



LAND TENURE, FARM INVESTMENTS AND FOOD PRODUCTION IN MALAWI

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ABSTRACT

The unequal distribution of land in Malawi has been identified as one of the binding constraints on agricultural productivity and production. Most smallholder farmers hold land under customary tenure and own less than one hectare, many being unable to produce adequate food. In order to improve access to land, the Government started implementing a land reform programme in 2005 through a market-assisted, community-based approach to land acquisition. This study highlights the impact of the land reform programme on investments, food production and agricultural productivity. The study shows that smallholder farmers that participate in the community-based land development programme have increased access to land and financial resources, are more likely to invest in improved maize seeds, tend to be more productive, and have overall better welfare than non-participants. However, the econometric results show that these positive effects are driven more by access to the financial resources provided under the package of assistance in the first season, than change in land tenure per se. New beneficiaries with only one season of farming under the programme tend to invest more in hybrid maize and are more productive than those that have been under the programme for two seasons. The results underscore the importance of complementary investments and assistance in order for land reform programmes to have significant impact of poor smallholder farmers.

1 INTRODUCTION

Land is one of the natural resources that remains unequally distributed in Malawi. The World Bank (2003b) notes that the majority of the rural population produce 84 percent of agriculture value-added from 1.8 to 2 million smallholder farmers, who on average, own only 1 hectare of land. Recent estimates indicate that though 55 percent of smallholder farmers have less than 1 hectare of cultivatable land (GOM, 2002a), there are about 30,000 estates cultivating between 10 to 500 hectares. Over time and due to the high population growth and the customary tenure, land has been subjected to sub-division among family members leading to fragmentation. The per capita land holdings have declined from 1.53 hectares in 1968 to 0.8 hectares per capita in 2000 (GOM [Government of Malawi], 2001). Nonetheless, land plays a critical role in the livelihood systems of Malawians: near landlessness in Malawi has been linked to poverty and food insecurity. For instance, in 1998 the ultra-poor had mean household land holdings of 0.84 hectares producing 48.5 kilograms of maize compared to the non-poor who held 1.10 hectares and producing 115.8 kilograms of maize (NSO, 2002). Others such as Alwang and Siegel (1999) estimate that 70 percent of Malawian smallholder farmers cultivate 1.0 hectare with the median area cultivated being 0.6 hectares, and devote 70 percent of the land to maize, the main staple food.

Empirical studies have been mixed on the impact of formal land titles on investment and agricultural productivity.¹ The World Bank (2003a), summarizing the evidence from Africa, notes that some studies in Africa show that formal land title had little or no impact on investment or farm income, partly due to the fact that land tenure is secure under most customary land rights and that formal land titles do not necessarily equal to higher tenure security. Do and Lyer (2008) find no evidence that land titling in Vietnam increased access to credit or increased land market activity. Smith (2004) in a study of land tenure and investment in Zambia found evidence that documentation of land title is positively associated with fixed investments and agricultural productivity. Similarly, Gebremedhin and Swinton (2003) found that long-term investments in stone terraces in northern Ethiopia were associated with secure land tenure. Graham and Darroch (2001) found evidence that households that had more security of tenure were more likely to demand and receive credit for agricultural investment financing and complementary inputs in South Africa.

Similarly, there is mixed evidence of a positive relationship between land tenure security and agricultural investments. Brasselle et al. (2002), while taking into account the endogeneity between investment and tenure, found weak evidence that land tenure and rights affect investments in Burkina Faso. In Uganda, Place and Otsuka (2002) found evidence that land tenure provides incentives for investments while there is no evidence that tenure systems affect agricultural productivity. Place and Otsuka (2001) also showed customary land in Malawi to be secure, although customary tenure under patrilineal system have led higher to levels of land improving investments and adoption of technology. Gavian and Ehui (1999) found no empirical evidence that land tenure is a constraint to agricultural productivity. In China, Li et al. (1998) the right to use land for long periods of time encourages the use of land-saving investments and that land tenure affects agricultural production decisions although the difference between collective and private plots is small.

Other studies have established that the distribution of land among households is an important variable explaining technology adoption and poverty levels in Malawi (Green and Ng'ong'ola, 1993; Mukherjee and Benson, 2003; Chirwa, 2005a and 2005b; GOM and World Bank, 2006). Others such as Chirwa (2006) show that access to larger parcels of land is also associated with commercialisation of food crops. Therefore, land redistribution under conditions of functioning factor and product markets holds the potential for delivering tangible benefits to household welfare. As the World Bank (2003b) notes, experiences in Asia and Africa have illustrated that land reforms can significantly improve the livelihoods and well-being of households.

The importance of property rights in providing incentives to efficient utilisation of land has provided justification for land reforms that not only focus on land distribution from estates or large farms to farm families, but also on the security of tenure and liberalisation of land markets – sales and rental markets (World Bank, 2003b). However, different countries have chosen different paths of land reforms, some mainly focusing on access to land while others have dealt with the questions of access to land and the security of tenure, with varying implications on land distribution and household welfare. For instance, the land reform programme in South Africa focuses on land restitution, land tenure reforms and redistribution with a package of initial financial assistance (Bradstock, 2005; Dieninger, 1999); in Zimbabwe the reforms included land redistribution with and without (fast-tracking) financial packages (Waeterloos and Rutherford, 2004; Kinsey, 2004); in Taiwan the land reforms included the new tenure system that limited land rents, privatisation of government farms and restrictions on absentee landlords (Chen, 1994); the transfer of rights from farming co-operatives to individual households in Vietnam (Do and Iyer, 2008).

1 See also Gavian and Ehui (1999) and Brasselle et al. (2002) for a summary of the empirical evidence on land issues in Sub-Saharan Africa; and Do and Lyer (2008) in other developing countries.

