Policy Research Working Paper 5093

Can a Market-Assisted Land Redistribution Program Improve the Lives of the Poor?

Evidence from Malawi

Gayatri Datar
Ximena Del Carpio
Vivian Hoffman

The World Bank
Independent Evaluation Group
Corporate, Global and Methods Division
October 2009

Policy Research Working Paper 5093

Abstract

This paper uses a rural household survey dataset collected in 2006 and 2008 to investigate the impact of a market-based land resettlement project in southern Malawi. The program provided a conditional cash and land transfer to poor families to relocate to larger plots of farm land. The average treatment effect of the program is estimated using a difference-in-difference matching technique based on propensity score matching; qualitative information complement the analysis to ensure unobservable characteristics do not bias the findings. As expected, the results show a significant effect on landholdings and agricultural production, with land size increasing and maize production increasing by more than 100 kilograms relative to the control. However, the impacts on food security and asset holdings were mixed. Households that relocated great distances had systematically lower impacts than those households that stayed within their district of origin because they had to adapt to unfamiliar agro-ecological, cultural, and market environments. Impacts also varied across gender of the household head; female-headed beneficiary households increased their productive and consumption assets significantly, while male-headed households increased their asset holdings less so.

This paper—a product of the Corporate, Global and Methods Division , Independent Evaluation Group—is part of a larger effort in the department to evaluate World Bank programs rigorously. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at xdelcarpio@worldbank.org.

Can a Market-Assisted Land Redistribution Program Improve the Lives of the Poor?

Evidence from Malawi[1]

Gayatri Datar Ximena Del Carpio Vivian Hoffman

JEL Codes: D12, D24, O12, O18, O54, Q12, Q15
Keywords: Rural development, Productivity, Land consolidation, Impact evaluation, Malawi

[1] We thank Julia Behrman, Brian Blankespoor, Peter Fleming, Irene Jillson, Niall Kelleher and Pamela-Velez-Vega for inputs and support. We recognize great efforts from the World Bank country team who planned and implemented the project, and the field research team who collected the data. We are indebted to World Bank reviewers and colleagues who commented on previous versions of the paper, especially Javier Baez, Kathleen Beegle, Norman Loayza, Elisabeth Sadoulet, Mark Sundberg, Hardwich Tchale and Andrew Warner. Lastly, we thank the Swiss Agency for Development and Cooperation (SDC) and the World Bank Independent Evaluation Group for financial support. All errors and omissions are our own. Correspondence authors are xdelcarpio@worldbank.org and vhoffmann@arec.umd.edu

Can a Market-Assisted Land Redistribution Program Improve the Lives of the Poor?
Evidence from Malawi

I. Introduction

This paper evaluates Malawi's Community Based Rural Land Development Project (CBLDP), which provides a conditional cash and land transfer to a group of families to relocate to larger and more productive plots of land. In addition to supporting families in obtaining land, the program administers a farm development grant, assists in the procurement of water infrastructure, provides extension services, and makes sure that beneficiaries obtain group titles to the land. Individual land titling is also available through the project, though this part of the project was not emphasized. This paper sheds light on whether the project had an impact on agricultural production, productivity, and a host of welfare outcomes by measuring differences between beneficiaries and statistically comparable non-beneficiaries, before and after the program. The paper also investigates whether aspects of the program improved or worsened impacts.

Land reform has long been recognized as a powerful tool for the economic and social development of agriculture-based economies. Over the past decades, several reform programs have been implemented with the aims of enhancing farmer productivity, augmenting the assets of the poor, and improving land equity, thus alleviating poverty and reducing the potential for social unrest (Silveira et al, 2001; Binswanger, Deininger, and Feder, 1999; Deininger and May, 2000). One such model involves voluntary market-based redistribution of land from larger estates to smallholders, and has been implemented in Malawi, Zimbabwe, South Africa, Brazil, Japan, Taiwan, China, Bangladesh and several former Soviet bloc countries (Byres, 2003). Market-based reforms have received significant criticism for not truly benefitting those who are

most in need, and instead benefitting those with relatively more political power and means to take advantage of the program (Borras, 2007; Mutume, 2001; Wegerif, 2004). However, few of these programs around the world, and none that we are aware of in Sub-Saharan Africa, have been empirically evaluated in such a way that would enable a robust understanding of who benefits and how.

Existing evaluations – most of which lack a valid control group– demonstrate very mixed results. Rigorous evaluations are especially important for policy makers given that land reforms require vast financial resources, human resources, and political will. This paper contributes to the very limited body of research on market-based redistributive land reform, particularly in the African context, by evaluating the impact of a $27 million land resettlement program in Malawi.

The theoretical impacts of such a land reform program are clear. Increased access to farmland and cash for farm inputs should increase production, increased extension support is expected to enhance productivity, and formal land title may promote longer-term investments in land. Several papers have found that productivity decreases with farm size (see for example Binswanger et al., 1995; Kutcher and Scandizzo, 1979; Berry and Cline, 1979; Barraclough, 1970), and that long term economic growth and productivity decreases with asset inequality (Bardhan et al., 2000; Nugent and Robinson, 2002; Banerjee and Iyer, 2005). Thus, transfers may not only reduce poverty and inequality, but also increase efficiency and spur economic growth. Few evaluations have rigorously measured whether each of these four mechanisms – increasing the size of land cultivated, providing farm inputs, offering extension advice, and promoting land title – actually increase incomes and reduce poverty.

Some papers have found that a marginal increase in land can make a tremendous difference for smallholders; however, the difference varies depending on the season (and country). Previous work in Malawi documented an overall labor scarcity at peak of the cropping season and excess labor after the harvest leading to underemployment (Kamanga, 2002; Wodon and Beegle, 2006). A paper using panel data from Mexico found that an additional hectare of land significantly increases expenditures by 880 pesos, which is 1.3 times the earnings of the average agricultural worker (Finan, Sadoulet, and de Janvry, 2004). However, evaluations of land reform projects intended to increase the size of land cultivated show mixed results.

More specifically, one study found that the 1980 Zimbabwe land reform had dramatically positive impacts in terms of assets, household consumption, agricultural income, and reduced inequality (Gunning, Hoddinott, Kinsey, and Owens, 2000; Kinsey, 1999; Hoogoveen and Kinsey, 2001). However, another paper that utilized propensity score matching only found modest, although positive impacts on per capita expenditure, largely due to a marked increase in household size (Deininger, Hoogeveen, and Kinsey, 2004). Reforms in Japan, Korea, and Taiwan were shown to improve productivity (Jeon and Kim, 2000), while some reforms in Latin America appear to not have such an impact (de Janvry and Sadoulet, 1989). A 20 year panel studying Indian land reforms demonstrates significantly positive impacts on income and consumption, especially for those who are relatively poor, that tend to decline over time (Deininger, Jin, and Nagarajan, 2007).

The impact of land titling is likewise controversial. Some papers find that ownership security increases capital formation, land-improving investments, and land-specific investments (Alston and Libecap, 1996; Feder and Onchan, 1987), while others find no significant impact on such investments, use of inputs, access to credit, productivity, or land value (Jacoby and Min-

ten, 2007; Place and Hazell, 1993). Although very few of the program beneficiaries exercised the opportunity to acquire individual titles, all received communal titles that many believe hold similar value (Barrows and Roth, 1990).

This study uses a panel dataset collected by the project team specifically to evaluate the program that includes information on 256 program beneficiary households immediately before resettlement (2006) and two years after relocation (2008), as well as 381 households in nearby districts with similar climatic and socioeconomic conditions who were not eligible to participate in the program at the time of data collection[i]. In order to measure the impact of the program on all variables of interest propensity score matching is used to identify a control group among the ineligible population that is similar to the beneficiaries at baseline, a series of t-tests at baseline helps ensure that the groups are comparable at baseline, qualitative information obtains in-depth information on potential sources of biases that need to be taken care of in the estimations and difference-in-difference is used.

Changes in several outcomes of interest, including landholdings, agricultural production, asset holdings, and indicators of food security, are then compared between beneficiaries and controls. As the survey conducted in 2008 is more extensive than that collected in 2006, for some variables, simple differences between the control and treatment groups two years after beneficiaries resettled are presented.

This analysis indicates that the program had overall positive effects on the landholdings, title-holdings, and agricultural production of participating households. However, there is mixed evidence of the impact of the program on the food security and asset holding. This is somewhat surprising, given the large transfer of both land and money for farm development

received by program participants. On the other hand, after only two seasons in their new locations, beneficiaries are likely still learning how to make the most of the resources they now control. This may be particularly true for households that relocated great distances and must adapt to unfamiliar agro-ecological environments, cultural settings and new markets. Indeed, the degree to which participants benefited from the program, and the ways in which they did, differed depending on the distance they moved. Impact also varied across gender of the household head – female-headed beneficiary households increased assets significantly more than male-headed households – while impact rarely varied across levels of farming experience.

The remainder of the paper is organized as follows: Part II describes the background of the project, Part III discusses both the qualitative and quantitative analytical approaches, Part IV describes the empirical strategy, Part V discusses the quantitative and qualitative findings, and Part VI concludes.

II. Background

CONTEXT

The 2007 Malawi Poverty and Vulnerability Assessment reports that 52 percent of the population in this landlocked country of 14 million lives below the poverty line, and there has been little progress reducing poverty since 1998 (World Bank, 2007). Poor growth performance over this period was primarily attributed to erratic weather patterns that adversely affected agriculture, the most important economic sector in the country. Severe droughts in 2001 and 2005 devastated production of rain-fed maize, the primary crop of Malawi's 1.8 million smallholders who each own an average of one hectare of land. Eighty-five percent of the country's employment is in agriculture, and land distribution, especially when large estates are included, can be very unequal. Land inequality is particularly a concern in areas with very high popula-

tion density; especially because it is estimated that one-third of total arable land is under-utilized (World Bank, 2005). Land pressure in southern Malawi is particularly extreme; land holdings can be as low as 0.1 hectares per household, and soil suffers from erosion and nutrient depletion.

