

# **Gender and Intra-Household Use of Commercial and Subsidized Fertilizers in the Malawi Farm Input Subsidy Programme**

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*11 December 2010*

Abstract: The Farm Input Subsidy Programme targets households for subsidized farm inputs, and usually it is the head of the household who received the coupons. Since households tend to have multiple plots which are controlled by different members of the household, there may be intra-household issues that arise in the use of farm inputs available to the household. This paper, relying on survey data and qualitative interviews, analyses the gender issues in intra-household use of both commercial and subsidized fertilizers. The study shows that while male-headed households are more likely to receive coupons than female-headed households, there seem to be less bias in intra-household use of subsidized fertilizers (or fertilizers in subsidized households) between plots controlled by female and male members. This is despite the fact that more generally household incomes from various sources tend to be controlled and allocated by men. It also contrasts with evidence that plots controlled by female members were more unlikely to be applied with fertilizers when we consider all fertilizers in subsidized and unsubsidized households. The study also finds that when commercial fertilizers are available males in male-headed households control its use while women in female-headed households also control its use.

## **1. Introduction**

The Farm Input Subsidy Programme (FISP) implemented by the Government of Malawi has been in place since the 2005/06 agricultural seasons. FISP is designed as a targeted input subsidy programme, targeting smallholder farmers with land but who cannot afford to purchase inputs at market prices. The main objective of the programme is to raise the income of smallholder farmers through improvements in agricultural productivity and food security. The size of the FISP rose from 132,000 tonnes of subsidised fertiliser in 2005/06 to 216,000 tonnes in 2007/08 and has since fallen back to 160,000 tonnes in 2009/10 (Dorward and Chirwa, 2010).

The FISP is targeted at households, with each targeted household expected to receive 2 coupons for subsidized fertilizers and one coupon for subsidized improved maize or/and legume seeds. In recent years the targeting guidelines have also encouraged communities to accord special consideration to vulnerable groups such as child headed, female-headed or orphan headed households and those households with infected or affected with HIV and AIDS (GOM, 2008). However, in practice it has been found that although each household is expected to receive 2 fertilizer coupons, some households receive less or more than the expected number (Dorward et al., 2010). The targeting of the subsidy programme at household level ignores intra-household issues in the use of subsidized fertilizers within the households. Previous studies that have looked at access to subsidized fertilizers in Malawi find that female-headed households are less likely to receive coupons than male-headed households (Chirwa et al., 2010) and where female-

headed households receive subsidy coupons they also tend to receive less compared to their male counterparts (SOAS et al., 2008; Dorward et al., 2010). It is not clear whether such biases are also evident within the household with respect to allocation and use of fertilizers among plots controlled by different members of the households.

This paper attempts to investigate the gender differences in the application of fertilizers in general and subsidized fertilizers in particular on plots controlled by male and female members of households. We utilize quantitative and qualitative data collected in the 2009 Agricultural Input Subsidy Survey (AISS2) covering the 2008/09 agricultural season.<sup>1</sup> In the household survey, data on plot level control of farming decisions on plots by household members and plot level information on application of fertilizers allow us to investigate gender and intra-household use of fertilizers within the households. The sample of 1,982 rural households gives 4,727 plot level observations, regardless of the type of crops cultivated. Intra-household allocations were also discussed in focus group interviews in eight communities with male and female groups and intra-household issues were discussed within the context of subsidized fertilizers and overall income allocation.

## **2. Gender and Intra-household Use of Fertilizers**

### *2.1 Gender and Access to Subsidized Farm Inputs*

Gender issues in the FISP are considered in the targeting of the subsidy. The criteria for targeting subsidies singles out female-headed households as one of the vulnerable groups that requires particular attention in the targeting of subsidized fertilizers. Previous studies on the analysis of gender in the FISP have therefore concentrated on differential access between male-headed and female-headed households (SOAS et al., 2008; Dorward et al., 2010). For example, Dorward et al. (2010) find that in 2008/9 66 percent and 68 percent of male-headed and female-headed households had access to fertilizer coupons, respectively (equivalent figures reported by SOAS et al. (2008) for 2006/7 were 56% and 47%). However, it was also found that male-headed recipient households tended to receive more maize fertilizer coupons than female-headed recipient households, with male-headed households receiving on average 1.55 coupons compared to 1.45 coupons received by female-headed households in 2008/9 (with 1.7 compared to 1.3 coupons received per households in 2006/7). With respect to communities' perceptions on who is likely to receive coupons, there were no significant differences between male-headed and female headed households across regions (Dorward et al., 2010). In addition, in 2008/9 81 percent of male-headed household and 66 percent of female-headed households reported utilizing savings to obtain cash for coupon redemption, but a higher percentage of female-headed households relied on gifts (11 percent) compared with male-headed households (2 percent).

