GENDER AND AGRICULTURAL SUPPLY RESPONSES TO STRUCTURAL ADJUSTMENT PROGRAMMES

A Case Study of Smallholder Tea Producers in Kericho, Kenya

Nordiska Afrikainstitutet
Uppsala 1999
This report was commissioned and produced under the auspices of the Nordic Africa Institute’s programme on *The Political and Social Context of Structural Adjustment in Sub-Saharan Africa*. It is one of a series of reports published on the theme of structural adjustment and socio-economic change in contemporary Africa.

Programme Co-ordinator and Series Editor:
Adebayo O. Olukoshi

<table>
<thead>
<tr>
<th>Indexing terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural production</td>
</tr>
<tr>
<td>Tea</td>
</tr>
<tr>
<td>Smallholders</td>
</tr>
<tr>
<td>Structural adjustment</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Kenya</td>
</tr>
</tbody>
</table>

Language checking: Elaine Almén
ISSN 1104-8425
ISBN 91-7106-440-0
© the author and Nordiska Afrikainstitutet 1999
Printed in Sweden by Motala Grafiska, Motala 1999
## Contents

1. **INTRODUCTION** .................................................. 7

2. **GENDER, STRUCTURAL ADJUSTMENT, AND AFRICAN AGRICULTURE** ........................................... 10
   2.1 Introduction .................................................. 10
   2.2 Conceptual Analysis of Structural Adjustment, Gender, and African Agriculture ........................................... 10
   2.3 Gender Issues, Smallholder Well-Being and Supply Response in African Agriculture—Empirical Evidence ........................................... 20
   2.3.1 Results for the Household as a Unit ........................................... 22
   2.3.2 The Effect of the Gender of the Household Head ........................................... 23
   2.3.3 Comparison of Female and Male Crops ........................................... 23
   2.3.4 Intra-Household Bargaining ........................................... 24
   2.4 Conclusion .................................................. 26

3. **TEA PRODUCTION IN THE CONTEXT OF ECONOMIC REFORMS** ........................................... 27
   3.1 Introduction .................................................. 27
   3.2 Institutional Framework of Tea Production in Kenya ........................................... 27
   3.3 Smallholder Tea Producers ........................................... 28
   3.4 Gender Dimensions of Smallholder Tea Production ........................................... 30
   3.5 Economic Policy Reforms and the Tea Sector ........................................... 33
   3.5.1 World Market Tea Prices ........................................... 34
   3.5.2 KTDA Payments to Smallscale Tea Farmers ........................................... 35
   3.5.3 Agricultural Sector Reforms and Smallscale Tea Farmers ........................................... 36
   3.6 Conclusion .................................................. 39

4. **METHODOLOGY OF TWO CASE STUDIES, 1985/86 AND 1995/96** ........................................... 41
   4.1 Introduction .................................................. 41
   4.2 Criteria for Selection of Location and Sample ........................................... 41
   4.3 Methods of Fieldwork and Data Analysis, 1995/96 Study ........................................... 43
   4.4 Strengths and Weaknesses of Research Design ........................................... 46
   4.5 Conclusion .................................................. 47

5. **GENDER, LIVING STANDARDS, AND TEA PRODUCTION IN KERICHO 1985/86 AND 1995/96** ........................................... 48
   5.1 Introduction .................................................. 48
   5.2 Tea Households, Never-Tea Households and Households Switching to Tea: Household Characteristics ........................................... 49
   5.3 Living Standards ........................................... 52
   5.4 Adoption of Tea by Smallholders ........................................... 57
   5.4.1 Tree Crop Adoption in Kenya—A 1982 Study by Bevan, Collier and Gunning ........................................... 57
   5.5 Average Productivity per Bush ........................................... 65
6. SUMMARY AND CONCLUSIONS ........................................... 70
6.1 Changes in Tea and Maize Prices .................................... 70
6.2 Changes in Characteristics of Sampled Households ............... 73
6.3 Adoption of Tea ........................................................... 75
6.4 Tea Yields ................................................................. 77
6.5 Perceived Changes in the Standard of Living ...................... 78
6.6 Policy Recommendations .............................................. 79
6.7 Future Research .......................................................... 82

Bibliography ........................................................................ 83

Appendix: Specification of the model ........................................ 89

List of Tables
Table 2.1 Location and Date of Selected Household and Community Case Studies ............................................. 15
Table 2.2 Labour Allocation by Sector and Gender, 1982 ............................................................ 18
Table 3.1 KTDA Planting Statistics 1994/95 .......................................................... 29
Table 3.2 Effects of Increasing Women Farmers’ Human Capital and Input Levels ........................................... 32
Table 3.3 Annual Average Kenya Tea Prices .............................................................. 34
Table 3.4 Average Rural Market Prices to Producers .......................................................... 38
Table 3.5 Average Rural Market Prices for Maize by Province .................................................. 39
Table 4.1 Sample Size 1985/86 and 1995/96 Studies .......................................................... 43
Table 5.1 Household Mean Values: Always-Tea, Tea-Switchers and Never-Tea in 1985/86 ........................... 50
Table 5.2 Household Mean Values: Always-Tea, Tea-Switchers and Never-Tea in 1995/96 ...................... 50
Table 5.3 Waged Work, 1985/86 .............................................................. 51
Table 5.4 Waged Work, 1995/96 .............................................................. 51
Table 5.5 Women’s perceptions of benefits tea households are getting from production .......................... 53
Table 5.6 Women’s perception of whether the standard of living had changed in 1995/96 compared to 1985/86 .............................................................. 53
Table 5.7 Child Nutrition Indicators, Kericho District, and Kenya, 1982, 1987, 1994 ...................... 55
Table 5.8 Crop Production in Kericho 1983–1992 .............................................................. 56
Table 5.9 Production per Capita of Main Food Crops in Kericho .............................................................. 56
Table 5.10 Composition of Bevan, Collier and Gunning Sample ...................................................... 58
Table 5.11 Logit Analysis of Growing Tea (Variant 1, 1995/96 values) .................................................. 60
Table 5.12 Logit Analysis of Growing Tea (Variant 2, 1985/86 values) .................................................. 61
Table 5.13 Logit Analysis of Growing Tea (Variant 3, 1995/96 values) .................................................. 62
Table 5.14 Logit Analysis of Growing Tea (Variant 4, 1985/86 values) .................................................. 63
Table 5.15 Logit Analysis of Tea-Switching in the Period 1985/86–1995/96 .................................................. 65
Table 5.16 Multiple Regression on Average Productivity per Bush .............................................................. 67

List of Figures
Figure 3.1 Harvested Tea Area 1980–1994 .......................... 30
Figure 3.2 First and Second Payments to Smallscale Farmers .......................... 36
Figure 3.3 Fertilizer Price Index .................................................. 37
Figure 5.1 Year in which Non-Tea Farmers Switched to Tea Production .................. 48

List of Abbreviations

CFS   Crop Forecasting Survey
CS    Community Survey
EATTA East African Tea Trade Association
ESAF  Extended Structural Adjustment Facility
FAO   Food and Agriculture Organisation
FHH   Female Headed Household
GDP   Gross Domestic Product
GNP   Gross National Product
IMF   International Monetary Fund
KETEPA Kenya Tea Pluckers Limited
KTDA  Kenya Tea Development Authority
KTDC  Kenya Tourism Development Corporation
KTGA  Kenya Tea-Growers Association
NTZDC Nyayo Tea Zones Development Corporation
SAL   Structural Adjustment Lending
SAP   Structural Adjustment Programme
SCDA  Special Crops Development Authority
SECAL Sector Adjustment Loan
SDR   Special Drawing Rights
1. Introduction

Agriculture plays an important role in sub-Saharan African economies and will continue to do so for some time to come. African Women have always taken a very significant part in farming activities, providing most of the labour force required to produce food for local consumption and agricultural commodities for export. However, women farmers in male-headed households very often do not directly receive any of the proceeds from the sale of crops for export; the money is paid to their husbands. Because of their different roles and responsibilities, men and women are likely to respond differently to economic reform. From both an efficiency and equity perspective, successful policy formulation has to address the specificity of women’s contribution and the constraints they face in the economy. This has been increasingly recognised by a number of development agencies, including the World Bank (Blackden, 1993).

However, most of the studies on structural adjustment and agriculture in sub-Saharan Africa do not focus on gender issues. The only empirical study that has addressed the impact of policy reforms on smallholders in Kenya is Bigsten and Ndung’u (1992), covering the period 1979–1989. The study found that despite the improvements in agricultural pricing policy in Kenya during the period, there were still large administrative problems in the marketing of agricultural produce, supply of inputs, and provision of credit. Delays in payments to smallholders had strong disincentive effects arising from uncertainty. The study argues that positive effects on agricultural productivity may result from both credit and extension advice; it also emphasised the importance of public services to the welfare of smallholders. The study does not, however, mention the gender dimensions of smallholder production and the gender implications of economic reforms.

There is, thus, no existing study that focuses on the gender dimensions of agricultural policy reform in Kenya. However, gender-based constraints can affect supply response and hold increases in production below what could otherwise obtain. Moreover, gender inequalities can result in women failing to benefit from structural adjustment measures.

The present study aims to improve on the current state of knowledge by contributing to a deeper understanding of gender and smallholder agriculture in the context of structural adjustment implementation. The focus of the study is on tea production, since tea remains Kenya’s largest agricultural foreign exchange earner. The main objectives of the study are as follows:
– To investigate, analyse, and evaluate the factors influencing the adoption and production of tea among male and female smallholders in Kenya in the period 1985/86 to 1995/96.
– To investigate women farmers’ perceptions of the costs and benefits of structural adjustment programmes for both tea and non-tea producing households.
– To make policy recommendations to improve both supply response and the benefits to women farmers.

The study focuses in particular on two questions: What are the constraints faced by male and female farmers in both tea and non-tea households? What impact do these constraints have on the adoption of tea and the productivity of tea farms in the context of structural adjustment? Since women are at the centre of the agricultural production system, providing labour both for export and domestic food production (that is, for sale and on-farm consumption), understanding the implications of structural adjustment for both women and men will be important for equity and efficiency reasons.

The study is based upon both secondary and primary data sources. The primary data comes from fieldwork carried out by the author in 1995/96. The essence of the fieldwork was to enable us to re-survey households already surveyed in an earlier study conducted by Dorthe von Bülow and Anne Sørensen of the Centre for Development Research, Copenhagen in 1985/86 on “Gender Dynamics in Contract Farming: Women’s Role in Smallholder Tea Production in Kericho District, Kenya”. The rationale for choosing to build on a previous study was the existence of baseline data which provided a basis for comparison of farming practices before and after the adoption of some key agricultural adjustment measures. Both qualitative and quantitative evidence from these two data sets are analysed. Information from household surveys and in-depth interviews is used to throw light on women’s perception of changes in standards of living during the 1985/86–1995/96 period. This is contextualised using secondary data on food production, nutrition, health and education in Kericho District.

To investigate the factors influencing the adoption of tea before, during and after economic reforms over the period 1985/86 to 1995/96, we use a logit model, following the example of Bevan, Collier and Gunning, (1989). To assess the factors affecting average productivity per bush in 1995, a simple regression analysis is used. This report is organised as follows: Section 2 discusses the literature on gender, structural adjustment and African agriculture. It also contains a discussion on smallholders in sub-Saharan African agriculture. Tea production in the context of economic reforms in Kenya is analysed in section 3. Section 4 discusses the methodologies that informed the two survey studies undertaken in 1985/86 and 1995/96. A discussion on gender, liv-
ing standards and tea production in Kericho in 1985/86 and 1995/96 is under-
taken in section 5. Section 6 is made up of a summary of the findings and the
conclusions drawn. This section also recommends policy modifications and
areas for further research.
2. Gender, Structural Adjustment and African Agriculture

2.1 Introduction

Most of the general assessments that are available on the experiences of smallholders with structural adjustment in sub-Saharan Africa do not focus on gender issues. This section examines the dynamics of gender and structural adjustment in the African agricultural sector. A conceptual analysis of structural adjustment, gender and African agriculture is undertaken in sub-section 2.2. Some of the available empirical evidence on gender, structural adjustment and African agriculture is discussed in sub-section 2.3. In section 2.4, some concluding comments are offered.

2.2 Conceptual Analysis of Structural Adjustment, Gender, and African Agriculture

In this section, we review the theoretical works of Palmer, Elson and Collier, which provide a conceptual framework for thinking about the gender dimensions of structural adjustment in African agriculture.

Palmer (1991) develops a theoretical framework that focuses on distortions in the pricing of resources as the key to understanding the interactions between structural adjustment programmes and gender relations. She argues that policy design has not yet succeeded in incorporating measures to remove gender-based price distortions. Palmer (1991:11–15) examines four main gender considerations that are important to the functioning of markets: gender discrimination in access to resources or outlets for selling produce; additional tasks women face in reproduction and family maintenance; intra-household markets; and the final disposal of incomes.

The first consideration, discrimination, could arise from social and cultural factors or government policies. For instance, the absence of land titles limits women’s access to productive resources such as credit, extension, training and information. In most parts of sub-Saharan Africa, land is patrilineally inherited. Women simply get some rights to use land as a way of fulfilling their obligation to the family. Thus, women only have usufructuary rights and are insecure in their use of land. Furthermore, policies of land adjudication and registration discriminate against women in land titling by registering only men’s names as heads of households and ignoring women’s traditional rights to use land. This results in an inefficient allocation of
resources. Resources such as credit and fertilizer will only move to their most efficient use when women enjoy equal access with men. The efficient allocation of resources refers to a situation where the use of resources leads to a greater total output.¹

The second consideration is that women have roles and obligations that are different from those of men in that they have to nurse the sick, cook the food, take care of the young children, and collect water and firewood. All these obligations represent what Palmer refers to as “a labour overhead” or a “reproduction tax” on women (Palmer, 1991:12). They must pay this tax before embarking on any income-generating activity. The reproduction tax not only restricts the time women can spend on economic activities but also confines them to activities that are compatible with their home schedule. Like any tax on particular activities, the reproduction tax changes choices and can be seen as distorting resource allocation away from the pattern that would have prevailed without it.

The third consideration stems from the fact that in sub-Saharan Africa, the household cannot be treated as a simple unit. In many countries, within the household, women and men operate separate accounting units,² and there is both cooperation and conflict within it. The terms of exchange within the household are not equal between men and women and do not represent an efficient distribution of the combined resources of the household. In other words, the terms of trade are biased against women. Men have a degree of command over family labour that is not reciprocated by an equal degree of command by women over the proceeds of their work. Women are more likely to labour for men than men for women. This leads to what Palmer calls an asymmetry of access to resources (and income) between women and men. Unless these differences are considered, the efficiency goal may not be realised.

The fourth consideration concerns the unequal distribution of income within households. This means that women often do not directly receive incentives from increases in the prices of crops which are marketed by their husbands. Both men’s and women’s labour is required for the production of most crops but some crops are managed by men and some by women. According to Palmer, there are two principal determinants of whether a crop is managed by the woman or man: the first is market access and the second is production technique. If a crop is sold through large-scale national and inter-

¹ For more discussion of the meaning of economic efficiency see Palmer (1992:71–74).
² According to Palmer, “Separate accounting units mean that the wife and husband may draw separate personal incomes from agriculture and associated activities to meet separate financial obligations” (1991:21). This is more pronounced in West Africa than in East and Southern Africa.
national marketing channels, it tends to be managed by men. If a crop is only locally marketed, then women are more likely to be involved in its management. A crop tends to be managed by men when the method of production is changed by the use of hybrids and chemical inputs. A common situation is where women are significant, though partial, managers of the use of land, but have no ultimate control over inputs and outputs. There are many instances of de facto female household heads, where the husband is away in wage employment and the woman is left with the task of making day-to-day operational decisions with regard to farm management, but the husband determines which crops to plant and controls the proceeds from their sale. In cases where women are allocated land specifically to grow the family’s food, the divisions of management are more apparent.

Palmer (1991) emphasises that women farmers face pressing time constraints. They may not necessarily spend more time in farming activities than men, but their working day becomes longer due to other tasks, including child care and domestic chores. Women’s labour is very demanding during the planting and weeding seasons. Furthermore, support services at the farm level tend to favour male farmers. Women farmers’ yields are generally lower than those of male farmers in cases where the same crop is grown due to poor land use by women, credit constraints, and the lack of new technology or information. Apart from being involved in farm activities, farming women are also often involved in other off-farm income-generating activities such as beer brewing (Palmer, 1991:36–38). Palmer argues that stabilisation and structural adjustment programmes can only achieve efficiency by properly costing resources, and that this must include women’s labour, both paid and unpaid.

The issue of gender is very significant in the analysis of the use of existing resources to produce more output. Women’s labour is already fully employed but, in the short run, the most significant ways that output can be increased make heavy demands on women’s time. For instance, weeding is, according to Palmer, the most important factor in the short to medium term production outcomes of the adjustment programmes (Palmer, 1991:121). Palmer’s main policy recommendation is based on the argument that there is a need to bring as much as possible of the reproduction labour tax on women into the paid economy. She wants to price as much unpaid labour as possible, including unpaid agricultural labour and unpaid reproductive labour. In order to reduce the reproduction labour tax on women, Palmer recommends the provision of tap water and electricity in homes, childminding facilities in the villages as well as in formal and informal sector enterprises, and maternity leave legislation. She suggests that funding for this should come from an employment tax on all registered enterprises to be paid into a national provident fund. In the rural areas, funds will be raised from a sales tax on selected cash crops.
Elson criticises Palmer for too readily accepting that the best way to allocate resources is to bring as much labour as possible into the market, including unpaid reproductive labour, claiming that:

The calculus of costing is not always the best way to secure efficient allocation of resources. Social customs and norms can play an important role in resource allocation. It may not always be appropriate to see market forces as breaking down and replacing social customs and norms that impede effective resource allocation. Rather, we may think of ways of restructuring social customs and norms on a new basis. (Elson, 1994a:153)

Furthermore, the sources of funding suggested by Palmer may not be practical due to the poor structures of tax collection in most sub-Saharan African economies. However, the merit of Palmer’s framework is that it links the design of adjustment programmes and the structure of gender relations through the notion of gender-based price distortions.

Elson develops an analysis, intended to be widely applicable, that links the design of adjustment programmes and the structure of gender relations by placing more emphasis on adjustment and the operation of deregulated markets as a process which, in fact, though not in intention, leads to the extraction of more labour from women. She argues that changes in incomes, prices, levels and composition of public expenditure, and working conditions will not affect all the members of the household in the same way and are tending to operate in ways that add to the work of poor women (Elson 1989a, 1992, 1993a, 1993b, 1995a, 1995b).

Elson’s line of argument is that changes in relative prices brought about by price reforms and devaluation do not operate simply to redistribute the existing workload. This is mainly because “there are limits to which relative prices can restructure an important non-tradable sector, the household production of non-tradables, including the production and reproduction of labour itself” (1993a:9). Elson identifies the following limits:

- Limits to the reduction in the time spent on child care. She points out that: “Women do not usually regard their children as just another crop, to be tended if the benefits are high enough, and to be left to rot if the costs of production become too high in relation to benefits.” (Elson 1993a:9)

- Persistence of the gender division of labour which assigns the bulk of reproductive work to women and girls, and which designates some paid work (e.g. light industry) as women’s work, and other paid work (e.g. heavy industry) as men’s work.

- Limits to the way household expenditure can be switched, due to the fact that men tend to retain a portion of their income for their personal expenditure on leisure activities such as drinking and smoking. To obtain suffi-
cient cash to maintain household nutrition in the face of rising food prices, women have to undertake more paid work.

In the context of these rigidities, women, in effect, absorb the shocks of adjustment. Ignoring such rigidities is an example in the realm of policy design of what Elson calls male bias. According to Elson, male bias distorts resource allocation by denying women adequate access to productive inputs, resulting in low productivity and lower output compared to what it could have been if there were no male bias. While preserving the subordination of women as a gender to men, male bias is a barrier to the achievement of development objectives. Overcoming male bias “requires changes in the deep structures of economic and social life, and collective action not simply individual action” (Elson, 1995b: 15).

Three types of male bias in policy design identified are (Elson 1993c:10):

- Male bias concerning the sexual division of labour.
- Male bias concerning the unpaid domestic work necessary for producing and maintaining human resources.
- Male bias concerning the household which is taken to be the basic unit from which the economy is made up.

The first kind of male bias ignores the fact that some kinds of work are socially constituted as “women’s work” while others are socially constituted as “men’s work” (p. 10). Labour is, therefore, not always easily transferable between sectors. Structural adjustment programmes may mean more work for women and unemployment for men.

With regard to the second type of male bias, it is emphasised that human resources have an intrinsic value as opposed to instrumental value. The unpaid work of maintaining human resources has to go on regardless of relative price changes. Elson argues that women’s unpaid labour is not infinitely elastic—“a breaking point may be reached and women’s capacity to reproduce and maintain human resources may collapse”. What conventional economics may regard as increased efficiency may be a shift of costs from the paid economy to the unpaid economy (Elson, 1993c:12).

The third type of male bias ignores the fact that the household is not an undifferentiated unit but a site of conflict as well as cooperation, inequality as well as mutuality. It is structured along gender lines and women have a

---

3 “Male bias is a bias that operates in favour of men as a gender, and against women as a gender” (Elson 1995b:3). (See Elson, 1995b for more discussion of the immediate causes of male bias in development process, the underlying supports of male bias and ways of testing for the existence of male bias.)
weaker bargaining power since they do not enjoy the same control over resources (Elson, 1993c and Elson, 1995b:6).