THE PROJECT

The Community Based Rural Land Development Project was a community-based and voluntary approach to land acquisition in four pilot districts in rural Malawi. The lifespan of the pilot project was initially set at five years, 2004 to 2008; however due to a slow start only 12,600 families out of 15,000 intended beneficiaries had been moved as of mid-2009, and relocations may therefore continue through 2009. The two primary components of the program are the provision of land and farm development grants to groups of landless or land-poor households. The land provision included a group-level title, and as part of the farm development component, farmers were offered extension services and assistance managing group-level grants.

The project was implemented in four districts in the Southern region of the country characterized by overpopulation and shortages of land: Mulanje, Thyolo, Machinga and Mangochi. Mulanje and Thyolo in particular face extreme levels of land inequality. Large tea and coffee estates occupy vast tracts of the best arable land, leaving substandard quality land for subsistence farmers. Machinga and Mangochi face the same issues to a lesser extent due to the presence of coffee and tobacco estates. A large percentage is held under customary tenure (estimated at 90 percent), and the rest is owned mostly by tea and coffee estates in Thyolo and Mulanje, and tobacco estates in Machinga and Mangochi. Many of these leasehold tobacco estates were enthusiastic to sell unproductive land in light of the decline of global tobacco prices

over the last decade. In contrast, few landowners in Thyolo or Mulanje were willing to sell to the CBRLDP. Thus, beneficiaries were relocated from all four districts to former estates in Mangochi and Machinga.

The Ministry of Lands and Housing, working through a Lands Project Office in each participating district, conducted a sensitization campaign to inform potential beneficiaries about the project. Interested households registered with local traditional authorities and were asked to form Beneficiary Groups (BGs) of 10 to 35 households. Village authorities, group leaders and project personnel at the district level verified the eligibility of prospective beneficiaries. To be eligible, one had to be relatively land poor or landless Malawian national from one of the four targeted districts. Beneficiary groups, with the assistance of Lands Project Officers as needed, began the land identification and acquisition process.

The process of land acquisition was organized by project officials from Mangochi and Machinga, who contacted local estate owners and created a database of owners willing to sell. Groups from Thyolo and Mulanje relied upon the project database to identify potential land and sent group leaders to evaluate prospective estates on behalf of the group. Potential beneficiaries from Mangochi and Machinga were generally familiar with local estates and estate owners and did not need project assistance to identify land. In many cases these groups lived near the land they subsequently legally acquired, thus hardly moving. Those who moved onto different pieces of land often maintained the original piece of land (for extended family members that did not move, or for themselves).

Once the land was identified, the BGs entered into negotiation directly with the owner of the estate to agree on a price, and a binding provisional sale agreement was signed by all par-

ties. The field appraisal team worked to ensure that the land was suitable on a variety of dimensions that could affect future outcomes (for example: agriculture, environment, social welfare, and so forth). The findings of the field appraisal were written up as a formal proposal to purchase the land and were then presented to the project Committee. The proposal had to be approved by the Project Manager (located in the urban area of Blantyre) and approvals for beneficiary relocation were done by the National Technical Advisory Committee. Once all approvals were completed, money was disbursed and public notices of the land sale were issued to do a final verification of the estate owner's title.

Only six BGs were moved in the first year of the program (2005), and 123 were moved in the latter part of 2006 until early 2007. Subsequent groups were moved in the following years under a slightly changed implementation scheme. This evaluation focuses on beneficiaries who moved in the second year, and uses baseline and follow up data that were collected for these beneficiaries as well as for comparison households living in neighboring districts. For a map of the areas affected by the program, see Annex Figure I.

Each beneficiary household received approximately two hectares of land, a cash grant held in a group bank account, and title to their land through a group-level title deed. The total amount per household was $1050, from which 30 percent could be spent on the purchase of land, 8 percent was given as a relocation allowance prior to resettlement, and the rest of the money was supposed to be applied toward farm development[ii]. Cash was released in tranches to the BGs upon request. Each tranche of money was released to the group as a whole, and then allocated among households. Project administrators often requested a report of how the money had been spent before releasing subsequent tranches. Beneficiaries could use the money to pay themselves for their own labor inputs, which was very common in the first two years of the

program. In subsequent years (beginning in 2007) Lands Project Officers required that BGs secured quotes for expenditures before funds were released; this however does not apply to the group under evaluation.

Another benefit of the program was access to agricultural extension services. Extension officers were hired by the project and provided assistance that ranged from training beneficiary households in negotiating land prices to drafting farm development and input expenditure plans. Extension officers also helped link farmers to non-government organizations (NGOs), service providers, agro-dealers and other long-term extension providers. Despite many obstacles faced during the implementation of the program, only 2 percent of beneficiaries withdrew from the program, and most reported being satisfied with the move.

III. Analytical approach

MIXED-METHODS

This evaluation uses a mixed methods approach. By using qualitative techniques to obtain a more nuanced understanding of the context and implementation of the program, it is possible to develop identification strategies that reflect the realities of program participants that may have influenced the program's impact or lack thereof (Ravallion 2003). The qualitative work also enables better understanding of the channels through which impacts may have occurred, and to get at less easily quantifiable impacts of the program. The simultaneous and sequential mixing of methods seeks to attenuate the disjuncture that exists among stakeholders involved in program design and evaluation, and thus yields insights that neither method alone can produce to lead to operational policy recommendations (Rao and Woolcock 2004).

QUALITATIVE DATA

The qualitative analytical methodology was designed to inform and elucidate unclear or ambiguous quantitative findings, and to enhance understanding of project impact, the determinants of success or failure, and the channels through which changes in productivity were achieved. The areas of potential impacts we considered to explain possible ways through which the program affected productivity are displayed in Table I.

[INSERT TABLE I]

The sampling frame for the study consisted of those communities covered in the household surveys that would be used in the quantitative exercises. These communities were selected using a geographic stratification (by district) and selected at random from a list of all communities. Interview instruments were organized ex-ante, following a structure similar to the household survey except using open ended questions. The instruments were designed to capture any possible associations between the project intervention and changes in productivity, and allowed for identification of patterns across respondents on key questions and/or topics. The categories of respondents were designed to ensure a comprehensive representation of key project stakeholders (such as, World Bank project management team, field implementation staff, beneficiaries and non beneficiaries) and to guarantee that a balanced source of information about the project vision, specifics, accomplishments and failures were represented.

The study design used a cause-effect approach to assess the relevance of the predetermined factors hypothesized to influence productivity as compared to other factors outside the project scope. This was done by focusing on changes experienced by beneficiary (treatment) and non-beneficiary (control) participants in the same project intervention areas during a specific period of time. A comparative analysis was done between both groups to provide a more ba-

lanced view of the role project interventions played in improving farmers' productivity, income among others. The present paper cites the most relevant findings obtained from the field work; for a comprehensive picture of the qualitative work, as well as a detailed description of the analytical methodology and data, see Behrman (2009).

QUANTITATIVE DATA

The quantitative analysis makes use of a panel survey specifically designed to measure the impact of the program. The survey was designed and implemented in 2006 by a research firm under the direct supervision of the World Bank. The baseline survey was administered to 857 households immediately following their relocation. Fifty beneficiary groups were selected, and 5-10 households from each of these were surveyed. Households were asked about their assets, agricultural production during the 2005-2006 season, current activities, and average (monthly and yearly) expenditures on various categories of goods. The same survey was administered to households in districts untouched by the program in the same time period, both at baseline and at follow-up.

While data collection was conducted after relocation, a number of variables are retrospective and can therefore be interpreted as true baseline values. These include variables related to agricultural production and livestock holdings, for which all questions referred the previous agricultural cycle ending in June 2006. The survey includes a question on the year in which year each durable asset owned by the household was obtained, which is used to construct values of productive assets and consumer durables acquired in 2005 or earlier. While most questions on expenditures and food security refer to the current period and are therefore unusable as baseline variables, data on the number of meals taken in the lean season (or time in the year before crops are ready to harvest, January – February) refers to years preceding relocation. All

beneficiaries moved and were surveyed between July and November of 2006, after the end of the 2006 lean season and before the start of the 2007 lean season[iii].

Of the 857 households that were surveyed in 2006, 504 were also surveyed at the end of 2008, representing a re-survey rate of only 59 percent. This was not due to withdrawals, as only 2 percent of beneficiaries dropped out of the program, but rather poor data collection at follow-up. It is likely that beneficiaries were re-surveyed non-randomly, for example, only those who were easy to find were re-surveyed. Thus, to address the attrition problem, 200 of the attrited households were randomly selected to be re-surveyed in February 2009. Of these, 133 were located and surveyed, resulting in 637 households at baseline and follow up. The team was not able to locate the other 66 households, due to a combination of false names given by some respondents at baseline, migration of households out of project areas, and inaccessibility due to flooding, as these surveys were conducted during the rainy reason. Thus, the final panel includes 637 households, 74 percent of the original baseline sample. Of these, 256 are beneficiary households, and 381 are from non-project districts; table II breaks down households by beneficiary/control status, and attrition status.

[INSERT TABLE II]

In order to better understand whether attrited households were systematically different from those for which there exists follow-up data, baseline tests are run on key outcomes of interest. Results show that attrited beneficiaries do not differ from the non-attrited sample, with the exception of consumption assets (non-productive), for which attrited households had more at baseline. While the attriters in the control group cultivated slightly less cassava and had less food security than controls that were sampled at follow-up, this is hardly a concern given that

we construct a comparable control sample using propensity score matching (described in the next section). Thus, there is little reason to believe that the households not surveyed at follow-up are substantially different from those that were, or that this is a source of bias.

IV. Empirical strategy

Outcome variables among program beneficiaries are compared to those of similar households in neighboring districts that did not participate in the CBRLDP during the pilot phase, but to which the program will be expanded if it is scaled up. Participation in the program was determined through a combination of self-selection and needs assessment. Not all households in the participating districts elected to participate, and not all of those who wished to participate were eligible according to the criteria of landlessness or land poverty. Simply comparing outcomes across beneficiaries and populations in non-participating districts would therefore be misleading. It is necessary to identify a valid control group from among the ineligible population, namely those who would have participated in the program had they been given the option to do so.