The findings on access to subsidized fertilizers from previous studies mask issues of who actually uses the fertilizers available to the household. Most of the coupons within the household were received by the household head. The data reveals that only 2.7 percent of households that received coupons in the 2008/09 had more than 1 member receiving coupons and 4.1 percent of households that received coupons had one person receiving more than two coupons. Given that most of the coupons were received by one member

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<sup>1</sup> See Dorward (2010) for a description of data and the coverage of the household survey and focus group discussions.

of the household, intra-household issues become important in determining the extent to which subsidized fertilizers reach and benefit female members of households.

## 2.2 Gender and Use of Farm Inputs: Household Survey Evidence

Plot level analysis enables us to compare input use between female-controlled and male-controlled plots within the household. Out of 4,727 plots, 71 percent and 29 percent are male-controlled and female-controlled within the household, respectively. Table 1 presents the gender differences in member and household characteristics by gender of the member that makes input decision on the plots regardless of source of fertilizers. We find significant differences in the characteristics of the member and their household of origin across the variables with the exception of sale of maize by the household. Male members of households are younger than female members of households, with an average difference of about 4 years. Almost all male members (99%) that control plots come from male-headed households while only 28 percent of female members that control plots come from male-headed households. This may suggest that females in male-headed households tend to have little control over farming decisions. Male members that control plots tend to originate from larger households and households with more land than female members who control plots. It is worth noting that in male-headed households only 10.4 percent of the plots are female-controlled (mainly spouses) while in female-headed households only 5 percent (3.1 percent being spouses) of the plots are male-controlled.

Table 1 Mean Member and Household Characteristics by Gender for Members Controlling Plots

Variable	All	Males controlling plots	Females controlling plots	Mean Diff
Age of Household Member	45.98	44.74	49.04	-4.305 <sup>a</sup>
Male-headed Households (0/1)	0.782	0.985	0.281	0.703 <sup>a</sup>
Household Size (adult equivalent)	4.956	5.122	4.545	0.577 <sup>a</sup>
Household Land Size (hectares)	1.224	1.314	1.001	0.313 <sup>a</sup>
Household grew Tobacco 08/09 (0/1)	0.239	0.275	0.150	0.125 <sup>a</sup>
Household sold Maize 08/09 (0/1)	0.103	0.102	0.106	-0.004
Household access Social Safety Net 07/08 (0/1)	0.146	0.139	0.163	-0.024 <sup>b</sup>

Note: (0/1) indicates dummy variable. Superscripts *a*, *b* and *c* indicate statistically significant differences at 1%, 5% and 10% levels.

There are also significant differences in terms of households' participation in the cultivation of tobacco in the 2008/09 agricultural season. About 28 percent of male members controlling plots come from households that grew tobacco compared to only 15 percent of female members. The differences are statistically significant at the 1 percent level. However, there are no significant differences between households with male and female members controlling plots as regards households' sale of maize in the 2008/09 season.<sup>2</sup> There is, however, greater access to social safety nets among female members (16 percent) controlling plots than among male members (13 percent) controlling the plots and this difference is statistically significant at the 5 percent level.

<sup>2</sup> The sale of maize does not account for the fact that some of these households also are net maize buyer. In this case, the sale of maize is used here as one of the indicators of commercialisation of agriculture.

Table 2 presents gender differences in plot size and access and use of fertilizers among household members. Generally, plots controlled by men tend to be larger than those controlled by female members, with a difference of 0.06 hectares which is statistically significant at the 1 percent level. However, there are no statistically significant differences across male and female controlled plots as regards the frequency or intensity of overall fertiliser application. In terms of household access to subsidized fertilizers, the proportion of household members from households with access to subsidised fertilizers increased from 65 percent in 2007/08 to 75 percent in 2008/09. The lack of dominance of male members on use of subsidised fertilizers was also confirmed by focus group discussions in several districts. Most focus group discussions with females (such as in Zomba, Phalombe, Mzimba and Kasungu) revealed that decisions on the use of coupons and acquired fertilizers are collectively made by the family.