Elson (1992:62–65) suggests three steps which need to be taken in order to diminish male bias in structural adjustment:

- Recognition of the significance of gender divisions in work and consumption for the process of resource reallocation and the determination of living standards.
- Restructuring of the public sector in order to make it more accountable to women and restructuring of the functioning of markets to make them responsive to women’s needs.
- Reconsideration of the design of structural adjustment to restructure unequal gender relations, along with other structural changes, and the opening up institutions to advocacy on behalf of women.

Elson (1995a) examines household responses to stabilisation and structural adjustment programmes by reviewing a dozen available case studies (see Table 2.1). She recognises that it is not easy to make a valid assessment of the impact of these packages on the basis of before and after studies, since these do not establish causality. A counterfactual approach is often recommended but there are also methodological problems in relation to the definition of the relevant counterfactual. She argues that in the end, a judgement has to be made; what is important is to acknowledge methodological problems and make the basis for the judgement clear (Elson, 1995a:221–222).

Table 2.1 Location and Date of Selected Household and Community Case Studies

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Author and date of publication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban Latin America</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico City, Mexico</td>
<td>1988</td>
<td>Beneria (1992)</td>
</tr>
<tr>
<td>Guadalajara, Mexico</td>
<td>1985</td>
<td>Gonzalez de la Rocha (1988)</td>
</tr>
<tr>
<td><strong>Urban Africa</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rural Africa</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ogun and Bendel, Nigeria</td>
<td>1989</td>
<td>Elabor-Idemudia (1991)</td>
</tr>
<tr>
<td>Northern and Eastern Province, Zambia</td>
<td>1990</td>
<td>Geisler and Narrowe (1990), Geisler (1992)</td>
</tr>
</tbody>
</table>

Source: Elson, 1995a: Table 1.
In reviewing the case studies, Elson begins from the proposition that the initial impact of structural adjustment policies is felt by households in four ways: changes in incomes, changes in prices, changes in public expenditure and public provision, and changes in working conditions. According to Elson, “in all except two case studies (Ensminger, 1991 and Tripp, 1992), changes were mainly adverse, and decisions had to be made in the household about how to respond to these adversities” (p. 223). Increased generation of income and re-organisation of expenditure and consumption were the most important responses of households. The responses tended to be male-biased in that more burdens were placed on women than men, with less benefits tending to be accrued by women. In analysing male bias in household responses with regard to patterns of time use, Elson mentions that “there is strong evidence that unpaid domestic work has remained an exclusively female task” (p. 237). However, it was not possible to conclude definitively whether male bias in the length of the working day was increasing, decreasing or remaining the same because of the lack of gender-disaggregated time budget analysis before and after adjustment measures were introduced.

The picture on the question of male bias in access to and control of resources is mixed. But most of the evidence points to the emergence of a situation in which women face deteriorating market conditions and falling rates of return to their efforts (with two exceptions being women in the informal sector interviewed by Tripp (1992) in Dar es Saalam and the Orma pastoralists of the Tana River District in Kenya interviewed by Ensminger, 1991) (Elson, 1995a:247).

The general finding with respect to intra-household income and expenditure flows is that of continuing male bias in intra-household budgeting, male bias taking the form of men’s right to keep back some of their earnings for personal non-essential consumption, even though women are struggling to make ends meet. The case studies analysed by Elson (1995a) confirm that women act as shock absorbers in the process of adjustment since many of the studies “speak of women’s stress, tensions, anxiety, anguish and despair” (p. 249). There is no claim that adjustment measures are deliberately biased against women but Elson argues that so long as adjustment programmes fail to recognise the persistence of male bias at the micro level and to incorporate measures aimed at diminishing male bias, such programmes themselves may be regarded as male-biased (Elson, 1995a:249).

In sum, Elson develops an analysis that links the design of adjustment programmes and the structure of gender relations which can be compared to Palmer’s analysis. The difference between the two scholars lies in the fact that Elson emphasises the restructuring of the state and the market rather than the simple extension, as Palmer advocates, of the state and the market to cover women’s unpaid reproductive work. But Elson has been criticised on the
grounds that the gender-differentiated impacts of adjustment stem from gender-differentiated initial conditions. Haddad et al. (1995:883), citing Mukhopadhyay (1992), state that:

The problem lies in investing the macro concepts and macro policies with a gender bias yet the bias lies in the socio-economic environment within which such policies are applied. It is important to distinguish between the gender-differentiated impacts of adjustment and the gender-differentiated initial conditions. (Haddad et al., 1995:883)

But in support of Elson, it may be argued that the design of the adjustment policies is biased against women if it fails to recognise the significance of gender-differentiated initial conditions.

There has been some work by male mainstream economists on gender and structural adjustment, of which Collier is the leading example. Collier’s work is particularly significant for this study since it pays special attention to gender and adjustment in Kenya. Collier’s (1989a) analysis of gender and adjustment focuses on gender aspects of labour allocation during structural adjustment. In particular, Collier argues that women face various constraints in the labour market and this reduces their mobility and frustrates the structural adjustment programmes.

According to Collier (1989a:7–10), the four main constraints that women face are:

- Discrimination outside the household, in the labour and credit markets.
- Gender-specific roles. Boys copy fathers and other males and girls copy mothers and other females.
- Different obligations for men and women. In rural Africa, women are mainly involved in subsistence production, water fetching, firewood gathering, cooking, and taking care of the children, while men are involved in meeting the cash needs of the family. This results in long working hours for women and no say in the control of cash proceeds.
- The reproductive duties which hinder women from joining and actively participating in the labour market.

The fact that women work longer hours and cannot control proceeds from marketed output gives rise to what Collier calls the “principal-agent problem”, i.e. women’s incentive to work on cashcrops is weakened since they do not control the proceeds from the output. The “principal-agent problem” is illustrated further by an example of a study carried out in Kenya on the impact of weeding on maize yields in male and female-headed households, both of which carried out two weedings per season:

Whereas in female-headed households these weedings raised yields by 56%, in male-headed households the increase in yield was only 15%. Since other differences
are controlled for, the most likely explanation is a systematic difference in effort due to differential incentive. (Collier, 1989a:8–9)

The position of women in the labour and capital markets is worsened by lack of information about opportunities, mainly due to information biases in formal education and agricultural extension services. Collier’s argument here is that public extension services are dominated by male staff who are more likely to contact male farmers and to target existing growers rather than potential growers. Moreover, he argues, women are less likely to enter wage employment than men, due to gender-specific role model imitation (girls copy their mothers, who tend not to be in wage employment). Wage employment practices, such as hours of work and child care arrangements, also discourage women. In the credit market, there exist biases in the form of conditions that women are required to meet before getting credit, e.g. land ownership. In sum, due to the above constraints, the market cannot be expected to reallocate women’s labour effectively during structural adjustment.

Table 2.2 Labour Allocation by Sector and Gender, 1982
(Percent of total in each sector)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Agriculture: Estates</td>
<td>76</td>
<td>24</td>
</tr>
<tr>
<td>Smallholder</td>
<td>42</td>
<td>58</td>
</tr>
<tr>
<td>Food Agriculture</td>
<td>37</td>
<td>63</td>
</tr>
<tr>
<td>Import Substitution Sector</td>
<td>88</td>
<td>12</td>
</tr>
<tr>
<td>Non-Tradable Capital Goods</td>
<td>96</td>
<td>4</td>
</tr>
<tr>
<td>Public Sector Wage Employment</td>
<td>81</td>
<td>19</td>
</tr>
<tr>
<td>Private Wage Employment</td>
<td>79</td>
<td>21</td>
</tr>
</tbody>
</table>

Source: Collier, 1989a.
Notes: Export Agriculture: Estate crops covered are coffee, tea and sisal.
Smallholder data is from a rural household survey of 1982. Crops covered are coffee, tea and pyrethrum.
Import substitution sector: Proxy is manufacturing.
Non-tradable capital goods: Proxy is construction.
Private sector wage employment: Proxy is residual of formal sector wage employment.

Collier (1989a) uses an example from Kenya to explain the general pattern of labour allocation by sector and gender (Table 2.2). The differential constraints that women face make them less mobile intersectorally than men and this poses a policy problem since the goals of the structural adjustment programmes cannot be achieved without labour mobility. He argues that women are concentrated in two activities, food production and the provision of non-tradables such as marketing services. Overall, women are under-represented in export agriculture compared to food agriculture, due to the constraints that were discussed above. Women are also under-represented in the public sector...
and in private sector wage employment, as compared to food agriculture\(^4\) (Collier, 1989a:19–20).

Women are under-represented in the private formal sector wage labour market due to their lower levels of education, reproductive obligations which affect their time and interrupt their career pattern, and discrimination by firms. The disadvantages which women face in entering public sector employment are made worse by women’s lower social status, which affects their bargaining power within a patronage system.

The export sector is the sector which is expected to attract resources during the structural adjustment period. In most parts of sub-Saharan Africa, the export sector is mainly made up of smallholder agriculture. Collier cites a study on the adoption of tree crops in Kenya (Bevan, Collier and Gunning, 1989) to illustrate his point that female farmers may not be in a position to move into tea cultivation. He reports the findings of this study as follows:

... female-headed households had only half the propensity of male-headed households to adopt tea... . Most of the labour of tea picking is done by females... . Holding other household characteristics constant, extra male labour has no effect upon the propensity to adopt tea whereas extra female labour leads to a statistically significant increase... . In Kenya, women do most of the work on tea; households with more women are more likely to adopt the crop yet households headed by women are less likely to do so. (Collier, 1989a:7)

The study assumes that a key factor in explaining the adoption of a crop is the availability of farmers already growing the crop to act as role models who can be imitated by other farmers. Collier emphasises gender-specific information constraints and the propensity to copy gender-specific role models as the key reason hindering the adoption of tea by women. This is based on the fact that women have fewer women tea producers as role models to copy. Elson (1995a: 1861) is, however, sceptical about the identification of the lack of appropriate role models to copy as a key factor. First, farmers may adopt similar crops to their neighbours not so much because they have a propensity to copy neighbours, as because they are able to learn by observing their neighbours. But the structure of gender relations may place constraints on interaction between the men and women of different households. Second, Elson notes that there are other differences (not identified by Bevan, Collier and Gunning, 1989) between female and male heads of household that may hinder the former from adopting export tree crops. For instance, female heads of household

\(^4\) According to Collier, “food can be non-tradable, protected import substitute, or unprotected tradable sector. The key distinction within a set of tradable goods is whether they are protected or not. If food is protected, structural adjustment will lead to its contraction. If food is unprotected, structural adjustment will lead to its expansion” (Collier, 1989a:19–20).
may have greater risk aversion resulting from their greater direct responsibilities for the well-being of children. Third, Elson suggests that marketing boards may have rules that operate in a way that does not allow women farmers to easily obtain licenses to grow tree crops in their own right.

2.3 Gender Issues, Smallholder Well-Being and Supply Response in African Agriculture—Empirical Evidence

The disappointing supply response that has been experienced by many sub-Saharan African countries implementing structural adjustment programmes has been a source of concern because of its adverse implications both for the well-being of smallholders and the achievement of export targets. There is a small body of empirical studies that analyses gender issues in this context. Perhaps the most comprehensive of these is a study on Zambia carried out by a team of Norwegian and Zambian researchers and entitled Supply Response in a Gender Perspective: The Case of Zambia (Wold (ed.), 1997). The main objective of the study was to investigate whether and how economic reforms (introduced in 1991) have had an impact on the economic response and subsequent well-being of smallholders and medium scale farmers, especially women farmers as compared to their male counterparts. The study analysed living standards during the pre-adjustment period using existing information on crop production, poverty and nutritional status. It found that the mean income in rural areas increased 34 per cent in the pre-adjustment period 1975 to 1991 and that this coincided with increases in marketed agricultural output in the off-the-line-of-rail provinces. Thus, on average, increased production led to increased incomes leading to welfare increases in rural Zambia during the pre-adjustment years. Nevertheless, the average urban income was higher than the 1991 average rural income.

In the early 1990s, Zambia faced a fiscal crisis and growing inefficiency in its agricultural marketing system; the government responded by introducing a structural adjustment programme. The agricultural policy reforms introduced aimed at providing an environment which would enable the private sector to play a leading role in crop marketing and distribution, transportation, the provision of credit, and input supply. Market liberalization in the agricultural sector in Zambia was also aimed at correcting distorted prices in order to produce higher prices for farmers. Farmers were expected to respond positively to these changes by increasing crop production and marketing. The

5 Zambian farmers are usually classified in three categories: 1. Smallscale farmers: around 600,000 households; 2. Emerging farmers, also called medium scale farmers: around 100,000 households; and 3. Commercial farmers: around 2000 units (households and companies). The study includes the first two groups.
changes were also expected to lead to increased economic and social welfare for both male and female farmers (Wold (ed.), 1997:14–15).

The time series analysis undertaken by the authors found that during the pre-adjustment period, aggregate marketed maize supply rose despite falling real prices: farmers in the central provinces continued to produce and market the same volume and more was produced and marketed by farmers in remote regions. This was explained by a “redistribution shift effect through the subsidies and cross-subsidies of the public marketing and distribution system and the expanding coverage of the pan-Zambian maize pricing system” (Wold (ed.), 1997:26). A stable system was created which underpinned production levels in central districts and raised them in remote areas. The study found that in most provinces, marketed maize was hybrid maize, a male-managed crop, while most women concentrated on other crops both for food and cash. Female-managed crops were local maize, groundnuts, millet, sorghum, mixed beans and vegetables. Women sold their products at the local market with little attention from cooperative unions. The study concludes that men gained more and received a larger share of benefits from the public marketing system than women.

A cross-sectional supply response analysis was conducted to see how female and male farmers in the different regional contexts of Zambia responded to the different price levels which prevailed in different regions, while controlling for other factors. The empirical tests used PS2, CF5 and CS data for the 1992/93 season, a period when deregulation had ended pan-territorial pricing. During that season, there was a floor price for maize, and maize was sold partly through the public marketing system and partly through private traders, but all other crops were sold in unregulated markets dominated by private traders, and there were wide variations in the prices received by farmers for the same crop in different parts of Zambia. (The same was true for input prices.)

The crops included in the analysis were maize, groundnuts, beans, millet, and sorghum. While maize is grown by both sexes, (with the hybrid varieties mainly grown and marketed by men), groundnuts and beans are grown and marketed for sale by women. Supply equations were constituted for each crop, with crop output as the dependent variable. The researchers expected a different response, depending on who was in charge of the crop, men or women. But they had no direct data on this for each household. They, thus, considered four main settings for analysis:

(i) the uniform household which models supply response as if the household is an undifferentiated unit where all decisions are made unanimously;
(ii) disaggregation into male and female-headed households assuming that the supply responses of male and female headed households are different. This analysis could only be done for maize and groundnuts owing to limitations in the sample size;

(iii) disaggregation into female and male crops, modelling the supply response for each crop in the same way as for a uniform household, but including variables that might differentiate between female and male crops;

(iv) intra-household bargaining, which assumes that the production function of the husband and wife are interdependent and cannot be identified separately and that a higher degree of bargaining power by the wife is reflected in a higher allocation of household resources to food, child care and household maintenance.

The study notes that since households were both producers and consumers of the crops, it is not necessarily the case that an optimising household would give a positive supply response to a producer price increase. Households might even produce less if the price went up, and devote more resources to other crops, or to child care, household maintenance or leisure. The study applied a tobit estimation procedure since a large proportion of the households in the sample are non-producers of many of the crops. A logit regression was also run to find the probability that any given farmer would grow each of the crops—the results were similar to those produced by the tobit analysis, and were not repeated separately.

2.3.1 Results for the Household as a Unit

The tobit\(^6\) model for maize production did not reveal any significant price response. The research team suggests that this may be linked to the fact that at the time of the survey, there was still a floor price for maize. Households with children produced less output per active household member. But given this, more children and old people per productive member tended to be associated with increased production per active household member. Increased production may have been due to production by the dependants themselves, or that more dependants forced adult members to increase production. The producer price response for groundnuts only materialised with respect to the maize price and it was negative. The negative cross-price response was a result of substitution effects. The total area under the crop had a positive relationship

\(^6\) The tobit model addresses the likely value of production and was designed to estimate the size of supply response of farmers.
but the number of dependants and stage of life cycle had no significant effects.

The results also indicate that cassava is mainly grown by poor households in remote villages, but they may substitute maize when the maize price increases. There was no producer price response in the case of millet. The results indicated a negative own price impact and no maize price impact in the case of sorghum despite the fact that it is a substitute for maize. The dependency ratio was significant and positive for sorghum, with more dependants being associated with higher production per active adult in the household. In the case of beans there was a negative maize price response and the female agricultural wage was found to be significant for the production of mixed beans, with a higher wage corresponding to lower production, thus confirming that beans is a female crop.

2.3.2 The Effect of the Gender of the Household Head

There was still no producer price response for maize when the data obtained was split into male and female-headed households. In the case of male-headed households, if the household had children, it produced less per active household member; but given this, the more children in the household, the higher the production per active household member. This was, however, not the case in female-headed households. The effect of the gender of the household head was also considered for groundnuts. Here, the only significant producer price was that of maize, for male-headed households, which negatively affected groundnut production.

2.3.3 Comparison of Female and Male Crops

An analysis was carried out of the supply response of maize for sale (usually hybrid maize which is a male crop) and local maize (which is a female crop produced for on-farm consumption). The response to price of hybrid maize was negative. This was also true when the data was analysed separately for male- and female-headed households, but the negative effect was twice as large for female-headed households. The dependency ratio was not significant but households with children tended to produce less hybrid maize.

According to Wold (ed.) (1997):

There are two complementing interpretations of the negative supply response to crop price level. First, the analysis supports the hypothesis that farmers respond simultaneously as producers and consumers—when prices are higher they can afford to focus more on production for own consumption and/or on other activities. This is the so-called household income effect. Second, the higher prices are found in central areas, where there are other competing opportunities as well, such
as the production of perishable products, food processing and other non-agricultural production, as well as employment for reasonable pay. (Wold (ed.) 1997:30)

2.3.4 Intra-Household Bargaining

The dependent variable in this case was not total production per productive household member, but the share of consumption in total production. It was hypothesised that this would be higher the higher the bargaining power of the wife. The wife’s bargaining power was proxied by her level of education and the proportion of household income she had generated. The analysis found that the wife’s bargaining power did not have a significant effect on the consumption share of maize, but there was a significant effect in the case of groundnuts.

The results of the cross-sectional analysis are summarised as follows:

The results of the cross-sectional analysis do support the main hypothesis of a negative supply response by small-scale women farmers. But in fact all the groups, women farmers and men farmers, small-scale and medium-scale farmers, were found to have a negative (significant) supply response: the lower the producer price level was in the community, the higher the volume of maize produced... . On the other hand, positive price sensitivity was evidenced by farmers in the supply response to cross-price changes: producers do respond to relative price changes by switching to relatively better paid crops. Significant gender differentiation is in evidence in this regard—while the male farmers respond to a broad range of relative price changes (i.e. switching between crops), women farmers respond to only some of these changes. Given their obligations, it is almost impossible for women farmers not to produce the traditional food crops, e.g. they can hardly switch to cotton production. (Wold (ed.) 1997:30)

The study connected the gender analysis of supply response to their potential welfare outcomes by means of three hypotheses: first, that female-headed households would prefer to utilise increased production to improve the nutritional status of children in the household; second, that male-headed households with a wife who enjoys a high bargaining power would also show a stronger relative preference for improving the nutritional status of children; third, that male-headed households with a wife with a low bargaining power would rather utilise increased production to increase total household consumption (including non-food items). The nutritional status of children was found to be primarily determined by their health status, but the results did indicate support for the third hypothesis. Moreover, in male-headed households, an increase in total consumption appeared to correspond to a decrease in nutritional status for the poorest rural households. This may mean that the increase in total consumption is brought about by a diversion of output from home consumption to the market, with the increased income earned spent on non-food items, including alcoholic beverages. The study concluded that the
gender bias in supply response requires an active policy to offset its impact and reduce the gender biases themselves.

There appears to be no other study as comprehensive as Wold (ed.) (1997). Gladwin (ed.) (1991) contains a number of studies from sub-Saharan Africa regarding the implications of SAPs for women farmers, covering the following countries: Nigeria (Elabor-Idemudia, 1991; Guyer and Idowu, 1991); Kenya (Ensminger, 1991); Tanzania (Meena, 1991); Malawi and Cameroon (Gladwin, 1991)); but only the first three have empirical data about women’s experiences of structural adjustment.

Elabor-Idemudia (1991) studied the impact of structural adjustment on 10 men and 30 women in ten villages in Bendel and Ogun States in Nigeria in 1989 and found out that women’s access to farm inputs had not been much improved by the reforms:

When women’s and men’s access to farming inputs (fertilizer, tractors, high-yielding seed varieties, and seedlings) were assessed, 56.6 per cent of the women (17 of 30) said that farming inputs were readily available to them while 26.6 per cent (8 of 30) said that inputs were sometimes available to them. Five out of 30 or 16.6 per cent did not provide any answer to the question. When men were asked to assess the availability of farming and production inputs, 90 per cent (9 of 10) said that inputs were readily available to them while only 10 per cent found inputs to be sometimes available to them. (Elabor-Idemudia, 1991:135–136)

Moreover, rising prices of food and other consumption goods meant that the women had to reduce the quantity and nutritional quality of food they could provide to their families.