Propensity-score matching is used to identify such a counterfactual. Under this method, a binary variable indicating program participation is regressed on baseline household characteristics thought to influence participation. Program participants as well as those living in ineligible districts are included in this regression. The resulting coefficients are then used to predict treatment for each observation, in order to construct a propensity score for all households in the two groups. The propensity score is used to match participating households with those that were ineligible due to their location, but who were similar along other dimensions likely to predict program participation[iv]. Details on the merits of propensity score matching and the me-

chanics of how matches are determined are described in Dehejia and Wahba (2002) and in the seminal work by Heckman, Ichimura and Todd (1997 and 1998).

The program was targeted to the landless or land-poor. There was no cut-off landholding above which a household was excluded; rather, members of applicants' communities and district-level officials verified that applicants were in fact poor. A dummy variable indicating any positive land ownership, and the size of land cultivated, are therefore used as predictors of program participation.

Interviews with lands project officers indicated that eligibility for the program was based on general poverty status rather than simply land poverty. Meals taken in the lean season and months of reserve food (as measures of food security), and durable asset value and as a measure of wealth, are thus included in the participation equation. A dummy variable indicating that a member of the household had completed primary school is included as well, since human capital is associated with engagement in higher-income activities such as cash cropping and off-farm employment.

Qualitative work also suggests that households with fewer able-bodied adults were less likely to take up the program, owing to the heavy labor demands of farm development. Based on this observation, the number of adult household members, age of head, and household size are included as predictors of program participation. Finally, since the impact of the program on agricultural production is of primary interest, households are matched on maize, tobacco, and cassava production in the 2005-2006 season. Cassava production may also serve as an indicator of expected income, as this is a less-preferred food, though a more drought tolerant crop. Thus, the participation equation is as follows[v]:

$$\begin{aligned} Participation = \; & \beta_0 + \beta_1 (Land\ Ownership) + \beta_2 (Garden\ Size) + \beta_3 (Meals\ in\ Lean\ Season) + \\ & \beta_4 (Months\ of\ Reserve\ Food) + \beta_4 (Productive\ Assets) + \\ & \beta_5 (Consumption\ Assets) + \beta_6 (Primary\ School) + \beta_7 (\#\ Adults\ in\ HH) + \\ & \beta_8 (HH\ Head\ Age) + \beta_9 (Household\ Size) + \beta_{10} (Maize\ kg) + \\ & \beta_{11} (Tobacco\ kg) + \beta_{12} (Cassava\ kg) + \varepsilon \end{aligned}$$

All of the matching criteria are at the household level; and all, except the number of adults and kilograms of maize cultivated at baseline, significantly predict participation. As expected, those who own land are less likely to participate, as they were less likely to be eligible and/or interested in the program. Also as predicted, those who had less food security, those who were less educated, and those who held a lower value of consumption assets (for example, consumer durables, and furniture), an indicator of wealth, were more likely to participate. However, probability of participation increased with productive assets, potentially signaling farming households. Similarly, those farming more cassava and tobacco at baseline were more likely to participate. Larger households were also more likely to take up the program.

Once beneficiaries are matched to ineligible households based on their predicted outcome from this matching equation, the treatment (beneficiary) and matched comparison households are similar across the key outcome variables of interest at baseline. As shown in Table I in the Annex, treatment and matched controls do not differ significantly on any of the outcome variables of interest measured at baseline. Annex tables IIa and IIb display descriptive statistics of the beneficiaries and the matched control households, respectively.

We used several methods to ensure the comparability of the treated and the matched control. First, much of the qualitative investigation focused on identifying locality characteristics that may be different between treated and control localities; in particular, elements that are difficult to observe with survey data and may influence quantitative comparability between the groups. The final estimations include variables that reflect findings from this investigation.

Second, in a series of t-tests we test the balancing property of the probit specification previously outlined to ensure that the mean propensity scores are comparable for both groups at various levels of propensity scores. Third, quantitatively we use a difference-in-differences approach (except on two subjective variables), where the change in the outcome variable is regressed on a dummy variable indicating program participation, and control for time-invariant differences between beneficiary and comparison households.

There are two variables for which baseline data is not available; these are subjective assessments of well-being, wherein respondents were asked to assess whether their economic and general well-being was better than before moving (or better than 5 years ago for controls). For these we compare simple difference in outcomes across beneficiary and comparison households, conditional on controls. As this asks about changes over time, the coefficient on the treatment dummy also represents a difference in difference. A complete list of outcome variables used to measure the impact of the program is as follows in Table III.

[INSERT TABLE III]

The primary explanatory variables of interest in these regressions are "Treated", "Treated*Moved_Far", "Treated*Female Head", and "Treated*Maize kg (BL)". The "Treated" variable indicates that the household received land and inputs through the CBRLDP. The "Treated*Moved_Far" variable indicates that the group of which the household was part moved outside its district of origin.[vi] Separate treatment effects are estimated in this way because it is expected – both from a key qualitative finding and theoretically – that impact will differ between households who essentially remained within their communities but acquired more land, versus those who moved far away from their social networks and the agro-ecological en-

vironment—which may affect the type of crops cultivated--to which they were accustomed. Those who moved longer distances are also more likely to have relocated to remote areas, far not only from their own place of origin, but also from markets and social services.

The specific treatment effect for female-headed households, who make up over a quarter of the sample at baseline, is also examined. Qualitative work indicated that female-headed households faced particular challenges of relocation due to labor constraints and traditional reliance on extended family networks. Finally, the estimation also includes an interaction of program participation with maize production at baseline to examine whether the program had differential effects on those with more versus less prior farming experience.

In addition to the treatment variables, household size, an indicator equal to one if any household member completed primary school, gender of household head, age and age squared of head are included as controls. An indicator of previous farming experience, measured by kilograms of maize at baseline, is also included. It is also important to control for whether the household benefited from the national fertilizer subsidy program in the previous agricultural season. In 2007, the Government of Malawi distributed vouchers for fertilizer and seeds valued at $62 million US to smallholder farmers all over the country. Each voucher could be redeemed for one 50 kg bag of fertilizer at a price of 800 MK ($5.7 US), less than 10 percent of its market value. For the year following relocation, beneficiaries were officially made ineligible for the subsidy. Beyond this one-year period, vouchers were distributed by beneficiaries' new village leaders.

The qualitative study indicates that beneficiaries of the CBRLDP were seen by others in their new communities as relatively well-off, and so continued to be denied vouchers two years

after relocation even though most had depleted their farm development grants during the first season. Not accounting for the difference in access to fertilizer subsidies across beneficiaries and controls would lead to underestimation of the CBRLDP's effects.[vii] Explicit data on access to the subsidy is not available, however since the vast majority of vouchers in previous years were redeemed either through the Agricultural Development and Marketing Corporation (ADMARC) or through the Smallholder Farmers' Fertilizer Revolving Fund of Malawi (Malawi Ministry of Agriculture and Food Security, 2008), it is assumed that if a household used fertilizer and obtained inputs from ADMARC or from a cooperative, they benefited from the subsidy. Sixty-five percent of beneficiaries and 77 percent of comparison households in the sample acquired fertilizer from one of these sources.[viii] Although imperfect, this strategy is likely to come closer to the true estimate than the alternative of leaving out this important control variable.

The average treatment effect of Y at the household level (h) at time t is first measured in Specification 1. This specification includes a control for maize production in kilograms at baseline (or t-1) and receiving a fertilizer subsidy, parallel to the program. Specification 2 looks at the differential impact across those households that moved far and those that were headed by a female. A third specification measures how the treatment effect varies with farming experience at baseline.

$$Y_{h,t} - Y_{h,t-1} = \alpha + \beta_1(treat_{h,t}) + \delta(maize_{h,t-1}) + \gamma(fert\_sub_{h,t}) + X_{h,t-1} + \varepsilon_{h,t} \quad (1)$$

$$Y_{h,t} - Y_{h,t-1} = \alpha + \beta_1(treat_{h,t}) + \beta_2(treat_{h,t} * movedfar_{h,t}) + \beta_3(treat_{h,t} * female_{h,t-1}) + \delta(maize_{h,t-1}) + \gamma(fert\_sub_{h,t}) + X_{h,t-1} + \varepsilon_{h,t} \quad (2)$$

$$Y_{h,t} - Y_{h,t-1} = \alpha + \beta_1(treat_{h,t}) + \beta_2(treat_{h,t} * maize_{h,t-1}) + \delta(maize_{h,t-1}) + \gamma(fert\_sub_{h,t}) + X_{h,t-1} + \varepsilon_{h,t} \quad (3)$$

V. Mixed-Methods Findings

Two broad sets of outcomes are considered: agricultural production and household welfare. Data on most of the variables used were included at baseline and follow-up, thus allowing for comparison of changes across control and treatment groups. Where this was not possible, simple differences at follow-up are presented. The impact on land holdings and land title, two direct provisions of the program, are first examined.

The analysis then turns to agricultural assets and productivity of beneficiary households, as they are two of the primary outcomes the project is theorized to influence. The set of outcome variables considered includes changes in: natural log of productive asset value, production and yield of maize, production of tobacco, production of cassava, and livestock holdings. The natural log of total crop value at follow-up is also included[ix]. Welfare outcomes, namely the change in food security, consumption assets, and subjective well-being, are examined next. Finally, the differential treatment effects of distance moved, household head gender, and farming experience are analyzed for all outcomes.

GENERAL IMPACT ON AGRICULTURAL OUTCOMES

Two of the main channels through which the project aimed to meet its objectives were increasing land holding and promoting formal group titling. Qualitative and quantitative results both suggest that the project succeeded in increasing access to land, which increased the size of cultivable land, and promoting formal titling. As displayed in Table IIa in the Annex, cultivable land (garden) size increases significantly for beneficiaries (by 1.01 acres) relative to the control group; also, beneficiaries were 65 percent more likely than controls to gain formal title to their land. Qualitatively, beneficiaries report satisfaction with their increased land holdings and higher quality of lands acquired. A project administrator from Mangochi asserts that

land ownership was a key factor of the project because it provides the beneficiary with an "incentive" to fully utilize the potential of the land. Observing significant impact on these dimensions is to be expected since land transfers and group titling were provided directly through the project. Although the program intended for beneficiaries to obtain individual deeds for their land, most of them were content with group-level legal ownership provided by the program; people cited high administrative costs as the main reason for not obtaining individual deeds.