Recently, government has acknowledged the problem of access to land and has introduced land reforms in Malawi (GOM, 2002a and 2002b). Chirwa (2005a) notes that the agricultural development policies in Malawi have largely been formulated on the assumption that the agrarian question did not exist. The land reform programme involves resettlement and distribution of land to landless households and improving the security of land tenure. The reforms in the tenure system are transitional, awaiting the legislation of the new Land Act that will formalise customary land tenure as customary estate. The transitional arrangement is to offer group titles according group rights under leasehold title, which will be converted to family customary estate once the new Land Act is in place. This paper therefore assesses the impact of the change in land tenure brought about by the land reform programme on agricultural investments, food production and agricultural productivity. The paper is organised as follows: the next section briefly discusses land ownership, land tenure and land reform in Malawi; and we examine the various forms of acquiring land and the security of tenure and the design of the land reform programme. Section three presents the methodology used in the study, including data collection methods and methods of analysis. Section four presents and discusses the empirical results on the impact of land reforms on investments and productivity and finally, section five provides concluding remarks.

2 LAND OWNERSHIP, TENURE AND LAND REFORM IN MALAWI

2.1 Land Ownership and Tenure Systems

The land ownership structure in Malawi dates to the colonial period in which the Land Ordinance of 1951, governed by the English law, defined land as public, private or customary (GOM, 2002a). Customary land was taken as a species of public land and Malawians became tenants of their own land. After independence, the land ownership systems and security of tenure did not change even with the Land Act of 1965. Malawi has four categories of land ownership: public land, customary land, leasehold and freehold. Public land is land held in trust by Government, local or traditional authorities and is used openly or accessible to the public; this includes land gazetted for national parks, recreation areas and historical and cultural areas. Customary land is land falling under the jurisdiction of a recognized traditional authority, which has been granted to a person under customary law; such land is allocated to the person, resident or immigrant, by the traditional leaders holding jurisdiction over the land. Once customary land has been allocated to the family or lineage under the customary tenure, the land is perceived as the property of the family in perpetuity (Bosworth, 1998). Leasehold tenure is a personal contract granting the exclusive right of use of land for a fixed period shorter than the private ownership rights held by the person issuing the lease. Freehold land accords the holder exclusive possession of the land in perpetuity without term limits placed on the title of the owner. As noted by GOM (2002a), a freeholder has the right to subdivide or lease the land without seeking Government approval and the Government has no legal right to interfere with the occupational right to land. Freehold land, therefore, offers the highest security of tenure.

Most of the land in Malawi is held under customary tenure. The World Bank (2003a) notes that in many African countries, more than 90 percent of land remains under customary tenure, and lacks legal recognition. Such land can be sub-divided by family members and households are not allowed by customary law to sell the land. Place and Otsuka (2001) argue that customary land tenure institutions and the inadequate incentives they give to farmers to undertake long-term investment may hamper agricultural development. According to Mbaya (2002) Malawi has two customary systems of inheritance, the matrilineal and the patrilineal systems: under a matrilineal system, women's rights to customary land tend to be primary while under the patrilineal system inheritance of customary land tilts more towards men. Place and Otsuka (2001), however, find that under the patrilineal and matrilineal systems there are five distinct categories of land acquisition with different implications on tenure of security. Others have argued that since property rights are not well defined in traditional land ownership systems, and the literature suggests that traditional land ownership systems usually make land insecure and provide disincentives to investments. However, studies in Malawi show that even under the existing customary land tenure system land is secure and there is no evidence that customary tenure creates disincentives to investment (Place and Otsuka, 2001; Chirwa et al., 2003; BDPA, 1998).²

Table 1 shows the distribution of plots by mode of acquisition. Most of the plots in the sample, 52.6 percent, were acquired through inheritance. Plots granted to households by local leaders only account for 20.8 percent. The low proportion of plots allocated by traditional leaders reflects the fact that frontiers of land available for allocation from the traditional chiefs have declined and most land is inherited from parents (Bosworth, 1998; Mbaya, 2002; Chirwa et al, 2003). Mbaya (2002) also notes that household heads are increasingly assuming the role of allocation to their children and relatives. About 18.3 percent of the plots were acquired through family of spouses of the household head and 6 percent of the plots were being rented. Purchase with title only accounts for 0.4 percent, purchase without title accounts for 0.9 percent, leasehold accounts for 0.3 percent and tenancy accounts for only 0.4 percent of the number

² Brasselle et al. (2002) also find no systematic evidence that land tenure security is associated with investment in Burkina Faso.

of plots held by the households. If we group granting by local leaders, inheritance and land acquired through family of spouse as customary land, it implies that 91.7 percent of the plots are under customary tenure.

Table 1 Distribution of plots by mode of acquisition

Mode of land acquisition	Plots		Mean size (ha)		Total land	
	N	%	Mean	SD	Hectare	%
Granted by local leaders	4,340	20.84	1.78	27.35	7,738	16.65
Inherited	10,955	52.59	2.58	64.66	8,237	60.75
Through family of spouse	3,807	18.28	1.81	41.33	6,882	14.81
Purchased with title	85	0.41	0.80	1.04	68	0.51
Purchased without title	175	0.85	6.26	73.41	1,114	2.40
Leasehold	61	0.29	1.43	2.07	87	0.19
Renting: short-term	1,240	5.95	1.73	21.94	2,139	4.60
Tenancy	76	0.36	0.59	0.42	45	0.10
Others	88	0.42	1.96	13.77	175	0.37
Total	20,830	100.00	2.23	52.367	46,484	100.00

Source: NSO (2005) IHS2 data

The average number of plots per household is 2, but ranges from 1 to 10 plots, the mean size of plots being 2.23 hectares. Plots that were purchased without title are on average larger (6.3 hectares) and plots under tenancy are the smallest (0.59 hectares). Plots acquired through inheritance account for 60.8 percent while those acquired through local leaders account for 16.7 percent of total land among sample households.

2.2 Land Reform: Community-based Rural Land Development Project

The rising population and the expansion of estate agriculture have exerted a lot of pressure on customary land, to the extent that local leaders hardly have any spare land for allocation to households (Lele, 1989; Mbaya, 2002 and Chirwa et al, 2003). Due to the link between access to resources, such as land and poverty in an agrarian economy, the Malawi Government introduced a programme of land reforms (GOM, 2002b). Following a number of studies on land access and utilisation, the Government formulated a National Land Policy, which inter alia, seeks to give legal recognition to customary land and in which 'a customary estate will have private usufructuary rights in perpetuity, and once registered, the title of the owner will have full legal status and can be leased or used as security for a mortgage loan' (GOM, 2002a). However, the title holders are restricted on disposal of land. According to GOM (2002a), 'because of the interest of the proprietor of customary estate is usufructuary, the registration of sale, lease or mortgage is not with absolute title and will be subject to what are known as overriding interests of the community and the sovereign right of the state'. It also follows that any disposal of such land transfers the residual property interest of the community. The land policy also states that land registered as customary estate cannot be sold within the first five years of titling.