Another study from a different part of Nigeria reveals a rather different picture. Guyer and Idowu (1991) present the results of a longitudinal study on women’s agricultural work in Ibarapa District, Oyo State, Nigeria. In the first research period 1968–1969, males dominated smallholder production, supported by female labour engaged mainly in harvesting, processing, and porterage. In this period, most women did not farm in their own right. In the second period in 1987, after the introduction of some economic reforms, some notable changes were observed: an increase in the mean size of men’s farms of about 40 per cent from 2.9 acres to 4.1 acres and a new group of own-account women farmers whose farms had a mean size of just under 2 acres (these women comprised 69 per cent of the 222 women surveyed). Almost half of the women claimed to have started their farms after the onset of the economic reforms in 1984. A detailed analysis of 40 of these women revealed that they found farming attractive when improved transport increased marketing possibilities at the same time as introducing new competition into their existing occupations of trade and processing. The study found out that women hired more labour for land clearing (using tractors) and weeding than men, some of them operating more like farm managers than farmers. They concluded that:
For the moment, in the first years of SAP implementation, when the demand for cassava from the poor urban population is enormous and tractors are still on the scene, there is a veritable boom in ‘women’s farming’. (Guyer and Idowu, 1991:268)

Gladwin’s book contains one study of rural women in Kenya (Ensminger, 1991) but these women are pastoralists rather than smallholders. The study is based on field research carried out in 1978–81 and 1987 among the Orma pastoralists. During this period, the price of the meat they produce rose substantially in relation to the price of the consumer goods they purchase, in response to the decontrol of meat prices, the opening up of new livestock markets and the devaluation of the national currency. As a result, household expenditure also increased substantially in real terms. Women were able to find new employment operating tea kiosks. The enrolment of school age girls rose from 4 per cent to 30 per cent. There was a noticeable increase in the presence of women at village meetings. No other studies of gender, structural adjustment and African agriculture are noted in the review of gender and adjustment undertaken by Haddad et al. (1995).

2.4 Conclusion

In conclusion, the review of literature in this section supports the conclusion that understanding the relationship between structural adjustment programmes and the structure of gender relations is important for both equity and efficiency reasons. While Palmer discusses this relationship through the notion of gender-based price distortions, Elson looks at the relationship through the extraction of more labour from women in the re-allocation of labour from non-tradables to tradables. Collier’s analysis focuses on gender constraints on inter-sectoral labour re-allocation during structural adjustment implementation, arguing that due to the constraints women face, they are likely to be less mobile than men.

Since women comprise a significant proportion of farmers in Africa, the constraints faced by women farmers may be a factor in the weak supply response prevalent in the agricultural sector in most sub-Saharan African economies. The empirical evidence on the gender implications of structural adjustment programmes (most notably Wold (ed.) 1997) indicates that women farmers may not respond positively to higher prices due to the constraints they face, such as lack of inputs, credit, land, and labour. However, the literature is still quite scanty. There are no current studies on Kenya that have looked at the relationship between structural adjustment, gender and smallholder agriculture. It is this gap that this study hopes to fill.
3. Tea Production in the Context of Economic Reforms

3.1 Introduction
This section looks at tea production in the context of economic policy reforms. The institutional framework for tea production in Kenya is discussed in sub-section 3.2. The gender dimension of tea production is discussed in sub-section 3.3. A discussion on economic policy reform and its impact on smallholder tea producers is presented in sub-section 3.4. The conclusions drawn from the discussion in this section are presented in sub-section 3.5.

3.2 Institutional Framework of Tea Production in Kenya
Kenya’s tea sector is the country’s largest agricultural earner of foreign exchange, accounting for 20.2 per cent of total export earnings in 1994 (Republic of Kenya, 1995 Economic Survey). Tea was introduced into Kenya in 1903 and began to be grown commercially in the 1920s. The Ministry of Agriculture gives the tea industry the general guidelines on the government’s policy on tea. The Tea Board of Kenya is a state corporation in charge of issuing licences for tea growing, manufacturing, and exports; it carries out research through the Tea Research Foundation of Kenya and advises the government on all policy matters related to tea. The Kenya Tea Development Authority (KTDA) was established in 1964 as a state corporation charged with overseeing the smallholder sector. Smallholders must obtain a licence from the KTDA in order to grow tea and they can only sell their output through the KTDA. The farmers get a registration number when they start to deliver tea to the buying centre. Payments are made directly into the bank accounts of each registered tea grower.

The KTDA provides planting material and extension service to smallholders. Another state corporation was established in 1986 with responsibility for managing the government’s tea projects around the forest zones. There is also the Kenya Tea-Growers Association (KTGA) whose membership consists of large farmers who own approximately 10 hectares of land. Furthermore, there is the East African Tea Trade Association (EATTA) which brings together large tea producers, brokers and buyers in the East African region. The Kenya Tea Pluckers Limited (KETEPA) supplies tea to the domestic market and for export. The leading packer and distributor of tea in the domestic market is KETEPA and it is based in Kericho (Mukumbu, 1993:139).
Tea in Kenya is cultivated on three types of farms:

(i) Large private farms whose owners are represented by Kenya Tea-Growers Association.
(ii) Government run estates—Nyayo Tea Zones.
(iii) Smallholder tea farms which are serviced by the KTDA.

Tea is a very labour-intensive crop and requires manual labour all year round. It takes about three years after it is planted before it yields its first harvest; the productivity of tea bushes increases until the ninth year after planting.

3.3 Smallholder Tea Producers

Smallholder participation in tea production started with the launching of the Swynnerton Plan in 1954 in Kericho and Nyeri Districts of Kenya. The Special Crops Development Authority (SCDA) was formed in 1961 with the aim of managing and coordinating smallholder tea farmers. The KTDA was formed in 1964 and took over the functions of SCDA (Mukumbu, 1993:137).

The main source of data on smallholder tea in Kenya is the KTDA. According to KTDA figures, the total number of smallholder tea-growers in 1994/95 was 289,270 farmers, out of which 19,389 or 6.70 per cent were in Kericho District. The national average plot size for smallholder tea producers in 1994/95 was 0.7 acres while the average for Kericho District in 1994 was 1 acre (KTDA, 1995). A tea population census took place in early 1996 to verify the details of smallholder tea producers. The aim of the tea census was to ascertain the actual quantity of tea on the ground and its ownership.

Figure 3.1 shows the trend of the harvested tea area in Kenya from 1980 to 1994. Smallholders accounted for over 50,000 hectares of the tea area in the early 1980s, and by 1994, the sector accounted for 68,400 hectares (67.1 per cent of the total tea area). The estates accounted for over 25,000 hectares of tea in the early 1980s, and by 1994, estates accounted for 31,000 hectares (30.4 per cent of the total area). Nyayo Tea Zones, a government parastatal, was established in 1986 and by 1994, the sector harvested 2,600 hectares of tea, a 2.5 per cent share of the total area (FAO, 1996). While large commercial estates are concentrated in the west of the Rift Valley, smallholders dominate production east of the Rift Valley.

The KTDA assists smallholder tea producers with planting materials, extension services, fertilizer, inspection, the collection of their green leaf, quality control, processing, and marketing. It collects a monthly payment from smallholder tea farmers for road maintenance but the situation of the roads has deteriorated and, in the 1990s, farmers faced delays in leaf collection because of poor, impassable roads during the rainy season and the lack of KTDA lorries in sufficient numbers. The KTDA attempts to maintain uniform tea
planting techniques for the smallholders using the Tea Research Foundation’s recommendations for the clonal material and plant density (3,500 bushes per acre for smallholders and 4,300 bushes per acre for the estates) (Mukumbu, 1993).

Table 3.1 KTDA Planting Statistics 1994/95

<table>
<thead>
<tr>
<th>Province</th>
<th>Total hectares planted</th>
<th>Total no. growers</th>
<th>Average plot size (hectares)</th>
<th>Average plot size (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiambu</td>
<td>6705.62</td>
<td>17015</td>
<td>0.39</td>
<td>0.96</td>
</tr>
<tr>
<td>Murang’a</td>
<td>10409.63</td>
<td>34817</td>
<td>0.3</td>
<td>0.74</td>
</tr>
<tr>
<td>Nyeri</td>
<td>6277.41</td>
<td>23705</td>
<td>0.26</td>
<td>0.64</td>
</tr>
<tr>
<td>Kirinaga</td>
<td>5170.84</td>
<td>15166</td>
<td>0.34</td>
<td>0.84</td>
</tr>
<tr>
<td>Provincial Total</td>
<td>8563.5</td>
<td>90703</td>
<td>0.31</td>
<td>0.77</td>
</tr>
<tr>
<td>EASTERN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embu</td>
<td>3357</td>
<td>10669</td>
<td>0.31</td>
<td>0.77</td>
</tr>
<tr>
<td>Meru</td>
<td>2590.95</td>
<td>15007</td>
<td>0.17</td>
<td>0.42</td>
</tr>
<tr>
<td>Nyambene</td>
<td>3177.28</td>
<td>12106</td>
<td>0.26</td>
<td>0.64</td>
</tr>
<tr>
<td>T/Nithi</td>
<td>1463.9</td>
<td>5313</td>
<td>0.28</td>
<td>0.69</td>
</tr>
<tr>
<td>Provincial Total</td>
<td>10589.13</td>
<td>43095</td>
<td>0.25</td>
<td>0.61</td>
</tr>
<tr>
<td>RIFT VALLEY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nakuru</td>
<td>940.89</td>
<td>259</td>
<td>0.75</td>
<td>1.85</td>
</tr>
<tr>
<td>Kericho</td>
<td>7866.29</td>
<td>19389</td>
<td>0.41</td>
<td>1.01</td>
</tr>
<tr>
<td>Bomet</td>
<td>6377.22</td>
<td>25130</td>
<td>1.25</td>
<td>3.09</td>
</tr>
<tr>
<td>Nandi</td>
<td>2412.02</td>
<td>6348</td>
<td>0.38</td>
<td>0.92</td>
</tr>
<tr>
<td>Kitale</td>
<td>735.93</td>
<td>1092</td>
<td>0.67</td>
<td>1.65</td>
</tr>
<tr>
<td>Provincial Total</td>
<td>18392.35</td>
<td>53181</td>
<td>0.34</td>
<td>0.84</td>
</tr>
<tr>
<td>NYANZA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kisii</td>
<td>7296.11</td>
<td>46557</td>
<td>0.16</td>
<td>0.39</td>
</tr>
<tr>
<td>Nyamira</td>
<td>9724.25</td>
<td>44470</td>
<td>0.22</td>
<td>0.54</td>
</tr>
<tr>
<td>Provincial Total</td>
<td>17020.36</td>
<td>91027</td>
<td>0.19</td>
<td>0.47</td>
</tr>
<tr>
<td>WESTERN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kakamega</td>
<td>512.64</td>
<td>2177</td>
<td>0.24</td>
<td>0.59</td>
</tr>
<tr>
<td>Vihiga</td>
<td>1734.04</td>
<td>9050</td>
<td>0.19</td>
<td>0.47</td>
</tr>
<tr>
<td>Provincial Total</td>
<td>2246.68</td>
<td>11227</td>
<td>0.2</td>
<td>0.49</td>
</tr>
<tr>
<td>KTDA Plots/Farms</td>
<td>216</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GRAND NATIONAL TOTAL</td>
<td>76968.02</td>
<td>289270</td>
<td>0.27</td>
<td>0.67</td>
</tr>
</tbody>
</table>

Note: 1 hectare = 2.47 acres
3.4 Gender Dimensions of Smallholder Tea Production

Some information on the gender dimensions of smallholder agricultural production in Kenya, including tea production, is provided by Davison’s (1988) study of Chwele in the Western Province and Mutira in the Central Province. Smallholder households generally combine subsistence food production with cash crop production depending upon land size, soil fertility, and capital resources, although, as Davison (1988) notes, the distinction between “cash crops” and “subsistence crops” is an arbitrary one in some cases. She cites the example of Chwele smallholders who grow maize and groundnuts which they concurrently sell and use for their own consumption. A subsistence crop may also become a cash crop at another point in time as the economic needs of a household fluctuate.

Davison’s (1988) study of smallholder production in Kenya includes tea-growing smallholders in Mutira in Central Province, and provides a useful introduction to the gender dimensions of smallholder production in Kenya. She notes that “productive and reproductive tasks are at times gender specific and others gender collaborative” (p. 160). While women and girls are responsible for wood and water collection, cooking and child care, and women and children are also mainly involved in planting and weeding subsistence crops, there exists collaboration with men in the harvesting of most subsistence and cash crops. Nevertheless, women are identified with food production, while cash crop production is mainly controlled by men as household heads. It is only in cases of female-headed households that the pattern differs in that
women bear the responsibility for all agricultural tasks. Men generally handled the preparations for cultivation, particularly if the crop has a cash value. However, the study found that both men and women prepared the land and planted the maize and that “men were the sole producers of tea or coffee in only 23 per cent of the households in the 1985 study.” Men were also responsible “… for construction, herding cattle, operating farm implements, spraying and insecticides” (p.161).

The key issue Davison (1988) investigates is land ownership and how this affects production. She argues that the economic position of peasant women as agricultural producers was weakened by the 1954 Swynnerton Plan:

By individualising holdings and awarding male heads of “households” title deeds, women’s guaranteed access to cropland was endangered and their ability to secure loans for improvements on existing land was circumvented. In addition, the Plan’s emphasis on cash cropping marginalised women’s position as food producers. (Davison 1988:173)

Smallholders with large lands allocated a major portion of their land to cash crop production with the result that women spent more time in the production of these crops than in the production of food crops. The study suggested the expansion of women’s legal rights to land and the transformation of these rights into a reality. Not only do women in smallholder agriculture in Kenya lack adequate land rights, they also lack access to education, credit, fertilizer, and other inputs on the same terms as men. There are studies that show that this gender inequality restricts productivity in smallholder production in Kenya. The World Bank (1995c:41), citing three studies on Kenya (Moock, 1976; Saito and Spurling, 1992; Bindlish and Evenson, 1993), found that the gender of the farm manager was an insignificant factor in output per hectare but the manager’s educational level had a significant effect on farm productivity. Increasing human capital and input levels increases the yields for women farmers (see Table 3.2). According to the Bank:

Data from the studies show that if women and men shared the same educational characteristics and input levels, farm specific yields would increase between 7 and 22 per cent. Giving women primary schooling, by itself, would increase yields by 24 per cent. (World Bank, 1995c:41)

---

7 “In the 53% of the 30 compounds surveyed in 1985, the entire family (husband, wife, children, and young relatives living in the compound) helped with the cultivation and harvesting of tea and coffee. In 32% of the compounds, the adults of both sexes cultivated and harvested tea or coffee with little help from children. In seven compounds (25%), only adult males produced cash crops. There were no female-headed compounds in the 1985 sample (though a number existed in the 1983–84 sample), and in no cases were women the sole producers of cash crops” (Davison, 1988:160).
Unfortunately none of the data relate specifically to tea production. The World Bank (1995c) concludes that gender inequalities within the household affect market outcomes and that these feed back into household decision making. When the relative status of women within the household is improved and their access to assets and services increased, there will be an increase in returns to investment in human resources and an improvement in the prospects for sustainable economic growth. The World Bank, in reporting these studies, does not discuss why education should have this effect. Possible reasons for this are: literacy enables people to understand the use of new technology better, education gives people the confidence to deal more effectively with others, and education improves interaction and social relations with other people.

Table 3.2 Effects of Increasing Women Farmers’ Human Capital and Input Levels

<table>
<thead>
<tr>
<th>Policy Experiment</th>
<th>Increase in yield (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize farmers, Kenya, 1976&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Effects of giving female farmers sample mean characteristics and input levels</td>
<td>7</td>
</tr>
<tr>
<td>Effects of giving female farmers men’s education and input levels</td>
<td>9</td>
</tr>
<tr>
<td>Effects of giving women primary schooling</td>
<td>24</td>
</tr>
<tr>
<td>Food crop (maize, beans and cowpeas) farmers, Kenya, 1990&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Effects of giving female farmers men’s education and input levels</td>
<td>22</td>
</tr>
<tr>
<td>Effects of increasing land area to male farmers’ levels</td>
<td>10.5</td>
</tr>
<tr>
<td>Effects of increasing fertilizer to male farmers’ levels</td>
<td>1.6</td>
</tr>
</tbody>
</table>

<sup>a</sup>Coefficients from Moock 1976
<sup>b</sup>Coefficients from Saito and Spurling 1992

Note: For simplicity, the assumption was made that changes in one input do not affect others.
Source: World Bank, 1995c:Table 2.6.

Besides Davison (1988), the only other in-depth study that analyses gender is a study by Bülow and Sørensen (1988) which focuses on 120 households in the Kericho district in 1985/86. They found that on average, smallholder tea farmers devote 1.16 acres of land around their homestead to the cultivation of tea and that total fields ranged from 0.1 acres to 5 acres of land. The remaining acres of land are devoted to the homestead, livestock keeping, and other subsistence crops such as maize, beans, vegetables, tomatoes and onions. We shall return to a fuller discussion of this study later as it is central to our own research effort.
3.5 Economic Policy Reforms and the Tea Sector

In this section, we discuss the structural adjustment reforms that have been implemented in Kenya with specific reference to the tea sector. One of the main objectives of the adjustment programmes in countries where agriculture is the dominant economic activity is to increase incentives to farmers and promote exports by raising prices and improving the operation of markets. The incentive structure for smallholders is likely to be affected directly by fluctuations in the exchange rate and world market tea prices, and by the level of the tea payments the farmer receives from the KTDA. However, it is worth pointing out that the exact way in which the KTDA fixes its advanced payments and the bonus payment is not clear. There are fluctuations in both the Mombasa auction tea prices and also in the first and second payments made to the farmer. Furthermore, the first and second payments do not mirror what is happening to the Mombasa auction prices. The world market prices and tea payments to smallscale tea farmers will be discussed further in the next section. It is also important to note that there was no policy reform measure targeted at tea prices as part of the structural adjustment programmes. It is not clear why this happened in Kenya given that producer price reform was so important in other African structural adjustment programmes.

During the period of economic reforms, the smallholder tea farmer is also likely to be affected by policies such as the introduction of user charges in health and education; civil service reforms (since many smallholders receive remittances from relatives with jobs in the civil service); rises in fertilizer prices; and the general rise in the prices of consumer goods. Smallholders are likely to be affected not only by what is happening to tea but also what is happening to maize, since they grow both crops (as discussed in Section 3.2 above).

In analysing the structure of peasant income in 1982, including the value of self-produced items which are not marketed, Bevan et al. disaggregated it into six varieties according to the source from which it is derived: “food crops, cash crops (i.e. non-food crops), livestock, own business, wages and remittances” (p. 24). Disaggregating crop and livestock income into subsistence and marketed output, the study found a pronounced tendency in both Central and Nyanza Provinces for the share of subsistence to decline as income increased. They interpreted this finding as either a risk minimizing strategy on the part of the poor or that households which are unable to enter more remunerative activities are locked into subsistence. Furthermore, most households had diversified income structures, many receiving income from each of the six sources mentioned (Bevan et al. 1989:25–27).
Focusing on the patterns of rural consumption, Bigsten and Ndung’u (1992) found that half of the food consumed is purchased while the other half is self-produced. This implies that smallholders do not grow all the food that they consume. Taking maize as an example, farmers are both buyers and sellers. It is, therefore, important to emphasize that even households growing tea do grow maize as well and so what is happening to both crops is important for the smallholders. Movements in fertilizer and maize producer prices are important for smallholder farmers since they are producers as well as consumers of maize.

3.5.1 World Market Tea Prices

Kenyan tea is sold through two major outlets, the Mombasa auctions and the London auctions. The weekly Mombasa auction brings together tea brokers who act on behalf of tea factories in the East African region, on the one hand, and international tea buyers, on the other. In 1992, the Mombasa auction accounted for more than 67 per cent of total export sales, its share expanding rapidly after the 1992 policy change allowing auctions to be conducted in US dollars (Table 3.3). The main overall incentive for smallholder tea producers was the increase in tea prices in Kenyan shillings during the period.

Table 3.3 Annual Average Kenya Tea Prices

<table>
<thead>
<tr>
<th>Year</th>
<th>London Auction (pence per kg)</th>
<th>Mombasa Auction (Ksh per kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>65.8</td>
<td>8.55</td>
</tr>
<tr>
<td>1976</td>
<td>89.3</td>
<td>11</td>
</tr>
<tr>
<td>1977</td>
<td>169.7</td>
<td>19.78</td>
</tr>
<tr>
<td>1978</td>
<td>124</td>
<td>13.36</td>
</tr>
<tr>
<td>1979</td>
<td>114.4</td>
<td>12.37</td>
</tr>
<tr>
<td>1980</td>
<td>111.3</td>
<td>13.7</td>
</tr>
<tr>
<td>1981</td>
<td>107.4</td>
<td>14.8</td>
</tr>
<tr>
<td>1982</td>
<td>118.2</td>
<td>18.13</td>
</tr>
<tr>
<td>1983</td>
<td>148</td>
<td>25.54</td>
</tr>
<tr>
<td>1984</td>
<td>271.7</td>
<td>40.87</td>
</tr>
<tr>
<td>1985</td>
<td>172.6</td>
<td>26.47</td>
</tr>
<tr>
<td>1986</td>
<td>156.5</td>
<td>27.36</td>
</tr>
<tr>
<td>1987</td>
<td>117.8</td>
<td>21.82</td>
</tr>
<tr>
<td>1988</td>
<td>103.6</td>
<td>24.25</td>
</tr>
<tr>
<td>1989</td>
<td>123.4</td>
<td>31.18</td>
</tr>
<tr>
<td>1990</td>
<td>112.4</td>
<td>34.22</td>
</tr>
<tr>
<td>1991</td>
<td>101.1</td>
<td>39.57</td>
</tr>
<tr>
<td>1992</td>
<td>115.6</td>
<td>55.16</td>
</tr>
<tr>
<td>1993</td>
<td>123.9</td>
<td>157.00*</td>
</tr>
<tr>
<td>1994</td>
<td>125.6</td>
<td>163.00*</td>
</tr>
<tr>
<td>1995</td>
<td>103.4</td>
<td>134.00*</td>
</tr>
</tbody>
</table>

*US cents per kg
Source: Food and Agriculture Organization, Commodities and Trade Division, 1996.