Table 2 Mean Differences in Plot Size and Fertilizers Access and Use (Plots and Households) by Gender of Member Controlling Plot

Variable	All	Male controlled	Female controlled	Mean Diff
Plot size (Hectare)	0.382	0.399	0.340	0.059 <sup>a</sup>
Application of Fertilizers (0/1)	0.653	0.649	0.662	-0.014
Fertilizer Intensity (Kg/Hectare)	107.0	107.5	105.8	1.677
Households Subsidized 08/09 (0/1)	0.750	0.757	0.732	0.025 <sup>c</sup>
Households Subsidized 07/08 (0/1)	0.652	0.653	0.651	0.002
Household with commercial fertilizer 08/09 (0/1)	0.473	0.502	0.401	0.101 <sup>a</sup>
Household with commercial fertilizer 07/08 (0/1)	0.342	0.376	0.258	0.118 <sup>a</sup>

Note: (0/1) indicates dummy variable. Superscripts *a*, *b* and *c* indicate statistically significant differences at 1%, 5% and 10% levels.

However, in some focus group discussions (such as in Chikwawa, Lilongwe and Karonga) it was reported that the use of coupons was mainly decided by men. In Ntcheu, the female group discussion argued that in a matrilineal system women should be in control of coupons. Women also argued in all the districts that if coupons were given to female members of the households, they were unlikely to sell the coupons. In most focus group discussions with men, it was noted that the families were involved in the decisions about use of coupons, although in a few districts, such as Zomba and Mzimba, men revealed that they were making most decisions about the use of coupons. Box 1 presents some selected quotations from focus group discussions on the control of subsidy coupons.

### Box 1 Some Views on Who Controls Coupons in the Household

“Some households discuss together on how they would use the coupon received while others do not and in most cases it is the households that do not discuss the use of the coupon that end up selling it. However, it is the men who are in control of the coupon in most cases.” *[FGD with Women in Karonga District]*

“The decisions about the use of coupons in the household are made between the two, but mostly it is the woman who made the decision because men decided to sell the coupon while the wife would want to buy fertilizer.” *[FGD with Women in Ntcheu District]*

“In our society the man is the head of the family so he is the one who makes all decisions.” *[FGD with Women in Lilongwe District]*

“It is the men who decides when and where to buy inputs because in most cases they are the ones who go about looking for money to buy the inputs.....Women cannot sell coupons...its us men who usually do that...so if they can be in control of the coupons then incidences of selling would be very minimal or not at all” *[FGD with Men in Mzimba District]*

“We were discussing at family level what to do with the coupon. We all agreed to buy fertiliser. With this hunger, you can't sell a coupon.” *[FGD with Men in Phalombe District]*

“According to our culture a man has the powers to decide. But when the woman finds that her husband is not wise she negotiates with the village head that they should take out coupons from the man and be given to them to take care of them, they fear the man will sell it” *[FGD with Men in Zomba District]*

As regards access to commercial fertiliser, we also only find statistically significant differences between male and female members managing plots in 2008/09 at the 10 percent level but no differences in 2007/08 season. In contrast, there are significant differences in access to commercial fertilizers in both seasons between the gender of the controller of plots, with the proportion with access to commercial fertilizers in 2007/8 almost doubling among both male and female members of households.

### 2.3 Gender and Intra-Household Income Use and Allocation: Qualitative Evidence

In focus group discussions, we also discussed how incomes generated from different sources were controlled within the household. Table 3 presents a summary of the views from male and female groups in various districts. There are a lot of variations in the decision making processes about control and use of incomes within the household. The dominant view, however, is that men, particularly husbands, tend to be the main decision makers within the household. Both men and women focus group discussions perceived that men mostly dominate in deciding the allocation of incomes from produce sales, across the income sources. There are also a few instances in which decisions about resources were said to be jointly made by the husband and wife. Another interesting observation that was made was that it is usually in poor households that household resource allocation is dominated by men: in ‘not poor’ households, discussions normally precede joint decisions about resource use.

