

# **SOCIAL ECONOMICS, POLICY AND DEVELOPMENT**

**Working Paper No. 26**

**Gender, Marital Status, Farm Size and other  
Factors Influencing the Extent of Cash  
Cropping in Kenya:  
A Case Study**

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**GENDER, MARITAL STATUS, FARM SIZE AND OTHER FACTORS  
INFLUENCING THE EXTENT OF CASH CROPPING IN KENYA: A CASE  
STUDY**

**ABSTRACT**

*This article examines the effects of commercialisation of agriculture on land use and work patterns by means of a case study in the Nyeri district in Kenya. The study uses cross sectional data collected from small-scale farmers in this district. We find that good quality land is allocated to non-food cash crops, which may lead to a reduction in non-cash food crops and expose some households to greater risks of possible famine. Also the proportion of land allocated to food crops declines as the farm size increases while the proportion of land allocated to non-food cash crops rises as the size of farm increases. Cash crops are also not bringing in as much revenue commensurate with the amount of land allocated to them. With growing commercialisation, women still work more hours than men. They not only work on non-cash food crops but also on cash crops including non-food cash crops. Evidence indicates that women living with husbands work longer hours than those married but living alone, and also longer than the unmarried women.*

*Married women seem to lose their decision-making ability with growth of commercialisation, as husbands make most decisions to do with cash crops. Furthermore husbands appropriate family cash income. Husbands are less likely to use such income for the welfare of the family compared to wives due to different expenditure patterns. Married women in Kenya also have little or no power to change the way land is allocated between food and non-food cash crops. Due to deteriorating terms of trade for non-food cash crops, men have started cultivation of food cash crops with the potential of crowding out women. It is found that both the area of non-cash crops tends to rise with farm size but also the proportion of the farm area cash cropped rises in Central Kenya.*

**Key words: agricultural commercialisation, gender inequality, non-food cash crops, food cash crops, non-cash food crops.**

# **GENDER, MARITAL STATUS, FARM SIZE AND OTHER FACTORS INFLUENCING THE EXTENT OF CASH CROPPING IN KENYA: A CASE STUDY**

## **1. INTRODUCTION**

The main objective of this study is to examine the effects of commercialisation of agriculture on land use and work patterns by means of a case study in the Nyeri district in Kenya. Commercialisation of subsistence agriculture can take different forms. It can occur not only on the output side of production with increased marketing of agricultural surpluses, but also on the input side with increased use of purchased inputs. In this study, we concentrate on sales of output rather than purchases of inputs as an indicator of commercialisation.

Generally, cash crops can be defined as crops for sale. Commercialisation is not restricted to just non-food cash crops. Traditional food crops are also sometimes marketed to a considerable extent, and some cash crops are retained, to a substantial extent, on the farm for home consumption. Commercialisation can also be enforced by direct government action, namely, by various forms of compulsion related to the establishment of plantations, execution of certain management practices and input use, or forced procurement of produce (Bouis and Haddad, 1994; McComb et al; 1994).

In many developing countries, much land and other resources are devoted to the production of agricultural crops for export. Davison (1988) contends that as more land is converted to cash crop production, land scarcity becomes a pressing reality, and women's obligation to produce food for their families is at risk. The author found that smallholders with more land tend to allocate relatively more of it to cash value crops and conversely, those with less land tend to allocate relatively more of it to food production. Besteman (1995), Agarwal (1992) and Goheen (1991) also argue that commercialisation of agriculture decreases women's access to land. Fortmann (1982) found that in Tanzania, commercialisation contributed to land shortages, and men tend to be the recipients of land rights. Julin (1993) contends that commercialisation results in a decreased demand for male labour while at the same time increasing the demand for female labour.

Does non-cash food production suffer in the process of commercialisation? How are fixed resources, like land and labour, reallocated to cater for commercialisation? To what extent are resources for non-food cash crop production drawn from non-cash food production? Do women devote their time to non-cash food crop production while men spend their time on non-food cash crop production? Do men spend fewer hours than women on non-food cash crop farming in the Nyeri district?

This article provides a historical review of agricultural commercialisation in Kenya first. This is followed by a review of literature relevant to commercialisation of agriculture and changes in land use patterns. Section four presents information about the study site and data collection methodology. Section five uses descriptive statistics to present and discuss the main survey results. These results are then analysed in section six by applying multiple regression analysis and section seven concludes.

## **2. COMMERCIALISATION OF AGRICULTURE IN KENYA: A HISTORICAL REVIEW**

During the early 20<sup>th</sup> century, colonial policies restricted land use mainly in two ways: the establishment of reserved areas for Europeans and legislation against African cash crop production. This resulted in a sharply dualistic agricultural system in Kenya. The strategy of commercialising agricultural and overall rural development in Kenya was started early in the colonial era. Starting around 1910 in most areas, export cropping took off in earnest after the Second World War with the rapid expansion of cropped area per agricultural worker following the expansion of cash cropping for export. In the 1950s African farmers in Kenya were subsistence-oriented and generally had smallholdings. The African farmers produced only 20 percent of the marketed production. European settlers cultivated large holdings of about 800 hectares on average, produced cash crops and were dependent on hired African labour.

The Swynnerton Plan of 1954 for Kenya led to the consolidation and registration of land holdings and title deeds granted to individual African male household heads who were encouraged to produce cash-value crops for export which further marginalised the labour of women in food production. The plan set a precedent for male African domination of income-producing agriculture and transformed land from a source of

family food to a commercial asset, from an abundant resource valued for its ability to provide food to a scarce commodity having cash-value (Nasimiyu, 1985).

The Swynnerton Plan meant a change in the colonial agricultural policies and attitudes towards agricultural development. African smallholders were allowed to produce some cash crops and land registration paved the way for long term-investments by small holders. The major impact of the Swynnerton plan was to provide more favourable conditions for a market-oriented development in agriculture on a widespread scale.

Land policies since Kenya's independence in 1963 have continued the trend first established by the Swynnerton Plan. By 1978, 7.6 million hectares had been registered in the names of African males (Barnes, 1983). In addition, technical inputs and agricultural extension services promoted by transnational and national donor agencies to increase production of smallholders have continued to favour male rather than female producers (Staudt, 1987).

At independence in 1963, the government of Kenya lifted completely colonial restrictions on cash crop growing by Africans. In the 1960s and the first half of the 1970s, cash crop production on small-holdings provided farmers with substantial incomes, and provided the state with foreign exchange. However, in the last half of the 1970s, coffee began to lose its attraction for smallholder producers. State corruption swallowed sales income and farmers were not being paid fairly and promptly. The "hey day" of cash crop expansion continued throughout the 1960s as world commodity prices rose until the first oil shock in 1973. It was also a time when many African small holders first obtained access to cropping opportunities previously reserved for colonial farmers (Heyer, Maitha and Senga 1975).

The commercialisation of agriculture, particularly of crops for export, was adopted as a growth strategy, consistent with the then prevailing view that growth and development were synonymous and that the binding constraint on growth was lack of foreign exchange. It was also consistent with the prevailing view at the time that the role of agriculture in economic development was a source of resources for industrialisation.