Tea prices in Kenyan shillings at the Mombasa auction fell from 1984 to 1987 and, thereafter, rose due to an increase in world demand for Kenyan tea, the
35
devaluation of the nominal exchange rate, and policy changes in the third quarter of 1992 which allowed Mombasa auctions to be conducted in US dollars (Mukumbu, 1993:145). By 1992, prices were higher than the previous high in 1984. We must note, however, that smallholders, unlike estates, cannot sell directly through the tea auction, but must sell to the KTDA, which, in turn, sells through the tea auction.

3.5.2 KTDA Payments to Smallscale Tea Farmers

The incentives for smallholder tea producers depend upon the payment made to them by the KTDA. There are two forms of payment, known as the first and second payments. The first payment (also known as an advance monthly payment) is made on the basis of each kilogramme of green leaf delivered. It is normally fixed. The cost of the fertilizer supplied to the farmer by the KTDA is deducted from the monthly payment. In 1984/85, the first payment was Ksh 1.90 per kilogramme of green leaf delivered and this increased to Ksh 4.50 by 1994/95, an increase of 137 per cent.

The second payment is called the bonus payment and is paid at the end of every financial year. It is based on what the crop fetched in the market, less all deductions for other services such as transportation. Factors affecting the second payment include: the fluctuation of the shilling against the dollar, the international price of tea, the quality of the made tea, and the profits of the tea factory. The eastern region generally gets higher bonus payments than the west mainly due to the better prices that are offered for its higher quality tea (Mukumbu, 1993:151). The KTDA has not been transparent on the exact way in which both the first and second payments are calculated. This is one of the reasons why smallholder farmers feel that they should have more say in the determination of tea prices since they, and not the KTDA, are the producers of tea.

Figure 3.2 presents the first and second payments to smallholder tea producers. The first payment was Ksh 1 per kg of green leaf in 1980/81 and rose steadily so that by 1994/95, it was Ksh 4.50 per kg. There have been fluctuations in the second payment, with a first peak in 1983/4, and a second peak in 1993/94 (Ksh 15.90) before a fall was recorded in 1994/95 (Ksh 6.20). A likely explanation for the fall in the second payment was that the decline in the nominal exchange rate was not enough to offset the considerable fall in the sterling and dollar price offered for tea on the world market between 1994 and 1995 (see Table 3.3). The overall picture from 1985/86 to 1990/91 is one of steadily rising first and second payments, followed by a dramatic increase and an equally dramatic fall in the second payment from 1991/92 to 1994/95, while the first payment continued to rise steadily.
3.5.3 Agricultural Sector Reforms and Smallscale Tea Farmers

The reform conditionalities built into the first agricultural sector credit loan which the World Bank offered Kenya in June 1986 emphasised more efficient fertilizer distribution and the costing of fertilizer based on world prices; the restructuring of the National Cereals and Produce Board, the South Nyanza Sugar Company and the National Irrigation Board; and the rehabilitation of the Agricultural Finance Corporation, the body in charge of providing credit facilities to smallholder farmers. There were no conditions relating specifically to the KTDA attached to this loan. Attention did not focus on the KTDA until 1993 when the IMF made available an extended structural adjustment facility which had parastatal reform as a condition.

The reform of the parastatals which the IMF and the World Bank have been pushing for broadly aims at improving the efficiency of service delivery and enhancing opportunities for private sector investment, but parastatal reform in Kenya has made very slow progress. Although the KTDA had transferred 43 tea factories to private shareholders by 1995, the complete restructuring of the KTDA had still not taken place by the time this report was being written. Thus, smallscale tea-growers have been more affected by the reform of exchange rate policy. However, since most of them also grow maize, they

8 According to the (1996) Report on "Liberalization and Restructuring of the KTDA and the Smallholder Tea Sub-Sector", the key issue is that of reducing government control and influence over the KTDA and the smallholder tea subsector, thereby allowing for the full commercialization of KTDA operations and the amendment of the KTDA order.
will, additionally, have been affected by reforms relating to fertilizer and the marketing of maize.

Figure 3.3 Fertilizer Price Index

Initially, the reform measures increased the price of fertilizer dramatically, as shown in Figure 3.3 and the use of fertilizer by farmers dropped. The freeing of the prices of fertilizer and the upward adjustment of fuel prices pushed up the overall level of input prices, raising the total agricultural input index from 216 to 235 (Republic of Kenya, *Economic Survey*, 1993:8). However, the subsequent fall in fertilizer prices contributed to a decline in the input price index from 460 in 1994 to 436 in 1995 (Republic of Kenya, *Economic Survey*, 1996). There was a general increase in the consumption of all farm inputs such as fertilizer and seeds in response to the declining prices of inputs.

However, prices for most of the commodities went down in 1992 compared to 1990, except for two cash crops, namely, tea and coffee. The continued rise in the prices of both cash crops has mainly been attributed to the increased demand for them on both the local and world markets. The rise in the prices paid to farmers has also been attributed to the further liberalisation of the agricultural sector and the government’s desire to stimulate agricultural production by raising farmers’ incentives (Republic of Kenya, *Economic Survey*, 1995:109).

Table 3.4 gives details of the prices paid to producers for major cash crops during the period 1983–1994. These prices are for the calendar year and may differ from those based on crop years. In the cases of tea and coffee, the prices are for made tea and processed coffee respectively. There was a rising trend in the prices paid to producers after 1992.
Table 3.4 Average Rural Market Prices to Producers (Ksh per 100 Kg)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>222.2</td>
<td>269</td>
<td>271</td>
<td>450</td>
<td>385.67</td>
<td>1200</td>
</tr>
<tr>
<td>Maize</td>
<td>153.9</td>
<td>175</td>
<td>187</td>
<td>264.67</td>
<td>239.65</td>
<td>950</td>
</tr>
<tr>
<td>Rice Paddy</td>
<td>178</td>
<td>178</td>
<td>343</td>
<td>-</td>
<td>159.6</td>
<td>-</td>
</tr>
<tr>
<td>Pyrethrum Extract</td>
<td>115000</td>
<td>115000</td>
<td>115000</td>
<td>180000</td>
<td>154700</td>
<td>217500</td>
</tr>
<tr>
<td>Sugarcane**</td>
<td>22.7</td>
<td>22.7</td>
<td>27</td>
<td>44.8</td>
<td>39.91</td>
<td>155.3</td>
</tr>
<tr>
<td>Seed cotton</td>
<td>380.79</td>
<td>448</td>
<td>480</td>
<td>981</td>
<td>527.3</td>
<td>913.5</td>
</tr>
<tr>
<td>Clean coffee**</td>
<td>3488</td>
<td>3844</td>
<td>3972</td>
<td>3636</td>
<td>4146</td>
<td>14427.8</td>
</tr>
<tr>
<td>Sisal**</td>
<td>625</td>
<td>674</td>
<td>669</td>
<td>918.2</td>
<td>944</td>
<td>1100</td>
</tr>
<tr>
<td>Tea**</td>
<td>2184</td>
<td>5184</td>
<td>3366</td>
<td>3521</td>
<td>4750</td>
<td>8738.4</td>
</tr>
</tbody>
</table>

**These are world prices paid to estates less local transportation costs to Mombasa.

In 1983–1992, the change in the rural market maize price paid to producers was less than the change in the tea payment (first and second payments). However, in the period 1983–1994, the change in the rural market maize price paid to producers was greater than the change in the tea payment. The net farmgate price of both tea and maize had risen during the period. It is important to note that the tea payment is the net of inputs so it would be necessary to compare changes in maize prices paid to producers with the movement of fertilizer prices. The change in maize price to producers during the 1983–1992 period was 56 per cent and looking at Figure 3.3, we see that fertilizer prices had risen more than maize prices i.e. the price of the fertilizer input moved faster than the price of the output, maize.

Table 3.5 presents the average prices of maize in rural markets in Kenya shillings for the months of March and September from 1991 to 1995. Due to the poor harvest in 1993, maize prices were high in the month of March 1994 but declined by September 1994. In 1995, maize prices were generally low and registered slight drops from March to September. It was noted that the deregulated distribution network does not seem to be responsive to regional price differentials. For instance, in the coastal market, the average maize price was Kshs 23.40 per kilogram in September 1995 and only Ksh 6.70 per kilogram in Western Province. This suggests distribution inefficiencies in the marketing of maize (Republic of Kenya, Economic Survey, 1996:123).

In general terms, the average price of maize in rural markets, as can be seen from Table 3.4 and Figure 3.3, increased during the period 1991–1995 and outstripped the rise in fertilizer prices. This was good news for smallholders selling maize, but not for those who had to buy maize. What is important to maize farmers is not only the rise in producer prices but also what is
happening to fertilizer prices and the indirect effects of structural adjustment measures such as the introduction of user charges and consumer price increases.

Table 3.5 Average Rural Market Prices for Maize by Province (Ksh per Kg)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coast</td>
<td>3.8</td>
<td>4.5</td>
<td>8.25</td>
<td>9.5</td>
<td>10.2</td>
</tr>
<tr>
<td>Eastern</td>
<td>3.05</td>
<td>3.7</td>
<td>4.5</td>
<td>11.05</td>
<td>8.18</td>
</tr>
<tr>
<td>Central</td>
<td>3.05</td>
<td>3.7</td>
<td>5.7</td>
<td>11.63</td>
<td>7.78</td>
</tr>
<tr>
<td>Rift Valley</td>
<td>3.6</td>
<td>4.78</td>
<td>7.5</td>
<td>11.35</td>
<td>9</td>
</tr>
<tr>
<td>Nyanza</td>
<td>3.1</td>
<td>5.39</td>
<td>5.2</td>
<td>7.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Western</td>
<td>3.2</td>
<td>3.88</td>
<td>5.42</td>
<td>7.56</td>
<td>8.18</td>
</tr>
</tbody>
</table>


A comparison of the changes in the maize price, tea payments and the consumer price index is not possible due to differences in the time period. We can conclude, however, from the available information that, despite the rise in prices paid to tea households during the period, this did not compensate for the rise in the price of maize paid by consumers. Moreover, the annual increase in the consumer price index for the rural population reached 24 per cent in 1992 and 55 per cent in 1993 (World Bank, 1995). This increase was due to the decontrol of the prices of many other food items, which included fats and edible oils, rice, tea and milk, leading to increases in the prices of these commodities. Farmers were affected by what was happening to both tea and maize prices, fertilizer prices, and consumer prices. They were also affected by the introduction of user charges.

3.6 Conclusion

Little empirical work has been done on the impact of economic reforms on smallholder tea producers. Despite the growth in the output of tea during the period, both yield and exports have stagnated. Since tea producers also produce maize as a food and cash crop, an increase in the use of farm inputs and seeds due to the decline in fertilizer prices is a likely positive impact of the reforms, although the distribution of fertilizer to the rural areas may not be satisfactory due to poor infrastructure.

There has been a decline in per capita production of maize, the main staple food, and despite the import of maize during drought years, the open market prices of maize have fluctuated over the period, resulting in a marginal growth of per capita consumption. There has been a general rise in the prices of consumer goods.
The gender dimensions of tea production among the small-scale tea households are an issue that has not been adequately addressed in spite of the fact that women are involved in tea production as unpaid family members and their labour is important since tea requires a continuous labour input, with women particularly important in tea plucking. Lack of control of income from tea may negatively affect women’s incentive to work on tea fields and their ability to cope with the rising prices of food and other consumer goods. We will turn to explore this in subsequent sections.

4.1 Introduction

As was mentioned in the introduction, the objectives of this study were: to investigate and evaluate factors influencing the adoption and production of tea among male and female smallholder tea producers in Kenya in the period 1985/86 to 1995/96; to analyse what the experience of the structural adjustment period has meant for women and men in both tea and non-tea producing households; and to make policy recommendations to improve both supply response and the benefits to women farmers. The research strategy for this study was to obtain longitudinal data by conducting a follow up study to that conducted by Dorthe von Bülow and Ann Sørensen in Kericho District in 1985/86.

In undertaking this research, I received a lot of assistance from Dorthe von Bülow, who not only provided the list of the farmers interviewed in 1985/86, but also shared her knowledge of the area with me, introduced me to the key informants and was always willing to share her research experience and clarify baseline data throughout the period of my study. The main objectives of the 1985/86 study carried out by Bülow and Sørensen were to investigate how gender relations affect the process of agricultural development in tea and non-tea households, women’s role in tea production and changes that had occurred among the smallholders due to the introduction of tea. The 1985/86 study had different objectives from my 1995/96 study but the point of contact between the two studies is a shared concern with gender relations and tea production.

4.2 Criteria for Selection of Location and Sample

Bülow and Sørensen were guided by the following criteria in their choice of location and households:

At locational level:
– Pressure on land
– Distance to tea estates
– Distance to major town centres

At household level:
– Size of tea production
– Age of tea production
– Type of labour used in tea production (family/hired)
– Family structure—monogamous/polygamous

Mosop location was selected since it met the set criteria:
– It borders the Brookbond Tea Estates and Kericho Township.
– It is the first place in the district where tea was introduced among the smallholders in 1959.
– It is close to the tea estates, thereby facilitating the use of hired labour.
– There is higher pressure on land use there and its closeness to the township made land more expensive compared to other parts of the district.
– The average farm size of 5 acres and average tea plot of 1 acre correspond with the rest of the district.
– Some farmers own land in other divisions or districts as well.
– There was the existence of polygamous households as well as monogamous households.
– Villages existed in the form of “kokwets” best understood as a number of neighbouring households with their fields.

Bülow and Serensen conducted their field research during the period March 1985 to April 1986 in the Mosop Location which was in Belgut Division at the time.

A random sample of 120 households was selected consisting of 63 tea households and 57 non-tea households. They interviewed 63 men and 57 women from tea households and 57 men and 56 women from non-tea households. In each household, data was collected using two questionnaires, one for the male household head and the other for his wife. The wife had to answer both questionnaires where the husband was absent. In-depth interviews were conducted on gender relations within the household for a selected sub-sample of 14 households of which 8 were tea and 6 were non-tea. The basis on which the selected sub-sample was chosen aimed at ensuring that there was a fair representation of different age groups and different marital statuses among the women. In each household, discussions were held separately with wives and husbands.

My fieldwork was conducted during the period May 1995 to April 1996 in the same location, which was now in Ainamoi Division. Out of the combined total of 120 households studied in 1985/86, I was able to locate and interview 94; of these 79 were male-headed households and 15 were female-headed households. There were 4 households which were traced but which did not wish to participate in the interviews. In total, my study traced 98 households,

---

9 Belgut division was divided into two in 1992 to form Ainamoi and Belgut Divisions.
if we include the 4 households which did not participate. I interviewed 44
men and 54 women from tea households and 37 men and 36 women from
non-tea households. In-depth, semi-structured interviews were conducted
with a sub-sample of 11 households, of which 6 were tea and 5 non-tea.

Table 4.1 Sample Size 1985/86 and 1995/96 Studies

<table>
<thead>
<tr>
<th></th>
<th>1985</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>120 households (63 tea and 57 non-tea)</td>
<td>94 households (51 always tea and 43 which were non-tea in 1985; of these, 17 switched to tea by 1995)</td>
</tr>
<tr>
<td>Female-headed households in the sample</td>
<td>7 tea households headed by widows</td>
<td>15 households* (10 tea and 5 non-tea)</td>
</tr>
<tr>
<td>In-depth interviews with men and women</td>
<td>14 households (8 tea and 6 non-tea)</td>
<td>11 households (6 tea and 5 non-tea)</td>
</tr>
</tbody>
</table>

Source: Bülow and Sørensen (1988) and 1995/96 Survey.

*Out of the 15 female-headed households, 14 were widows and 1 household was headed by a single female who inherited tea from dead parents. Since the brothers were young, relatives were helping in the tea management.

4.3 Methods of Fieldwork and Data Analysis, 1995/96 Study

The sources of information that were used in establishing the socio-economic context were: the 1985/86 study conducted by Bülow and Sørensen; discussions with the officials of the KTDA both in Nairobi and Kericho District; the Chief who facilitated access; the KTDA’s field officers in Kericho; the farmers in the sample; the Tea Research Foundation based in Kericho, and the key informants who had co-operated with the 1985/86 study.

The first entry point in Kericho was the District Commissioner, who had to confirm that I had permission from the Office of the President to carry out research in Kericho. The Chief of the area was very helpful since he not only facilitated access but also introduced me to school students from among whom I selected my research assistants. The Chief also gave me permission to use his office as a base. One of the key informants and his wife, who had co-operated with the 1985/86 study, were very helpful in the 1995/96 study. The Kericho tea officer introduced me to the field officers and allowed me to confirm the farmers in the sample with the list at the KTDA Kericho office. We had discussions with the tea field officers on their experiences of fieldwork and various cases of farmers who had low productivity. I was able to obtain from the KTDA’s Kericho and Nairobi offices, data on payments to tea farmers and information on output and bushes planted by a selected group of farmers.

The research methods used in the 1985/86 study consisted of structured and semi-structured questionnaires, in-depth discussion and participant ob-
There was a different questionnaire for male and female farmers. The 1995/96 study also used structured questionnaires for male and female farmers. They were based on the previous survey but were modified in the light of the objectives of the study. The key differences in the two sets of questionnaires was that the one in 1985/86 gathered more detailed information on historical and cultural changes. For example, the 1985/86 questionnaires asked about traditional labour groups while the 1995/96 survey did not.

In the 1995/96 study, use was made of five research assistants, who were all form four school leavers and consisted of three females and two males. They were selected from a total of ten possible assistants. They could speak the Kipsigis language and Swahili fluently. I conducted three days’ training with them, which involved explaining the purpose of the study; the questionnaire and techniques of administering them to the farmers; and styles of introduction and ways of handling respondents who were reluctant to respond. There were no problems related to young men interviewing male farmers and young women interviewing women farmers. There were no major management problems faced by the research assistants who worked quite enthusiastically until the end of the research. On average, one questionnaire took almost one hour per farmer. I conducted the in-depth interviews myself, with the help of an interpreter,10 since this involved lengthy discussions of about two hours about gender relations at the household level.

The questionnaire for women farmers in the 1995/96 study asked questions about household characteristics, decision-making, control of resources, new activities engaged in during the period 1985–1995, the division of labour in household work, time allocation, and the division of labour hours spent in tea and maize production. The questionnaire for male farmers asked questions about land size and the technology of land preparation, bonus payment, labour in tea production, tasks in tea production, cropping patterns, decision making, livestock, off-farm wage employment, and income expenditure.

The in-depth discussions in the two studies were also slightly different in that the 1985/86 study discussed in detail, historical and cultural changes. The in-depth discussions in my study focused on responsibilities and rights within marriage, access to resources, and perceptions of improvements in living standards. Furthermore, there were a number of problems that I faced during the period of research in 1995/96 that were different from the problems faced by Bülow and Sørensen in 1985/86. I was unable to get accommodation in the research location so I had to stay in Kericho town. Bülow and Sørensen had accommodation in the research location and stayed there for a

10 The in-depth discussions were very detailed and most respondents felt more comfortable explaining issues in the Kipsigis language rather than Swahili. I used an interpreter who was the tea field officer in the area.
year with their families and, thus, were able to spend more time with the people learning about and documenting the changes that had taken place in the research location.

Despite having a list of the farmers' names from the 1985/86 sample, tracing the farmers was very difficult due to two main reasons. First, some farmers had changed their names or had different names from those recorded on the list. We had to confirm that the farmers had been interviewed in 1985/86 by asking them if they remembered the researchers who came then, and by cross-checking the 1985/86 household characteristics against the 1995/96 household characteristics. The second problem related to tracing farmers was that their homes were scattered over a large area and locating the correct homes of the farmers was very time consuming. It involved long hours of walking and the problem became worse during the rainy season, especially when rain started falling around midday.

It was easier to interview male farmers than female farmers. When interviewing male farmers, we would be seated, while the husbands ordered the wives to serve us with tea and food; when interviewing female farmers, we had to help with the domestic chores and farm work. We observed that the wives looked much older than the husbands, although, in fact, they were generally younger.

Despite Kericho District being well served by roads, except for Londiani Division in the northern part, the main problem with the roads in the District is that during the wet season, they are impassable. The fieldwork revealed that transportation was poor in the area. Bülow and Sørensen did not experience transportation problems since they had a four wheel drive vehicle. During the fieldwork period, I was able to use various vehicles, but they were small and could not pass through the roads in times of rain.

The other problem was that of language. In conducting my interviews with farmers, I had to use an interpreter because I do not speak the local language. In sum, many of the problems I faced in the 1995/96 study were different from those faced by Bülow and Sørensen in 1985/86 study and required perseverance.

One of the other main differences between the two studies was that Bülow and Sørensen used qualitative techniques of data analysis while I used both quantitative and qualitative techniques of data analysis. Descriptive statistics and cross tabulation were produced and regression analysis of productivity was conducted using the Statistical Package for Social Sciences (SPSS). I also used LIMDEP statistical package to conduct a logit analysis of tea adoption.
4.4 Strengths and Weaknesses of Research Design

An important problem I faced was that of trying to investigate complex issues concerning intra-household relations in a relatively short period of time, since I was unable to spend a long time in the field due to resource constraints. Bülow and Sørensen were much better resourced and were able to spend longer time in the field doing ethnographic research.

The other major problems concern the design of studies to investigate the impact of and responses to changes in the policy environment. Studies which use “before and after” data may be criticised on the grounds that their methodology implicitly assumes that all the other things are equal in the “before and after” situations, and attribute differences to the policy changes. However, other non-policy factors (such as weather or international prices) may also change.