Agricultural impacts of the program such as production, productivity of beneficiary households, and productive assets are more ambiguous. The majority of respondents (both beneficiaries and project officers) felt that the grant was not adequate to beneficiary needs, due to price increases in crucial inputs such as fertilizer and the fact that water infrastructure was not provided through a separate agency as had been expected. Although some project administrators believed that the grant promoted aid dependency and was used by beneficiaries on consumption goods such as cellular phones and radios, many informants refute misspending. Qualitative evidence shows that beneficiaries spent their farm development grants on farm inputs (seeds, fertilizer, and hired labor), productive assets (sickles, hoes, panga knives, machetes, axes, and watering cans), housing, and food.

There are also reports from project staff and beneficiaries that casual labor use increased dramatically in the first year of the grant when the beneficiaries had money to spend and large plots of virgin, or previously fallow, land to cultivate. However, other beneficiary households relocated too late to plant and had to rely on their farm development grant to purchase food for most of the first year after moving. This can explain the depletion of farm development grants on food and intermediary inputs during the first agricultural season after relocation, and suggests that expenditures on housing and subsistence needs consumed a large portion of the

grant. The fact that the quantitative analysis shows no significant increase on productive asset value for program participants substantiates this latter effect.

[INSERT TABLE IVa]

Key measures of production are positive and significant (Tables IVa, IVb and IVc). Beneficiaries increase their maize cultivation by over 100 kilograms more than the control group increased cultivation, although maize yields were not affected. Beneficiaries also increased tobacco production by 53 kilograms more than the control group, and increased livestock holdings and total crop value significantly more. There is a consensus among project staff that as a result of the farm development grant and, to a lesser extent, the increased plot sizes, the beneficiary groups use more inputs, and that as a result of the extension services they use these inputs more productively. However, as productivity of households did not significantly increase, it is likely that the increase in maize production was driven by additional land, and other non-land farm inputs. Moreover, productivity in terms of land utilization likely increased substantially because beneficiaries received and are farming land previously underutilized. Unfortunately, the data contains no information on land utilization prior to the program and this finding can only be qualitatively confirmed.

Extension services may have also contributed to beneficiary success in enhancing production and making effective use of their increased land. These services were extremely popular, and were effective in instructing beneficiaries on land resource management, preservation, ridge and plant spacing, hybrid seed usage, and effective fertilizer and insecticide use. However, beneficiaries also complained that extension services were very thinly spread. Nonetheless, 75 percent of beneficiary groups interviewed reported that access to extension improved with

the program. Additionally, informants from all four districts report that due to increased plot sizes, beneficiaries are no longer forced to practice intercropping.

[INSERT TABLE IVb and IVc]

GENERAL IMPACT ON ECONOMIC WELFARE

Data limitations prevented the analysis from examining key welfare indicators such as income and expenditures. However, other welfare indicators such as food security and asset holdings, along with qualitative findings, provide a picture of the project's welfare impacts. As demonstrated in Table V, participation in the program had a mixed impact on food security. While beneficiaries' change in months of reserve food in times of plenty is greater than controls', the opposite is true for change in lean season meals. This is consistent with the qualitative findings. Production generally increased, leading to additional months of reserve food in the times of plenty. Respondents say that it is common during these months to have three meals a day.

Project administrators also report that children's consumption in particular has increased vastly and children are more inclined to attend school since they are able to have breakfast. However, lean season meals (based on recall data from the previous lean season) decreased because farmers were forced to sell much more of their output, and thus reduce their meals, in order to make a profit given the significantly lower market prices. Several farmers maintain that they would be able to keep more of their produce for personal consumption if they had access to more reliable markets with better prices (for example, ADMARC) or to outside income generation activities. It is also possible that farmers overestimated the appropriate amount to sell after an initial bumper harvest due to increased land and inputs. However, low

market prices, and the lack of other income-generating opportunities (such as piecework), were consistently the reason given for poor food security, and were seen to be a major obstacle to poverty reduction.

Somewhat surprisingly given the large cash transfer, the change in consumption assets such as consumer durables was significantly lower than that of controls. This contrasts with reports from program administrators that beneficiaries had spent money on "luxury" items such as radios and tin roofs. As the qualitative work found that beneficiaries moved from living with larger extended families to only living with their nuclear families in the new location, it is possible that consumption assets were left behind to extended family members. Consumption assets include beds, tables, cupboards, and other bulky items, which beneficiaries potentially did not have enough cash left over to reacquire after spending it on farm inputs, food, and consumer goods mentioned above. Another possible explanation for the negative coefficient is that respondents may have accounted for the assets of everyone in the extended family at baseline, and only those who moved at follow-up.

The follow-up survey included several subjective questions related to changes in economic welfare since the time of relocation; these range from adequacy in income to general satisfaction. People who participated in the program had a positive perception of changes in their income and economic well-being two years after relocation as compared to the control group's perception. This change is most apparent, 20 percent more for beneficiaries, when asked about general economic well-being which may proxy for a more permanent measure of economic security.

[INSERT TABLE Va and Vb]

DIFFERENTIAL IMPACTS

Distance Moved

The quantitative and qualitative work both demonstrate that project impact was lower for beneficiaries that moved out of their district of origin. With the exception of maize production, the agricultural impact for those who moved far was almost consistently less than it was for those who did not move far, although only significantly so for tobacco production and total crop value. With respect to welfare outcomes, beneficiaries were generally 26 percent more likely than controls to believe their economic well-being was better than before; however, beneficiaries that moved far were only 4 percent more likely, a significantly lower likelihood. Similarly, beneficiaries thought their income was better now than before the program 17 percent more often than control households, but this percent is negative (5 percent worse) on average for beneficiaries who moved far compared to households in the matched control group.

Qualitative informants consistently cited this differential impact, and identified four reasons for it. First, beneficiary groups who relocated greater distances were at a disadvantage in terms of land identification and negotiation. Two representatives from each group were taken by Lands Project Officers, along with others from several beneficiary groups to see available estates, to inspect available estates. Competition for land among beneficiary groups weakened their negotiating position, as did relative ignorance about land quality. In contrast, groups who lived nearer to the estates to be purchased would eventually obtain better land because they were in a much better position to identify good land and negotiate a reasonable price for it.

Second, beneficiary groups from Mulanje and Thyolo came from areas with available health and education services, and moved to more remote areas with limited access to such social services. The project recognized this and quickly moved to ameliorate the situation through

mobile health clinics and new schools. However, most beneficiaries were still left without access to schools, and they cited infrequent and inadequate care at the mobile clinics.

A third factor adversely affecting those who moved far was the need to adjust to a new economic environment. Perhaps most importantly, households faced a lack of reliable markets and market prices, which adversely affected their economic well-being despite improvements in production. Several beneficiaries accustomed to working as day-laborers on tea or coffee estates reported difficulty adjusting to the lack of opportunities for piece-work and casual employment in Mangochi and Machinga to supplement income during weak harvests, especially given the unreliable markets and low market prices. This was not an issue specific to those who moved far, however, the contrast in market environments was greater for these BGs. Moving from an environment in which there are two agricultural seasons, to one in which only a single harvest is possible, was also a challenge for those relocating from Mulanje and Thyolo. All six of the interviewed beneficiary groups who were relocated within their origin district reported that income increased since resettlement. On the other hand, five of the six focus groups that relocated externally reported that their income decreased since resettlement. The reasons cited for these decreases include a dry spell in the last growing season, poor markets for agricultural goods, and the seasonal nature of income since resettlement.

Fourth, those who moved from Mulanje and Thyolo faced a different cultural environment. Mulanje and Thyolo are culturally Lomwe and Christian whereas Machinga and Mangochi are culturally Yao and largely Muslim. Some customs that are accepted in Mulanje/Thyolo, such as rearing pigs, are not accepted in the new areas and some customs that are accepted in new areas, such as polygamy, are not accepted in the old ones. While there were few reports of conflict between relocated and receiving communities, beneficiaries and project officials report

some cases of discrimination and describe limited mixing between groups from different backgrounds.

Finally, households that moved greater distances were then further away from social networks and informal support systems. Some beneficiaries left family and extended social networks hundreds of miles away, thus unable to draw on support in times of need. Travelling long distances to attend funerals or care for sick family members, while possible, could also be an economic burden. These factors combined led to smaller impact for those that moved far, reflected by their significantly lower (but still positive) economic well-being and total value of production as compared to other beneficiaries.

Female-Headed Households

Project staff members report that female-headed households face a special set of challenges in the relocation process. Upon relocation these households have difficulty constructing houses or cultivating virgin land and as a result spend a disproportionate amount of grant money on hiring casual laborers when they cultivated. Most BGs reported that since relocation, women also spend more time working on agricultural activities and less time engaging in non-agricultural income generation activities because plots are larger, and because of the lack of other opportunities in areas of resettlement. While focus group discussions suggested no major difference in expenditures between female headed households and other beneficiaries, the quantitative findings show significantly higher assets, both productive and consumption, for female-headed beneficiary households. In fact, while the average treatment effect on productive assets is negative for male-headed households, it is positive for female-headed households. Female-headed households who do not move far also increase their *consumption* assets more than controls, whereas male-headed households do not. However, all households that move far

increase consumption assets significantly less than controls. This effect suggests either differing expenditure preferences across beneficiary gender, or a substitution effect of productive assets to compensate for labor needs. It may also demonstrate differing decisions to transport assets.