In order to achieve the post colonial commercial objective of promoting agricultural production for exports, the Kenyan Government put emphasis on the development of exportable agricultural commodities by providing supporting agricultural loans, technical inputs and extension services. Subsistence crops were generally neglected in the provision of extension services and credit and this forced most farmers to shift to the production of cash crops. This emphasis was reflected in the export bias in the allocation of land resources, resulting in structural distortions of the pattern of agricultural production. Government policies tend to encourage the production of export cash crops because in the process, the government earns foreign exchange, charges export taxes whose incidence falls directly on the producer. At the same time, food price policies that are pursued through state interventions in food marketing keep prices paid to farmers low in the interest of urban consumers.

The second oil shock of 1979 drove up the cost of production of oil dependent cash crops. Between 1980 and 1990 real international prices for Africa's coffee exports fell by 70 percent (World Bank, 1994). Most farmers in Kenya's Central Province uprooted their coffee and replaced it by maize, beans and other horticultural crops. In 1986, the Government of Kenya accepted an International Monetary Fund program, which featured export crop expansion and privatisation. In response to lower coffee export earnings, the World Bank and the International Monetary Fund provided funds to increase coffee production. At the same time, the government's adoption of IMF recommended policies for cost sharing in health and education between citizens and the state created a greater need amongst producers for cash. This need constituted a coercive incentive to farmers to concentrate on the production of cash crops at a time when most farmers were abandoning coffee production. Apart from introducing cost sharing in health and education, peasant farmers are also put under pressure to grow cash crops to meet cash obligations such as to buy salt, sugar, cooking oil, cost of transport, purchase of clothing and so on.

In 1996, the International Monetary Fund loaned 12 billion shillings (US\$960m) to the Kenyan Government earmarked to support the full commercialisation of agriculture with emphasis on export crops (Kimenia 1996).



### **3. OVERVIEW OF RELEVANT LITERATURE**

Besteman (1995b) notes that the commercialisation and mechanisation of agriculture leading to increased production of cash crops, has had both positive and negative consequences for women of the Third World. The benefits lie primarily in enabling them to earn cash income in an increasingly cash-based economy. Yet, as more productive land is dedicated to cash crop production, which is often controlled by male farmers, women are left with less land and with increasingly marginal land. In Africa, commercialisation has been a major factor in shifting land tenure systems from use rights on community land to the individualisation and consolidation of land rights. In this process, women lose their traditional use rights. In Asia, increased commercialisation by large plantations has led to a large class of landless women working as agricultural wage labourers (Agarwal, 1989). Where women do retain access to land, their choices of which crops to grow are often constrained since men make many of the decisions regarding agriculture (Kiriti, Tisdell and Roy, 2002).

Women in developing countries are often considered responsible for feeding the family. Where wives and husbands keep separate fields, as is frequently so in Africa, men have traditionally had more options for moving into cash cropping on their own fields and leaving the production of subsistence crops to their wives. With this increased responsibility for family subsistence, women often do not have adequate land, labour and time to produce their own cash crops. Furthermore, in most cases, wives work as unpaid family labourers in their husband's cash crop fields. Men are not necessarily under any obligation to share the proceeds from their fields with their wives (Kiriti, Tisdell and Roy, 2002; Kennedy and Cogill, 1985).

Charlton, Everett and Staudt (1989) claim that Third World countries have been increasingly drawn into the international trade in foodstuffs, because many governments actively encourage the production of crops that can be sold for badly needed foreign currencies. Women are most disadvantaged by this policy when they have no choice but to continue working in the subsistence economy with few resources and no institutional support. Worldwide, men are often in better positions to exploit new cash crops, and thus women become increasingly responsible for food crop production (Safilios-Rothschild, 1988). Changes in production strategies seem to

have resulted in increased work and decreased access to cash for women in many developing countries.

Davison (1987) found that in Africa food crops were commonly cultivated and harvested exclusively by women with the help of their children. In 27 percent of the households surveyed the entire family performed the cultivation tasks of crop for cash, though women did most of the weeding. In 23 percent of the compounds, adult members of both sexes performed the tasks. There were no cases where men were the sole producers of cash crops. Thus, women continue to be identified culturally with the production of food crops in Africa, while cash crop production is largely a family affair, often though not always orchestrated by male household heads, as their work is mainly supervisory. An exception to this pattern is the female-headed compound where women bear the major responsibility for agricultural tasks regardless of gender norms.

Davison (1988) found that in Mutira location, more land had been converted to cash crop production and women's obligation to produce food for their families was at risk. She also found that smallholders with less land tended to allocate more of it to food production, and conversely, those with more land assign a larger percentage to the production of cash value crops. Davison's survey found that the more land an owner had, the more he allocated to cash crop production relative to household food production. Of 30 small-holder households in Mutira location in Kenya, small-holders with one to 3 acres of land allocated 44.3 percent of cultivated land to food crop production, while small holders with 4-6 acres only allocated 33.2 percent of their cultivated land to the growing of food crops. Small holders with 7-8 acres reserved even less land for food production (27.8 percent).

Fafchamps (1992) argues that other things being equal, a risk-averse farmer whose share of food in total expenditure is large will produce proportionally more food than a similarly risk-averse farmer whose share of food in total expenditure is small. Only farmers with low share of food in total expenditure will devote a significant amount of resources to cash crop production. Therefore the most likely relationship between farm size and cash crop emphasis is positive.

Davison also found that in Mutira location, women spend the bulk of their time cultivating and harvesting tea yet it is the owner (the husband) of the land and tea crop who largely benefits from production. Her findings imply that cash cropping and increased income does not necessarily lead to increased welfare for women and children. These findings are also supported by Fortmann (1982) who after examining the effect of Tanzania's national agricultural policy on the nation's women found that agricultural policies had reduced their income and their families' well being.

The competition for arable land between cash crops and food crops means that women depend increasingly upon cash to buy food they no longer produce themselves. Because cash is necessary to buy commodities not produced at home and is necessary for children's school fees, women farmers are allocating more of their labour time to the production of crops that bring a cash-value (Davison, 1988).

Julin (1993) contends that modernisation efforts in the Kenyan agricultural sector have been directed towards cash crop production and introduction of modern technologies, areas that are traditionally dominated by men. Men's productivity has therefore increased resulting in decreased demand for male labour, while the demand for female labour by men has increased due to the larger land areas prepared by men and the increase in the number of crops. Women's ability to produce their own food and cash crops has diminished due to lack of time. Women work as unpaid family workers on their husband's fields and have no control of the profit from this work. This view supports that of Davison (1988).

According to Gladwin et al. (1991), Structural Adjustments Programs (SAPS) designed to stimulate cash crop production benefit men more than women. Women often have little access to the vital agricultural inputs necessary to increase production. SAPS that focus on those factors, without also focusing on increasing their availability to women, do not benefit women directly and may serve to decrease food availability as prices rise and supplies diminish.