The Malawi Government identifies two ways in which the problem of small land holdings among smallholder farmers can be addressed: ensuring security of tenure and distributing land to the landless. First, security of tenure of customary land will be ensured through titling of customary land as customary estate. This is believed to facilitate the development of a land market in the medium- and long-term. It has been observed that security of tenure helps in developing the land market, which has implications on poverty reduction – such as facilitating access to financial or physical capital and rent or sales (World Bank, 2003a). Secondly, the Malawi Government has introduced a willing seller/willing buyer approach to land redistribution and a resettlement programme to the landless or near landless (GOM, 2002a, World Bank, 2004). In 2004, the Government launched a pilot project, the Community-Based Rural Land Development Project (CBRLDP) in four districts (Mulanje, Thyolo, Machinga and Mangochi) in southern Malawi – where the average land holdings among smallholder farmers are smallest with the highest population density. The CBRLDP is funded by the World Bank through the International Development Association in the form of a grant to the Malawi government amounting to US\$27 million. The main objective of the CBRLDP is to increase the incomes of about 15,000 poor rural families in the four pilot districts by providing land to the landless and land-poor.

The beneficiaries to the programme self-select each other and typically come from the same village. The District Assemblies and CBRLDP officials through sensitisation meetings with the communities and radio programmes play a critical role in providing information about the opportunities available to the landless for land purchase in the pilot districts. The beneficiaries are required to form groups which are

screened by the CBRLDP as to whether they meet the criteria. The CBRLDP also provides information on the availability of land that is being offered for sale by estate owners, but it is the responsibility of the group to identify the land they wish to acquire. The land is offered by estates and beneficiary groups directly negotiate the price with the estate owner. As Chirwa (2005a) notes, a number of estates, even outside the pilot districts, are also advertised for sale in the media, which offers the potential for expansion of the programme. Most of these estates were created out of customary land and have either been abandoned for cultivation or are being under-utilised. According to Chilimampung et al. (1998), about 65 percent of estates had leasehold deeds or offer of lease, with only 1 percent under freehold tenure.

The CBRLDP uses a market-assisted (willing seller-willing buyer) community-driven decentralised system of land acquisition in which beneficiaries actively participate in identification of land for purchase and enter into initial negotiations with the potential seller. The District Assembly officials and CBRLDP staff set the range of prices over which beneficiary groups bargain with land owners. The beneficiaries of the project are landless or land-poor and food insecure Malawian citizens with low incomes and those chronically dependent on external assistance: the vulnerable and disadvantaged (Machira, 2007). The beneficiaries form self-selecting groups comprising 10–35 households who are willing to relocate and engage in farming. However, as Chinsinga (2008) notes due to the financial grants associated with resettlement, there are circumstances where the traditional leaders and community management committees influence the membership of these beneficiary groups. Each beneficiary receives a uniform grant of US\$1,050 for land administration and farm development, with 30 percent devoted to land acquisition, 10 percent to cover settlement costs and 60 percent meant for farm development (World Bank, 2004). This grant is provided in the first year of resettlement and households have to find their own resources in subsequent years of developing the land. Activities funded under farm development related to start-up capital needed to engage in agricultural production such as inputs, tools, livestock and technical assistance. Households that relocate from more than 50 kilometres are also provided with transport means under the project. The sources of land include Government land, land that is being under-utilised and being offered for sale by private estate owners.³ Focus group discussions with beneficiaries confirmed the nature of financial assistance to cover resettlement costs and farm investments, with one of the groups receiving '\$80 for resettlement, \$110 for farm investments, 6 bags of fertilizers, hoes, panga knife and maize and tobacco seeds' per household.

The project has made some progress, although achievement of the targets is less than planned. According to Machira (2007), by the end of 2006, about 3,000 families had benefited from the land reform project through land relocation. The average maize production among beneficiary households increased from 200 kilograms before the project to 1454 kilograms after the project in 2005/06 and yields were significantly higher after the project (2269 kilograms per hectare) compared to 962 kilograms per hectare before the project. There is evidence from the project's impact evaluation that household incomes for beneficiaries have increased by more than 40 percent after one year of relocation (Machira, 2007). However, as Chinsinga (2008) notes, the sustainability of these short-term benefits are threatened by the absence of complementary investments in infrastructure and access to agricultural finance. Many farmers under the programme produced more maize than they require, but they had problems in finding better markets for the excess and as a result sold the maize at give-away prices.

Nonetheless, in spite of the reported impact, the tenure of land under the programme remains poorly defined. As a transitional mechanism, land titles are issues to groups of beneficiaries – group land titles that provide group rights. Beneficiaries indicated that group members can be relieved of their allocated land if they violate the rules, which include breach of peace, although they believe that Government cannot take away the land from the group. The issuing of group titles is problematic and characterised by the bureaucracy of Government services. Key informant interviews revealed that only 21 percent of the beneficiary groups (out of 364 groups) have obtained group land titles with leasehold still remaining the form of tenure. Currently, there is no legal framework for transfer or registration of land to customary estate – the new Land Act is being drafted but it is yet to be presented to Parliament. The concerns about the security of tenure were widely raised by beneficiaries – for instance, one beneficiary group noted that

'The CBRLDP land was bought and given to us by the Government. Each household has 1.70 hectares of land. However, this land does not have documentation that proves that it is ours. The only documentation available pertains to the whole Trust. Our Village Headman signed a document with the owner of the estate that is proof of the sell and the number of hectares sold and this copy is kept by the Village Headman'. [Focus Group Discussion with male beneficiaries in TA Liwonde, Machinga District]

The slow process of obtaining group lease titles is creating uncertainty about the rights individuals have over their plots. Chinsinga (2008) notes that the lack of titling of the newly acquired land is contrary to the public awareness campaign in the media that suggests that individuals will own the land and have title. Apart from these administrative issues, the CBRLDP has experienced several other problems including elite capture, withdrawal of beneficiaries in the second year of the programme, encroachment of resettled

3 Chirwa (2005a) notes that with the poor performance of estate tobacco, some estates owners are offering land for sale, which offers opportunities for a market-based (willing seller/willing buyer) land reforms and redistribution.

land by neighbouring communities, difficulties in accessing agricultural inputs in subsequent seasons and social stigmatisation of new settlers (see Chinsinga, 2008).