A control group approach partly overcomes the deficiency of the “before and after” approach by attempting to distinguish between the programme and non-programme determinants of outcomes. A World Bank study grouped countries into the following three categories: Early Intensive Adjustment Lending (EIAL), Other Adjustment Lending and Non-Adjustment Lending and compared the performance of the three groups in an attempt to isolate the effect of the Bank-supported adjustment programmes (World Bank, 1992). The approach compares average change in performance variables for both programme and non-programme countries. The difference is attributed to the effect of the programme. The key weakness of the control group approach is that it assumes that all countries are subject to the same non-programme influences i.e. facing the same external environment. It also assumes that the effect on performance of these other determinants is the same for all groups of countries. Furthermore, the approach ignores the effects of the programme and other country-specific characteristics on performance and may, therefore, be subject to a “sample selection bias”.

The Modified Control Group approach minimises sample selection bias and takes account of the changing external environment of each country.

The approach recognises the non-random selection of the programme countries, identifies the specific differences between programme and non-programme countries in the pre-programme period and then controls for these differences in the comparison of subsequent economic performance. (World Bank 1990:24)

The control group approach (modified or not) is well suited to comparisons of macro-economic and sectoral outcomes across countries. But it is not well suited to investigations of underlying micro-economic processes of change. This study focuses on the micro-economic level, but it draws a lesson from the control group approach in terms of the importance of using cross-sectional as well as time series data. So although the study does make use of “before and
after” data, it does not attempt to draw simple uniform conclusions about the impact of adjustment measures on male and female farmers. Rather, it aims to investigate differences in household experiences, perceptions and decisions in the context of a shared policy and natural environment. In both the “before” and the “after” period, the research is designed to use cross-sectional data comparing different households and investigating the household-level factors, especially gender relations, which may influence the response to, and experience of, adjustment.

The issue of causal links between policy measures (such as structural adjustment) and outcomes can never be completely resolved. Ultimately, there will always have been a judgement on the basis of circumstantial evidence e.g. whether tea output increased after tea payment to smallholders rose after due allowance is given for conditions and changes in international market price of tea. The research design adopted here aims to collect and analyse evidence in ways that will enable us to make well-founded judgements about whether there is a case for modifying adjustment measures.

4.5 Conclusion

The research for this work was designed to use as baseline, a study conducted in 1985/86 by Bülow and Sørensen, who agreed to co-operate and make available unpublished data. Dorthe von Bülow gave invaluable help in the design of the fieldwork. Despite a low level of resources and many logistical difficulties, it was possible to trace and interview most of the households which participated in the baseline study. The research was designed to provide data which could be analysed quantitatively as well as qualitatively, and to focus on potential differences in household responses to, and experiences of, a period in which a number of important adjustment measures were affecting the agricultural sector.

5.1 Introduction

This section discusses the changes that have taken place among the smallholder tea producers in Mosop Location, Kericho District during the period 1985/86–1995/96 and the factors influencing tea production. The main sources of the information are the 1985/86 and 1995/96 surveys.

As we mentioned earlier, out of the 120 households (63 tea and 57 non-tea households) in the 1985/86 survey, the 1995/96 survey traced 94 households. Of these, 17 male-headed households had switched to tea during the 1985/86–1995/96 period, (Figure 5.1), while 51 had grown tea in 1985/86 and continued to grow tea in 1995/96. There were 26 non-tea households, which had never grown tea in the period 1985/86 to 1995/96.

Figure 5.1 Year in which Non-Tea Farmers Switched to Tea Production

In the subsequent analysis, we shall distinguish between the always-tea households which had grown tea in 1985/86, the tea-switchers which were households which had switched to tea during the period between the surveys, and the never-tea households. Out of the 68 tea households in 1995/96 survey, four always-tea households were dropped from the subsequent analysis. This
This was because two households had incomplete information and two were outliers, with one of them being substantially richer than the others. The other outlier was a single female who had inherited tea from dead parents and her relatives were helping her with the management of the farm. Thus, the total number of tea households in the analysis was 64 while there were 26 households which had never grown tea in the 1995/96 sample; out of these, two cases were dropped from the subsequent analysis due to incomplete information. The analysis thus covered 24 never-tea households. The statistical analysis in this section, therefore, covers 88 households both in the 1985/86 and 1995/96 surveys (except for the analysis of tea adoption in sub-section 5.6, from which, for reasons which will be explained, the female-headed households were excluded).

5.2 Tea Households, Never-Tea Households and Households Switching to Tea

Household Characteristics

In 1985/86, 8 per cent of the households were in polygamous unions with co-wives either living together in one compound and using the same piece of land or living separately on different farms. The proportion of polygamous households in 1995/96 and their living arrangements remained the same.

Details of mean values of selected characteristics of the always-tea, tea-switchers and never-tea households in 1985/86 and 1995/96 are presented in Tables 5.1 and 5.2 respectively. Focusing on the always-tea households in 1985/86 and 1995/96, the main change that can be observed over the ten-year period was an increase in the number of adult females and males in the household. On average, declines can be observed in acres under tea, number of bushes, acres under maize, and livestock keeping. Comparing the never-tea households in 1985/86 and 1995/96, declines can be observed in total farm size, the average number of children under 5 years, and acres under the maize crop and livestock. On average, in 1995/96, the tea-switchers had a smaller total farm size, fewer children under five years of age, and fewer livestock when compared with the always-tea and never-tea households in 1995/96. Comparing the always-tea households to the never-tea households in 1985/86, the former were older, had larger farms, and more children attending school. In 1995/96, the always-tea households were generally older than the never-tea households, had larger farms, and had more adult males and females in the household compared to the never-tea and tea-switchers. Tea households had fewer acres under the maize crop in 1995/96 compared to the never-tea households.

Testing for differences in means between tea-growers in 1985/86 and 1995/96, statistically significant differences were found in the age of the farm-
ers, the number of adult females and males, children less than five years, acres under maize, and livestock in the household. Testing for differences in means between non-tea-growers in 1985/86 and 1995/96, statistically significant differences were found in the age of the farmer, farm size, number of children going to school and livestock in the household.

Table 5.1 Household Mean Values: Always-Tea, Tea-Switchers and Never-Tea in 1985/86

<table>
<thead>
<tr>
<th></th>
<th>Always-Tea*</th>
<th>Tea-Switchers**</th>
<th>Never-Tea***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of respondent (years)</td>
<td>45.45</td>
<td>37.88</td>
<td>36.54</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>8.57</td>
<td>8.81</td>
<td>7.42</td>
</tr>
<tr>
<td>Adult females in the household</td>
<td>1.49</td>
<td>1.65</td>
<td>1.54</td>
</tr>
<tr>
<td>Adult males in the household</td>
<td>1.15</td>
<td>1.71</td>
<td>1.79</td>
</tr>
<tr>
<td>Children under five years of age</td>
<td>0.81</td>
<td>1.12</td>
<td>1.29</td>
</tr>
<tr>
<td>Children attending school</td>
<td>2.83</td>
<td>2.59</td>
<td>1.92</td>
</tr>
<tr>
<td>Acres under tea crop</td>
<td>1.15</td>
<td>NA****</td>
<td>NA</td>
</tr>
<tr>
<td>Number of bushes</td>
<td>3553</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Acres under maize crop</td>
<td>1.67</td>
<td>1.69</td>
<td>1.71</td>
</tr>
<tr>
<td>Livestock*****</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>


* Sample size of Always-tea= 47
** Sample size of Tea-switchers= 17
*** Sample size of Never-tea= 24
**** NA= Not applicable
***** Livestock= Number of cows, goats and sheep

Table 5.2 Household Mean Values: Always-Tea, Tea-Switchers and Never-Tea in 1995/96

<table>
<thead>
<tr>
<th></th>
<th>Always-Tea*</th>
<th>Tea-Switchers**</th>
<th>Never-Tea***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of respondent (years)</td>
<td>53.62</td>
<td>48.59</td>
<td>48</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>8.96</td>
<td>4.65</td>
<td>5.24</td>
</tr>
<tr>
<td>Adult females in the household</td>
<td>2.45</td>
<td>1.65</td>
<td>1.58</td>
</tr>
<tr>
<td>Adult males in the household</td>
<td>2.57</td>
<td>2.29</td>
<td>1.79</td>
</tr>
<tr>
<td>Children under five years of age</td>
<td>0.47</td>
<td>0.41</td>
<td>0.83</td>
</tr>
<tr>
<td>Children attending school</td>
<td>2.81</td>
<td>3.53</td>
<td>3.21</td>
</tr>
<tr>
<td>Acres under tea crop</td>
<td>1.21</td>
<td>0.39</td>
<td>NA****</td>
</tr>
<tr>
<td>Number of bushes</td>
<td>3427</td>
<td>1259</td>
<td>NA</td>
</tr>
<tr>
<td>Acres under maize crop</td>
<td>1.1</td>
<td>0.82</td>
<td>1.18</td>
</tr>
<tr>
<td>Livestock*****</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>


* Sample size of Always-tea= 47
** Sample size of Tea-switchers= 17
*** Sample size of Never-tea= 24
**** NA= Not applicable
***** Livestock= Number of cows, goats and sheep
Table 5.3 Waged Work, 1985/86

<table>
<thead>
<tr>
<th>Percentage of households engaged in:</th>
<th>Always-Tea* (%</th>
<th>Tea-Switchers** (%)</th>
<th>Never-Tea*** (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tea wage employment</td>
<td>27.7</td>
<td>52.9</td>
<td>45.8</td>
</tr>
<tr>
<td>Non-tea wage employment</td>
<td>17</td>
<td>17.6</td>
<td>25</td>
</tr>
<tr>
<td>Previous experience in tea wage employment</td>
<td>34</td>
<td>52.9</td>
<td>45.8</td>
</tr>
<tr>
<td>Use of hired labour in tea production</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hired labour in pruning only</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–2 contractors</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 or more contractors</td>
<td>19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Sample size of Always-tea= 47
** Sample size of Tea-switchers= 17
*** Sample size of Never-tea= 24
**** The figure for use of hired labour in 1985/86 is based on all of the 63 tea-growers.
***** NA= Not applicable

Table 5.4 Waged Work, 1995/96

<table>
<thead>
<tr>
<th>Percentage of households engaged in:</th>
<th>Always-Tea* (%)</th>
<th>Tea-Switchers** (%)</th>
<th>Never-Tea*** (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tea wage employment</td>
<td>14.9</td>
<td>47.1</td>
<td>25</td>
</tr>
<tr>
<td>Non-tea wage employment</td>
<td>8.5</td>
<td>5.9</td>
<td>20.8</td>
</tr>
<tr>
<td>Previous experience in tea wage employment</td>
<td>38.3</td>
<td>64.7</td>
<td>45.8</td>
</tr>
<tr>
<td>Use of hired Labour in tea production</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>38.3</td>
<td>76.5</td>
<td>NA*****</td>
</tr>
<tr>
<td>Some of which:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male permanent</td>
<td>61.7</td>
<td>23.6</td>
<td></td>
</tr>
<tr>
<td>Female permanent</td>
<td>19.1</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>Male contractor</td>
<td>4.3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Female contractor</td>
<td>29.8</td>
<td>11.8</td>
<td></td>
</tr>
</tbody>
</table>
* Sample size of Always-tea=47
** Sample size of Tea-switchers= 17
*** Sample size of Never-tea=24
***** NA= Not applicable

In 1985/86, 53 per cent of the 17 farmers who subsequently switched to tea were currently engaged in tea wage employment and a larger percentage of the tea-switchers had previous experience in tea wage employment compared to the always-tea and never-tea households (Table 5.3). By 1995/96, the proportion of tea-switchers currently in tea wage employment had declined to 47 per cent but 65 per cent of tea-switchers had previous experience in tea wage employment. In general, the pattern indicates that there was a decline in wage...
employment for all the three groups during the 1985/86 to 1995/96 period (Tables 5.3 and 5.4). The decline in wage employment may have resulted from withdrawal from work due to old age, retirement, higher incomes from tea, or fewer wage employment opportunities.

In 1985/86, half of the tea households used hired labour on a regular basis while the other half depended on family labour, except for pruning which was, in many cases, done by hired specialists (Bülow and Sørensen, 1988:152). In 1995/96, 62 per cent of the always-tea households hired labour for tea production, compared to 24 per cent of tea-switchers. The main type of labour hired was male contractor and male permanent. Overall, by 1995/96, the use of hired labour had declined among the tea-producing households. This is reflected in the proportion of the always-tea households not using hired labour—38 per cent in 1995/96 compared to 17 per cent in 1985/86. The tea-switchers mainly used family labour. Households which had never grown tea did not use hired labour. The 1985/86 survey found that they had a keen interest in preserving traditional labour groups, which operated mainly during weeding and harvesting periods. Women in particular depended on traditional labour groups as a source of support in times of distress and to provide labour for maize and milk production (Bülow and Sørensen, 1988:141). The 1995/96 survey found a decline in the use of traditional labour groups. However, in-depth discussions revealed that traditional labour groups were still important among the never-tea households, and women in particular.

Furthermore, among the tea households, due to increased demand for women’s labour, husbands did not allow women to participate in traditional labour groups. In both 1985/86 and 1995/96, tea competed with maize production and cattle and dairy farming for both land and labour. Maize and milk were produced both for sale and household consumption by all the households in the sample. But while the tea households planted maize mainly for home consumption, the never-tea farmers depended more on maize as a major source of cash income and cultivated a larger acreage of maize compared to the tea households. Other sources of cash income for the never-tea households included engagement in off-farm employment and the sale of milk and vegetables. The income sources of the non-tea households remained the same in 1995/96 but the selling and buying of cattle was no longer a major source of income for the never-tea households in 1995/96. Cattle keeping had declined in 1995/96 compared to 1985/86. We did not investigate the factors that may have led to the decline.

5.3 Living Standards

Women from the tea households were asked to identify the benefits which the household was getting from producing tea. Their responses are presented in
Table 5.5. Thirty nine per cent of the always-tea households mentioned being able to educate their children, 18 per cent were able to build better houses, and 7 per cent were able to eat and dress well while 18 per cent did not specify any reason. The tea-switchers, as we mentioned earlier, switched at different times during the 1985/86–1995/96 period. Since tea takes almost three years to mature before the first harvest, some of the switchers had very young plants. According to the responses they gave, 29 per cent said they were able to educate their children, 12 per cent were able to eat and dress well while 47 per cent did not specify any reason.

Table 5.5 Women’s perceptions of benefits tea households are getting from production (Percent of respondents)

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Always-Tea</th>
<th>Tea-Switchers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to educate children</td>
<td>39</td>
<td>29</td>
</tr>
<tr>
<td>Able to build a house</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>More money for taking care of family</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Able to dress and eat well</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Bought land</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>None specified</td>
<td>18</td>
<td>47</td>
</tr>
</tbody>
</table>

Sample of always-tea=47
Sample of tea-switchers=17

The in-depth discussions also confirmed that the tea-producing households were able to get regular incomes and pay fees. It was also observed that tea households tended to have better houses and assets such as livestock, radios and good furniture. Table 5.6 gives details of women’s perception of changes in standards of living in 1995/96 compared to 1985/86.

Table 5.6 Women’s perception of whether the standard of living had changed in 1995/96 compared to 1985/86

<table>
<thead>
<tr>
<th>Standard of Living</th>
<th>Always-Tea</th>
<th>Tea-Switchers</th>
<th>Never-Tea</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Improved</td>
<td>28 13</td>
<td>53 9</td>
<td>25 6</td>
</tr>
<tr>
<td>Same</td>
<td>10 5</td>
<td>23 4</td>
<td>29 7</td>
</tr>
<tr>
<td>Worse</td>
<td>62 29</td>
<td>24 4</td>
<td>46 11</td>
</tr>
<tr>
<td>100 47</td>
<td>100 17</td>
<td>100 24</td>
<td></td>
</tr>
</tbody>
</table>

Sample always-tea=47
Sample tea-switchers=17
Sample never-tea=24
In the always-tea category, most (n=29) women felt that they had a worse standard of living during 1995/96 compared to 1985/86. However, among the tea-switchers, most women (n=9) felt that their standard of living had improved. Among the never-tea, the majority of women felt that their standard of living had remained the same or worsened. The majority of women in the sample clearly felt that their standard of living had either stayed the same or worsened.

The main reasons mentioned for an improvement in the standard of living were better earnings from wage employment, tea production, and the sale of maize. A few farmers had prospered by diversifying their farm activities by planting fruits, sugarcane and coffee. The main reasons given for a worsened standard of living were the burden of school fees, an increase in the number of children, and the rise in food prices.

This finding can be supported by secondary data available on the annual average increase in the consumer price index from 1985 to 1993 for the Rift Valley Province (Kericho District falls within the Rift Valley Province). The annual percentage rise in consumer prices for the Rift Valley was 7.7 per cent in 1990 and this increased to 52.2 per cent in 1993. The sharp rise in the consumer price index mainly resulted from price decontrol, increased prices of imports and a general rise in consumer prices. Fieldwork was conducted in 1994 when households were experiencing high consumer prices. Declines were observed in the annual price of maize in the Rift Valley Province in the period 1994–1995. Tea payments made to the farmers fluctuated and declined by 47.5 per cent in 1994/95. Considering all these factors, it is not surprising that the majority of women felt worse off in 1995/96 compared to 1985/86.

Some of the reasons for improvement or deterioration were personal to households, and were associated with the stage they were in their life cycle. For instance, those who now had more school age children than in 1985/86 had to meet more expenses than those whose children had now grown up. But such life cycle changes were compounded by the effect of economic reforms, in particular cost sharing in education and health services and rising food prices as confirmed with a sub-sample of 9 female and 7 male farmers. For example:

Life is becoming harder and harder every day. As children are becoming older, school fees are becoming impossible to afford. There are more and more problems due to increases in food prices. (Woman farmer, non-tea household)

I do not know how I am going to afford school fees for the children in high school. I am expected to pay almost Ksh 20,000 in total for all the children in school. Life has become very difficult since I have to buy everything unlike before yet I only depend on my farm. (Male farmer, non-tea household)

Some people could afford to pay fees for health services.
My life has improved during the past ten years since I am getting income from tea. I also sell milk. I am able to feed and clothe my family. I can afford to pay the health bills, we attend the mobile clinic nearby. (Male farmer, tea household.)

Most people who were interviewed in-depth reported difficulties with the payment of hospital fees and said that family members could only be taken to hospital if they were critically ill. Neither the 1985/86, nor the 1995/96 survey directly collected indicators of health and nutrition.

According to the 1994–96 Kericho District Development Plan, the infant mortality rate in Kericho was 86/1000 in 1983, declined to 70/1000 in 1987, 62/1000 in 1991 and 42/1000 in 1992. This decline in the infant mortality rate was attributed to the:

... intensified immunization programme especially on communicable diseases which are covered under the Kenya Expanded Programme on Immunization, enhancement of nutritional activities through advising mothers on the value of different types of food and intensification of health education and public meetings to raise awareness of the availability of medical services (Kericho District Development Plan, 1994–1996:57).

Information on child nutrition in Kericho District is available from national nutrition surveys, as summarised in Table 5.7.

Table 5.7 Child Nutrition Indicators, Kericho District, and Kenya, 1982, 1987, 1994

<table>
<thead>
<tr>
<th>Per cent stunted</th>
<th>Per cent wasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kericho</td>
<td>32</td>
</tr>
<tr>
<td>National</td>
<td>37.1</td>
</tr>
<tr>
<td>Number of children*</td>
<td>5323</td>
</tr>
</tbody>
</table>


*These were the number of children in all the districts covered included in the three surveys conducted in 1982, 1987 and 1994 (see Republic of Kenya, 1995 Economic Survey, Table 3.3 for details).

– Kericho (‘stunting’) height for age figures show an increase and then a fall, but to a level still higher than in 1982. Weight for height (wasting) moves in the opposite direction, with a fall, followed by a rise, to a level below that in 1982.
– Nationally, stunting levels have decreased marginally while wastage was high in 1994.

Finally, we contextualise the farmer’s perceptions of changes in living standards by considering available data on agricultural output in Kericho District. The data covers the period 1983–1992. Table 5.8 shows production by crop
and reveals different trends in the production of smallholder crops which are staple items of local food consumption and non-food crops that are primarily for export. The output of the latter increased considerably (albeit with some fluctuations), whereas the production of the staples (maize, potatoes, millet, wheat) decreased considerably. The output of some vegetables (beans, kales and cabbage) increased rapidly but other vegetables saw little change.