Women are the major food producers for families in many developing countries. At the same time, they increasingly have a need to generate cash income for commodities and services such as education and the health services required by their children, that

they cannot directly provide. In areas where a cash economy has taken hold, women's agricultural labour at the compound-household level is likely to be under-compensated or not compensated at all (Safilios-Rothschild, 1988). This view agrees with that of Angelique (1995) who found that in Kenya the people who really pick the coffee are not men, it is the women and children. But when time comes for the payment, the people who actually collect the money are men, not women. The labour is for the wife and the children, but the money is for the husband. The state and transnational corporations continue to regulate women's labour by giving credit to male title deed-holders to encourage horticulture. This is a labour intensive and chemically dependent type of export production.

The consequences of commercialisation are reflected in changes in time allocation of men and women and control over household resources. Women may also find that their decision-making role is reduced significantly with cash crop farming. Commercialisation may affect differently the welfare of various members, depending on how work and responsibilities and control over income within a household change (von Braun, de Haen and Blanken, 1991; Kaiser and Dewey, 1991; Julin, 1993; Angelique, 1995).

Specific characteristics of non-food cash crops may imply certain household food security and nutritional effects. For example, if a cash crop that is also a food is introduced, has several products, has a short maturation period, fits into existing cropping patterns, women have a role in farm decision-making and marketing systems are efficient, the crop may have a positive impact on food security and nutrition. On the other hand if a cash crop introduced is a non-food, is backed up with a comprehensive research, extension and marketing service which ignores all the food crops, inputs may be subsidised to the exclusion of the staple crops, has a long maturation period, revenues from it are lumpy and is controlled by men, does not fit with the existing cropping patterns, it may have a negative impact on food security and nutrition (Longhurst, 1988).

The technical characteristics of crops impinge on the ability of farm households to respond to changing price ratios in the short run. The characteristics of perennials such as coffee and tea production give less ability in the short run to respond to price

changes than is the case for annual crops such as carrots, potatoes, maize and beans. Coffee and tea represent a semi-fixed factor situation to a farmer who has switched to these. If after the switch is made and investments are made, the terms of trade between coffee and a competing crop (say maize) shift in favour of the competing crop, then moving out of coffee is constrained in the short run. Production of tea and coffee will continue as long as variable costs are covered (Islam, 1994).

Although many authors agree that women's role as food producers has been peripherised by the introduction of cash cropping (eg. Boserup, 1970; Safilios-Rothschild, 1982; Barnes, 1983; Guyer, 1984; Kennedy and Coghill, 1985; Nasimiyu, 1985), others find that women producers in some areas of West Africa, in particular, have actually benefited from the introduction of cash cropping and the commercialisation of land (eg. Berry, 1975; Okali, 1983; Afonja, 1986).

According to Afonja (1986), Yoruba wives of cash crop farmers in Nigeria were initially compensated by their husbands in gifts and later in cash for their labour in cash crop production (Afonja, 1986: 131). Additionally, the increase of individual private property ownership in connection with cash crop production means that some Yoruba women in bilaterally organised kin groups who customarily inherited land, subsequently gained access to cash crop producing farms or inherited uncultivated land on which they began to grow cocoa (Afonja, 1986: 131). Consequently, where commercialisation has intruded on subsistence forms of production, its impact is experienced differently depending upon pre-existing and changing forms of production and exchange, kinship patterns of inheritance and land use practices.

#### **4. STUDY SITE AND DATA COLLECTION METHODOLOGY**

Kenya has a total land area of 580,367 km<sup>2</sup>. Only about 20 percent of Kenya's land is considered to have high or medium potential for farming or intensive livestock production. Another 10 percent of the land is categorised as marginal for agriculture, while the remaining 70 percent is used for extensive grazing or taken up by national parks and forests. With a population of about 28.7 million (1999 census), Kenya has one of the highest agricultural population densities in the world when its agro-climatic potential is taken into consideration. Central Province has a population of 3.7 million people.

Kenya has since independence relied heavily on the agricultural sector as the base for its economic growth, employment creation, and foreign exchange generation. The sector contributes to the country's food security and a source of off-farm employment (Government of Kenya, 1997). Approximately 80 percent of Kenyans live in rural areas and depend on agriculture for their livelihood.

This study is based on data collected in Nyeri district in Central Kenya. The Kikuyu, who are Kenya's largest ethnic group and account for over half the province's population, mainly inhabit Central Kenya. Nyeri district is bordered by Mount Kenya to the East and the Aberdare ranges to the West. The Western part is relatively flat while to the south and east the topography is characterised by steep ridges and valleys. Rainfall varies from 750 millimetres in the central-northern part of the district to 1750 millimetres in the southwestern and northeastern parts of the district. The "long" rains normally begin in March and end in May, while the "short" rains begin in October and end in December.

Nyeri district has a very high population density with some areas of high agricultural potential, such as Tetu division, having more than 400 persons per km<sup>2</sup>, whereas new settlement areas such as Kieni West have 100 persons per km<sup>2</sup>. The infrastructure in the district is better developed than in other rural districts of Kenya. The principal town is Nyeri with a population of about 50,000 persons and it is also the provincial headquarters.

Six divisions were selected for the study. These divisions were selected because of their differences in ecology and levels of commercialisation. The divisions are Nyeri, Othaya, Tetu, Mukurweini, Mathira and Kieni. In these divisions, farmers produce subsistence foods mostly for home consumption and some for sale, as well as cash crops such as tea, coffee, pyrethrum and tobacco for sale in the international market.

We used the Kenya Central Bureau of Statistics Welfare Monitoring Sampling Frame to randomly select our sample. The data were collected in the months of December 2000 and January 2001.

A random sample of 330 households was selected but due to death, migration, absentees and non-responses we ended up with 185 households with 235 respondents. The sample consisted of 98 male respondents, 63 wives staying with their husbands, 26 wives staying alone as their husbands were working in the urban areas, and 48 unmarried women who were heads of their households. The reasons for the low response rate was because (1) the women were too busy as it was during the short rains and there were food crops in the fields and coffee, tea, pyrethrum and other cash crops were being harvested, (2) the husbands refused to give permission in a number of cases, (3) the husbands were suspicious that their wives were being incited to divorce or disobey them, (4) the households thought that we had been sent by the government and since Nyeri district is an opposition zone, they would not respond kindly to any government functionaries, and (5) the households did not perceive any direct personal benefit from answering the questions.

A questionnaire was administered to collect information on the various products households produce, size of farm, labour and other inputs for the previous season, fertiliser and agro-chemicals, contact with extension officers, use and availability of credit, education, age and so on. Usually, the harvest months are September and October. This therefore means that the recall period was quite short and for this reason, we assume the data is reasonably correct and quite representative of agricultural production in Nyeri district.

Subsistence crops in Nyeri include maize, beans, bananas, cassava, onions, tomatoes, carrots and potatoes. Additionally, garden vegetables such as cabbages and kale are also grown. Coffee, tea, pyrethrum, tobacco and wheat are grown as cash crops.

The distinction between cash crops and subsistence crops is an arbitrary one in some cases. For example, in Nyeri the farmers grow maize and beans, carrots and so on, which they concurrently sell and use for their own consumption. Further, what is a subsistence crop at one point in time may become a cash commodity at another as the economic needs of each household fluctuate. In our study, subsistence crops are referred to as non-cash food crops; semi-subsistence crops as food cash crops; and cash crops as non-food cash crops.