3 METHODOLOGY

3.1 Sample and Data Collection Methods

The land reform project is being piloted in four districts in southern Malawi: Thyolo, Mulanje, Machinga and Mangochi. A case study approach was used to understand the politics and the impact of land reform on pro-poor growth. The sample was drawn from the Machinga district in which farmers had been recently resettled and where such farmers have had the experience of at least one growing season. The study used both qualitative and quantitative research methods. This involved conducting interviews with key informants and policy-makers, focus group discussions with farmers, and administering a structured questionnaire to participant and non-participant smallholder farmers. Key informant interviews and focus group discussions were critical in understanding the politics of land reform, while the structured questionnaire interviews were critical in understanding the impact of land reforms on welfare.

With respect to the quantitative approach, interviews were conducted with both farming households that have been resettled and resident farming households. Households that have acquired land under the CBRLDP have gained from both land redistribution and change in tenure of security from customary land holding to the transitional leasehold group land holding. The sample of non-participants to CBRLDP represent farmers that have not benefited from either – hence their land holdings are still under customary tenure. A total sample of 146 farming households, beneficiaries and non-beneficiaries were interviewed. The usable sample comprises resettled farming households or beneficiaries (49 percent) and resident farming households or non-beneficiaries (51 percent). The farm groups of beneficiaries were purposively sampled from the list of groups that had at least a year of farming experience and a mix of those that have relocated from other districts and those from areas neighbouring the acquired land. The non-participants were randomly selected from villages neighbouring the acquired land.

With respect to the qualitative approach, eight focus group discussion interviews were conducted with beneficiary groups and non-beneficiary groups, six key informants interviews were conducted in the communities. The qualitative approach also involved four case study households from the beneficiary groups on their personal experiences and the changes that are being experienced as a result of participation in the land reform project.

3.2 Methods of Analysis and Model Specification

This study uses both statistical and econometric analysis to determine the impact of the land reform programme, and land tenure, on beneficiary households. The quantitative analysis is triangulated with data from focus group discussion and key informant interviews. The statistical approach uses the t-test to compare the differences between beneficiary households and non-beneficiary households, on the outcome and impact variables. The statistical approach is, however, limited because of its failure to control for other factors affecting the impact variables. In order to control for other factors that influence impact variables, the study uses econometric approaches adapted from Place and Otsuka (2001 and 2002) on impact of land institutions on investments and farm productivity. The following models are estimated to assess the impact of the land redistribution and tenure reform on investments and maize productivity, respectively:

$$I_i = \alpha_0 + \alpha_j CBRLDP_i + \beta_j X + \varepsilon_i \quad (1)$$

$$M_i = \lambda_0 + \lambda_j CBRLDP_i + \gamma_j F + \mu_i \quad (2)$$

where for household i , I is the indicator of investment; M is the natural logarithm of quantity of maize produced; CBRLDP is a dummy variable representing participation in the land reform programme which captures the effects of land redistribution and improved tenure of security; X is a vector of household and farming characteristics; F is a vector of factor inputs in natural logarithm, other household and farming characteristics; and ε is the error term. Equation (2) is essentially a Cobb-Douglas production function. Most of the households in our sample cultivated maize, but there were variations in the type of seeds used on the plots. We assume that use of improved seeds, hybrid maize, is an investment decision that requires a lot more investment in maize production through acquisition of hybrid seeds and the amount of fertilizers and labour inputs required in order to achieve high yields. Thus, our investment indicator is the proportion of land devoted to hybrid maize production. Since, the major input in hybrid maize production is the amount of fertilizer, fertilizer being the most expensive input, we assume that the expected access to fertilizers determine the farmer's decision to expand hybrid maize production.⁴

4 In practice, the decision to plant improved seeds is typically a bivariate decision of technology adoption – hybrid seeds and inorganic fertilizers. However, the most expensive input of the two, which is fertilizer is likely to dominate in the decision making process of the farmer. We, however, do not model this bivariate decision in this study.

The effect of household participation in the programme on investment in hybrid maize is measured regardless of whether the land was acquired through the community-based land reform project or under other forms. Beneficiaries have technical advice from extension workers on farm use during the farm development plans that the beneficiary groups make. It is expected that the knowledge acquired can be used on other plots. The technical advice and access to financial resources available if properly utilized should lead to more efficient maize production.

However, given the design of the CBRLDP, the observed impacts may be due to both land relocation and land tenure combined with greater access to agricultural inputs acquired through the resettlement package that beneficiaries receive in the first year of benefiting from the CBRLDP. Although, these effects are difficult to unpack, we estimate alternative models that categorize beneficiaries into those that have been under the scheme for two agricultural seasons (resettled in the 2005/06 season) and those that have been under the programme for only one season (resettled in the 2006/07 season). We expect the financial package to play a diminishing role for beneficiaries that have cultivated on the new land for at least two agricultural seasons. If changes in land tenure are important for investments and production, we hypothesize that their impact should be independent of year of resettlement for beneficiaries. Thus, if land tenure is a major driver of the changes in investment and maize production, the dummy variables for the year of resettlement - 2005 and 2006 - should both be statistically significant. However, if only the 2006 dummy variable of resettlement is significant, it may suggest that access to agricultural inputs is the main driver of the impacts of the land reform programme in this transitional phase.