Table 5.8 Crop Production in Kericho 1983–1992 (tons)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>226,800</td>
<td>194,400</td>
<td>178,132</td>
<td>153,000</td>
<td>156,337</td>
<td>155,142</td>
</tr>
<tr>
<td>Beans</td>
<td>4,154</td>
<td>5,400</td>
<td>7,204</td>
<td>7,212</td>
<td>7,896</td>
<td>6,186</td>
</tr>
<tr>
<td>Irish potatoes</td>
<td>25,630</td>
<td>30,000</td>
<td>8,952</td>
<td>19,680</td>
<td>8,699</td>
<td>8,439</td>
</tr>
<tr>
<td>Millet Sorghum</td>
<td>1,800</td>
<td>2,025</td>
<td>667</td>
<td>1,521</td>
<td>921</td>
<td>627</td>
</tr>
<tr>
<td>Wheat</td>
<td>2,316</td>
<td>1,773</td>
<td>1,910</td>
<td>954</td>
<td>662</td>
<td>187</td>
</tr>
<tr>
<td>Kales</td>
<td>-</td>
<td>1,280</td>
<td>1,3000</td>
<td>9,720</td>
<td>9,240</td>
<td></td>
</tr>
<tr>
<td>Cabbages</td>
<td>-</td>
<td>-</td>
<td>13,550</td>
<td>12,564</td>
<td>13,056</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>4,360</td>
<td>6,400</td>
<td>6,230</td>
<td>6,340</td>
<td>6,220</td>
<td>4,020</td>
</tr>
<tr>
<td>Onions</td>
<td>-</td>
<td>-</td>
<td>2,010</td>
<td>2,040</td>
<td>2,450</td>
<td>2,075</td>
</tr>
<tr>
<td>Pineapples</td>
<td>-</td>
<td>3,850</td>
<td>4,080</td>
<td>4,080</td>
<td>6,600</td>
<td></td>
</tr>
<tr>
<td>Tea* (KTDA)</td>
<td>29,047</td>
<td>31,392</td>
<td>56,907</td>
<td>71,039</td>
<td>64,505</td>
<td>62,607</td>
</tr>
<tr>
<td>Coffee</td>
<td>-</td>
<td>-</td>
<td>728</td>
<td>4,608</td>
<td>899</td>
<td>2,289</td>
</tr>
<tr>
<td>Pyrethrum</td>
<td>-</td>
<td>-</td>
<td>150</td>
<td>178</td>
<td>213</td>
<td>305</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>57,200</td>
<td>57,200</td>
<td>305,856</td>
<td>452,228</td>
<td>514,680</td>
<td>334,680</td>
</tr>
</tbody>
</table>

* Kenyan Tea Development Authority figures.
* Not Recorded

Table 5.9 Production per Capita of Main Food Crops in Kericho (Production per capita kg)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>284.5</td>
<td>243.8</td>
<td>193</td>
<td>162.6</td>
<td>172.7</td>
<td>172.7</td>
</tr>
<tr>
<td>Millet and sorghum</td>
<td>2</td>
<td>2</td>
<td>0.7</td>
<td>1.7</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Potatoes</td>
<td>31.5</td>
<td>36.6</td>
<td>10.1</td>
<td>22.3</td>
<td>1</td>
<td>9.6</td>
</tr>
<tr>
<td>Beans</td>
<td>5.1</td>
<td>7.1</td>
<td>8.1</td>
<td>8.1</td>
<td>8.1</td>
<td>6.9</td>
</tr>
<tr>
<td>Cabbages</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
<td>15.2</td>
<td>14.2</td>
<td>14.2</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>5.1</td>
<td>8.1</td>
<td>7.1</td>
<td>7.1</td>
<td>7.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Onions</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Kales</td>
<td>-</td>
<td>-</td>
<td>1.4</td>
<td>14.6</td>
<td>12.2</td>
<td>10.2</td>
</tr>
<tr>
<td>Milk</td>
<td>-</td>
<td>23.2</td>
<td>25</td>
<td>31.8</td>
<td>28.1</td>
<td></td>
</tr>
</tbody>
</table>

Source: Bülow and Sørensen 1988, Table 4.1, p. 51; Kericho District Development Plan 1994–1996, Table 2.22, p. 59.
In the case of staples, food production did not keep pace with production growth per capita, as shown in Table 5.9. Only beans, cabbages, kale, and milk showed some improvements. Declining per capita production of staple crops may be an important explanation of why the majority of women farmers felt no better-off, despite increases in the production of non-staple export crops. It also offers further support for the idea that there may be a trade-off in the deployment of women’s labour between the two types of crops. The constraint on women’s labour availability may be a key reason why there was no expansion of both types of crops. These issues are discussed further in the rest of this section.

5.4 Adoption of Tea by Smallholders

Regularity of income has remained the main reason for starting tea production in 1995/96. Nevertheless, there has been a substantial minority not growing tea at all. As we saw in Tables 5.1 and 5.2, there were differences among farmers in terms of the acres they had under the tea crop. In this section, we will investigate some of the factors that enable farmers to adopt tea. The section analyses tea adoption among the farmers in the survey using logit analysis in a way that is comparable to the study conducted by Bevan, Collier, and Gunning in 1982 on the adoption and non-adoption of tree crops in Kenya.

5.4.1 Tree Crop Adoption in Kenya
—A 1982 Study by Bevan, Collier and Gunning

The aim of the study by Bevan, Collier and Gunning was to investigate the processes of change amongst peasants during the 1974–82 period as a result of the income shock that resulted from the high world market prices for coffee and tea in 1976 and 1979. The baseline data which they used for the situation before the price rises was drawn from the First National Rural Household Budget Survey-Integrated Rural Survey (IRS1) conducted in 1974/75 by the Central Bureau of Statistics (CBS). As for the situation after the price rises, the authors used the results of a survey conducted in 1982. Although the 1982 survey was not national, it covered the two major regions in Kenya, namely, Nyanza and Central provinces, which account for half of the rural population in Kenya.

The 1982 survey used clusters from the CBS’s 1977/78 Integrated Rural Survey 3 in selecting the sampled households. Out of a total of 876 households, 783 households were located. In investigating the barriers to the adoption of tree crops, the selection of the sample was restricted to those clusters11

11 A cluster is a small geographical area of 200 contiguous households.
within which at least two out of the twenty households were growing coffee and this reduced the sample to 382 households for an investigation of the adoption of coffee, and 231 households for the adoption of tea. The reason for this was firstly to ensure that the sample included only households in ecological conditions which definitely permitted the growing of coffee or tea; and secondly that it included only households which had the opportunity to learn about the growing of coffee or tea by observing their neighbours who were already growing it. Bevan et al. divided their sample into four categories as shown in Table 5.10.

Table 5.10 Composition of Bevan, Collier and Gunning Sample

<table>
<thead>
<tr>
<th></th>
<th>Non-grower</th>
<th>Adopter</th>
<th>Grower pre-1975</th>
<th>Abandoned by 1982*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>130</td>
<td>46</td>
<td>196</td>
<td>8</td>
</tr>
<tr>
<td>Tea</td>
<td>87</td>
<td>78</td>
<td>66</td>
<td>0</td>
</tr>
</tbody>
</table>


*Among the remaining 10 coffee households, 8 were growing coffee in 1975 but had abandoned it by 1982, and two households were not growing coffee in 1975, but adopted it, only to abandon it prior to 1982. These two groups were dropped from the statistical analysis.

The study hypothesised that both household endowments and information were important for the adoption of tree crops. They suggested that information derived from localised social networks is particularly important. “Households with otherwise the same characteristics have powerfully different propensities to adopt tree crops depending upon what they see around them” (p. 116). The study assumed that this was because farmers tended to copy the behaviour of other farmers.

In order to analyse the adoption of tea and coffee, the study used a logit model, because the dependent variable was not continuous. A logit model indicates the probability of an event occurring. Since the event was either growing tea (coffee) or not growing tea (coffee), a binary logit model was used (for a more detailed discussion of this technique, see Appendix).

Explanatory factors (X_i) used in determining whether a male farmer adopts tea or not were:

12 The study concentrates on coffee and gives less detail for tea. It is possible the number of households in the tea study was greater than 231 if there were any households growing tea in 1975 which had abandoned tea by 1982; or any households which adopted tea and then abandoned it; as these are not reported by Bevan et al. (1989) in Table 6.16a. Details of such households are given by Bevan et al. for coffee (Bevan et al., 1989:109) but are not provided for tea.
Experience  Previous experience in wage employment in tea.
1 = Yes, 0= No

Non-tea wage employment  1= Yes, 0= No

Age and age²  Age in years of the male farmer.

Farm size  Total cultivable farm size in acres.

Females  Number of adult female residents in the households.

Males  Number of adult male residents in the households.

Maize  Area in acres under maize.

Livestock  Number (cows, sheep, goats).

There are two different ways one can ask questions about tea adoption—the first is about the likelihood of a farmer being a tea grower at any particular point in time; the second is about the likelihood of a farmer switching to tea during any specific period of time. We carried out two analytical exercises, addressing each of these questions. The advantage of the first exercise is that it permitted the use of a much bigger data set that could be used for the second exercise. The first exercise carried out was to analyse the likelihood of a farmer being a tea grower. The four ‘best’ variants of this (i.e. the four variants with the highest percentage of overall correct predictions of outcomes) are presented, with two different specifications of the explanatory equation each of which are estimated at the 1995/96 values of the variables and the 1985/86 values of the variables:

Variant 1
Variables-age, age², non-tea wage employment, farm size, females, maize.
Values for 1995/96

Variant 2
Same variables as Variant 1
Values for 1985/86

Variant 3
Variables-age, age², previous experience in tea wage employment, farm size, males, females, maize.
Values for 1995/96

Variant 4
Variables as for Variant 3
Values for 1985/86

The sample size used in the 1995/96 analysis was 74. As we mentioned in section 5.1, 64 tea households and 24 non-tea households were covered in the tabular statistical analysis, giving a total of 88 households. The logit analysis dropped widows from the analysis as they do not adopt tea in their own
right. There were 14 widows in the sample of 88, and so the sample size for the logit analysis in 1995/96 was 74.

The 1985/86 analysis used a sample size of 83. There were 47 households growing tea in 1985/86 and 41 not growing tea. From a total of 88, we dropped 5 widows. The results obtained are presented in Tables 5.11, 5.12, 5.13, and 5.14.

Table 5.11 Logit Analysis of Growing Tea (Variant 1, 1995/96 values)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>Probability</th>
<th>Partial derivatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.9443</td>
<td>-0.594</td>
<td>0.5526</td>
<td>-0.4275</td>
</tr>
<tr>
<td>Age</td>
<td>0.1064</td>
<td>0.543</td>
<td>0.5873</td>
<td>0.0154</td>
</tr>
<tr>
<td>Age-squared</td>
<td>-0.001</td>
<td>-1.647</td>
<td>0.0996*</td>
<td>0.0154</td>
</tr>
<tr>
<td>Non-tea wage employment (1=Yes 0=No)</td>
<td>-1.235</td>
<td>-1.647</td>
<td>0.0996*</td>
<td>0.0154</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>0.2146</td>
<td>2.088</td>
<td>0.0368**</td>
<td>0.0311</td>
</tr>
<tr>
<td>Females (number of adult females in household)</td>
<td>0.7825</td>
<td>1.973</td>
<td>0.0485**</td>
<td>0.1136</td>
</tr>
<tr>
<td>Maize (acres under maize)</td>
<td>-0.7944</td>
<td>-1.811</td>
<td>0.0701*</td>
<td>-0.1153</td>
</tr>
</tbody>
</table>

Partial derivatives or marginal effects are computed at the means of the exogenous variables:

\[ E[y_i|\mathbf{x}_i] = \Lambda(\mathbf{b}'\mathbf{x}_i) \]

Significant at 5%
*Significant at 10%
Sample=74
(Tea households=64 less 9 widows=55) + (Non-tea households=24 less 5 widows=19)
Log-likelihood -34.0232
Restricted (slopes=0) log likelihood -42.1531
Chi-squared (6) 16.2598
Significance level 0.0124
Per cent correct predictions 78%

The life cycle proxies age and age² were not significant. The variable non-tea wage employment was significant and negatively related to the likelihood of tea growing. This result indicates that involvement in non-tea wage employment is a competing activity with tea growing, rather than a source of capital for growing tea.

The variable farm size was significant and positive which implies that the likelihood of tea growing increased with farm size. That is not surprising since tea competes for land with food crops such as maize and millet. In Variant 1, if land were increased by one acre, keeping all the other variables constant, the estimated odds of tea growing would increase by \( e^{0.2146} \approx 1.2393 \). This means that one additional acre of farm land, other things being equal, increases the likelihood of tea growing by 3 per cent at the mean values of the variables.
The variable *females* (number of adult females in the household) was significant and positively related to the likelihood of tea growing. This is an important finding in the study. Increasing the number of females by one and holding all the other variables constant, the estimated odds of tea growing would increase by \( e^{0.7825} = 2.1869 \). This meant that one additional adult female resident in the household, keeping other things equal, increases the likelihood of tea growing by 11 per cent at the mean values of the variables.

The variable *maize* was significant and negatively related to the likelihood of tea growing. This is not surprising since tea competes with maize; if the land area under maize was increased by one acre, keeping the other variables constant, the estimated odds of adoption would decrease by \( e^{-0.7944} = 0.4518 \). At the mean values of variables, one additional acre of maize cultivation, other things being equal, means that the likelihood of tea adoption will decrease by 11 per cent. The variable *maize* is a “bearer of gender” since maize growing is particularly demanding on women’s time. A further discussion of these results is undertaken in the conclusions of this paper.

**Table 5.12 Logit Analysis of Growing Tea (Variant 2, 1985/86 values)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>Probability</th>
<th>Partial derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.3552</td>
<td>0.956</td>
<td>0.339</td>
<td>1.322</td>
</tr>
<tr>
<td>Age</td>
<td>-0.2966</td>
<td>-1.133</td>
<td>0.2571</td>
<td>-0.0737</td>
</tr>
<tr>
<td>Age-squared</td>
<td>0.0045</td>
<td>1.46</td>
<td>0.1443</td>
<td>0.0011</td>
</tr>
<tr>
<td>Non-tea wage employment (1=Yes 0=No)</td>
<td>0.1254</td>
<td>0.213</td>
<td>0.8313</td>
<td>0.0309</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>0.0066</td>
<td>0.122</td>
<td>0.9029</td>
<td>0.0016</td>
</tr>
<tr>
<td>Females (number of adult females in household)</td>
<td>-0.3573</td>
<td>-0.983</td>
<td>0.3256</td>
<td>-0.0882</td>
</tr>
<tr>
<td>Maize (acres under maize)</td>
<td>-0.3906</td>
<td>-1.621</td>
<td>0.1049*</td>
<td>-0.09642</td>
</tr>
</tbody>
</table>

Partial derivatives or marginal effects are computed at the means of the exogenous variables:

\[
E[y_i | x_i] = \Lambda(\beta'x_i)
\]

*Significant at 10%  
Sample: 83  
(Always tea in 1985 = 47) + (Never-Tea in 1985 = 41) (Less 5 widows from tea households)*

Log-likelihood: -48.6941  
Restricted (slopes=0) Log-likelihood: -57.3252  
Chi-squared (6): 17.6621  
Significance level: 0.0071  
Per cent correct predictions: 72%

In Variant 2, the life cycle proxies *age* and *age*² were not significant. The variables *non-tea wage employment*, and *farm size*, were all positively related to the decision on tea adoption but were not significant. The variable *maize* was sig-

---

13 The 1985/86 logit used only households that were traced in 1995/96, less widows.
ificant and negatively related to the likelihood of adoption. If acreage under maize was increased by one acre, keeping the other variables constant, the estimated odds of adoption would decrease by $e^{-0.3906}=0.6766$. At the mean values of variables, one additional acre of maize cultivation, other things being equal, decreases the likelihood of tea adoption by 10 per cent.

The third variant is presented in Table 5.13. The variable *non-tea wage employment* was dropped and the variables introduced were *male* and *previous experience in tea wage employment*. The model is statistically significant, with 77 per cent of outcomes correctly predicted. The significant variables were *farm size (+)* and *maize (-)*. Female labour remains positive when *male* labour was added to the equation but is no longer statistically significant. The variable *male* was positive and insignificant. It is worth noting that the *female* variable coefficient was larger than the *male* variable coefficient. Increasing the number of females by one and keeping all the other variables constant, the estimated odds of tea growing would increase by $e^{0.5390}=1.7143$ while that of males would increase by $e^{0.1665}=1.1811$. This means that one additional female resident in the households, keeping other things equal, increases the likelihood of tea growing by 8 per cent compared to 2 per cent for males at the mean values of variables. The variable *previous experience in tea wage employment* was positive though not significant in variant 3.

Table 5.13 Logit Analysis of Growing Tea (Variant 3, 1995/96 values)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>Probability</th>
<th>Partial derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.309</td>
<td>-0.256</td>
<td>0.7979</td>
<td>-0.202</td>
</tr>
<tr>
<td>Age</td>
<td>0.0325</td>
<td>0.16</td>
<td>0.873</td>
<td>0.005</td>
</tr>
<tr>
<td>Age-squared</td>
<td>0</td>
<td>-0.155</td>
<td>0.877</td>
<td>0</td>
</tr>
<tr>
<td>Previous experience in tea employment (1=Yes 0=No)</td>
<td>0.1853</td>
<td>0.304</td>
<td>0.7615</td>
<td>0.02858</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>0.1878</td>
<td>1.77</td>
<td>0.0768*</td>
<td>0.029</td>
</tr>
<tr>
<td>Males (number of adult males in household)</td>
<td>0.1665</td>
<td>0.625</td>
<td>0.532</td>
<td>0.0257</td>
</tr>
<tr>
<td>Females (number of adult females in household)</td>
<td>0.539</td>
<td>1.372</td>
<td>0.1701</td>
<td>0.0831</td>
</tr>
<tr>
<td>Maize (acres under maize)</td>
<td>-0.7567</td>
<td>1.722</td>
<td>0.0850*</td>
<td>-0.1168</td>
</tr>
</tbody>
</table>

Partial derivatives or marginal effects are computed at the means of the exogenous variables: $E[y_i|\tilde{x}_i] = \Lambda(\tilde{\beta}'\tilde{x}_i)$

*Significant at 10%

Sample=74
Log-likelihood -35.0974
Restricted (slopes=0) Log likelihood -42.1531
Chi-squared (7) 14.1114
Significance level 0.0492
Per cent correct predictions 77%
The fourth variant is shown in Table 5.14. It was statistically significant with 70 per cent of outcomes correctly explained.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>Probability ( t/t_{12} )</th>
<th>Partial derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>5.3485</td>
<td>0.866</td>
<td>0.3863</td>
<td>1.3219</td>
</tr>
<tr>
<td>Age</td>
<td>-0.2941</td>
<td>-1.001</td>
<td>0.3169</td>
<td>-0.0727</td>
</tr>
<tr>
<td>Age-squared</td>
<td>0.0046</td>
<td>1.299</td>
<td>0.1939</td>
<td>0.0011</td>
</tr>
<tr>
<td>Previous experience in tea employment 1=Yes 0=No</td>
<td>-0.1471</td>
<td>-0.279</td>
<td>0.7805</td>
<td>-0.0363</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>0.0103</td>
<td>0.188</td>
<td>0.8505</td>
<td>0.0026</td>
</tr>
<tr>
<td>Males (number of adult males in household)</td>
<td>-1.0695</td>
<td>-1.722</td>
<td>0.0850*</td>
<td>-0.2643</td>
</tr>
<tr>
<td>Females (number of adult females in household)</td>
<td>0.5855</td>
<td>0.876</td>
<td>0.3809</td>
<td>0.1447</td>
</tr>
<tr>
<td>Maize (acres under maize)</td>
<td>-0.3874</td>
<td>-1.523</td>
<td>0.1278</td>
<td>-0.0957</td>
</tr>
</tbody>
</table>

Partial derivatives or marginal effects are computed at the means of the exogenous variables:

\[ E[y_i | x_i] \equiv \Lambda(\beta' x_i) \]

*Significant at 10%

Sample=83
Log-likelihood -45.7067
Restricted (slopes=0) Log likelihood -57.5232
Chi-squared (7) 23.6370
Significance level 0.0013
Per cent correct predictions 70%

In the fourth variant, the variable non-tea wage employment was dropped and the variables introduced were males and previous experience in tea wage employment. All the following variables were insignificant: age (-), age² (+), previous experience in tea wage employment (-), farm size (+), females (+), and maize (-). The variable males was significant and negatively related to the likelihood of tea growing. One additional adult male in the household, keeping all the other variables constant, decreased the odds of tea adoption by \( e^{-1.0695}=0.9329 \). At the mean values of variables, one additional adult male in the household, other things being equal, decreased the likelihood of tea adoption by 26 per cent. This is rather puzzling. It is possible to explain why male household labour was not a constraint to tea growing in 1985/86 (the year to which variant four refers) in terms of the availability of hired labour. But it is harder to explain why more male household labour decreases the likelihood of adoption—it may be linked to the wealth of the household. It is possible that sons of the better off farmers (who were more likely to be growing tea in 1985/86 than poor farmers) were getting better education and moving out of the household for wage employment elsewhere.
In sum it is important to note that one of the key findings of the study was that female labour was positive in variants 1, 3 and 4 and statistically significant in variant 1. This could be interpreted as an increase in the significance of female labour during the period of reforms.

We now turn to the analysis of the likelihood of a farmer switching to tea during the period 1985/86–1995/96. As we have mentioned earlier, during the period 1985/86–1995/96, 40 per cent of farmers (n=1743) in the sample who had not previously grown tea switched to tea. We carried out a logit analysis of tea switching using data from male-headed switchers and never-tea households. It is worth commenting on the small sample size of 36 households (17 tea-switchers + 24 never-tea households less 5 widowed households = 36 households).

The best equation is reported in Table 5.15. It was statistically significant with 75 per cent of outcomes correctly predicted. It was based on data on household characteristics in 1995/96. The variables age and age were significant in both cases and negative in the second case. The likelihood of switching to tea rose until the farmer was 49 and fell thereafter. The variable non-tea wage employment was significant and negatively related to the likelihood of tea adoption, indicating that farmers involved in non-tea wage employment were less likely to switch to tea. Amongst the tea-switchers, a unit change in the variable non-tea wage employment (from 0 to 1), and keeping all the other variables constant, led to a decrease in the estimated odds of farmers who were in non-tea employment switching to the adoption of tea.