Farming Experience

Some project staff believed that the poorest of the poor were an inappropriate target population for the program since these people had little experience farming or managing their finances before participating in the program. The low education level of project beneficiaries was also cited as a major challenge to the success of the project by several project staff. Low education levels account for beneficiary difficulties in budgeting of resources, in comprehending project related information and in identifying and negotiating for land. In order to explore differences in impact across those who were more versus less poor, we include an interaction term to allow the treatment effect to vary with a proxy for farming experience, kilograms of maize cultivated at baseline. We find that the interaction is generally not significant, indicating that impact did not vary across farmer experience. The exception is consumption assets and months of reserve food; those who had more farming experience at baseline increasingly augmented their consumption assets, and decreasingly increased their months of reserve food. The finding concerning consumption assets is reasonable given that these households had to spend less on extension services, farming instruments and potentially wasted time cultivating and harvesting. Additionally, it makes sense that those who were cultivating relatively more maize at baseline increased their food reserves less than those who cultivated relatively less, with all treatment effects still positive.

VI. Conclusion

Because Malawi is an agricultural economy, access to land is crucial for poor Malawians to ascend from poverty. More than half of population in the country lives below the poverty line, and inequitable land distribution likely inhibits general economic growth. For these reasons, the Government of Malawi, with assistance from the World Bank, undertook the Community-Based Rural Land Development Program (CBRLDP) as a pilot project for a larger land reform effort.

Due to multi-faceted nature of the CBRLDP, as well as concurrency with other poverty alleviation efforts such as the Agricultural Input Subsidy Programme, we employ a mixed methods approach in order to fully understand project impact. Both qualitative and quantitative analyses take into account changes across time and also across beneficiaries and controls. The quantitative component employs propensity-score matching and a difference-in-differences approach, whereby we compare how the assets, production, expenditures, and other welfare indicators of beneficiaries have changed over time as compared to those of similar households who were ineligible for the program due to their location. The qualitative evaluation was structured to focus on trends over time and across treatments. Thus, the evaluation as a whole aims to identify the specific impact of the project as opposed to national-level trends or pre-existing differences between the control and treatment households.

The evaluation finds that the Community-Based Rural Land Development Program has had a positive impact on agricultural activity, with significantly greater cultivable land, maize production, tobacco production, livestock holdings, and total crop value; however, maize productivity, compared to the control group, was not affected. The program had modest or negative effects on assets and food security, with no effect on productive assets, a negative effect on con-

sumption assets, and a mixed effect on food security. However, subjectively, beneficiaries believed that their income and economic well-being had improved significantly more than the control group. Therefore, in terms of the primary project objectives – increasing agricultural productivity, increasing incomes, and increasing food security – impacts were mixed.

Impact was somewhat varied across two dimensions: 1) whether beneficiaries moved a great distance from their original home, and 2) whether the beneficiary household was headed by a female. Those who moved far were almost always impacted less, although only significantly so regarding total crop value and subjective economic well-being. Qualitative informants cited several reasons for this, including disadvantages in identifying new land, significantly worse access to social services and reliable markets, large differences in the cultural and economic environment, and distance from their social and informal support networks. Female-headed households that were beneficiaries increased their assets, both productive and consumption, significantly more than the control group. On the other hand, male-headed households increased their assets *less* than the control group, significantly so for consumption assets. Female-headed households also grew less tobacco, a crop requiring more specialized skills, market knowledge and farm investments. Impact did not tend to vary across farming experience at baseline.

Ultimately, the impacts of the CBRLDP are mixed. One hand, production and, to a lesser extent, farmer productivity increased as a result of the project and its three central components. However, undoubtedly, farmers in Malawi also need access to reliable markets, increased extension services, and links to financial and credit institutions. All of these components need to be a part of successful reform efforts. Quantitative calculation of productivity changes do not measure land productivity due to data restrictions; however, since most

farmers moved to previously underutilized land, it can be argued that land productivity significantly increased with the project. Qualitative evidence shows that beneficiaries increased the utilization of land by occupying and cultivating unfarmed land.

Given the vast cost and potential of these sorts of investments, several authors have called for greater research attention to land reform projects (Deininger, 2003; Deininger, Jin, and Nagarajan, 2007). Understanding the impact of these projects on particular sub-groups is important to both design and targeting of such interventions. This evaluation contributes to the growing body of research on land reform projects around the world, particularly thin in Sub-Saharan Africa, and shows how mixed-methods analysis can be used to gain a richer understanding of program effects.

TABLES TO BE INSERTED IN THE TEXT

Table I. Potential impacts assessed through qualitative work

Area	Description
Project impact on individual households	Focuses on how the project might have influenced farming practices, use of resources (fertilizers, labour), household income, household consumption, family relationships
Project impact on receiving communities	Deals with the economic, environmental and social impacts the project may have had on the receiving community
Non project factors that impact productivity	Sheds light on the degree to which impact on productivity can be attributed to the project, by providing information on non-project related factors that took place parallel to the project intervention and are believed to have impacted productivity in the intervention areas. This includes similar projects in the area, rising prices of inputs, availability of markets, weather conditions and so forth.

Source: Behrman (2009).

Table II: Attrition Rates by Type of Beneficiary

	Control Group	Beneficiary Group	Total
Non-attrited (in final panel)	**381**	**256**	**637**
Attrited (only at baseline)	80	140	220
Total	461	396	857

Table III. Outcome Variables

Agricultural Variables	
Change in Land (Garden) Size	The total size of cultivated (not total land)
Change in Title	1 if the land was purchased with a title, 0 if not
Change in Productive Assets (ln)	Natural log of the value of productive assets
Change in kg Maize	Kilograms of maize produced
Change in Maize Yield	Kilograms of maize produced / acre of land
Change in kg Tobacco	Kilograms of tobacco produced
Change in kg Cassava	Kilograms of cassava produced
Change in Livestock	Livestock holdings in tropical livestock units
Total Crop Value (ln)	Natural log of the total selling value of all crops
Welfare Variables	
Change in Months of Reserve Food	Months for which current food supply would last
Change in Lean Season Meals	Number of meals household eats in lean season
Change in Consumption Assets (ln)	Natural log of the value of consumption assets
Income Better than Before	1 if respondent believes income is better than before moving (better than 5 years ago for control groups), 0 if not
Economic Well-Being Better than Before	1 if respondent believes economic well-being is better than before moving (better than 5 years ago for control groups), 0 if not

Table IVa: Agricultural Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Change in Garden Size			Change in Title			Change in Productive Assets (ln)					
Treated	0.96***	0.91***	1.04***	0.67***	0.69***	0.64***	-0.85	-0.32	-1.04	-0.60	-1.50	-0.62
	(0.18)	(0.21)	(0.23)	(0.05)	(0.05)	(0.06)	(0.64)	(0.59)	(0.78)	(0.74)	(1.20)	(1.09)
Treated*Very far		0.20			-0.21**				-0.79	-0.95		
		(0.30)			(0.10)				(1.09)	(1.13)		
Treated*Female Head		0.06			0.07				1.54	2.19*		
		(0.37)			(0.08)				(1.35)	(1.29)		
Treated*Maize kg (BL)			-0.00			0.00					0.00	0.00
			(0.00)			(0.00)					(0.00)	(0.00)
Maize kg (BL)	-	-										
	0.00***	0.00***	-0.00*	0.00	0.00	0.00	-0.00*	-0.00**	-0.00*	-0.00**	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fertilizer Subsidy								3.52***		3.63***		3.49***
								(0.69)		(0.71)		(0.69)
Female HH Head	-0.06	-0.08	-0.06	0.04	0.01	0.04	0.30	0.14	-0.40	-0.86	0.33	0.16
	(0.21)	(0.26)	(0.20)	(0.04)	(0.01)	(0.04)	(0.63)	(0.60)	(0.69)	(0.62)	(0.62)	(0.58)
Age of HH Head	0.01	0.01	0.01	0.00	0.00	0.00	0.07	0.12	0.06	0.11	0.07	0.12
	(0.03)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)	(0.13)	(0.13)	(0.13)	(0.12)	(0.13)	(0.13)
Age of HH Head squared	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Primary School	-0.02	-0.03	-0.03	-0.01	-0.00	-0.01	0.76	0.48	0.76	0.47	0.83	0.51
	(0.20)	(0.20)	(0.19)	(0.04)	(0.04)	(0.04)	(0.89)	(0.82)	(0.88)	(0.80)	(0.93)	(0.87)
HH Size	-0.08	-0.08	-0.08	0.00	0.00	0.00	0.07	0.08	0.09	0.11	0.09	0.09
	(0.05)	(0.05)	(0.05)	(0.01)	(0.01)	(0.01)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
Constant	0.66	0.70	0.63	-0.06	-0.05	-0.05	0.98	-2.92	1.24	-2.64	1.19	-2.79
	(0.61)	(0.61)	(0.62)	(0.13)	(0.11)	(0.13)	(2.83)	(2.77)	(2.81)	(2.73)	(2.72)	(2.65)
Observations	469	469	469	432	432	432	477	477	477	477	477	477
R-squared	0.147	0.148	0.147	0.519	0.535	0.519	0.032	0.127	0.039	0.139	0.035	0.128

Standard Errors in Parenthesis (p<0.10, ** p<0.05, *** p<0.01)*

Table IVb: Agricultural Outcomes (Continued)