## 5. NON-FOOD CASH CROP FARMING, NON-CASH FOOD PRODUCTION AND ALLOCATION OF RESOURCES IN NYERI DISTRICT: SUMMARY STATISTICS

Commercialisation of agriculture has had a profound effect on the production priorities of households. As more land is converted to cash crop production, land scarcity becomes a pressing reality and households' food security can fall.

Women's food production in Kenya is directly affected by the amount of land their husbands are willing to assign to them for the production of food crops. Besteman (1995a) claims that as more productive land is dedicated to cash crop production, which is often controlled by male farmers or by agribusinesses, women are left with less land and with increasingly marginal land. Is this the case in Nyeri district? Table 1 shows how women perceive the quality of the land on which they practice farming.

**Table 1: Land Quality of their Farms as Perceived by Women in the Nyeri District According to the Marital Status**

Quality of land →	N	Above Average (%)	Average (%)	Below Average	Total Percentage
Marital status ↓					
Married women living with husbands	63	17.5	66.7	15.9	100
Married women living alone	26	26.9	61.5	11.5	100
Unmarried women	48	27.1	70.8	2.1	100
<b>Total</b>	137				

Table 1 shows that the largest percentage of land in Nyeri district is perceived to be of average quality and only a very small percentage is of poor quality. But how much of this good quality land is allocated to non-cash food production? This question will be answered in the next section.

How do the farmers in Nyeri district allocate the land between subsistence and cash crops? Table 2 shows the percentage allocation of land between uncultivated land, non-cash crops, food-cash crops and non-food cash crops by marital status.



**Table 2: Average Farm Size, Average Percentage Allocation of Land to Crops for Home Consumption and for Cash in Nyeri District**

<b>Marital Status</b>	<b>N</b>	<b>Average Farm Size (acres)</b>	<b>% Fallow (a)</b>	<b>% Non-cash Crops (b)</b>	<b>% Food Cash Crops (c)</b>	<b>% Non-food Cash Crops (d)</b>	<b>Total</b>
<b>Married women living with husbands</b>	63	2.25	16.24	48.73	7.08	27.87	100
<b>Married women living alone</b>	26	1.65	15.19	55.65	4.00	25.00	100
<b>Unmarried women</b>	48	2.70	14.58	52.29	7.21	25.92	100
<b>Total</b>	137						

Table 2 shows that on farms where married women live with husbands a higher percentage of the land is allocated to non-food cash crops than on farms headed by unmarried women and those where the husband has migrated. Unmarried women have the biggest farms and they allocate slightly over 50 percent of the farm to non-cash farming and slightly over 25 percent to non-food cash crops. When unmarried women head households they allocate the lowest percentage of their farm to uncultivated land. Married women living alone on average allocate the highest percentage of their land (56 percent) to non-cash farming and almost 26 percent for non-food cash crops. None of the households entirely specialise in cash cropping. All households had some subsistence food production.

What is the relationship between non-cash food production and commercialisation in Nyeri district? Table 3 shows the production of non-cash food crops, food cash crops and non-food cash crops by marital status. This output is attributable to the whole farm. In male-headed households, husbands generally control cultivation of non-food cash crops while their wives manage cultivation of non-cash food crops. However, married women living with husbands are expected to work on their husband's fields (cash crop fields) if they are not working on their own fields. On the other hand, the female-headed households (households headed by single mothers, divorced or

widowed and those women whose husbands have deserted them and those headed by women whose husbands are away working as migrant workers in urban areas) have greater choice.

**Table 3: Production of Non-cash Food Crops, Food Cash Crops and Non-food Cash Crops by Women's Marital Status for one Season**

Marital Status	N	% Land for Food Cash and Non-food Crops	Non-cash Food Output (Kg)	Food Cash Output (Kg)	Non-food Cash Output	Total Output (Kg)
Married living with husband	63	34.95	103.78	101.02	79.08	283.88
Married living alone	26	29.00	107.73	71.92	90.46	270.11
Unmarried women	48	33.13	95.53	29.71	98.29	223.53
<b>Total</b>	137					

Table 3 shows that although all women in Nyeri district practise non-cash crop farming, unmarried women produce the lowest amount of non-cash food crops and the highest amount of non-food cash crops. They also produce the lowest output of food cash crops. On those farms where married women live with their husbands, the lowest output of non-food cash crops is produced and the highest output of food cash crops. Married women living alone produce the highest output of non-cash food crops.

Do households spend less time on non-cash food crops and allocate more time to non-food cash crops? Von Braun and Kennedy (1994) found that in general, women work less on the more commercialised crops than do men or hired labourers, who are also mostly men. They contend that women generally spend more time working on subsistence crops than they do on commercial crops. Table 4 shows allocation of time between non-cash food crops and non-food cash crops by marital status of women in our sample. The hours spent on non-food cash crops are inclusive of the hours spent on food cash crops.

**Table 4: Allocation of Time per Week between Non-Cash Food Crops and Non-Food Cash Crops by Gender and Marital Status**

Marital Status	N	Hours Spent	Hours Spent	Total Hours
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		<b>on Non-cash Food Crops</b>	<b>on Non-food Cash Crops</b>	<b>Spent</b>
<b>Married women living with husbands</b>	63	17.73	13.52	31.25
<b>Married men living with Wives</b>	73	16.71	10.75	27.46
<b>Married women living alone</b>	26	17.38	10.19	27.57
<b>Unmarried women</b>	48	14.32	11.53	25.85
<b>Total</b>	210			
<b>Missing</b>	25			

Table 4 shows that hours spent on non-cash food production are generally higher than the hours spent on non-food cash crops in all cases, findings that support von Braun and Kennedy (1994). However, married women living with husbands and unmarried women work longer than men on non-food cash crops, findings that contradict von Braun and Kennedy (1994). This table also indicates that women living with their husbands generally work more hours than all the other women. They spend on average 31.25 hours working on the farm. Their husbands work equally hard on both non-cash food crops and non-food cash crops. Although not shown, these women also spend their time preparing food, collecting firewood and water, looking after children, and so on implying that women in Nyeri district work harder than men, findings that concur with those of Funk (1988) in her study in Guinea Bissau. This author found that although men spend more hours per day in field labour, if we count the total work hours including food gathering, processing and domestic work, women clearly work more hours per day than men.

The above results imply that commercialisation leads to an increased workload for women for jointly managed households. Also married women living with husbands still work more hours than their husbands. Julin (1993) contends that commercialisation results in decreased demand for male labour, while demand for female labour increases due to the larger land areas prepared by men and the increase in the number of crops. Our results suggest that demand for female labour increases with commercialisation when husbands are present in a household. This is consistent with Julin's hypothesis. However, it is not clear that the demand for male labour declines with commercialisation.

According to Gladwin et al. (1991), Structural Adjustments Programs (SAPS) designed to stimulate cash crop production benefit men more than women. Women often have little access to the vital agricultural inputs necessary to increase production. Extension services are not generally offered for food crops since their economic returns are very low yet these are the crops controlled by women, which provide households with the main source of income and food security. From our Nyeri sample we found that extension officers had visited only 12.4 percent of the 137 women farmers. We also found that only 13.9 percent of the women had attended training on good farming techniques. This would imply that the women farmers could be using outdated and crude methods of cultivation since they lack the knowledge, which they could gain if extension officers visited them, or they attended seminars and training on good farming techniques.