The variable farm size was positive though not significant. This finding is consistent with the fact that on average, tea-switchers had smaller farm sizes of 4.6 acres and only 0.39 acres dedicated to tea plots. The variable females was positive though not significant amongst the tea-switchers. The variable maize was significant with a negative relationship to the likelihood of tea adoption. This variable is a “bearer of gender” because of the demands it makes on women’s time and the importance of maize to women as managers of household food security. If acreage under maize was increased by one acre among the tea-switchers, holding the other variables constant, the estimated odds of adoption would decrease \( e^{-2.3594} \approx 0.0944 \). At the mean values of variables, one additional acre of maize, other things being equal, decreases the likelihood of tea adoption by 57 per cent. We tried introducing the variables males and experience in the model, but the whole model became less significant and only the variable maize was significant and negatively related to the decision on adoption. The variables experience, farm size, males, and females were all positively related to the decision on adoption, though not significantly.

In sum, female labour was positive for both exercises and seems to have become more of a constraint over the period of the reforms, being significant when 1995/96 values are used in variant 1 but not significant in 1985/86.
Farm size has also become more important over the reform period. It was positive in all specifications and positive and significant in 1995/96.

Table 5.15 Logit Analysis of Tea-Switching in the Period 1985/86–1995/96

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-ratio</th>
<th>Probability</th>
<th>Partial Derivative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-26.936</td>
<td>-2.05</td>
<td>0.0403**</td>
<td>-6.4942</td>
</tr>
<tr>
<td>Age</td>
<td>1.1826</td>
<td>2.18</td>
<td>0.0293**</td>
<td>0.2851</td>
</tr>
<tr>
<td>Age-squared</td>
<td>-0.0122</td>
<td>-2.2</td>
<td>0.0277**</td>
<td>-0.003</td>
</tr>
<tr>
<td>Non-tea wage employment (1=Yes 0=No)</td>
<td>-3.3064</td>
<td>-2.25</td>
<td>0.0246**</td>
<td>-0.7971</td>
</tr>
<tr>
<td>Farm size (acres)</td>
<td>0.1242</td>
<td>0.655</td>
<td>0.5122</td>
<td>0.0299</td>
</tr>
<tr>
<td>Females (number of adult females in the household)</td>
<td>0.8643</td>
<td>1.328</td>
<td>0.1842</td>
<td>0.2084</td>
</tr>
<tr>
<td>Maize (acres under maize)</td>
<td>-2.359</td>
<td>-1.93</td>
<td>0.0536**</td>
<td>-0.5688</td>
</tr>
</tbody>
</table>

Partial derivatives or marginal effects are computed at the means of the exogenous variables: $E[y_i|x_i] = \Lambda(x_i')$

**Significant at 5%
Sample=36
Log-likelihood -16.7142
Restricted (slopes=0) Log-likelihood -24.8977
Chi-squared (6) 16.3669
Significance level 0.0119
Per cent correct predictions 75%

5.5 Average Productivity per Bush

As noted earlier, the increase in the production of tea has been mainly due to the expansion of the acreage devoted to tea cultivation. Tea yield figures for the smallholder sector were low in the early 1980s but, thereafter, rose in 1990 and then stagnated. The tea production figures in Kericho also showed the same trend, a rise and then a fall in yield. Despite the more rapid rise in tea payments to smallholders from 1990 onwards, yields did not improve and, indeed, actually fell in 1992 and 1994.

There has been very little work done on gender as a factor constraining the productivity of smallholder tea farmers at the household level. Bülow and Sørensen’s study (1985/86) is the only research that has addressed the issue of how gender relations among smallholder tea producers may lead to low productivity. They emphasise intra-household struggles over the income from tea between the male household head and the wife or wives, and between the household head and the adult married sons, leading to refusal to work on tea fields in some households.

The 1985/86 survey found 8 cases of neglect of tea farms: 6 cases resulted from conflicts with wives, and 2 cases resulted from conflicts with sons (Bülow and Sørensen, 1988:93). My 1995/96 survey found 4 cases of neglect of
tea resulting from conflicts with wives. These cases of neglect were generally similar to those found by Bülow and Sørensen in that they resulted from polygamous households. In the 1995/96 survey, there was only one case of a woman farmer who had completely refused to work on her husband’s field due to conflict. It is worth noting that the issue of conflicts was well known by neighbours, extension workers, and key informants but the questionnaire did not capture the conflict issue, and people were reluctant to discuss it.

Even if there is no outright neglect of fields, productivity may be lowered because of insufficient incentives for women to pluck tea intensively. As mentioned earlier, the tea payment is made to men and they control how it is used. The answers to the questions we raised on this issue suggested that men tended to use the money in ways that benefit their families. However, as we discussed earlier, in-depth interviews revealed that there were some male farmers who never used the bonus payment to benefit the household. According to the 1995/96 survey, women said that they would work more on plucking tea if directly paid part of the bonus. This may be an indication of an incentive problem that may result in a low yield of tea.

Productivity may also be low due to over-burdened family labour, or delay in pruning. When tea is not pruned at the right time, green leaf productivity will be affected. Some farmers ignore advice given by the extension officers regarding fertilizer applications and other farm inputs. All these factors may lead to low production from existing bushes.

Bülow and Sørensen had been unsuccessful in getting production data from the KTDA, but I was able to obtain some production figures from the parastatal’s head office in Nairobi, for specific farmers over the period 1989/90 to 1994/95. A total of 31 of these farmers were matched with the list of tea farmers used for the 1995/96 survey. Three farmers had to be dropped from the analysis due to incomplete information. It was not possible to obtain production data for earlier years because, as the KTDA office explained, since information on productivity is sensitive, what was available on farmers’ output prior to 1989/90 had been destroyed.

According to the KTDA, the national tea yield figures per bush were 0.66 kgs in 1985/86 and 0.99 kgs in 1994/95. The average yield per bush in Kericho District was 0.63 kgs during both periods (KTDA, 1996). However, it is worth pointing out that there were fluctuations in output figures for individual farmers during the period 1989/90–1994/95. To investigate whether productivity had any relationship with household characteristics, a regression was run using average yield per bush for the period 1989/90–1994/95 as the dependent variable against a number of independent household characteristics as measured in the 1995/96 survey. The selection of the characteristics was based on hypothesised factors that were likely to affect productivity. We report the best equation among those we tried.
Variables in the equation:
- **Age**: Age of respondent (years)
- **Acres**: Acres under tea crop
- **Children under 5 years**: Total number of children under 5 years of age in a household
- **Experience**: Previous experience in tea wage employment of tea farmer
- **Farm size**: Total farm size
- **Females**: Number of adult female residents in the household
- **Males**: Number of adult male residents in the household
- **Maize**: Area under maize (acres)
- **Widow**: A dummy variable which took the value 1 if the tea grower was a widow and 0 if the tea grower was male

There was difficulty in finding a proxy variable for intra-household conflicts over rewards from tea growing. We did not have data for other relevant variables such as fertilizer application.

Table 5.16 Multiple Regression on Average Productivity per Bush

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T</th>
<th>Significant T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.780494</td>
<td>4.462</td>
<td>.0003***</td>
</tr>
<tr>
<td>Age</td>
<td>-0.20666</td>
<td>-3.532</td>
<td>.0026***</td>
</tr>
<tr>
<td>Age²</td>
<td>0.002852</td>
<td>3.396</td>
<td>.0034***</td>
</tr>
<tr>
<td>Acres</td>
<td>0.110029</td>
<td>-2.964</td>
<td>.0236**</td>
</tr>
<tr>
<td>Children under 5 years</td>
<td>-0.257062</td>
<td>1.944</td>
<td>.0087***</td>
</tr>
<tr>
<td>Previous experience in tea wage employment</td>
<td>0.228952</td>
<td>-2.386</td>
<td>.0687*</td>
</tr>
<tr>
<td>Total farm size</td>
<td>-0.027403</td>
<td>0.56</td>
<td>.287**</td>
</tr>
<tr>
<td>Females</td>
<td>0.029383</td>
<td>-0.439</td>
<td>.5828</td>
</tr>
<tr>
<td>Males</td>
<td>-0.027378</td>
<td>-3.135</td>
<td>.6662</td>
</tr>
<tr>
<td>Maize</td>
<td>-0.341936</td>
<td>-2.805</td>
<td>.0060***</td>
</tr>
<tr>
<td>Widow</td>
<td>-0.455789</td>
<td>-2.805</td>
<td>.0122**</td>
</tr>
</tbody>
</table>

Source: 1995/96

***Significant at 1%
**Significant at 5%
*Significant at 10%

Sample size = 28

Multiple R  = 0.8692
R square = 0.75567
Adjusted R square = 0.61195
Standard error = 0.29496

Analysis of variance

<table>
<thead>
<tr>
<th>DF</th>
<th>Sum of squares</th>
<th>Mean square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>10</td>
<td>4.57433</td>
</tr>
<tr>
<td>Residual</td>
<td>17</td>
<td>1.47900</td>
</tr>
</tbody>
</table>

The whole model was statistically significant. The adjusted R² indicates that 61 per cent of the variation in average productivity per bush is explained by changes in the specified independent variables. The 1995 study found that factors that were statistically significant in influencing productivity were the
age of the farmer (-), age\(^2\) (+), acres under maize crop (-), acres under tea crop (+), young children under five years of age (-), previous experience on tea employment (+), farm size (-), and widows (-).

Age and age\(^2\) were statistically significant, with a negative sign and a positive sign respectively. This implies that productivity declines until a certain age and then rises thereafter. The variable maize denoting the area cultivated with the maize crop was significant and negatively related with average productivity per bush. As we have mentioned in the analysis of tea-adopters and tea-growers, maize competes with tea for land and labour. Maize has an advantage over tea since it is an annual crop, implying quicker returns. Also, it appears that women have more control over maize. Unlike tea, it can also be consumed on the farm and it is not as labour intensive as the tea crop. Increasing maize by one acre and keeping all the other variables constant, average annual productivity per bush will decline by 3.4 kgs. The variable acres under tea crop was highly significant and positively related to average productivity per bush. Keeping other variables constant and increasing acres under the tea crop by one acre will increase average productivity per bush by 1.1 kgs. This may imply economies of scale, or be related to the wealth of the household, which may have a positive impact on productivity.

Children 5 was significant and negatively related to average productivity per bush. Keeping all the other variables constant and increasing by one extra child under age five in a household, average productivity per bush declines by 2.5 kgs. Since tea is a very labour intensive crop and the input from women's labour is very important, particularly with regard to tea picking, it is not surprising that children under age five negatively affect productivity. Due to their child care responsibilities, women with young children may not put in as many hours of tea farm work as those with older children and this is likely to negatively affect average productivity.

Previous experience in tea wage employment was significant and positively related to average productivity per bush. Increasing experience by one unit and keeping all the other variables constant, average productivity per bush will increase by 2.2 kgs. As we have seen earlier, previous experience in tea employment was a significant variable influencing the decision on the adoption of the tea crop. It is important to mention that tea is a very demanding crop from the time the seedlings are in the nursery until the time the tea is ready for first picking three years later. Advice from the agricultural extension workers from the KTDA is not always available. The extension workers face transportation problems and, at times, may not visit the tea farmers who are located in remote areas. The other important point observed from the 1995/96 field survey was that extension workers were overworked and had low morale. Due to all these factors, the previous experience the farmer acquired is likely to help in raising productivity, since the farmer will be aware
of the right time for planting, the use of fertilizers and other chemicals in the right quantities, the right time for plucking, the high standards needed for plucking the green leaves, and the correct time for pruning.

The variable farm size was significant and negative. This may be due to increasing competition from other activities for inputs and family labour. The variable widow was significant and negatively related to productivity. The negative relationship may have resulted from various factors such as labour constraints within the widowed households, bias from male extension workers, lack of knowledge on fertilizer and pruning, prioritising food production, and conflict in the household over which son is going to get the tea license.

The 1995/96 finding on widows was different from the 1985/86 finding. Bülow and Sørensen (1988) found that widows were very powerful in terms of decision making and control of income from tea. They found that widows were fully capable of running their farms. Productivity on their tea fields was not different from that on farms run by male household heads. They also found that the pattern of widows' investment in tea farms was similar to the rest of the tea farms in the sample. Their long-term investments included children's education (Bülow and Sørensen, 1988:188).
6. Summary and Conclusions

This work was initiated with the aim of improving the current state of knowledge and understanding about gender and smallholder agriculture in the context of structural adjustment in Kenya. This concluding section summarises the main findings, considers whether the research objectives have been met, makes some policy recommendations, and suggests areas for further research.

6.1 Changes in Tea and Maize Prices

The main overall incentive for the smallholder tea producers during the period covered by this study was the increase in tea prices denominated in Kenya Shillings. This happened because of the devaluation of the nominal exchange rate of the Shilling. The data in Figure 3.2 in Section 3 shows a steady rise in the first payment from 1 Shilling per kg in 1980/81 to 4.5 Shillings per kg in 1994/95. The second payment rose from 1.5 Shillings per kg in 1980/81 to 6.2 Shillings per kg 1994/95, with a peak of 16 Shillings in 1993/94. A likely explanation for the fall in the second payment is that the decline in the nominal exchange rate was not enough to offset the considerable fall in the sterling and dollar price offered between 1994 and 1995. The international price of tea at the London Auction (pence per kg) fell during the period under review from 172.6 pence per kg in 1985 to 103 pence per kg in 1995. The international price at the Mombasa Auction (Kenya Shillings per kg) rose from 26.5 Shillings in 1985 to 55.2 Shillings in 1992 (Table 3.3). This rise in the international price of tea at the Mombasa Auction resulted from the devaluation of the nominal exchange rate.

The KTDA passed on the increase in the shillings price of tea to the smallholders. The data suggests that the increase in the price paid to the smallholder was more than the increase in the tea price at the Mombasa Auction. The first payment to smallholder tea farmers entailed an increase in price from 1 Shilling per kg of green leaf in 1980/81 to 3 Shillings per kg of green leaf in 1992/93, an increase of 200 per cent. The second payment to smallholders resulted in a rise in price from 1.5 Shillings in 1980/81 to 12.8 Shillings in 1992/93, an increase of 753 per cent. The total payment (first and second payment) to smallholder tea farmers increased from 2.5 Shillings in 1980/81 to 15.8 Shillings in 1992/93, an increase of 532 per cent. On the other hand, the increase at the Mombasa Auction was from 13.7 Shillings per kg in 1980 to 55.2 Shillings per kg in 1992, an increase of 303 per cent. On the whole,
Before discussing maize pricing, it is important to recall the maize price and marketing conditionality associated with lending from the World Bank to the government. This conditionality was spelt out under the second World Bank Structural Adjustment Loan (SAL II) in June 1982. It required the government to:

- undertake a review of maize marketing in the country and implement the recommendations that flow from it;
- monitor the annual price review to confirm that prices are based on export parities.

The conditionalities were not implemented at that time due to delays in the introduction of liberalisation and the glaring inefficiency of the private market.

The evolution of maize prices in Kenya was inherited from a colonial system under which the controlled average national producer price was virtually the same as the producer price in a free market equilibrium. Despite recommendations that prices paid to grain farmers be set at import parity levels, this was not applicable to maize since Kenya imports maize only during drought years, hence the important role of droughts in explaining price changes. The change in the average rural market maize prices paid to producers in 1983 and 1992 was from 154 Kenyan Shillings per 100 kg to 240 Shillings, a percentage change of 56 per cent. The change between 1983 and 1994 was from 154 Kenyan Shillings per 100 kg to 950 Shillings, amounting to 516 per cent. The country experienced droughts in 1980/81, 1992/93 and 1995/96. The enormous jump between 1992 and 1994 in the rural prices paid to producers was mainly due to drought. This rise in the price of maize between 1992 and 1994 also coincided with the real implementation of the liberalisation of the maize price. The exchange rate would have had much impact on the price if the crop was significantly traded across international borders.

A comparison of tea and maize prices indicates that while over the period 1983–1992, the maize prices increased by 56 per cent, tea prices for the first payment increased by 100 per cent (from 1.5 Shillings per kg of green leaf in 1982/83 to 3 Shillings in 1991/92). The second payment increased from 2.53 Shillings per kg to 5.95 Shillings during the same period, an increase of 135 per cent. Thus, the increase in the maize prices paid to producers was less than first and second payments to smallholder tea producers. Furthermore, maize prices as a percentage of import parity and export parity fell while tea prices as a percentage of export prices rose between 1984/85 and 1991/92.

The average rural market prices for maize in Rift Valley Province are more representative of the prices received by farmers in the case study. During the
period 1992–1994, average rural market prices in the province rose from 7.50 shillings per kg to 14.50 shillings per kg, an increase of 93 per cent. Even in the face of higher increases in maize prices, the case study showed that 17 male-headed households switched to tea during the 1985/86–1995/96 period but no farmer switched out of tea during the same period (see Figure 5.1).

With regard to fertilizer prices, we found that initially the reform measures of freeing the prices of fertilizer and adjusting fuel prices upwards pushed up the overall level of input prices, and the total agricultural index rose from 216 to 235 during the 1991–1992 period. The dramatic increase in the price of fertilizer led to a decline in its use by farmers. Furthermore, in 1992, there were ethnic clashes in the study area and this affected the production of crops and livestock. Important farm activities such as planting and weeding were stopped during the 1992 clashes. However, due to the devaluation of the Shilling, the subsequent fall in fertilizer prices contributed to a decline in the input price index from 460 in 1994 to 436 in 1995. There was a general increase in the consumption of all farm inputs, such as fertilizer and seeds, in response to the declining price of inputs.

Smallholder farmers are producers as well as sellers of maize. As producers, their production is determined by maize producer prices and input prices. As consumers, they have to consider the prices they have to pay for maize, the consumption needs of the family, and storage facilities. Some farmers sell maize due to lack of storage facilities and then buy maize again during poor production years. The standard of living of farmers who have to buy maize would have been adversely affected by the experience in 1992–1994 when there was an increase in the price of maize. If tea farmers had to buy maize, their standard of living would have worsened. But if they were self-sufficient in maize, they would have been more cushioned from the maize price increase.

Moreover, the annual increase in the consumer price index for the rural population reached 24 per cent in 1992 and 55 per cent in 1993 (World Bank, 1995). This increase was due to the decontrol of the prices of many other food items, which included fats and edible oils, rice, tea and milk, leading to the increased prices charged for these commodities. Smallholder farmers were also affected by the introduction of user charges in health and education.

In sum, tea prices were mainly affected by SAP factors (i.e. devaluation) until the sharp fall in 1994/95 in the international price of the commodity. That fall was big enough to outweigh the effect of the devaluation of the Shilling. However, the most important factor affecting price of maize had to do with non-SAP factors—the drought. The changes in fertilizer prices were due largely to SAP factors. The changes in consumer prices and user charges were both due to SAP. The main changes in prices that were due to non-SAP factors were the big increases in maize prices in the 1992–1994 period and the
decline in the second payment for tea in 1994/95 due to drought and the decline in the international market for tea.

The distinction between SAP and non-SAP influences is important since we recognise that the causal links between policy measures such as structural adjustment and outcomes can never be completely resolved. There will always be a judgement on the basis of circumstantial evidence such as whether the output of tea rose given due allowance for conditions and changes in the international market prices for the commodity.

We noted that one limitation of the study was attempting to research complex issues concerning intra-household relations over a short period of time. Another limitation concerned the possibility of attributing causal relations between outcomes and adjustment measures. However, the study succeeded in providing a unique data set in two points in time that allowed for a comparison of the experience and behaviour of smallholder producers, some of whom responded to new incentives by adopting tea.

The first objective of the study was to investigate, analyse and evaluate the factors influencing the adoption and production of tea among male and female smallholders in Kenya in the period 1985/86 to 1995/96 using as baseline data, a study conducted in 1985/86 by two Danish researchers, Bülow and Sørensen. The study was able to locate and interview 94 households in 1995/96 out of 120 households which had been covered by the 1985/86 survey. Seventeen male-headed households had switched to tea during the period 1985/86–1995/96 period, while 51 households which had grown tea in 1985/86 continued to grow tea in 1995/96. 26 households had never grown tea over the period. With regard to supply response, the majority of farmers switched before 1992, at the time when the incentives to switch to tea relative to maize were stronger (see Figure 5.1).

6.2 Changes in Characteristics of Sampled Households

The main changes observed in the always-tea households between 1985/86 and 1995/96 were an increase in the number of adult females and males in the household and total farm size, and declines in acres under tea, number of bushes, acres under maize, and livestock keeping. The main changes observed in tea-switchers between 1985/86 and 1995/96 were increases in adult males in the household and children attending school, and declines in total farm size, children under five years of age, acres under maize and livestock keeping. The number of adult females remained the same among the tea-switchers during the period. The main changes observed among the never-tea households between 1985/86 and 1995/6 were increases in the number of adult females in the household, children under five years and children attending school, and declines in total farm size, acres under maize, and livestock keep-
The number of adult males remained the same among the tea-switchers during the period.

Comparing the always-tea households to the never-tea households in 1985/86, the always-tea households were older, had larger farms, and more children attending school. The always-tea households in 1995/96 were generally older than the never-tea households, had larger farms and more adult males and females in ten households compared to the never-tea and tea-switchers. In 1995/96, the tea-switchers had lower total farm size, fewer children under five, and fewer livestock compared with the always-tea and never-tea households in 1995/96.

In all the three types of households, the main similarity was that wage employment had declined. The decline in wage employment may have resulted from withdrawal from work due to old age and retirement, higher incomes from tea, or fewer wage employment opportunities. The second similarity among the three groups was the decline in the use of hired labour. In 1985/86, half of the tea households used hired labour on a regular basis while the other half depended on family labour except for pruning which was done by hired specialists in many cases. By 1995/96, 62 per cent of the always-tea households hired labour for land preparation and recorded an increase in the use of the hoe. As a result of these changes, it seems likely that there was more reliance on family labour in 1995/96 than in 1985/86, placing more demands on women’s time.