4 RESULTS AND DISCUSSIONS

4.1 Descriptive Analysis

Table 2 shows differences in various characteristics between participants and non-participants in the community-based land reform programme, which are noticeable. It is apparent that beneficiaries have on average more than doubled their access from 0.4 hectares of land under cultivation per household to 1.41 hectares: as noted earlier, the programme allocates at least 1.5 hectares of land per household. Access to land is also higher among participants to the programme compared with non-participants and the study finds that maize remains the main crop cultivated by both. The differences appear to be the level of investments in agriculture, with participants devoting proportionately more land to hybrid maize cultivation compared with non-participants: participants devote 63 per cent of their total land holding to hybrid maize production compared with only 31 per cent of the land devoted to hybrid maize by non-participants. Production of hybrid maize requires investments in quality seeds and fertilizers compared to local maize where seeds are typically recycled from one season to the next. Other crops grown by the beneficiaries include pigeon peas, rice, beans, groundnuts, cassava, sweet potatoes and tobacco.

Table 2 Differences between participants and non-participants of CBRLDP

Variable	Participants	Non-participants	Difference
Mean land size per household before CBRLDP (ha)	0.42	–	–
Mean land size per household after CBRLDP (ha)	1.41	0.96	0.50***
Mean land size devoted to maize (ha)	1.12	0.72	0.40***
Proportion of land devoted to hybrid maize	0.63	0.31	0.46***
Proportion of land devoted to OPV maize	0.08	0.11	-0.10*
Proportion of land devoted to local maize	0.04	0.30	-0.25***
Proportion of mono-cropped plots	0.38	0.48	-0.09
Proportion of mixed-cropped plots	0.43	0.32	0.11
Proportion of inter-cropped plots	0.53	0.65	0.12
Mean number of crops per plot before CBRLDP	2.54	–	–
Mean number of crops per plot after CBRLDP	2.46	2.30	0.16
Mean yield of local maize per hectare	1,178.13	790.58	389.56*
Mean yield of hybrid maize per hectare	1,510.29	1,204.17	306.12*
Mean yield of OPV maize per hectare	1,907.41	1,074.77	832.64**
Mean yield of all maize	1,559.55	1,011.48	448.07***

***Significant at 1% level; **Significant at 5% level; Significant at 10% level

With respect to yields in maize, there are substantial differences in yields between participants and non-participants in the land reform programme. Regardless of the type of maize grown, plots belonging to participants are more productive than those of non-participants, although in both cases the figures are much lower than the potential yields of 4,000 to 6,500 kilograms per hectare – but the figures for participants are comparable to the national average of 2,000 kilograms per hectare.

Table 3 presents household-level mean maize production among participants and non-participants of the land reform programme. The mean maize produced among participating households has increased from 291 kilograms before the programme to 1,411 kilograms after. In addition, there are statistically significant differences in maize production between participants and non-participants in favour of the former, with a mean difference of 814 kilograms per household. This is consistent with the qualitative evidence in which beneficiary focus group discussion interviews revealed that households produced more maize under the reform programme compared with what they used to produce before relocation. For example, one group that moved from Thyolo to Machinga indicated that before they moved they used to harvest 5 bags of 50 kilograms compared to 25–100 bags in the resettled area. Another striking feature is that 88 percent of the mean maize produced is hybrid maize among participants compared to 50 percent among the non-participating households. These figures point to the potential for the land reform programme in addressing the food security situation of landless or land-poor households.

Table 3 Differences in maize production – participants and non-participants of CBRLDP

Variable	Participants	Non-participants	Difference
Quantity of maize produced before CBRLDP (kg)	291.37	–	–
Quantity of maize produced after CBRLDP (kg)	1,411.01	652.31	758.70***
Local maize (kg)	323.44	464.83	-141.40***
Hybrid maize (kg)	1,380.51	591.39	989.12***
OPV maize (kg)	1,307.14	477.67	829.48**
Number of households	68	71	

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level

Table 4 presents subjective welfare evaluation by participants and non-participants of the land reform programme. In terms of self-assessment of poverty in relation to other households in the community, the differences in the valuation between participants and non-participants are not statistically significant although the participants seem to have a higher overall valuation of the current poverty status. However, in terms of poverty status in 2005, before participation in the land reform programme, participants were on average poorer than non-participants and the differences are statistically significant. This suggests that the programme did manage to target poorer households consistent with the criteria for eligibility. In terms of current economic wellbeing compared to one or two years ago, participants have significantly higher welfare compared to non-participants. These differences are statistically significant at the 1 percent level. Similarly, participants tend to be more satisfied with life in general compared with non-participants. However, with respect to food security in the past year – although that experienced by the participants is better than non-participants – the difference is not statistically significant. These positive outcomes among beneficiaries are consistent with the perceptions from focus group discussion interviews in which beneficiaries talked of no longer begging for food, and have more money available for household needs and farm investments.

Table 4 Differences in poverty status - participants and non-participants of CBRLDP

Variable	Participants	Non-participants	Difference
Poverty in 2007 ^a	2.397	2.239	0.158
Poverty in 2005 ^a	1.456	1.944	-0.488***
Economic wellbeing compared to 1 year ago ^b	2.353	2.859	-0.506***
Economic wellbeing compared to 2 years ago ^b	2.147	2.746	-0.599***
Satisfaction with life ^c	3.265	2.761	0.504***
Proportion with adequate food in past year	0.721	0.606	0.115
Number of households	68	71	

Note: a Ordinal scale: 1 = very poor, 2= poor, 3=less poor, 4 = average, 5= better off, 6 =rich
b Ordinal Scale: 1=Much better, 2 = Better, 3=No Change, 4=Worse off, 5=Much worse*
c Ordinal scale:1=very unsatisfied, 2=Unsatisfied, 3=Indifferent, 4 = Satisfied, 5=very satisfied

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

Overall, the statistical analyses of maize production data and self welfare assessment reveal that a land reform programme that increases access to land for poor households holds potential to promote pro-poor growth in agriculture and can facilitate the adoption of technology in a land constrained environment. However, the statistical analysis does not separate the impacts of land reforms and the complementary

inputs provided under the programme in the first year. In addition, the descriptive analysis ignores the fact that the impacts of land reforms may be driven by other factors rather than changes in land tenure and land redistribution. In the econometric analysis, we attempt to address both of these problems.