Efficient cultivation of land requires investment. Land titles enable land to be used as collateral to obtain credit from financial institutions. Although land titles are not essential prerequisites for investment in agriculture they are necessary. With land titles, women can have greater access to technology and information on productivity increasing agricultural practices and inputs. However, in our Nyeri sample, 74.5 percent of all female farmers did not own the farms they cultivated implying that they did not have titles to the land.

To be able to improve farm output, a farmer can borrow money or hire farm materials such as tractors, water pumps, wheelbarrows, fertilisers, seeds and so on, from the local cooperative society. They can repay through monthly deductions from their sale proceeds. From our female sub-sample, only 5.8 percent had borrowed money from the cooperative society, 7.3 percent had borrowed money from moneylenders while 86.9 percent had not borrowed at all due to various reasons one of them being lack of title deeds. On the other hand, 38 percent of the women had borrowed farm materials from the cooperative society.

Lack of credit, lack of visits by extension officers and lack of knowledge on good farming techniques could be some of the factors that may have contributed to the low non-cash food production in Nyeri district.

Smallholders that have adopted coffee production in Kenya have been experiencing returns to coffee that are not competitive with crops such as potatoes and cereals. Legal regulations do not permit them to completely abandon the coffee and convert to subsistence farming. As mentioned before, coffee prices have been declining over the years and this, coupled with corruption in cooperatives and allegedly in the Coffee Board of Kenya has meant that most farmers have lost confidence in coffee growing and started paying attention to food cash crops. The farmers who grew coffee had not been paid by December 2000 for coffee delivered to the factories in early 1999. It is worth noting that men seem to be spending more hours on food crops than on cash crops. This may be due to the poor prices that cash crops have been fetching and therefore men have moved to the production of subsistence crops, since compared to cash crops the terms of trade are much better. Falls in prices of traditional export crops is affecting the food sector in particular and attracting males to commercial food crops such as maize, beans and horticulture, traditionally controlled by women. The results imply that since cash crops like coffee (a man's crop) have lost favour in terms of cash value, the men have now turned to growing food crops (a woman's crop) for cash and this explains their increased participation in food crops as shown by the many hours they devote to food production. Our results concur with those of Nasimiyyu (1985); Okali (1983); Davison (1987) who contend that as selected crops become commoditised for export production, women's control over all aspects of production and allocation continues for some food crops, while for others that obtain a cash value, women's control becomes increasingly limited to allocated labour tasks such as hoeing, weeding, harvesting and processing. Men largely pre-empt women's allocation rights over crops grown for a cash value. Cowen (1986) also observes that when maize is grown for cash and has an exchange value, men cultivate it, but when it has subsistence value only women cultivate it. When maize loses its commercial value, the crop tends to revert to female production (1986:367). It has also been found (for example in Nigeria, Afonja, 1986) that if a woman's crop starts to increase in value due to, for example, changed price policies, men begin to take over the cultivation from the women and soon dominate the former female activity.

Do women lose their power of decision-making with cash crop farming? Decision-making in the context of land and production refers to decisions regarding the transfer (including inheritance, sales) of land and its use as an agricultural resource. Allocation of resources means the right to loan, pledge or sell a tract of land; access to and

control over improvements to land; and control over products harvested from that land, including processing, distribution and income generated (Davison, 1988). Boserup (1970) points to the introduction of cash cropping with its attendant emphasis upon male-controlled agricultural intensification as a primary determinant of women's loss of status and power in African agriculture (1970: 53-57). The introduction of cash crops has meant that male rather than female producers more often control intra-family decisions related to agricultural production (Staudt, 1982; Fortmann, 1984; Kennedy and Cogill, 1985; Cowen, 1986).

Capitalisation of land and production in Kenya means that although women have continued to play a major role in subsistence food production, men exercise an increasingly dominant role in the management of resources (including agricultural inputs), control of land, and the distribution of goods and services. As a result women experience a greater loss of socio-economic power (Boserup, 1970; Staudt, 1982; Nasimiyu, 1985).

In our study only 12.5 percent of the wives reported having made the decision regarding the acreage of the cash crop. For those who did not make the decision about the acreage of the cash crop, 69.8 percent said their husbands made the decision, 14.6 percent reported that their fathers-in-law made it, 14.6 percent attributed the decision to their mothers-in-law while 2.1 percent reported that their brothers-in-law decided on the acreage of the cash crop. This shows that most wives are presented with a fait accompli by their husbands in terms of decisions regarding cash crops.

Only 25.8 percent of the wives reported making decisions regarding acreage of non-cash food crops, 28.1 percent made decisions regarding how much fertiliser and pesticide to use on food crops and only 18.8 percent of the wives made decisions regarding how much fertiliser and pesticide to use on non-food cash crops. On the other hand, only 26.1 percent of the wives made decisions on when to direct labour to cash crops, 32.9 percent made decisions on how much to use at home and how much to sell. Our findings support those of Boserup (1970); Staudt (1982); Nasimiyu (1985); Cowen (1986); Fortmann (1984); Kennedy and Cogill (1985).

Tisdell, Roy and Regmi (2001) found that whereas the wife has control over the food that she grows for the family, she has little or no control over cash. It is generally contended that non-cash food production is under the control of the wife and directly used for family nutrition. However, cash income is not, and it is considered that husbands are less likely to use cash for the welfare of wives and children (Kaiser and Dewey, 1991). Our results show that only 13.5 percent of the wives make decisions on household spending. However, only 16.5 percent of the wives keep the cash after sale of crops compared to 83.5 percent of husbands. About 60 percent of the husbands keep the money in their own individual accounts while 40 percent keep it in a joint account. Thus, in the Kenyan case, women appear to have very little say in decisions on cash crops but they seem to have more leeway in matters concerning food crops. In other words, women appear to lose their ability to make decisions with increased commercialisation and this may impact negatively not only on food availability in general but also on the nutrition of children. Our results also support von Braun, de Haen and Blanken (1991); Kaiser and Dewey (1991).

Many women do not directly benefit from their increased work efforts or efficiency as individuals. Instead, men control the incomes (Julin 1993). Women work as unpaid family workers on their husband's fields and have no control of the profit from this work. Muntemba (1982:99) gives the example of an old Zambian woman farmer who said, "Now a woman is like a slave. She works hard ..... At the end of the year, the family sells one hundred bags of maize. The man gives her 20 Kwacha. The following year the family sells three hundred bags. He still gives her 20 Kwacha. What is that but slavery?" However, husbands' payment to wives for work on their fields have been documented in some cases in Nigeria (Galtetti et al., 1956). In Ghana male cocoa farmers prefer wives' labour because they can delay wage payment (Okali, 1983), and payments occur in the Gambia (Dey, 1982) and in Cameroon (Guyer 1984 and Jones, 1983). In our study, 93.8 percent of the wives said they and the children are not paid for work done on the cash crop plot and gave various reasons for this state of affairs. Our results support those of Julin (1993); Muntemba (1992); Safilios-Rothschild (1988); and Angelique (1995). Introduction of cash cropping has brought about greater gender segregation in labour tasks with men increasingly becoming agricultural managers.