It was noted that women continued to manage domestic work alone or got help from other female relatives, mainly sisters-in-law, mothers-in-law, and female children. Men were hardly involved in domestic work. There were no major changes regarding women’s perception of who takes farm decisions during the period 1985/86–1995/96. Almost all the women from the male-headed tea growing households indicated that their husbands controlled the bonus payment and its use. The use of income from tea mainly for men’s leisure activities (e.g. on alcohol) was revealed through in-depth interviews and the researcher’s own observations but was not expressed in the responses to the questionnaire survey either by male tea farmers or their wives. We considered women’s role in tea production and established that they work primarily as unpaid family members.

The changes that took place can be categorised under SAP and non-SAP factors. The fall in employment was related to structural adjustment measures like the reduction of public sector wage employment and declines in the performance of certain sectors such as manufacturing. The decline in the use of hired labour was also probably not solely related to structural adjustment. This may have been caused primarily by the ethnic clashes that took place in 1992. The 1992 clashes in this region were mainly caused by political factors. The decline in livestock keeping may have been as a result of the clashes, theft
of livestock, or insecurity involved in keeping livestock during the clashes. This did not seem to have anything to do directly with structural adjustment although, if we consider that during the era of reforms, smallholders may have opted for some other quick return activity, then a connection to SAP might be established. Such quick return activities may result in regular income which some farmers might find preferable to keeping livestock which, if zero grazing is established, could be very expensive to maintain. The decline in the use of tractors and ploughs for land preparation may be SAP-related due to increases in the cost of spare parts and fuel. The decline in the use of traditional labour groups in 1995/96 compared to 1985/86 was a result of the time constraint facing the women and this was SAP-related since reforms placed more demands on women’s time such that they did not have the time to participate in traditional group activities.

6.3 Adoption of Tea

We analysed the adoption of tea by smallholders, using a logit method similar to the one used by Bevan, Collier and Gunning (1989) but with important differences in the treatment of gender. Bevan et al. (1989) found that female labour was the only case in which labour endowment was significant and that female-headed households had only half the propensity of male-headed households to adopt tea. They concluded that while households with more women are more likely to adopt tea, households headed by women are less likely to do so. The analysis we conducted did not have a separate variable for the gender of the household head. This was because women do not grow tea in their own right, and do not make decisions about tea. Female-headed households growing tea had all inherited tea farms from their husbands and were, therefore, excluded from the logit analysis. All the households switching to tea were male-headed.

Our study found that female labour endowment was always positive in the 1985/86–1995/96 period but not always significant. However, it was positive and significant by 1995/96 in determining whether or not a male-headed household grew tea. Female labour was a constraint during the period due to the following reasons. First, there was a decline in hired labour which may possibly have been due to the ethnic clashes that took place in 1992 and which meant that non-Kalenjin migrant labourers, such as the Luos, had left the region. Also, due to the big rise in the price of maize as a result of the drought years, women may have preferred to spend more time in maize production. There was an incentive to grow maize for consumption needs since the price of maize had gone up.

There was a decline in the use of traditional labour groups in 1995/96 compared to 1985/86. Traditional women’s groups were previously mobilised
for weeding maize fields and this took women away from tea production. The case study found that women did not have time for these activities. The expectation was to see the use of traditional labour groups increase if there were more demands on women’s time. This was not the case since the study confirmed that in tea growing households, husbands stopped women from participating in traditional women’s group activities due to the priority given to tea production.

There was also less use of tractors and cattle and more use of hoes in land preparation. The increased use of the hoe creates an extra time burden for women. While it is assumed that in sub-Saharan Africa, land preparation is mainly a man’s job, there exists a gender division of labour in the activity. The figures in this study for land preparation include weeding as well as land preparation. Since weeding is mainly done by women, less use of the ox-plough would mean more use of the hoe in weeding, leading to an increased work burden for women. Furthermore, in households where the husbands were involved in wage employment, the wife had to perform the task of land preparation after weeding had been undertaken. Land had to be prepared every year for maize, though not for tea.

Regarding the introduction of user charges, particularly in health, there was no definitive evidence from the interviews that were conducted that households which could not afford hospital fees were relying on female members to take care of patients or that earlier discharges added to the burden already borne by women. This may be a possibility but no evidence was directly available. The study found that the smallholders had difficulties paying user charges in both the health and educational sectors.

The reasons discussed above in relation to the constraint faced by female labour can be categorised into those that are structural adjustment-related and those that are not structural adjustment-related. While we can say that the decline in the use of hired labour and the rise in maize prices caused by drought are not directly SAP-related, all the other developments such as the decline in the use of fuel and tractors (resulting from increases in fuel prices and the rise in the cost of spare parts) and the levying of user charges are SAP-related. The decline in the stocking of cattle may be more related to ethnic clashes and cattle raiding. The move to zero-grazing methods is partly related to SAPs because the expansion of tea production means that less land is available for grazing.

Considering the factors discussed above, we can say that there was an increase in the demand on female labour during the period of the study. Some factors resulted from SAP while others were non-SAP related. This finding reinforces the earlier findings on the greater reliance of households on family labour and a decline in the use of tractors and ploughs.
The variable *non-tea wage employment* was significant and negatively related to the likelihood of tea growing. This result indicates that involvement in non-tea wage employment is a competing activity with tea growing, rather than a source of capital for growing tea. Linking this finding to what was happening with regard to the implementation of SAP, we find that there had been a decline in manufacturing growth in the economy from 3.7 per cent in 1980–84 to 1.2 per cent in 1992–94. Public sector employment had also declined from 2.6 per cent in 1980–84 to -0.3 per cent in 1992–94. The decline in public sector employment can be linked to adjustment-related retrenchment of workers. There were, therefore, fewer opportunities for wage employment in 1992–94 compared to 1980–84. The variable *farm size* was significant and positive which implies that the likelihood of tea growing increased with farm size. The variable *maize* was significant and negatively related to the likelihood of tea growing.

6.4 Tea Yields

The main problem with the tea yield was not that there was no increase in tea production but that the yield stagnated after 1990 (Figure 3.6) even though payments continued to rise. We conducted an analysis of output of tea per bush for a sub-sample of households for which output data had been supplied by the KTDA. The analysis found that factors that were statistically significant in influencing productivity were: the age of the farmer (-), age² (+), acres under maize crop (-), acres under tea crop (+), young children under five years of age (-), previous experience in tea employment (+), farm size (-), and household head being a widow (-). Widows were included in this analysis since they were involved in managing the tea farms that they had inherited from their husbands.

The negative relation to maize was not surprising since maize competes with tea for land and labour. Maize has an advantage over tea because it is an annual crop, implying quicker returns. It appeared that women had more control over maize than tea and this might mean more demands on women’s time. It was not surprising that the presence of children under age five negatively affects productivity. Due to their child care responsibilities, women with young children may not put in as many hours in tea farm work as those with older children, and this is likely to negatively affect average productivity. The negative relationship of the variable *widows* may have resulted from various factors such as labour constraints within the widowed households, lack of support from male extension workers, lack of knowledge on the use of fertilizer and pruning, prioritisation by some households of food production, and conflict in the household over which son is eventually going to get the tea license.
In drawing a link between structural adjustment measures and the findings, the study found that the availability of women’s labour is a constraint on the responses of households to incentives to grow tea. This evidence supports concerns about gender and efficiency during the era of adjustment in the smallholder sector in sub-Saharan Africa.

In addressing the equity issue, we found that women’s work burden seems likely to have increased during the period and they remain dependent on the husbands’ income. We established that in the region as a whole, although there had been an expansion in tea production, there was a decline in food production. This has policy implications for food security. There is also a need for further research on the finding that there has been a decline in the area under maize production.

6.5 Perceived Changes in the Standard of Living

The second objective was to investigate women farmers’ perception of the costs and benefits of structural adjustment for both tea and non-tea producing households. The analysis of women’s perceptions of whether their standard of living had changed in 1995/96 compared to 1985/86 revealed that half the women felt worse off (n=44 out of 88 or 50 per cent) while 31 per cent (n=28/88) felt better off and 18 per cent (n=16/88) felt their life had remained the same. The study found that the effects of life cycle changes (such as children growing up) were compounded by the effects of economic reforms, in particular cost sharing in education and health services and rising food prices. It is important to note that there was variation within and between the always-tea, never-tea and tea-switcher households, with the third group having the highest proportion of those who felt better off. The main reasons for improvements in the standard of living were given as better earnings from wage employment, tea production and sale of maize, and the diversification of farm activities. The main reasons given for worsened standards of living were the burden of school fees, an increase in the number of children, and the rise in food prices. Some of the reasons for improvement or deterioration were personal to households and were associated with the stage they were in their life. For instance, households with more school-going children in 1995/96 had to meet more expenses than those with grown up children.

These findings were supported by secondary data on the annual increase in the consumer price index in Rift Valley Province, the area where the research location is situated. Declines were observed in the annual price of maize in the same Province and tea payments fluctuated. Since prices that are paid to farmers did not always keep pace with the increase in consumer prices, it is not surprising that the majority of women felt no better off in 1995/96 compared to 1985/86.
The study contextualised the farmers’ perceptions of changes in living standards by considering available data on agricultural output in Kericho District and found evidence of declining per capita production of staple crops. Some of these outcomes were due to SAP while others were not related to SAP. The effects of life cycle changes (such as children growing up) were not related to SAP but were compounded by the effect of economic reforms, in particular cost sharing in education and health services and rising food prices. The rise in food prices was linked to drought but also to the decontrol of food prices.

6.6 Policy Recommendations

The overall policy objective of the study is to increase both tea exports and food production simultaneously with greater gender equality in production and the control of the proceeds from the sale of the farm output. This study makes specific policy recommendations on tea and maize production. Taking tea production first, the study makes recommendations based on two assumptions. The first is that the KTDA will continue to play a key role in providing services to smallholder tea farmers. The second assumption is that the liberalisation of the smallholder tea sector will eventually take place, and that the role of the KTDA will change.

The KTDA was formed in 1964 under section 191 of the Agriculture Act (cap 318), and was charged with the responsibility of promoting the development of tea among smallscale farmers. The authority has performed several roles, including providing services to the smallholder, managing tea factories, and collecting and selling tea leaves.

Based on the assumption that the KTDA will continue playing this role, the two main issues that should be addressed in the light of the findings of the study are those of tea licensing and the distribution of bonus payments. Taking the issue of tea licensing first, we recall from the findings in both the 1985/86 and 1995/96 surveys, that the typical license holders were men or their sons. Virtually all female-headed tea growing households had inherited tea from their husbands or fathers, rather than deciding for themselves to adopt tea. We also confirmed that gender barriers are so strong in tea production that women are not generally able to take decisions to adopt the commodity, but only decisions about how much time they will spend on tea farms. Women were virtually prevented from adopting tea both as a result of the policy of the KTDA, and as a result of deeply entrenched social norms. This study, therefore, recommends that tea licenses should be given to women in their own right as has been practised with men, and the KTDA should play an active role in supporting women to grow tea in their own right.
This study found that women in male-headed households do not directly receive any of the bonus payments or monthly payments from the KTDA. Women from male-headed households work in tea fields mainly as unpaid family labour and the lack of payments to them, together with their inability to control the income from tea, is likely to negatively affect their incentive to work in tea fields. Women's labour constraint prevented a tea production response, and although until 1991 tea production was increasing, it would have been even greater without this constraint. Women from male-headed tea households said that they would devote more time to tea production if paid part of the bonus payment. This study recommends, based on the assumption that it will continue playing its current role, that the KTDA should arrange for payments to be made in a way that gives women some direct access to the cash proceeds. For instance, payments might be paid into joint accounts from which the wife as well as the husband can withdraw money or a portion might be put in a specific account for the payment of education and health service charges. The local government, tea farmers, chiefs and women's groups can liaise with the KTDA's district officers to ensure that women have access to bonus payments.

The smallscale tea sector has been managed by the KTDA for over thirty years. As we discussed in the study, acreage under tea increased and the factory companies were expanded to 45. However, the KTDA has had management problems, including flawed tender processes and delayed payments for tea. The KTDA has been criticised for running a structure that is too expensive.

The 1996 KTDA report on “The liberalisation and restructuring of the KTDA and the smallholder tea sub-sector” makes recommendations for the liberalisation and restructuring of the sub-sector. Regarding the reform and restructuring of the KTDA, it recommends as follows:

- The KTDA should continue to be incorporated under the KTDA Order but should be reformed and restructured to become fully commercialised. This implies the retention of the Government of Kenya and KTDA oversight of smallholder tea and their continued provision of guidance on policy matters, provision of tea transport infrastructure, training of extension staff and establishment of new factory companies. However, it concluded that: “The KTDA should privatise certain functions back to the factory companies which are already private” (p.14).

According to the report, with commercialisation, the KTDA would be exempted from all provisions of the State Corporation Act so that it is able to take timely decisions in a commercial and competitive environment. There would also be an amendment of the KTDA Order to give more voice to tea-growers:
- The appointment of the KTDA’s board members by smallholder tea-growers, except for the Permanent Secretaries to the Treasury and the Ministry responsible for Agriculture and the Director of Agriculture;
- The appointment of the Chairman and Managing Director of the KTDA Board by members of the Board;
- The repeal of tea export and trading regulations;
- The continued publication of governmental guidance on the promotion of smallholder tea sub-sector.

It is noteworthy that gender concerns have not been mentioned in the discussion on the liberalisation of the smallholder tea sector. It is important both for equity and efficiency reasons that women should be incorporated into the liberalisation effort and that their voices should be heard in the new structures.

In January 1998, for instance, the small-scale tea sector was hit by several controversies that led to a tea picking boycott involving approximately 10,000 farmers mostly from the major tea growing areas of the Central and Eastern Provinces. The strike was called by the unregistered Kenya Union of Small Scale Tea Owners. The farmers felt that since the establishment of the KTDA, the small scale tea owners had been oppressed and were voiceless. They were demanding the total repeal of the KTDA Order under the Agriculture Act, the withdrawal of the KTDA from the management of tea factories, the remittance of the proceeds from the sale of tea directly to the individual factory accounts, and the ordering of fertilizers directly from suppliers (Daily Nation, February 3, 1998).

Whether or not liberalisation takes place in this sub-sector, our study suggests that female labour remains a constraint to smallholder tea producers. My own participant observation indicated that women spent a lot of time fetching water, both for domestic and livestock uses, collecting firewood, and walking to market carrying heavy loads on their heads. It is noteworthy that the women farmers looked older than the male farmers, even though they were, in fact, typically younger. This study, therefore, recommends that more consideration should be given to ways of saving time for women farmers. Local government authorities, non-governmental organisations, churches and the local community should work together to provide better access to water, fuel and transport, and alternatives to the use of the hoe.

The study found that maize was an important crop for both tea and non-tea households. The smallholders are both producers and consumers of maize depending on maize prices and household consumption needs. There was an incentive to grow more maize if increases in the prices of maize paid to producers were higher than tea payments. In-depth discussions revealed that women preferred to spend more time in maize production since this is the main staple. Since tea competes with maize for land and labour and maize is
particularly demanding on women's time, this study recommends that there should be ways of expanding maize production since this has implications for food security.

6.7 Future Research

The study raised the following issues as areas for further research:

- Decline in the use of hired labour. This is an important issue for further analysis since unpaid family labour in general, and female labour in particular has become more important in the households during the reform process. The high demand for and on female labour has implications for the ability to combine the expansion of food and export production.
- Reduction in the use of tractors and ploughs for land preparation. It would be important to investigate factors that have led to the reduction of the use of tractors and ploughs. This is an important research issue, particularly in relation to increasing demands on unpaid family labour.
- It would be worth investigating the decline in total farm size, acres under maize, and number of livestock. Declines in livestock and land may signal falling wealth and increasing vulnerability. Declines of acres under maize may have household food security implications, especially among export growing households.
- There is need for a study comparable to Wold (ed.) on Supply Response in a Gender-Perspective: The Case of Structural Adjustment in Zambia.
- There is need for a further analysis of factors affecting productivity at the household level, with a focus on the role of intra-household resource allocation.
Bibliography


Food and Agriculture Organisation, Yearbook (various). FAO, Rome.


Kenya Tea Development Authority, Planning Section, Nairobi and Kericho.


APPENDIX: SPECIFICATION OF THE MODEL

Estimation of factors determining adoption or non-adoption of tea production

Different factors influence the farmer’s decision to adopt or not adopt tea production. The decision to adopt tea can be characterised as a dichotomous choice between two mutually exclusive alternatives. In this case, the dependent variable is a dummy variable taking the value of 1 if the farmer is adopting tea and 0 otherwise (Maddala 1988:272–274). The logit and the probit models can be used in specifying a binary decision model.14

Assume an underlying response variable defined by the regression relationship.

\[ y_i^* = \beta_0 + \sum_{j=1}^{k} \beta_j X_{ij} + \mu_i \]  
(1)

Where \( y_i^* \) is not observed and is called a latent variable. What we observe is a dummy variable \( y_i \) defined as:

\[ y_i = 1 \text{ if } y_i^* > 0 \]
\[ y_i = 0 \text{ otherwise} \]  
(2)

From relationship 1 and 2 we get

\[ P_i = \text{Prob} (y_i = 1) = \text{Prob} [\mu_i > -(\beta_0 + \sum_{j=1}^{k} \beta_j X_{ij})] = 1 - F[-(\beta_0 + \sum_{j=1}^{k} \beta_j X_{ij})] \]  
(3)

Where \( F \) is the cumulative distribution of \( u \). If the distribution of \( u \) is symmetric since \( 1-F(-Z) = F(Z) \) we get

\[ P_i = F(\beta_0 + \sum_{j=1}^{k} \beta_j X_{ij}) \]  
(4)

Since we know that \( y_i \) are simply realisations of binomial process with the probabilities given by the above equation varying from trial to trial based on \( X_{ij} \) the likelihood function is written as:

\[ L = \prod_{i=1}^{n} P_i^{y_i} (1-P_i) \]  
(5)

14 See Maddala (1983:22–27) for the derivation of the probit and logit models.
When the cumulative distribution of $U_i$ is logistic then we have the logit model specified as:

$$F(Z_i) = \frac{\exp(Z_i)}{1 + \exp(Z_i)}$$  \hspace{1cm} (6)

Hence:

$$\log \left( \frac{F(Z_i)}{1 - F(Z_i)} \right) = Z_i$$

The logit model takes the following form:

$$\log \left( \frac{P_i}{1 - P_i} \right) = \beta_0 + \sum_{j=1}^{k} \beta_j X_{ij}$$  \hspace{1cm} (7)

The left hand side of the equation (the dependent variable) is called log odds ratio and is a linear function of the explanatory variables.

The linear probability model can be used in estimating a regression model in which the dependent variable is dichotomous. But due to the problem of heteroscedasticity, the ordinary least squares (OLS) estimates will not be efficient. The main problem of using OLS is that the estimated conditional probabilities may not lie within the logical limits of 1 and 0.

Logit or probit models have been used as an alternative approach to the linear probability models. The only difference between the logit and probit models is in the specification of the distribution of the error term $u$ (or $\mu^*$).

In the probit model, an assumption is made that the error terms are normally distributed, “the normit model” whereas, in the logit model, the error term is the logistic (Maddala 1983:22).

The model expressed in equation 3 is a logistic due to the cumulative logistic distribution function $F$. The model expressed in equation 7 is a logit model because of the logit term.

According to Maddala 1988, “the cumulative and the logistic distributions are close to each other except at the tails. The results from the logit and the probit are not very different but the estimates of the two models cannot be directly compared before transformation estimates are obtained from logit model” (Maddala 1988: 273).

The special features of the logit model are that the estimated probabilities will always lie within 1 and 0. Secondly, unlike in the linear probability model, the
probability getting an A does not have a linear relationship with a unit change in the value of the explanatory variable. The disturbance term will also be homoscedastic unlike in the linear probability model (Gujarati 1992:423, Maddala 1988:272–274, Maddala 1983:22–27).

The logit model is estimated using the Maximum Likelihood Method (ML). OLS estimates cannot be used for individual or micro data when the dependent variable is dichotomous since the estimators obtained will not necessarily have optimal properties of best line or unbiased estimator (BLUE) (Gujarati 1992:278, 424).

Specification of the model

Farmers have to make a decision on whether to adopt tea or not based on household characteristics. The model will be based on equation 1.

\[ y_i^* = \beta_0 + \sum_{j=1}^{k} \beta_j X_{ij} + \mu_i \]

Where \( y_i \) the unobserved variable is related to the farmer’s decision as follows:

- \( y_i^* \) = propensity or ability to adopt tea
- \( y_i \) = 1 if the farmer is adopting tea production; 0 if otherwise
- \( \beta_0 \) = constant term
- \( \beta_j \) = the parameter to be estimated showing the probability of adoption or non-adoption of tea
- \( X_{ij} \) = the vector of explanatory variables
- \( \mu \) = error term
- \( k \) = number of explanatory variables
Publications of the research programme “Political and Social Context of Structural Adjustment in Africa” published by the Nordic Africa Institute


Research Reports published by the Institute

Some of the reports are out of print. Photocopies of these reports can be obtained at a cost of SEK 0.50/page.

1. Meyer-Heiselberg, Richard, Notes from Liberated African Department in the Archives at Fourah Bay College, Freetown, Sierra Leone. 61 pp. 1967 (OUT-OF-PRINT)
2. Not published
7. Selinus, Ruth, The Traditional Foods of the Central Ethiopian Highlands. 34 pp. 1971 (OUT-OF-PRINT)
33. Pipping, Knut, Land Holding in the Usangu Plain. A Survey of Two Villages in the Southern

□

□