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
	Total Crop Value (ln)						Change in Maize Yield						Change in kg Maize					
Treated	0.76***	0.74***	0.80***	0.80***	0.78**	0.75**	-137.44	-159.44	-171.56	-180.27	5.69	-37.45	112.70**	106.65**	107.99*	104.70*	-148.12***	-135.80**
	(0.20)	(0.20)	(0.25)	(0.25)	(0.34)	(0.31)	(106.28)	(116.29)	(153.33)	(153.87)	(103.54)	(111.87)	(46.10)	(48.30)	(54.71)	(55.31)	(55.73)	(58.52)
Treated*Very far			-0.47**	-0.45**					-2.14	-7.13					50.80	50.50		
			(0.21)	(0.21)					(109.23)	(118.40)					(84.95)	(88.60)		
Treated*Female Head			0.37	0.28					149.12	98.98					-24.80	-37.90		
			(0.51)	(0.49)					(231.14)	(198.69)					(78.11)	(74.40)		
Treated*Maize kg (BL)					-0.00	-0.00					-0.51	-0.43					-0.13	-0.10
					(0.00)	(0.00)					(0.43)	(0.36)					(0.18)	(0.17)
Maize kg (BL)	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.22	-0.21	-0.21	-0.20	0.06	0.03	-0.93***	-0.93***	-0.94***	-0.93***	-0.87***	-0.88***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.20)	(0.19)	(0.22)	(0.20)	(0.39)	(0.34)	(0.09)	(0.09)	(0.09)	(0.08)	(0.13)	(0.12)
Fertilizer Subsidy		-0.28		-0.25		-0.28		-202.09		-196.09		-189.24		-62.58		-64.53		-59.30
		(0.21)		(0.20)		(0.21)		(169.56)		(163.52)		(159.75)		(61.17)		(60.24)		(61.12)
Female HH Head	-0.65***	-0.65***	-0.86*	-0.81*	-0.65***	-0.65***	-49.29	-32.79	-125.16	-83.55	-58.98	-42.01	-96.80**	-92.97**	-85.70*	-76.09	-97.24**	-93.53**
	(0.24)	(0.22)	(0.46)	(0.44)	(0.24)	(0.23)	(92.46)	(84.77)	(183.81)	(155.83)	(96.90)	(88.97)	(38.58)	(39.13)	(49.78)	(47.77)	(38.48)	(39.19)
Age of HH Head	0.04	0.03	0.04	0.03	0.04	0.03	5.55	3.17	3.54	1.90	6.92	4.47	13.68**	12.78*	13.74**	12.93*	13.69**	12.84*
	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(14.44)	(14.08)	(14.05)	(14.07)	(13.77)	(13.37)	(6.39)	(6.53)	(6.29)	(6.53)	(6.37)	(6.51)
Age of HH Head squared	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.09	-0.06	-0.08	-0.05	-0.11	-0.08	-0.14*	-0.13*	-0.14*	-0.13*	-0.14*	-0.13*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.16)	(0.15)	(0.15)	(0.15)	(0.15)	(0.14)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Primary School	0.42**	0.46**	0.46**	0.49**	0.42*	0.46**	1.55	30.70	-6.57	24.63	-16.14	13.94	116.05**	122.97***	115.20**	122.77***	111.89**	119.21***
	(0.20)	(0.20)	(0.20)	(0.21)	(0.22)	(0.22)	(114.35)	(96.97)	(121.96)	(103.59)	(122.15)	(103.50)	(44.20)	(41.60)	(44.88)	(42.06)	(45.16)	(42.48)
HH Size	-0.05	-0.06	-0.05	-0.05	-0.06	-0.06	37.47	34.98	40.56	36.97	35.31	33.31	16.08	15.54	15.89	15.09	15.40	15.02
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(30.21)	(26.93)	(33.19)	(29.15)	(28.82)	(26.36)	(10.50)	(10.22)	(10.61)	(10.22)	(10.33)	(10.15)
Constant	9.15***	9.46***	9.14***	9.41***	9.14***	9.46***	-5.57	194.50	46.58	223.40	-96.12	105.49	-159.95	-93.95	-159.75	-94.95	-172.00	-107.22
	(0.69)	(0.74)	(0.67)	(0.72)	(0.72)	(0.77)	(304.19)	(308.26)	(290.15)	(315.48)	(299.23)	(281.60)	(123.85)	(123.60)	(120.59)	(123.84)	(125.91)	(125.76)
Observations	207	207	207	207	207	207	245	245	245	245	245	245	425	425	425	425	425	425
R-squared	0.220	0.234	0.243	0.254	0.220	0.234	0.070	0.100	0.073	0.102	0.083	0.110	0.372	0.377	0.374	0.378	0.374	0.378

Standard Errors in Parenthesis (p<0.10, ** p<0.05, *** p<0.01)*

Table IVc: Agricultural Outcomes (Continued)

	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
	Change in kg Tobacco						Change in kg Cassava						Change in Livestock (TLU)					
Treated	44.59***	47.80***	62.16***	63.75***	53.57**	59.42**	-14.43	-12.36	-9.29	-8.11	-20.97	-17.36	0.15**	0.14**	0.16*	0.15*	0.11	0.09
	(15.43)	(16.36)	(21.11)	(21.41)	(23.75)	(26.24)	(9.05)	(8.85)	(10.58)	(10.57)	(13.71)	(13.55)	(0.07)	(0.06)	(0.08)	(0.08)	(0.12)	(0.11)
Treated*Very far			-31.16**	-31.36**					-27.27	-27.21					-0.17	-0.17		
			(14.08)	(14.42)					(22.33)	(21.57)					(0.12)	(0.12)		
Treated*Female			-49.45**	-43.15**					0.57	4.41					0.14	0.13		
Head			(21.03)	(17.92)					(15.47)	(16.29)					(0.14)	(0.14)		
Treated*Maize kg					-0.03	-0.04					0.02	0.02					0.00	0.00
(BL)					(0.07)	(0.07)					(0.05)	(0.05)					(0.00)	(0.00)
Maize kg (BL)	-0.03	-0.03	-0.03	-0.03	-0.01	-0.01	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.03)	(0.03)	(0.04)	(0.03)	(0.05)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fertilizer Subsidy		32.36		30.04		33.28		19.05		19.22		18.62		-0.06		-0.05		-0.06
		(23.41)		(22.68)		(24.05)		(11.53)		(11.62)		(11.89)		(0.06)		(0.07)		(0.07)
Female HH Head	-0.58	-2.18	20.87	16.66	-0.82	-2.54	-3.80	-4.88	-3.77	-6.51	-3.60	-4.70	-0.02	-0.01	-0.08	-0.08	-0.02	-0.01
	(10.98)	(10.15)	(16.29)	(13.77)	(10.91)	(10.08)	(6.90)	(6.92)	(9.33)	(9.67)	(6.84)	(6.92)	(0.07)	(0.07)	(0.09)	(0.09)	(0.07)	(0.07)
Age of HH Head	-2.34	-1.83	-1.87	-1.45	-2.32	-1.79	0.56	0.88	0.59	0.88	0.54	0.86	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
	(2.74)	(2.98)	(2.74)	(2.96)	(2.76)	(3.02)	(1.94)	(1.82)	(1.94)	(1.83)	(1.92)	(1.79)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age of HH Head	0.02	0.02	0.02	0.01	0.02	0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
squared	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Primary School	-1.17	-4.53	1.63	-1.69	-2.24	-6.00	-4.02	-6.04	-3.13	-5.30	-3.23	-5.40	0.06	0.06	0.06	0.07	0.06	0.07
	(18.53)	(17.73)	(18.70)	(17.82)	(17.35)	(16.66)	(12.08)	(12.14)	(11.36)	(11.34)	(11.58)	(11.62)	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.08)
HH Size	3.27	3.47	2.24	2.53	3.09	3.24	-2.11	-1.98	-2.21	-2.01	-1.96	-1.87	0.01	0.01	0.01	0.01	0.01	0.01
	(3.34)	(3.33)	(3.34)	(3.30)	(3.45)	(3.44)	(2.44)	(2.43)	(2.42)	(2.45)	(2.44)	(2.42)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	28.23	-7.07	13.93	-17.38	24.85	-12.41	4.72	-16.33	2.35	-17.98	7.19	-13.99	0.32	0.39*	0.33*	0.38*	0.34*	0.41*
	(60.67)	(78.10)	(62.62)	(78.99)	(64.11)	(83.00)	(37.26)	(33.62)	(37.47)	(34.27)	(35.23)	(31.37)	(0.20)	(0.23)	(0.20)	(0.22)	(0.20)	(0.23)
Observations	435	435	435	435	435	435	433	433	433	433	433	433	469	469	469	469	469	469
R-squared	0.047	0.061	0.062	0.074	0.048	0.063	0.042	0.056	0.055	0.070	0.043	0.057	0.059	0.061	0.071	0.073	0.060	0.063

Standard Errors in Parenthesis (p<0.10, ** p<0.05, *** p<0.01)*

Table Va: Welfare Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Change in Months of Reserve Food						Change in Lean Season Meals						Change in Consumption Assets (ln)					
Treated	0.79	0.66	0.70	0.61	1.86**	1.67*	-0.24*	-0.22*	-0.19	-0.18	-0.26	-0.23	-1.50*	-1.40*	-1.75*	-1.65*	-3.44**	-3.32**
	(0.69)	(0.77)	(0.94)	(0.98)	(0.73)	(0.84)	(0.12)	(0.12)	(0.14)	(0.14)	(0.18)	(0.18)	(0.81)	(0.81)	(0.98)	(0.97)	(1.37)	(1.37)
Treated*Very far			0.70	0.71					-0.06	-0.06					-2.16***	-2.19***		
			(0.53)	(0.54)					(0.21)	(0.20)					(0.55)	(0.55)		
Treated*Female			-0.22	-0.42					-0.15	-0.12					3.06**	3.22**		
Head			(1.45)	(1.32)					(0.24)	(0.24)					(1.42)	(1.42)		
Treated*Maize kg					-0.00	-0.00					0.00	0.00					0.01**	0.01**
(BL)					(0.00)	(0.00)					(0.00)	(0.00)					(0.00)	(0.00)
Maize kg (BL)	-0.00***	-0.00***	-0.00***	-0.00***	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01**	-0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fertilizer Subsidy		-1.04		-1.06		-0.96		0.20		0.19		0.20		0.67		0.84		0.50
		(1.23)		(1.21)		(1.19)		(0.13)		(0.13)		(0.13)		(0.79)		(0.80)		(0.76)
Female HH Head	-0.91	-0.86	-0.82	-0.68	-0.93	-0.89	-0.16	-0.16	-0.09	-0.11	-0.15	-0.16	0.01	-0.02	-1.39	-1.50	0.10	0.07
	(0.64)	(0.61)	(0.97)	(0.88)	(0.64)	(0.61)	(0.13)	(0.13)	(0.20)	(0.20)	(0.13)	(0.13)	(0.75)	(0.74)	(1.15)	(1.14)	(0.70)	(0.70)
Age of HH Head	0.12	0.10	0.12	0.10	0.12	0.11	0.04	0.04*	0.04	0.04*	0.04	0.04*	0.07	0.08	0.05	0.06	0.07	0.08
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.18)	(0.17)	(0.17)	(0.17)	(0.18)	(0.17)
Age of HH Head	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
squared	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Primary School	0.43	0.53	0.41	0.52	0.31	0.41	0.29**	0.28*	0.30**	0.28**	0.30**	0.28*	0.60	0.55	0.63	0.56	0.82	0.77
	(0.69)	(0.63)	(0.72)	(0.66)	(0.71)	(0.65)	(0.14)	(0.14)	(0.14)	(0.14)	(0.15)	(0.14)	(0.96)	(0.94)	(0.94)	(0.92)	(0.96)	(0.94)
HH Size	0.25	0.25	0.25	0.25	0.22	0.22	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.32	-0.32	-0.29	-0.28	-0.27	-0.27
	(0.19)	(0.18)	(0.20)	(0.19)	(0.18)	(0.17)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.23)	(0.22)	(0.23)	(0.22)	(0.22)	(0.22)
Constant	-0.53	0.62	-0.53	0.61	-0.95	0.15	-0.36	-0.58	-0.40	-0.61	-0.35	-0.57	5.90	5.16	6.37*	5.46	6.55*	5.98*
	(1.87)	(1.86)	(1.90)	(1.94)	(1.91)	(1.85)	(0.44)	(0.49)	(0.44)	(0.49)	(0.43)	(0.48)	(3.85)	(3.69)	(3.80)	(3.60)	(3.80)	(3.58)
Observations	436	436	436	436	436	436	443	443	443	443	443	443	477	477	477	477	477	477
R-squared	0.088	0.096	0.089	0.099	0.097	0.105	0.061	0.071	0.063	0.072	0.061	0.071	0.059	0.062	0.092	0.097	0.086	0.088