Asked whether their husbands would like to grow less or more cash crops, 37.5 percent of the married women living with their husbands said their husbands would like to grow more cash crops, 25 percent said less while 37.5 percent thought their husbands think the percentage is just correct. On the whole, husbands would like more cash cropping.

## **6. MULTIPLE REGRESSION ANALYSIS: INFLUENCES OF THE ALLOCATION OF HOUSEHOLD LAND BETWEEN CASH CROPS AND SUBSISTENCE CROPS**

To explain what determines the allocation of household land between non-food cash crops and non-cash food crops, we estimate separate multiple regression models. The amount of land allocated to subsistence or cash crops will be considered as a function of the proportion of income out of total crop revenue of the type of crop, the amount of land the household has, the quality of land, age of the household head, the number of children in the family and proportion of household needs met from sale of cash crops. The actual model was expressed as follows.

$$L_i = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Where:

$L_i$  = Absolute amount of land in acres allocated for either non-cash food crops, non-food cash crops, food cash crops or left fallow<sup>4</sup>

$X_1$  = Cash income from crop category as a proportion of total revenue

$X_2$  = Total amount of land a household has in acres

$X_3$  = Quality of land as reported by respondents, 1 if above average, 2 if average and 3 if below average

$X_4$  = Age of woman in years

$X_5$  = Number of children in the family

$X_6$  = Proportion of household needs met from sale of cash crops

$\alpha_0$  = constant

$\beta_i$  = regression coefficients

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<sup>4</sup> Proportion of land allocated to different categories of crops was also regressed against the same variables but the explanatory power of the variables was very low and most variables were not significant. We only report these findings only occasionally.



The above may be estimated as a system of reduced form equations with an extended list of exogenous explanatory variables that affect any of the structural relations as allocation decisions may be treated as simultaneously determined. However, it would not be possible to identify the structural coefficients from the estimates and therefore it would not be possible to draw firm conclusions about the specific impact of explanatory variables in the system for each type of crop. We therefore estimate separate regression equations for the four allocation decisions partly due to limited information and data limitations and also to meet the objective of illuminating key factors that influence household allocation of land to different uses.

The results of the regression analysis are found in Appendices A, B and C. Appendix A provides this information for those women who are married but living alone as their husbands have migrated. Tables A1 through to A4 show the regression results of the analysis for these women. Appendix B contains similar information for those women who live with their husbands. Tables B1 through to B4 show the results of the regression analysis for them. On the other hand, Appendix C is for those women who are unmarried and the results of their regression analysis are shown in Tables C1 through to C4.

### **6.1 Regression Results with Discussion**

As shown in Table 1, most agricultural land in Nyeri district is judged by farmwomen to be of average quality and only a very small percentage is said to be of poor quality. But how much of this good quality land is allocated to non-cash food production? Are non-food cash crops grown on good quality land while non-cash food crops are grown on poor quality land? The data do not enable these questions to be answered exactly. However, the lower the reported quality of land on a farm, the lower is the quantity of land allocated to production of non-cash food crops. Tables A1, B1 and C1 indicate that quality of farmland in Nyeri district is negatively related to the amount of land allocated to non-cash food production. This means that farmers with poorer quality land, non-cash food crop production is relatively more important. Tables A3, B3 and C3 show that quality of farmland is positively related to the amount of land allocated for non-food cash crop production. However, quality of land is not significant in explaining the amount of land allocated to both non-cash food crop production or even non-food cash crop production, except in the case of married women living with

husbands, where quality of land is statistically significant at the 5 percent level in explaining the amount of land allocated to non-food cash crop production. This indicates that where husbands are present, non-food cash crop production is relatively more important than non-cash food production. This finding accords with that of Schoepf and Schoepf (1988) who found that in the Kabare Zone East Kivu in former Zaire, 65 percent of the best land was reportedly occupied by plantations growing export crops.

There is a negative relationship between the quality of land and the amount of land allocated for food cash crops for married women living alone. This means that for these types of households food cash crops are not very important in their land allocation patterns compared to the patterns of land allocation for the unmarried women and the married women living with their husbands, where the amount of land allocated for food cash crops is positively related to the quality of land.

In the case of married women living with their husbands there is a negative relationship between the amount of uncultivated land on a farm and the reported quality of the land on the farm (Table B4). Hence land on better quality farms is more intensively utilised. However, for the married women living alone and the unmarried ones, there is a positive relationship between the amount of land left uncultivated and the quality of land. For this group, on average, women on better quality land leave larger areas of land uncultivated. Why do these women leave part of the good quality land uncultivated? A possible explanation would be that on a farm, not all land is of equal quality. Hence, even on farms with good quality land on average, some of it would be poor and left uncultivated. An important additional factor could be that such farms suffer from labour shortage due to absence of adult males.

Besteman (1995b) contends that smallholders with less land tend to allocate more of it to food production, and those with more land assign a larger amount to the production of cash value crops. This also accords with the findings of Davison (1988) and Fafchamps (1992). However, our findings contradict their findings in that in our study as total size of farmland rises, the amount of land allocated to non-cash food crop production rises and this relationship is highly statistically significant at the 1 percent level for all women (Tables A1, B1, and C1). Also, as farm size increases, the amount

of land allocated to non-food cash crop production rises for all women and farm size is also statistically significant at the 1 percent (Tables A3, B3 and C3). The amount of uncultivated land also rises with total farm size for all farms and farm size is statistically significant at the 1 percent level. Using the proportion of land allocated to a crop category as a dependent variable (not reported in Tables), we found that the proportion of land allocated to non-cash food crops declines as total farm size increases for all women in the sample; a finding that supports Fafchamps (1992); Besteman (1995b); and Davison (1988). This relationship was significant at the 10 percent level for married women living with their husbands and for the unmarried women. However, it was not significant for the married women living alone. On the other hand, there was a positive relationship between the proportion of land allocated to non-food cash crops and total farm size for all women. However, total farm size was not significant in explaining variations in the proportion of land allocated to non-food cash crops for both the married women living alone and those living with their husbands. It was only for the unmarried women where this relationship was significant at the 5 percent level.

The proportion of land allocated for food cash crops was found to be positively associated with the total farm size for both married women living alone and those living with husbands but total farm size was not significant. On the other hand, there was a negative association between total farm size and the proportion of land allocated to food cash crops but this relationship was not significant.

We found a positive relationship between farm size and the proportion of land left uncultivated but it was not significant for the married women living alone and the unmarried women. It was significant at the 10 percent level for married women living with their husbands.