4.2 Econometric Evidence

4.2.1 Land Tenure and Farm Investments

Table 5 presents descriptive statistics of the variables used in the investment model ; the dependent variable is the proportion of land devoted to hybrid maize. The data shows that 48.2 percent of the land owned by the household was used for cultivation of hybrid maize, compared with 16 percent for local maize and 9 percent for open pollinated varieties. Most of the households in the sample are male headed households and are on average 42 years old. The average number of adult equivalents is four adults. In terms of human capital, about 27 percent of household heads have no education, but a similar proportion completed upper primary school while only 12 percent have a primary school qualification. Access to extension services is limited, with only 38 percent of households indicating that they had received extension advice. Fertilizer adoption is quite high at 91 percent, although 35 percent of the households indicated that the main source for fertilizers was the agricultural input subsidy programme while 28 percent had access to subsidized maize seeds.

Table 5 Descriptive statistics of variables in the investment model

Variable	Mean	Std. Dev	Min	Max
Proportion of land with hybrid maize	0.4819	0.3880	0.00	1.00
Dummy = 1 if household is beneficiary on CBRLDP	0.4855	0.5016	0.00	1.00
Dummy = 1 if CBRLDP beneficiary resettled in 2005	0.0580	0.2345	0.00	1.00
Dummy = 1 if CBRLDP beneficiary resettled in 2006	0.4130	0.4942	0.00	1.00
Dummy = 1 if sex of household head is male	0.7971	0.4036	0.00	1.00
Age of household head	42.2246	13.8380	21.00	87.00
Age of household head squared	1,973.02	1348.93	441.00	7569.00
Number of adult equivalent	4.1114	1.7261	1.44	11.86
Dummy = 1 if education of household head is Std 1-4	0.2391	0.4281	0.00	1.00
Dummy = 1 if education of household head is Std 5-7	0.2681	0.4446	0.00	1.00
Dummy = 1 if education of household head is Std 8	0.1232	0.3299	0.00	1.00
Dummy = 1 if education of household head is Form 1-4	0.1014	0.3030	0.00	1.00
Natural logarithm of value of assets	7.7600	1.2485	4.61	10.11
Natural logarithm of size of land	-0.0446	0.7036	-2.30	1.25
Dummy = 1 if household received extension advice	0.3768	0.4864	0.00	1.00
Number of plots held by households	1.8478	0.8871	1.00	6.00
Farming experience in years	6.7609	9.7296	1.00	48.00
Dummy = 1 if fertilizer was used on plot	0.9130	0.2828	0.00	1.00
Dummy = 1 if source of fertilizer was subsidy	0.3478	0.4780	0.00	1.00
Dummy = 1 if source of seeds was subsidy	0.2754	0.4483	0.00	1.00

Table 6 presents tobit regression results of the determinants of the share of land devoted to hybrid maize cultivation. The explanatory power of the model is good with an R-squared of 34.4 percent in Model 1 and 33.8 percent in Model 2 and the F-test indicates that the null hypothesis of all coefficients except the intercept being equal to zero is rejected at the 1 percent level of significance in both models. The key variable in the models is the participation of the household in the community based rural land development project and it represents land redistribution and improved tenure of security. Model 1 uses overall participation in the CBRLDP, and the regression results show that compared to non-participants, beneficiary households allocate relatively more land to hybrid maize cultivation. The coefficient is statistically significant at the 5 percent level.

However, Model 2 that distinguishes beneficiaries of CBRLDP by year of resettlement reveals that participation in a land reform programme is not a significant determinant of investment in hybrid maize. With the exception of the participation variable, the statistically significant variables in Model 1 have retained their significance and signs in Model 2. The size of the participation coefficients in Model 2 show that beneficiaries that resettled in 2006 (one season of cultivation) relatively allocated more land to hybrid maize than those that resettled in 2005 (two seasons of cultivation), compared to the base category of non-beneficiaries. Since, input support under the CBRLDP is only provided in the first year of resettlement, after controlling for other factors, the results suggest that land reforms (change in tenure and land relocation) are not the main drivers of agricultural investments in the transitional period.⁵ These results are some what consistent with the findings by Bradstock (2005) in the South African land reform programme in which the increase in per capita income was due to child grants and higher wage incomes

5 This contradicts the descriptive analysis, however, the economic evidence controls for other factors that influence investments decisions on improved maize seeds cultivation.

other than agricultural activities on the acquired land.

The results also show that male headed households invest less in hybrid maize production compared with female headed households. This is true in both Models 1 and 2, where the coefficient of gender is statistically significant at the 5 percent level. However, it is worth noting that the participation of female headed households remains limited in the land reform programme, hence increasing gender inclusiveness of the land reform programme is likely to enhance the positive impacts.

Table 6 Tobit regression results of share of land devoted to hybrid maize

Variable	Model 1		Model 2	
	Coefficient	t-statistic	Coefficient	t-statistic
Dummy = 1 if household is beneficiary of CBRLDP	0.2421	2.16**	–	–
Dummy = 1 if CBRLDP beneficiary resettled in 2005	–	–	0.0322	0.31
Dummy = 1 if CBRLDP beneficiary resettled in 2006	–	–	0.2056	1.59
Dummy = 1 if sex of household head is male	-0.2386	-2.57**	-0.2505	-2.66***
Age of household head	0.0185	1.05	0.0229	1.28
Age of household head square	-0.0001	-0.46	-0.0001	-0.66
Number of adult equivalent	-0.0028	-0.11	-0.0043	-0.16
Dummy = 1 if education of household head in Std 1–4	0.0695	0.55	0.0844	0.66
Dummy = 1 if education of household head in Std 5–7	0.1168	1.09	0.1388	1.28
Dummy = 1 if education of household head is Std 8	-0.1706	-1.28	-0.1447	-1.03
Dummy = 1 if education of household head is Form 1–4	0.2986	2.23**	0.3168	2.38**
Natural logarithm of value of assets	0.0289	1.00	0.0255	0.84
Natural logarithm of size of land	0.0692	1.33	0.0701	1.33
Dummy = 1 if household received extension advice	0.0141	0.19	0.0274	0.36
Number of plots held by household	-0.0979	-2.78***	-0.0937	-2.47**
Farming experience in years	-0.0035	-0.54	-0.0052	-0.81
Dummy = 1 if fertilizer was used on plot	0.5803	2.63***	0.6223	2.80***
Dummy = 1 if source fertilizer was subsidy	-0.3220	-3.17***	-0.3340	-3.16***
Dummy = 1 if source of seeds was subsidy	0.1745	2.02**	0.1850	2.03**
Constant	-0.6865	-1.61	-0.7754	-1.81*
Sigma	0.3805		0.3828	
Pseudo R^2	0.3444		0.3375	
F (17, 121)	8.30***		8.08	
Log pseudo-likelihood	-75.7420		-76.40	
Uncensored observations	97		97	
Number of observations	138		138	

