the F value computed exceeds the critical F value from the tables at our specified level of significance, we reject the null hypothesis, otherwise we accept it.

The coefficient of multiple determination, R^2 shows the percentage of the total variation of the dependent variable explained by the regression plane, that is by changes in X_1 and X_2 . Generally, $R^2 = \frac{\sum(\hat{Y} - \bar{Y})^2}{\sum(Y - \bar{Y})^2}$, and inclusion of additional explanatory variables in the function never reduces the coefficient of determination ($Y =$ observed variable, $\hat{Y} =$ estimated variable, $\bar{Y} =$ mean variable). The adjusted R^2 (\bar{R}^2) corrects for this defect by

taking into account the degrees of freedom, which decrease as new regressors are introduced into the function. $\bar{R}^2 = 1 - (1-R^2)^{n-1/n-k}$ (Ref: Koutsoyiannis, 1977).

Equation 1 in table 5.1 regresses output on purchased inputs and hired labour for all farmers in the sample. All the coefficients are significant at both the 1 and 5 per cent levels of significance of the two-tailed t-test. The adjusted regression coefficient of determination, \bar{R}^2 , is 0.62. Thus the regression line explains 62 per cent of the total variation of the values of output from their mean. About 38 per cent is unexplained and is attributed to omitted factors. For this equation the calculated F (97) is greater than the tabulated F ~ 4.8 (i.e. $F_{k-1, n-k} = F_{2,117}$). We therefore conclude that purchased inputs (X_1) and labour (X_2) taken together, have a significant influence on output.

Equation 2 regresses output on hired labour and purchased inputs for the 63 female managed farms. The purchased input coefficient is significant at the 1 and 5 per cent levels. The hired labour coefficient is not significant at the 5 per cent level. The regression line explains 65 per cent of the total variation of the values of output from their mean. The F statistic is again larger than the critical F and we thus conclude that our independent variables influence output.

Equation 3 regresses output on hired labour and purchased inputs for the 57 jointly managed farms. The purchased input coefficient is again significant at the 5 per cent level. The hired labour coefficient, X_2 , is not significant at the 5 per cent level of significance

for a two tail t-test. The \bar{R}^2 is 0.55, and the F statistic is larger than the tabulated F.

Purchased inputs are thus found to be important contributors to high farm output in the area of study. The slope coefficient for purchased output for equation 1 is approximately 0.7, and this is the output elasticity of purchased inputs. Thus a 1 per cent change in purchased inputs of fertilizer, pesticides and hybrid seed would result in a 0.7 per cent change in output.

One of our earlier results was that female headed households use less of purchased inputs than jointly managed households. We can now infer that this is one reason for lower farm output by female managed farms, given the important role of purchased inputs in the level of output.

Hired labour does not influence output significantly in the two types of households. This may be attributed to the fact that only a few farmers use hired labour as the farms are small and resources to hire labour are limited.

All equations have a reasonable Durbin-Watson statistic of approximately 2. We can therefore conclude that there is no first order auto-correlation. Also, the facts that correlation matrices have low values (see appendix) and R^2 are not too high indicate absence of the multicollinearity problem.

In addition to the above relationships we also attempted to investigate factors affecting acquisition of purchased inputs, as these determine output levels significantly. The major variables hypothesized to play a role in this regard were formal education, extension education and management type. However, attempts to regress purchased farm inputs on education, extension and management type did not yield reasonable results for the linear and log-linear functions, resulting in a regression with very low F and R statistics.

The above result and the fact that purchased inputs have been found to influence output significantly leave financial constraints as an important factor contributing to low levels of output. This conclusion is also supported by the fact that most farmers cited financial constraints as their main reason for not using adequate amounts of recommended inputs of seed, fertilizer and pesticides. It is also reasonable because adoption of any innovation requires, first and foremost, the resources necessary to implement the innovation and this agrees with Leagans (1981) adoption theory that money is a most important determinant of adoption.

Chapter Six

CONCLUSION AND RECOMMENDATIONS

An important hypothesis for this study has been that women are discriminated against in the delivery of various agricultural inputs, and this assertion, stemming from observations and literature has been investigated.

This work acknowledges the already existing discriminatory tendencies against women in the literature review and we have seen that this situation is really world wide and not confined to Kenya alone.