Fafchamps (1992) and Finkelshtain and Chalfant (1991) contend that the proportion of income out of total crop revenue derived either from food crops or non-food cash crop can also determine how the land as a resource will be allocated between non-cash food crops and non-food cash crops. If the proportion of income out of total crop revenue derived from food cash crops is very low, the relationship between the amount of land allocated to food cash crops and the proportion of income out of total

crop revenue derived from food cash crops would be negative and vice versa depending on whether a larger or a smaller share of the food cash crop is used for home consumption than for cash. If a larger share of the food cash crop is used for home consumption, then the household will allocate a larger share of the land to food cash crops. On the other hand, if the proportion of income derived from non-food cash crops out of total crop revenue is high, then the relationship between the amount of land allocated for non-food cash crops and the proportion of income out of total crop revenue derived from non-food cash crops would be positive and vice versa. Our results show that there is a positive relationship between the amount of land allocated for non-cash food crops and the amount of income arising from sale of food crops for all women and this variable is statistically significant at the 1 percent level for married women living with their husbands and 10 percent level for the unmarried women (Tables B1 and C1). A possible reason for these findings may be that these farmers may be risk-averse and a larger share of the food cash crop is used for home consumption.

On the other hand, the proportion of income derived from non-food cash crops is negatively related to the amount of land allocated for non-food cash crops. This variable is statistically significant at the 10 percent level for married women living alone (Table A3). These findings imply that non-food cash cropping is not bringing revenue commensurate with the amount of land allocated to it. This means that food cash crops are bringing in more revenue compared to non-food cash crops. A possible reason in the case of married women living alone is that they may be putting less effort into cultivation of non-food cash crops than is so for married women. Husbands may see to it that wives devote greater attention to non-food cash crops.

The proportion of household needs met from the sale of cash crops was found to be positively associated with the amount of land allocated for food cash crops for the unmarried women. These women allocate more land to food cash crops as the proportion of household needs met by sale of cash crops increases. However, the variable was dropped in the regressions for the other types of households as it reduced the explanatory power of all the other variables by lowering both the  $R^2$  and the F statistic.

The trend toward increased export crop production means that less emphasis is placed upon non-cash food production, which in turn adversely affects the nutritional status of women and their children, according to Davison (1988). This is because as more land is converted to cash crop production, land scarcity becomes a reality, and women's obligation to produce food for their families is at risk. It may also be that because income from cash crops comes in lump sum, households may allocate a larger share of it to purchase of luxuries and a smaller share of the income to food expenditure. Schoepf and Schoepf (1988) also argue that land expropriation for cash crop production has had a pronounced effect on peasant women's ability to provide a balanced diet for their families, leading often to advanced cases of nutritional deficiency. They found that the area devoted to food production had declined as the men had planted quinine in the fields formerly planted to food crops. Food crops had been pushed away from near the roads to small plots on the steep slopes and because of over exploitation, they gave dwindling yields.

## **7. CONCLUDING COMMENTS**

In summary, it can be seen more good quality land has been allocated to non-food cash crops than to non-cash food crops, which may lead to a reduction in non-cash food crops and expose a lot of households to possible famine. The lower the reported quality of land on a farm, the lower the quantity of land allocated to production of non-cash food crops. On the other hand, the higher the reported quality of land, the higher is the quantity of land allocated to non-food cash crops. This is especially true for jointly managed households.

For married women living alone, food cash crops are not very important in their land allocation patterns, as there was a negative relationship between the amount of land allocated for food cash crops and the reported quality of land. In female headed households, part of good quality land is left fallow while in the jointly managed households, land on better quality land is intensively utilised as there was a negative relationship between the amount of uncultivated land and the reported quality of land on the farm. Women also lack other resources like credit, are not visited by extension officers, and the majority of them have never obtained any training on good farming techniques.

Household surveys in Third World countries often show that cash crop orientation depends on farm size. In most cases, large farmers devote to cash crops a larger share of their land than do small farmers (Fafchamps, 1985; Davison, 1988; Besteman 1995b). Davison (1988) and Besteman (1995b) found a negative relationship between farm size and the amount of land allocated to non-cash food crops. Using the proportion of land allocated to different categories of crops, our findings concur with those of the above authors since we found that the proportion of land allocated to food crops declines as the farm size increases while the proportion of land allocated to non-food cash crops rises as the size of farm increases. This is true for all households and this may also lead to low production of non-cash food output.

However, using the amount of farm size, we found that as total size of farmland rises, the amount of land allocated to non-cash food crop production rises. A possible reason for this finding would be that these farmers would not want to expose themselves entirely to the uncertainties and risks associated with non-food cash crops as their prices fluctuate with world market demand. The farmers allocate land in such a way that food security is guaranteed.

Our results show that there is a positive relationship between the amount of land allocated for non-cash food crops and the amount of income arising from sale of food crops, while on the other hand the proportion of income derived from non-food cash crops is negatively related to the amount of land allocated for non-food cash crops. A possible reason for these findings may be that these farmers may be risk-averse and a larger share of the food cash crop is used for home consumption than for sale and also, it may be that cash crops are not bringing in as much revenue commensurate with the amount of land allocated to them.

Julin (1993) contends that commercialisations leads to increased productivity for men resulting in decreased demand for male labour while the demand for female labour increases due to the larger land areas prepared by men and the increase in the number of crops planted. Our results suggest that the demand for female labour increases with commercialisation when husbands are present in the household which support Julin's hypothesis. Married women living with husbands work more hours than men and they not only work on non-cash food crops but also on non-food cash crops findings that

contradict von Braun and Kennedy (1986). They found that in general, women work less on the more commercialised crops than do men or hired labourers, who are mostly men. They contend that women generally work much more on subsistence crops than they do on commercialised crops. There is also evidence to show that women living with husbands work more hours than those married but living alone and also the unmarried women who are household heads. A possible reason may be that the presence of husbands puts pressure on their wives to work much more on cash crop fields as well as on food crops which is not the case for the married women living alone and the unmarried women who decide how and for how long they can work on their farms. However, from our study it is not clear whether the demand for male labour declines with commercialisation.

Also, we have seen that women seem to lose their decision-making ability with commercialisation, as husbands make most decisions to do with non-food cash crops. This includes control of cash income, which as Kaiser and Dewey (1991) contend, husbands are less likely to use for the welfare of wives and children due to their different expenditure patterns. Our results in this respect also accord with those of Fortmann (1982) for Tanzania.

Women in Nyeri district have little or no power to change the way land and their labour is allocated for food and non-food cash crop production. This lack of decision-making power in the way resources are allocated implies that commercialisation impacts negatively on women, food availability and indirectly on the nutrition of children. They cannot on their own decide on the amount of land they require for food crops as this is determined by their husbands or male relatives. Their obligation to produce food for their families is therefore put at risk.

Prices that these smallholder farmers have been receiving for the non-food cash crops fluctuate with world market prices and recently prices have declined making non-food cash crop production unprofitable while the revenue derived from food cash crops seems to be rising. Due to the deteriorating terms of trade for non-food cash crops, men have started cultivation of food cash crops with the potential of crowding out women.

In our study, there were no households that were exclusive non-food cash crop producers or exclusive non-cash food producers. Smallholder producers make a conscious effort to maintain non-cash food production along side the new cash crops. This reliance on food from own production, under household control is a response to market, employment, and production risks and can be viewed as an insurance policy by farm households in a risky income environment. Farmers choose non-cash food production for home consumption because it is subjectively the best option given all constraints (von Braun, 1994).