Standard errors are heteroscedastic-consistent

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level

Household heads that have completed at least some secondary school education tend to locate more land to improved maize production. The coefficient is statistically significant at the 5 percent level in both models. This supports the evidence from other studies that better educated farmers are more willing to invest in new and productive technologies.⁶ Deininger and Jin (2003) find similar evidence of a positive relation between maximum education of the household head and amount of agricultural investments. However, the results are contrary to other studies that find no significance to the role of education in agricultural investments (see Otsuka et al., 2001). The number of plots owned by the households reveals the problem of land fragmentation in Malawi, and has consequences on investments. Fragmented plots introduce inefficiencies in farm management and may be a disincentive to investing in high yielding varieties that require more inputs and better farm management practices. The coefficient of number of plots is negative and statistically significant at the 1 percent level in Model 1 and the 5 percent level in Model 2, confirming the disincentive effect on investment.

Since 2005/06 season, the Government of Malawi has been implementing a targeted agricultural input subsidy programme which subsidizes fertilizers and improved seeds. Under the land reform programme, beneficiaries are also provided with grants for farm development which includes procurement of farm inputs. The study finds evidence that households that had access to fertilizers allocated more land to cultivation of hybrid maize. Given that the cost of fertilizers is much higher than the cost of hybrid seeds, for poor smallholder farmers their decision to increase investment in hybrid maize is likely to partly depend on the expected access to and affordability of fertilizers. The coefficients of access to fertilizer in general and access to subsidized fertilizer are statistically significant at the 1 percent level. However, access to subsidized fertilizers has dampening effects on investment in hybrid maize production; on the other hand, access to subsidized seeds stimulates investment in improved maize seeds by smallholder farmers. The negative effect of subsidized fertilizers on farm investments maybe due to the uncertainty in the targeting of subsidized fertilizers. Dorward et al. (2008) find that targeting of the agricultural input

6 For example, see Chirwa (2005b), Wier and Knight (2000), Doss and Morris (2001) and Croppenstedt and Demeke (1996).

subsidy varies considerably with communities using different criterion of targeting and this makes it difficult for smallholder farmers to make realistic plans on their farming decisions.

4.2.2 Land Tenure and Maize Production

Although farmers in the sample grow a diverse range of food and income crops, maize remains the dominant crop produced by both participants and non-participants household. It seems smallholder farmers decide to invest in food production first, before diversifying into other non-food crops to generate income. Since food security concerns are critical in smallholder farming decisions, improvements in maize productivity can potentially allow diversification into other income crops. It is therefore important to investigate the impact of participation in the land reform programme on maize productivity while controlling for other factors. Table 7 presents descriptive statistics of the variables used in estimating the maize production function. The adoption rate improved seeds, hybrid and OPV, is high and this may partly be attributed to the existing input subsidy programme. About 4 percent of households used both hybrid and OPV maize seeds. There is also high use of hired labour to augment family labour in maize cultivation, with 59 percent of household hiring labour on various activities on the maize plots. The programme has the potential to generate farm employment; this was confirmed by informants in the project area (see Chinsinga, 2008).

Table 7 Descriptive statistics of variables in the production model

Variable	Mean	Std. Dev	Min	Max
Natural logarithm of maize produced	6.4536	1.2134	2.71	8.70
Natural logarithm of land used for maize cultivation	-0.3277	0.7230	-3.00	1.09
Natural logarithm of labour used for maize cultivation	4.7034	0.8772	2.44	7.43
Natural logarithm of quantity of fertilizer on maize	4.2294	2.2329	-1.61	6.40
Natural logarithm of quantity of maize seeds	2.4550	0.7886	4.05	5.31
Dummy = 1 if household is beneficiary of CBRLDP	0.5076	0.5018	0.00	1.00
Dummy = 1 if CBRLDP beneficiary resettled in 2005	0.0606	0.2395	0.00	1.00
Dummy = 1 if CBRLDP beneficiary resettled in 2006	0.4318	0.4972	0.00	1.00
Dummy = 1 if household used hybrid seeds only	0.6894	0.4645	0.00	1.00
Dummy = 1 if household used OPV seeds only	0.1288	0.3362	0.00	1.00
Dummy = 1 if household used hybrid and OPV seeds	0.0379	0.1916	0.00	1.00
Dummy = 1 if household used hired labour on maize	0.5909	0.4935	0.00	1.00

Table 8 presents ordinary least square regression results of maize production function at the household level. The Cobb-Douglas production function is well-behaved with all the inputs positively related to maize output. The models explain at least 47 percent of the variation in maize output. Both Model 3 and 4 reveal decreasing (but nearly constant) returns to scale, with the value of returns to scale equal to 0.92. Among the inputs to maize production, the coefficients of land and fertilizer are statistically significant at the 1 percent level. The elasticity of maize production in relation to land and fertilizers are 0.54 and 0.15 in Model 3, respectively.

Table 8 OLS regression results of the maize production function

Variable	Model 3		Model 4	
	coefficient	t-statistic	coefficient	t-statistic
Natural logarithm of land used for maize cultivation	0.5759	3.01***	0.5363	2.64***
Natural logarithm of labour used for maize cultivation	0.1782	0.99	0.2121	1.15
Natural logarithm of quantity of fertilizer on maize	0.1507	3.80***	0.1521	3.87***
Natural logarithm of quantity of maize seeds	0.0158	0.11	0.0203	0.14
Dummy = 1 if household is beneficiary of CBRLDP	0.1336	0.77	–	–
Dummy = 1 if CBRLDP beneficiary resettled in 2005	–	–	-0.0676	-0.14
Dummy = 1 if CBRLDP beneficiary resettled in 2006	–	–	0.4593	1.97*
Dummy = 1 if household used hybrid seeds only	0.2828	1.32	0.2258	0.95
Dummy = 1 if household used OPV seeds only	0.3912	1.56	0.3919	1.52
Dummy = 1 if household used hybrid and OPV seeds	0.6417	2.75***	0.8006	2.51**
Dummy = 1 if household used hired labour on maize	0.1955	1.01	0.0186	0.08
Constant	4.4972	5.77***	4.4394	5.95***
<i>R</i> ²	0.4679		0.4898	
F (8, 124)	18.75***		17.42***	
Number of observations	132		132	

Standard errors are white heteroscedastic-consistent.