Research work has been carried on in Muruka location of Murang'a district, in addition to reviewing previous works. We interviewed women in their home setting about their access to various farm inputs namely, extension education, purchased inputs of fertilizer, pesticides and hybrid seed, and credit.

6.1 Access to Inputs

We found that there is great discrepancy between the legal and the practice. While nowhere in the rules on access to inputs is discrimination directly implied, the practice is quite different. Women face differential access to two crucial categories of inputs, credit and purchased inputs, relative to men.

Farmers in the area of study generally have equal access to extension education. The amount of education received from the local extension agent depends on one's ability to attend the Training and Visit extension demonstrations. Women actually constitute the majority of the extension clientele in the farm demonstrations. Women managed farms, however, hardly qualified to be contact farms because the absent husbands' consent was required for this.

Attendance at demonstration plots is very low with most farmers attending only twice a year rather than once in a fortnight as recommended.

Purchased inputs of hybrid seed, fertilizers and pesticides for all crops are generally channelled through the coffee factory. All farmers use some amount of these inputs at one time or other. The female managers purchase less amounts of these inputs than the joint managers. Financial constraints were named as the major reason for low use of farm inputs by most farmers. The women's lower levels of inputs can be attributed to the fact that they have less finances, and in particular, they do not control the income earned by coffee.

The major creditor in the area of study is the Murang'a Coffee Union. Credit is obtained either in kind, where purchased inputs are lent to farmers, or in cash, where money is lent out. All coffee farmers qualify to utilize the credit in kind facility. However, only a few farmers have been able to obtain cash loans. These require ownership of substantial amounts of coffee.

It was noted that all acquired loans had been applied for and received by the men. Further, received loans were mainly used for improving coffee production and for school fees. The women do not own the land or the coffee and therefore have no access to credit.

Unlike purchased inputs, hired labour does not seem to influence output significantly. It is seasonal and only used by a few farmers. Purchased inputs influence output positively.

Women have been found to be innovative as they seek extension advice much more than men do. Most of the participants at contact farm demonstrations are women despite their busy work schedules. Women have also formed financial self-help support groups where every member is able to obtain a small loan in a revolving cycle.

6.2 Women Headed Households

This study concludes that the high incidence of female headed households can be detrimental to rural development, if the prevailing biases towards women persist. ✓ Firstly, urban jobs taken up by emigrants who leave their wives behind in rural areas are often poorly paying. As such the men cannot remit significant amounts of money to their families. The Integrated Rural Survey (CBS 1979a) says the amount remitted accounts for 10 per cent of rural income. The jobs commonly cited by wives as being taken up by their absent husbands range from vegetable hawking and newspaper vending to construction labour and teaching in urban schools.

Secondly, women left in the rural areas are left with burdens they barely manage. They are sole parents for practical purposes, and sole farm managers, both of which are time and physically demanding jobs. They often provide for their children financially and socially single handed. In relation to time, we found that it is more difficult to find female managers on their farms during the day, than is the case for joint managers. This is because they have had to take up chores that are taken up by men in jointly managed farms. These duties include shopping for farm inputs, settling issues with the chief, the headmaster and relatives, and participating in public works.

Thirdly, we have found women to obtain less credit than their male counterparts in the area of study. Women managers in particular have less access to production inputs than joint managers.

It is not surprising then that we find female managed farms to produce lower levels of output than jointly managed farms. This has a negative impact on development objectives, crucial ones among which are self-sufficiency in food production and improving standards of living in the rural households.

6.3 Recommendations

The problems of differential access to farm inputs, and of generally low usage of farm inputs by all farmers, should be addressed with a specific commitment to improving women's access to the various farm inputs. A good starting point may be to acknowledge the existing

situation that women make up the bulk of the small scale farmers in the area of study. In most of the female-managed farms, the men work away from their families and only come home occasionally. In many of the jointly managed farms, the men have off-farm jobs and even those without other employment usually do not work on their farms. It is also important to recognize that women face severe financial constraints that make it difficult for them to improve their farming.

Secondly, the government along with the cooperatives and commercial banks should make credit more accessible to women. Credit acquisition should not necessarily be tied to land or cash crop ownership as is currently the case unless women can be made co-owners of these. A better security system should be searched.