Standard Errors in Parenthesis (p<0.10, ** p<0.05, *** p<0.01)*

Table Vb: Welfare Outcomes

	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
	Income Better than Before						Ec Well-Being Better than Before					
Treated	0.14**	0.15**	0.17**	0.18**	0.15	0.16	0.22***	0.23***	0.26***	0.27***	0.17*	0.19*
	(0.07)	(0.07)	(0.08)	(0.08)	(0.10)	(0.10)	(0.06)	(0.06)	(0.07)	(0.07)	(0.10)	(0.10)
Treated*Very far			-0.22**	-0.22**					-0.22***	-0.22***		
			(0.09)	(0.09)					(0.08)	(0.08)		
Treated*Female Head			0.06	0.08					0.01	0.02		
			(0.15)	(0.15)					(0.14)	(0.14)		
Treated*Maize kg (BL)					-0.00	-0.00					0.00	0.00
					(0.00)	(0.00)					(0.00)	(0.00)
Maize kg (BL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fertilizer Subsidy		0.06		0.07		0.06		0.07		0.07		0.07
		(0.08)		(0.08)		(0.08)		(0.07)		(0.07)		(0.07)
Female HH Head	-0.04	-0.04	-0.07	-0.08	-0.04	-0.04	0.03	0.02	0.02	0.01	0.03	0.03
	(0.08)	(0.08)	(0.12)	(0.12)	(0.08)	(0.08)	(0.08)	(0.08)	(0.12)	(0.12)	(0.08)	(0.08)
Age of HH Head	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age of HH Head squared	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Primary School	0.15*	0.14*	0.16*	0.15*	0.15*	0.14*	0.10	0.10	0.11	0.10	0.11	0.10
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
HH Size	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Constant	0.59*	0.52*	0.58*	0.51	0.59*	0.52*	0.00	-0.08	-0.02	-0.10	0.02	-0.06
	(0.31)	(0.31)	(0.32)	(0.31)	(0.32)	(0.31)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)	(0.27)
Observations	444	444	444	444	444	444	443	443	443	443	443	443
R-squared	0.060	0.062	0.075	0.078	0.060	0.062	0.081	0.084	0.095	0.098	0.082	0.085

Standard Errors in Parenthesis (p<0.10, ** p<0.05, *** p<0.01)*

References

Alston, L. J, G. D. Libecap, and Robert Schneider (1996). The Determinants and Impact of Property Rights: Land Titles on the Brazilian Frontier. 12 (1): 25.

Banerjee, A. and L. Iyer. (2005). "History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India." American Economic Review 95 (4): 1190-213.

Bardhan, P., S. Bowles and H. Gintis. (2000). "Wealth Inequality, Wealth Constraints and Economic Performance." In Atkinson, A. B. and F. Bourguignon, eds., Handbook of income distribution. Amsterdam: North-Holland.

Bardhan, P. and M. Ghatak. (1999). "Inequality, Market Imperfections, and Collective Action Problems." University of California, Berkeley, Center for International and Development Economics Research (CIDER) Working Paper: C99/108.

Barraclough, S. L. (1970). "Agricultural Policy and Land Reform." Journal of Political Economy 78 (4): 906-47.

Barrows, R. and M. Roth (1990). "Land Tenure and Investment in African Agriculture: Theory and Evidence". The Journal of Modern African Studies, Vol. 28, No. 2, pp. 265-297.

Behrman, J. (2009). Malawi: Community Based Rural Land Development Project Report of Qualitative Findings.

Berry, R. A. and W. R. Cline. (1979). Agrarian Structure and Productivity in Developing Countries. Baltimore: Johns Hopkins University Press.

Binswanger, H. P., K. Deininger and G. Feder. (1995). "Power, Distortions, Revolt and Reform in Agricultural Land Relations." Handbook of development economics 3B 2659-772.

Borras Jr, Saturnino M. (2005). Can Redistributive Reform be Achieved via Market-Based Voluntary Land Transfer Schemes? Evidence and Lessons from the Philippines. Journal of Development Studies, Volume 41, Issue 1, pages 90 – 134.

Borras Jr., Saturnino M (2007). Redistributive Land reform and the rural poor: a critique and contribution from the Philippines.

da Silveira J. M., Buainain, A. M., Neder, H. Dantas, Pires, D. Silva and Magalhães, M. Marques, (2008). Alternative Approaches of Land Tenure Restructuring in Brazil: Market-Assisted Intervention (MAAR) versus Land Expropriation-Distribution (TAR). Journal of Agrarian Change. Volume 4 Issue 1-2, pp. 1 – 16.

Deininger, K. (2003). Land policies for growth and poverty reduction World Bank Policy Research Report series. Washington, D.C.: World Bank; Oxford and New York: Oxford University Press.

Deininger, K. (1999). Making Negotiated Land Reform Work: Initial Experience from Brazil, Colombia, and South Africa. World Bank Policy Research Working Paper No. 2040.

Deininger, K., H. Hoogeveen, and B.H. Kinsey (2004) Economic Benefits and Costs of Land Redistribution in Zimbabwe in the Early 1980s, World Development Vol. 32, No. 10, pp. 1697–1709.

Deininger, K. & Jin, S. & Nagarajan, H. K., (2007). Land reforms, poverty reduction, and economic growth: evidence from India, Policy Research Working Paper Series 4448, The World Bank.

de Janvry, A. (1981). "The Role of Land Reform in Economic Development: Policies and Politics." American Journal of Agricultural Economics 63 (2): 384-92.

de Janvry, A. and E. Sadoulet. (1989). "A Study in Resistance to Institutional Change: The Lost Game of Latin American Land Reform." World Development 17 (9): 1397-407.

Feder G., and T. Onchan (1987). Land Ownership Security and Farm Investment in Thailand. American Journal of Agricultural Economics, Vol. 69, No. 2 (May, 1987), pp. 311-320.

Finan, F., E. Sadoulet, A. de Janvry (2005). Measuring the poverty reduction potential of land in rural Mexico. Journal of Development Economics 77 27– 51.

Gunning, JW, J Hoddinott, B. Kinsey, T. Owens (2000) Revisiting forever gained: Income dynamics in the resettlement areas of Zimbabwe, 1983-1996. Journal of Development Studies 36(6):131

Hoogeveen, J. G. M. and B. H. Kinsey (2001) Land Reform, Growth and Equity: Emerging Evidence from Zimbabwe's Resettlement Programme - A Sequel. Journal of Southern African Studies, Vol. 27, No. 1 (Mar., 2001), pp. 127-136

Jacoby, H. G. and B. Minten. (2007) Is Land Titling in Sub-Saharan Africa Cost-Effective? Evidence from Madagascar.

Jeon, Y. D. and Y. Y. Kim. (2000). Land Reform, Income Redistribution, and Agricultural Production in Korea. Economic Development and Cultural Change 48 (2): 253-68.

Kamanga, B. (2002). Understanding the Farmer's Agricultural Environment in Malawi. Risk and Management Projects Working Paper Series 02-01. International Maize and Wheat Improvement Center, Mexico.

Kinsey, B.H. (1999) Land Reform, Growth and Equity: Emerging Evidence from Zimbabwe's Resettlement Programme. Journal of Southern African Studies, Vol. 25, No. 2 (Jun., 1999), pp. 173-196

Malawi Ministry of Agriculture and Food Security (2008). "Evaluation of the 2006/7 Agriculture Input Subsidy Programme, Malawi: Final Report"

Mutume, G. (2001). Whose Land Reform? (Critique of World Bank's land reform policy). Multinational Monitor.

Nugent, J. B. and J. A. Robinson. (2002). "Are Endowments Fate?" CEPR Working Paper 3206. London.

Place, F. and P. Hazell. (1993). Productivity Effects of Indigenous Land Tenure Systems in Sub-Saharan Africa. American Journal of Agricultural Economics, Vol. 75, No. 1 (Feb., 1993), pp. 10-19.