Although commercialisation may provide much needed cash income, rural households are forced to maintain non-cash food production for several reasons. These include: (1) poor economic conditions, poor terms of trade for cash crops, corruption and mismanagement of cooperatives and lack of insurance services making farmers have limited ability to cope with increased risks associated with commercial production; (2) transaction and marketing costs are tremendously high due to limited markets and lack of infrastructure. Under these circumstances, as noted by von Braun and Kennedy (1994), maintenance of their own food supplies is perhaps the only feasible and economically efficient strategy available to small farmers in developing countries.

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## APPENDIX A: Married Women Living Alone

**Table A1: Determinants of Amount of Land for Non-Cash Food Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.523	1.566	-0.334
Totfmsz	0.469	0.057	8.274***
Landqual	-0.319	0.327	-0.973
Age	$1.034 \times 10^{-3}$	0.018	-0.057
Nochild	-0.117	0.098	-0.191
Subsrev3	1.692	1.730	0.978
R <sup>2</sup>	0.782		
Adj R <sup>2</sup>	0.728		
F stat	14.354		

**Table A2: Determinants of Amount of Land for Food Cash Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	1.226	0.462	2.655**
Totfmsz	$3.666 \times 10^{-2}$	0.036	1.019
Landqual	-0.395	0.189	-2.089*
Age	$-1.124 \times 10^{-2}$	0.011	-0.981
Nochild	$1.969 \times 10^{-3}$	0.063	-.031
R <sup>2</sup>	0.268		
Adj R <sup>2</sup>	0.128		
F stat	1.919		

**Table A3: Determinants of Amount of Land for Non-Food Cash Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.646	0.562	-1.150***
Totfmsz	0.379	0.040	9.444***
Landqual	$6.702 \times 10^{-2}$	0.232	0.289
Age	$8.246 \times 10^{-3}$	0.012	0.661
Nochild	$5.029 \times 10^{-2}$	0.070	0.723
Cashrev3	-2.957	1.274	-2.322*
R <sup>2</sup>	0.839		
Adj R <sup>2</sup>	0.796		
F stat	19.755		

**Table A4: Determinants of Amount of Uncultivated Land**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.811	0.363	-2.233*
Totfmsz	0.141	0.028	4.980***
Landqual	0.247	0.149	1.660
Age	$7.441 \times 10^{-3}$	0.009	0.826
Nochild	$3.587 \times 10^{-2}$	0.049	0.726
R <sup>2</sup>	0.614		
Adj R <sup>2</sup>	0.540		
F stat	8.336		

## APPENDIX B: Married Women Living with Husbands

**Table B1: Determinants of Amount of Land for Non-Cash Food Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.349	0.388	-0.900
Totfmsz	0.204	0.032	6.448***
Landqual	-0.110	0.105	-1.046
Age	$-5.44 \times 10^{-3}$	0.007	-0.732
Nochild	$-1.64 \times 10^{-2}$	0.036	-0.456
Subsrev3	1.380	0.337	4.093***
R <sup>2</sup>	0.470		
Adj R <sup>2</sup>	0.422		
F stat	9.920		

**Table B2: Determinants of Amount of Land for Food Cash Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	0.358	0.310	1.153
Totfmsz	0.114	0.035	3.302**
Landqual	-0.208	0.117	-1.780
Age	$-2.539 \times 10^{-3}$	0.008	-0.305
Nochild	$1.947 \times 10^{-2}$	0.040	0.482
R <sup>2</sup>	0.228		
Adj R <sup>2</sup>	0.175		
F stat	4.294		

**Table B3: Determinants of Amount of Land for Non-Food Cash Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-1.270	0.366	-3.474***
Totfmsz	0.416	0.041	10.155***
Landqual	0.426	0.135	3.151**
Age	$3.715 \times 10^{-2}$	0.010	0.389
Nochild	$2.721 \times 10^{-2}$	0.046	0.588
Cashrev3	-0.107	0.434	-0.246
R <sup>2</sup>	0.730		
Adj R <sup>2</sup>	0.706		
F stat	30.774		

**Table B4: Determinants of Amount of Uncultivated Land**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	0.141	0.257	0.550
Totfmsz	0.301	0.029	10.505***
Landqual	-0.174	0.097	-1.804
Age	$3.593 \times 10^{-3}$	0.007	0.522
Nochild	$-3.226 \times 10^{-2}$	0.033	-0.966
R <sup>2</sup>	0.689		
Adj R <sup>2</sup>	0.667		
F stat	32.056		

## APPENDIX C: Unmarried Women

**Table C1: Determinants of Amount of Land for Non-Cash Food Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.285	0.649	-0.440
Totfmsz	0.272	0.014	19.401***
Landqual	-0.227	0.159	-1.438
Age	$1.364 \times 10^{-3}$	0.006	0.239
Nochild	$-1.08 \times 10^{-2}$	0.028	-0.382
Subrev3	1.020	0.462	2.209*
R <sup>2</sup>	0.916		
Adj R <sup>2</sup>	0.906		
F stat	101.590		

**Table C2: Determinants of Amount of Land for Food Cash Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.338	0.322	-1.050
Totfmsz	$1.152 \times 10^{-2}$	0.012	0.934
Landqual	0.183	0.135	1.353
Age	$-3.63 \times 10^{-3}$	0.005	-0.664
Nochild	$3.041 \times 10^{-2}$	0.024	1.292
Hhneeds	0.118	0.057	2.079*
R <sup>2</sup>	0.113		
Adj R <sup>2</sup>	0.031		
F stat	2.049		

**Table C3: Determinants of Amount of Land for Non-Food Cash Crops**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	-0.699	0.343	-2.037
Totfmsz	0.607	0.013	47.027***
Landqual	$6.893 \times 10^{-2}$	0.146	0.473
Age	$3.784 \times 10^{-3}$	0.005	0.720
Nochild	$-1.358 \times 10^{-2}$	0.026	-0.052
Cashrev3	-0.820	0.426	-1.926
R <sup>2</sup>	0.984		
Adj R <sup>2</sup>	0.982		
F stat	512.733		

**Table C4: Determinants of Amount of Uncultivated Land**

Variable	$\beta$ Coefficient	Standard Error	t-statistic
Constant	$5.469 \times 10^{-2}$	0.255	0.214
Totfmsz	0.106	0.010	10.858
Landqual	$5.091 \times 10^{-2}$	0.107	0.477
Age	$-2.917 \times 10^{-3}$	0.004	-0.749
Nochild	$2.136 \times 10^{-2}$	0.019	1.142
R <sup>2</sup>	0.769		
Adj R <sup>2</sup>	0.747		
F stat	35.756		

\*\*\* Significant at the 1% level

\*\* Significant at the 5% level

\* Significant at the 10% level

#### **DEFINITION OF VARIABLES**

Totfmsz = Total amount of land in acres a household has

Landqual = Quality of land as reported by respondents

Age = Age of woman in years

Nochild = Number of children in the family

Subrev3 = Food cash income as a proportion of total revenue

Cashrev3 = Non-food cash income as a proportion of total revenue

Hhneeds = Percentage of household needs met from sale of cash crops



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