The prevalence of female managed farms as found in this study should be further investigated for its economic and social effects. This should be done with a view to reducing it, by encouraging families to keep together, whether in rural or in urban areas, if continued to be found having negative implications for development priorities.

Finally, other studies should be carried out in other parts of the country to assess women's access to production inputs under different economic, cultural and ecological zones.

Appendix

CORRELATION MATRICES

1. All Farmers

	Q	X ₁	X ₂
Q	1.0000	0.7808	0.3513
X ₁		1.0000	0.2956
X ₂			1.0000

2. Female Managers

	Q	X ₁	X ₂
Q	1.0000	0.8030	0.4105
X ₁		1.0000	0.3621
X ₂			1.0000

3. Joint Managers

	Q	X ₁	X ₂
Q	1.0000	0.7429	0.2509
X ₁		1.0000	0.1973
X ₂			1.0000

QUESTIONNAIRE

A. IDENTIFICATION

1. Farm No. _____
2. Village _____
3. Sub-Location _____
4. Enumerator _____
5. Female Managed _____ Jointly Managed _____
6. Date _____

B. PERSONAL INFORMATION

1. Age _____ Under 20 _____ 21 - 25 _____ 26 - 30
_____ 31 - 35 _____ 36 - 55 _____ Over 55
2. Which category best describes your level of formal education?
_____ No. of years
_____ Never attended
_____ Attended primary school
_____ Attended secondary school
_____ Adult literacy classes
_____ Other training (e.g. teacher, nurse, mechanic, etc.) - (specify)

3. Which category best describes your spouse's level of formal education?

_____ No. of years

_____ Never attended

_____ Attended primary school

_____ Attended secondary school

_____ Other training (specify) _____

4. Marital Status _____ Single _____ Married

_____ Divorced/separated _____ Widow

5. If married

_____ husband lives at home and works as part of the family

_____ husband lives at home but earns an income away from the
farm _____ place/type of work

_____ husband lives at home but does not work on the farm

_____ husband lives away from the farm and earns outside
income _____ place/type of work

6. Number of children _____

7. Under whose name is the land registered?

_____ husband _____ wife _____ joint husband/wife _____
rented _____ husband's father _____ other (specify)

8. Size of land _____ (total) acres
9. Size of land on which woman cultivates _____ acres
10. Do you have any other piece of land? ____ Yes ____ No If yes,
 how far is it from here _____ km
 How big is it _____ acres

C. EXTENSION EDUCATION

1. When you need agricultural advice, who do you consult?
 _____ Neighbour/friends _____ Agric. extension agent
 _____ Husband _____ Others (specify) _____
2. What kinds of agricultural advice have you sought for?
 _____ Spacing _____ Fertilizer application
 _____ Terrace _____ Pest control _____ Credit
 _____ Storage _____ Marketing _____ Others (specify)

3. What type of advice do you seek from the following
 _____ Advice _____ Last time sought
 Neighbours _____
 Agric. extension agents _____
 Co-operatives _____
 Women groups _____

Inputs shopkeepers _____

Chief's barazas _____

Radio _____

Home Economist _____

Livestock Officer _____

4. Have you had any problems in agriculture that you could not get advice on?

_____ Yes _____ No

If yes, which problem: 1. _____

2. _____

3. _____

5. When was the last time you were visited by an agricultural extension worker?

_____ Less than a month ago _____ 1 - 2 months ago

_____ 3 - 6 months ago _____ 7 - 12 months ago

_____ Over one year ago _____ Never

6. When was the last time you received agricultural advice from an extension service worker?

_____ Less than a month ago _____ 1 - 2 months ago

_____ 3 - 6 months ago _____ 7 - 12 months ago

_____ Over one year ago _____ Never

7. On the average, how often would you personally get agricultural advice from an official extension source?

_____ Two times per year _____ Ten times per year

_____ Five times per year _____ Never

_____ Other (specify)

8. Do you find that you are visited less now that there is

T & V extension system than you used to be visited before?