Wegerif, M. (2004). A critical appraisal of South Africa's market-based land reform policy: The case of the Land Redistribution for Agricultural Development programme in Limpopo. Nkuzi Development Association, Research report no. 19, December 2004

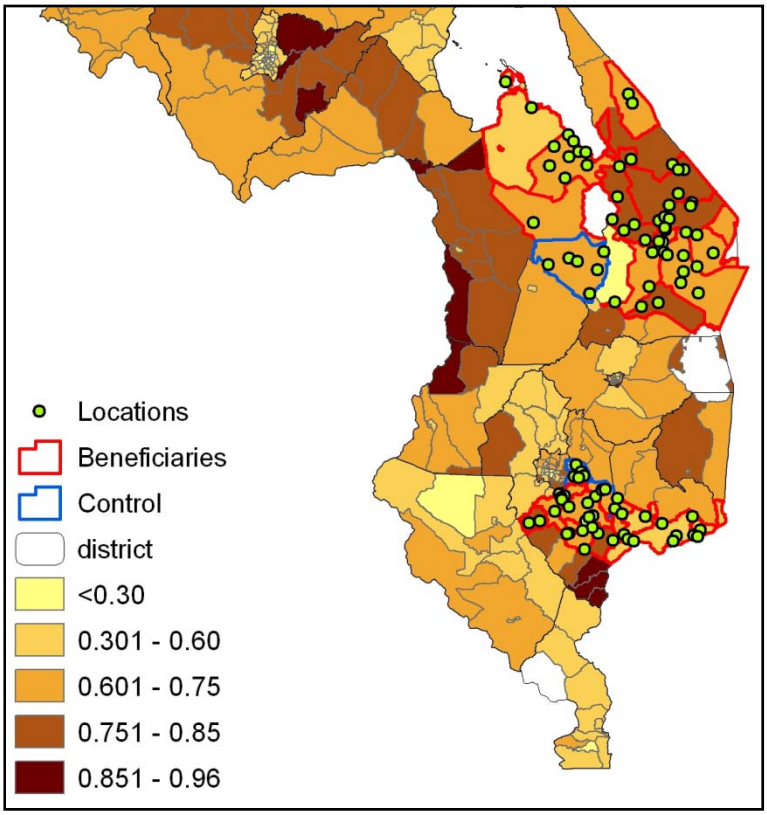
Wodon, Q. and K. Beegle (2006). Labor Shortages Despite Underemployment? Seasonality in Time Use in Malawi. MPRA Paper No. 11083, posted 14, October 2008

World Bank. (2004). Malawi Community Based Rural Land Redistribution Project: Project Appraisal Document.

World Bank. (2007). Malawi Poverty and Vulnerability Assessment: Investing in Our Future. Poverty Reduction and Economic Management, Africa region, The World Bank

ANNEX

Annex Figure I: Map of Treated and Control Districts



Notes: The lighter regions represent lower poverty levels, and darker regions represent higher poverty levels.
Source: Author's calculations using national poverty estimates

Annex Table I: Balancing Tests for Beneficiaries and Matched Controls

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Garden Size	Unmatched	1.06	1.27	-0.21	0.09	-2.41
	ATT	1.07	1.13	-0.07	0.13	-0.51
Productive Assets (ln)	Unmatched	10.43	9.55	0.88	0.30	2.98
	ATT	10.32	9.90	0.42	0.44	0.95
Maize kg	Unmatched	251.91	315.86	-63.94	23.33	-2.74
	ATT	250.55	254.13	-3.59	35.06	-0.1
Maize Yield	Unmatched	352.36	341.90	10.46	21.20	0.49
	ATT	352.39	309.85	42.54	32.80	1.3
Tobacco kg	Unmatched	23.66	5.90	17.75	5.48	3.24
	ATT	17.72	16.75	0.97	6.44	0.15
Cassava kg	Unmatched	22.34	8.68	13.66	4.43	3.08
	ATT	19.58	13.61	5.97	5.95	1
Livestock (TLU)	Unmatched	0.17	0.22	-0.05	0.04	-1.43
	ATT	0.17	0.22	-0.05	0.06	-0.87
Months Food Reserve	Unmatched	5.53	7.66	-2.13	0.33	-6.55
	ATT	5.66	5.67	-0.01	0.50	-0.02
Lean Season Meals	Unmatched	1.36	1.75	-0.39	0.05	-7.29
	ATT	1.39	1.34	0.06	0.08	0.73
Unproductive Assets (ln)	Unmatched	10.20	10.71	-0.51	0.36	-1.42
	ATT	10.16	9.49	0.67	0.52	1.28

Notes: The average effect of treatment on the treated (ATT) for each variable has a t-statistic of less than 1.7, and thus, the matched panel is balanced.

Annex Table IIa: Summary Statistics for Beneficiaries

Variable	Obs	Mean	Std. Dev.	Min	Max
Treatment					
Treat	218	1	0	1	1
Treat*Far	218	0.21	0.41	0	1
Treat*Female	185	0.22	0.41	0	1
Treat*Maize kg (BL)	218	250.55	241.29	0	1350
Follow-up					
Garden Size (acres)	212	2.21	1.48	0	6.4421
Land Title	187	0.65	0.48	0	1
Productive Assets (ln)	218	11.46	4.42	0	17.08
Maize kg	185	359.38	355.98	0	1440
Maize Yield	135	351.55	411.11	0	2141.58
Tobacco kg	190	47.99	126.33	0	805
Cassava kg	187	1.60	13.46	0	150
Livestock (TLU)	217	0.24	0.40	0	2.18
Total Crop Value (ln)	122	10.59	0.95	6.91	12.80
Months Food Reserve	190	7.66	3.30	1	15
Lean Season Meals	193	1.54	0.63	0	3
Unproductive Assets (ln)	218	14.95	3.18	8.29	24.46
Better Income than Before	193	0.55	0.50	0	1
Better Ec Well-Being than Before	193	0.63	0.48	0	1
Baseline					
Garden Size (acres)	218	1.07	1.02	0	6
Land Title	191	0	0	0	0
Productive Assets (ln)	218	10.32	3.51	0	15.28
Maize kg	218	250.55	241.29	0	1350
Maize Yield	182	357.62	233.35	6	1080
Tobacco kg	218	17.72	60.50	0	300
Cassava kg	218	19.58	60.20	0	350
Livestock (TLU)	216	0.17	0.35	0	2.83
Months Food Reserve	218	5.66	3.03	1	12
Lean Season Meals	218	1.39	0.56	0	3
Unproductive Assets (ln)	218	10.16	4.58	0	16.52356
Control					
Fertilizer Subsidy	218	0.65	0.48	0	1
Female Head	185	0.22	0.41	0	1
Age of Head	218	37.79	14.17	1	76
Age of Head2	218	1628.10	1214.75	1	5776
Primary School	218	0.39	0.49	0	1
Household Size	218	4.64	1.92	1	10

Annex Table IIb: Summary Statistics for Matched Control Group

Variable	Obs	Mean	Std. Dev.	Min	Max
Treatment					
Treat	338	0	0	0	0
Treat*Far	338	0	0	0	0
Treat*Female	294	0	0	0	0
Treat*Maize kg (BL)	338	0	0	0	0
Follow-up					
Garden Size (acres)	335	1.34	1.08	0	6.18
Land Title	317	0.00	0.04	0	1
Productive Assets (ln)	338	11.46	3.38	0	18.32
Maize kg	307	251.90	272.31	0	1250
Maize Yield	176	446.41	493.77	0	2100
Tobacco kg	315	2.82	25.02	0	300
Cassava kg	315	4.46	28.06	0	300
Livestock (TLU)	332	0.17	0.30	0	2.04
Total Crop Value (ln)	123	9.87	1.24	4.61	13.53
Months Food Reserve	316	6.95	3.90	0	25
Lean Season Meals	319	1.65	0.70	0	3
Unproductive Assets (ln)	338	15.22	3.21	8.82	24.82
Better Income than Before	319	0.44	0.50	0	1
Better Ec Well-Being than Before	319	0.42	0.49	0	1
Baseline					
Garden Size (acres)	338	1.13	0.81	0	6
Land Title	303	0	0	0	0
Productive Assets (ln)	338	9.90	3.30	0	15.13
Maize kg	338	254.13	240.20	0	1300
Maize Yield	271	310.99	214.85	0	1000
Tobacco kg	338	16.75	88.02	0	565
Cassava kg	338	13.61	51.39	0	310
Livestock (TLU)	338	0.22	0.51	0	4
Months Food Reserve	338	5.67	3.04	1	61
Lean Season Meals	338	1.34	0.61	0	5
Unproductive Assets (ln)	338	9.49	5.09	0	16.88
Control					
Fertilizer Subsidy	338	0.77	0.42	0	1
Female Head	294	0.23	0.42	0	1
Age of Head	338	37.10	13.49	1	93
Age of Head2	338	1558.08	1181.47	1	8649
Primary School	338	0.36	0.48	0	1
Household Size	338	4.74	1.90	1	11

[i] The program extended to one of the control districts, Balaka, recently (after the follow-up survey had been completed).

[ii] This was written as a requirement but not enforced strictly until later phases of the program, not evaluated in this paper.

[iii] It is likely that households were aware of the program a year or more in advance of relocation, and possible that their behaviour may have been influenced by this knowledge. Results should therefore be interpreted with this caveat in mind.

[iv] Epanechnikov kernel matching, with common support and a 0.05 bandwidth, is used. For each household that benefited from the program, this procedure assigns weights to several control (ineligible) households that are used in a linear combination to create a theoretical control with a similar propensity score and thus, similar characteristics. Beneficiary households with propensity scores so high that they are not similar to any control households are dropped. Common support prevents any control that has a propensity score higher than the maximum beneficiary propensity score, or lower than the minimum beneficiary propensity score, from being included.

[v] Sixty observations are dropped due to missing data, and thus not included in the matching equation or subsequent analysis.

[vi] We ran the same estimations using a change in the traditional authority (an administrative unit with an average population of approximately 60,000) and the results hold and coefficients do not change for most variables.

[vii] Because the input subsidy program was scaled up dramatically over between 2006 and 2008, qualitative informants estimated beneficiaries to be receiving subsidy at about the same rate in these two years. This indicates the importance of using a difference-in-differences approach to estimate welfare effects.

[viii] This difference is significant at $p<0.001$. We do not have data on source of fertilizer at baseline.
[ix] We do not have data on prices at baseline and so are unable to compute the change in this variable.