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

Model 3 shows that there is no significant evidence to suggest that households that are benefiting from the land reform programme are more productive than non-participants the project;⁷ the coefficient for the dummy of CBRLDP participation is positive, but statistically insignificant. Model 4 which distinguishes participation in CBRLDP by year of resettlement shows that it is only those beneficiaries that have recently resettled that produce more maize compared to non-participants. The coefficient of participation in CBRLDP since 2006 is positive and statistically significant at the 10 percent level. On the other hand, those beneficiaries that started participation in 2005 and who had access to the financial assistance package in the previous season tend to produce less maize than non-participants. These results suggest that the financial assistance package, rather than land tenure, is a major driving force in the positive impact of land reforms on maize production. The evidence is consistent with other studies such as Place and Otsuka (2002) in Uganda, who found no evidence that tenure is associated with productivity, but contrary to the evidence provided by Smith (2004) in the case of Zambia. The lack of evidence of a positive relationship between land tenure and productivity, suggests that managerial efforts are independent of tenure systems (Place and Otsuka, 2002). This also suggests that land reforms without complementary investments and assistance for poor smallholder farmers are unlikely to generate substantial benefits to investments and productivity.

Although, the CBRLDP programme documents suggest that beneficiaries have access to technical services as they make their farm development plans, the advice may not be effective or in practice this is not the case. Since, the erosion of the government extension system in the late 1990s, there is a general problem of the lack of extension advice to smallholder farmers. The government extension system is operating at less than 40 percent of its capacity, which partly handicaps the effective utilization of agricultural inputs by smallholder farmers. This is not surprising given that only 38 percent of households in the sample had access to extension advice, a situation which may not vary according to beneficiary status. The results also provide evidence that households that cultivated both hybrid and OPV maize were more productive than those that only used hybrid seeds or OPV seeds.

5 CONCLUSIONS

The land reform programme in Malawi provides opportunities for the land poor and near landless to access larger parcels of land under the resettlement programme. Land relocation in the CBRLDP also implies change in the tenure system from customary tenure to leasehold as a transitional arrangement through purchase of underutilised estates offered by estate owners. If the appropriate legislation were in place, this land would have been under the customary estate tenure which accords usufructuary rights. The transitional leasehold title accords group rights to the beneficiaries in the absence of the law. The CBRLDP uses a decentralised system of identification of land by poor households themselves, who also negotiate the price with the willing seller. Beneficiary households are also supported by financial grants that cover the cost of relocation and farm investments such as tools and inputs. The expectation is that access to land and change in the tenure system will have a positive impact on welfare and will lead to poverty reduction among the beneficiary households.

7 Similar results were obtained in a model of maize yield per hectare as a dependent variable which excluding land as an independent variable. In this model, quantity of fertilizers, dummy for hybrid and OPV seeds were the only statistically significant variables. The explanatory power of this model was weak.

This study tests the hypotheses that the change in the tenure system increases food security, agricultural investment and agricultural productivity. There is overwhelming evidence that food security for beneficiary households has significantly improved compared to before participation in the CBRDLP. Beneficiary households produce more maize and are not in a position of begging for food as the case was before relocation. Beneficiaries have experienced improved welfare and seem to be more satisfied with life compared to the period before participation in the land reform programme. In terms of investments, there is evidence to suggest that beneficiary households tend to allocate proportionately more land to the production of hybrid maize than non-beneficiary households. This may be partly due to the package of start-up assistance that relocated farmers get, working as a vehicle for introducing improved farming technologies. However, although the statistical analysis shows that plots of beneficiaries are more productive, if we control for other factors, there is no econometric evidence that beneficiary households are more productive in maize production than non-beneficiary.

The land reform programme, by allowing greater access to land and complementary input have had a positive impact on food security and agricultural investments. It has undoubtedly improved the food security situation of beneficiary households, however, the programme has been in existence just for only two agricultural seasons, and the time frame may be too short to realistically test the hypotheses about changes in land tenure systems. Moreover, the change in land tenure is transitional – group titles under leasehold – pending the establishment of the appropriate legal framework for registering customary estates. Currently, beneficiaries receive a lot of financial support in the first season under the programme and some of the decisions that are taken by farmers are heavily influenced by the design of the programme – such as provision of start-up fertilizers and improved seeds. It is therefore important to exercise caution in interpreting the positive impact of the programme as purely emanating from the changes in land institutions. The classification of participants into groups that have been under the programme for one season and those that have participated for two seasons, reveals that the package of financial assistance plays an important role that diminishes over time, and sheds more light on the question of sustainability given the missing or imperfect markets that exist in Malawian agriculture. The functioning of other markets such as transport, and output, labour and financial markets, are critical in a household's ability to maximize the benefits from access to land and improved tenure of security (Deininger, 1999; World Bank, 2003b; Bradstock, 2005).

Nonetheless, the results have important implications. First, from a methodological point of view it is difficult to separate the role of institutional change when land reforms are designed as a package of institutional change and complementary assistance to farmers in order to ease their cash constraints and enable them to undertake substantial investment. Second, from a policy perspective, the results show that institutional change – such as land tenure reforms in poor countries among poor smallholder farmers – are unlikely to generate substantial benefits in terms of investments, incomes and sustainable livelihoods without accompanying financial assistance to farmers through access to other agricultural inputs such as fertilizers and improved seeds. Bradstock (2005) reached a similar conclusion with respect to the land reforms in South Africa, along with the need for other services such as external agricultural and managerial support for the management of large parcels of land by smallholder farmers. Third, the transitional tenure system of group rights under leasehold tenure creates uncertainty about the rights individuals have over their portions of land. The real benefits of changes in land institutions can only be determined when individual households have individual titles to their parcel of land under customary estate tenure.

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