_____ Yes _____ No

9. Do you find that certain types of farmers are visited more often than you are?

_____ Yes _____ No

If yes, which ones? (Explain) _____

10. How often do you attend the Chief's Barazas?

_____ Once a month _____ Once a year

_____ Whenever they are announced _____ Other (specify?)

11. What agricultural advice have you received by attending such meetings?

12. If you went to visit the nearest extension agent for agricultural advice how far would you have to travel?

_____ less than one km _____ 1 - 5 km

_____ 6 - 10 km _____ more than 10 km

13. Have you ever visited his office for advice?

_____ Yes _____ No

If yes, for what advice? _____

14. Who is your contact farmer?

_____ Known _____ Unknown

If unknown, move to question 20

15. Have you ever gone for a demonstration at his farm?

_____ Yes _____ No

If no, move to question 20

16. How often do you attend such demonstrations?

_____ Once a fortnight _____ Once a month

_____ Once in two months _____ Once in six months

_____ Other (specify) _____

17. How often do you visit the contact farmer for agricultural advice?

_____ Once a fortnight _____ Once a month

_____ Once in two months _____ Once in six months

_____ Other (specify) _____

18. When demonstrations are held at the contact farmers, which response best describes your family participation?

_____ Attend by myself

_____ Husband attends

_____ Other (please explain) _____

19. On what activities is advice normally provided?

20. Have you required advice and failed to obtain it on time?

_____ Yes _____ No

(please explain) _____

21. Have you received advice that was irrelevant or difficult to implement?

_____ Yes _____ No

(Explain) _____

22. Is your sub - location extension officer male or female?

_____ Male _____ Female

23. Would you prefer a female or a male agricultural extension officer?

_____ female _____ male _____ No preference

24. Have you attended any course at an F.T.C.?

_____ Yes _____ No

If yes what course _____ Duration _____ If no, why not

25. Has your husband been to the FTC?

_____ Yes _____ No

D. CAPITAL INPUTS

1. Fertilizer Use

Crop	Type	Amount/Year			Source	Cost	Source of Information
		S1	S2	Total			
Coffee							
Maize							
Potatoes							
Beans							
Others							
Total							

2. Pesticides Use

Crop	Type	Amount/Year			Source	Cost	Source of Information
		S1	S2	Total			
Coffee							
Maize							
Potatoes							
Beans							
Others							
<hr/>							
Total							
<hr/>							

3. Use of Certified Seed

Seed	Type	Amount/Year			Source	Cost	Source of Information
		S1	S2	Total			
Maize							
Beans							
Potatoes							
Others							
<hr/>							
Total							
<hr/>							

4. Livestock

Animal	Number	Type
Cows		
Goats		
Poultry		
Pigs		
Others		
Total		

E. OUTPUT

Crops	Acres	Output/Year		Value	Amount	Value Marketed
		S1	S2 Amount			
Coffee						
Maize						
Beans						
Potatoes						
Others						
Total						

F. LABOUR

1. How many people work on your farm regularly?

2. Do you hire labour? _____ Yes _____ No

If yes, answer No. 3. If No move to section G.

3 _____

Labour	Amount	Terms	Payment	Value	Child	Friends
Activities					Labour	Labour

- a
- b
- c
- d

Total

G. WOMEN'S GROUPS

1. Do you belong to any informal women's group that acts as a source of credit?

_____ Yes _____ No

_____ (KSh) Monthly contribution

2. Do you belong to any registered women's group in your community?

_____ Yes _____ No

Continue if Yes and move to section H if No.

3. Which group do you belong to?

4. What are the main activities of this group?

5. Have you personally benefitted from this group?

_____ Yes _____ No

If yes, how? _____

If not, why not? _____

6. How often do agricultural officers address your group meetings?

7. Has your group obtained any credit?

_____ Yes _____ No

_____ Amount obtained

_____ Source of Credit

_____ Purpose

H. TIME ALLOCATION

Average number of hours per day spent in agricultural activities _____

Activities	Days/Week	Hours
a		
b		
c		
d		

I. CONTROL OF OUTPUT

1. Who controls income earned from sale of

(a) Food crops _____ Husband _____ Wife _____ Joint

(b) Coffee _____ Husband _____ Wife _____ Joint

(Explain) _____

2. Who is registered at the coffee factory?

_____ husband _____ wife

_____ Other (Specify) _____

J. ANY OTHER OBSERVATIONS: e.g. on perceived constraints to increased production.

1. Do you purchase firewood? _____ Yes _____ NO

2. Daily cost of firewood _____

3. Water Source _____

4. Type of House _____

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