Table 3 Reported Intra-Household Resource Allocation Decisions, by FGD Members and Income Sources

Source of Income		Male FGDs		Female FGDs
Business Income	<i>Men</i>	ZA, MZ, KU, LL	<i>Men</i>	ZA, PE, CK, LL, NU
	<i>Joint</i>	CK, PE	<i>Joint</i>	KA
			<i>Individual</i>	MZ, KU
Incomes from Produce Sales	<i>Men</i>	ZA, MZ, KU, LL	<i>Men</i>	ZA, PE, KU, CK, LL, NU
	<i>Joint</i>	CK, PE	<i>Joint</i>	MZ, KA
Incomes from PWPs	<i>Men</i>	ZA, MZ, LL	<i>Men</i>	ZA, PE, CK, LL
	<i>Joint</i>	CK, PE	<i>Joint</i>	MZ, KU
	<i>Individual</i>	KU	<i>Individual</i>	KA
Income from Ganyu	<i>Men</i>	ZA, MZ, KU, LL	<i>Men</i>	PE, MZ, CK, LL, NU
	<i>Joint</i>	CK, PE	<i>Individual</i>	ZA, KU, KA
Remittances	<i>Men</i>	ZA, MZ, LL	<i>Men</i>	PE, CK, LL
	<i>Joint</i>	CK, PE	<i>Women</i>	MZ
	<i>Individual</i>	KU	<i>Individual</i>	ZA, KU, NU, KA

Note: PWP: public works programmes. ‘Individual’ means that the person earning particular income has control over it. The district abbreviations are KA = Karonga, MZ = Mzimba, KU = Kasungu,

LL = Lilongwe, NU = Ntcheu, ZA = Zomba, PE= Phalombe, CK = Chikwawa

Source: AISS 2009 Qualitative Interviews

There was a dominant view from focus group discussions with women that individual members tend to control their own resources from remittances and *ganyu* labour, but this was less prevalent among the focus group discussions with men. In many women’s groups it was argued that the persons who receive the remittances are the ones that control the income and decide on the allocation, sometimes with consultations with family members. It was also observed that in many cases, it is women that receive remittances in the household, and they tend to control such income. Men’s focus group discussions revealed that for *ganyu* and remittance incomes, although men were in control, in many cases the decisions on the use are made by the family. In some women groups, income from business enterprises was typically controlled by owners of the business.

There was a general perception among women groups that when men control resources, they tend to use it for selfish purposes such as beer, at the expense of the welfare of the households. This view was reinforced by the views from some of the focus group discussions with men. For instance,

“Husband and wife sit down to discuss income allocation. Husband takes some to be spent on what he wants personally while the wife spends all of it on household needs.” [FGD with Men in Mzimba District]

It appears that resource allocation within the household is embedded in the culture in which for households that are male-headed, the husband seem to have control over more resource allocations. However, the analysis shows that intra-household issues are

complex and the extent to which males dominate over control and allocation of resources varies from one transaction to another and from one district to another. There are also cases in which sources of income are personalized and household members earning such incomes tend to have control over such resources, as well as increasing evidence of collective decisions within the households for particular types of incomes such as produce sales and incomes from safety nets.

### **3. Factors Associated with Intra-Household Use of Fertilizers**

Apart from the statistical analysis presented above, we estimated several regression models to find correlates of likelihood of application of fertilizer on plots held by households. We use gender of the member who controls input and farming decisions on the plot as the variable describing decision making on fertiliser use, and control for farmer characteristics and other household characteristics. Thus we examine the combined effects on plot fertiliser use of gender of the member, plot size, age of household head, headship of household, cultivation of tobacco, sale of maize, access to safety nets, access and previous access to subsidized fertilizers, and district dummies. Annex Table 1 shows the description of the variables and the descriptive statistics. Annex Table 2 report regression results for three models that were estimated: (1) intra-household use assuming availability of commercial and/or subsidised fertilizers at the household regardless of source of fertilizers – Model 1, (2) intra-household use assuming availability of commercial and/or subsidised fertilizers only in households receiving some subsidised fertiliser – Model 2, and (3) intra-household use assuming that only subsidized fertilizers were available to the household (i.e. excluding households who also obtained commercial fertilisers) – Model 2.

#### *3.1 Gender and Intra-Household Use of Fertilizers*

Five gender variables were included: female-controlled plots, male-headed household, and interaction variables of female-controlled plots with coupon recipient household, male-headed household and household with commercial fertilizers. The following results were obtained:

- Significant gender differentials exist in the allocation of fertilizers to plots within the households, with female-controlled plots less likely to have fertilizer applications compared to male-controlled plots. This is only in the case where we pool the sample of subsidized and unsubsidized households.
- Female-controlled plots in coupon-recipient households were more likely to be fertilized as compared male-controlled plots and female-controlled plots in female-headed households. Access to subsidized fertilizers improves the odds for female-controlled plots with the probability of fertilizer application increasing by 32 percent.
- Female-controlled plots in male-headed households were less likely to be fertilized than male controlled plots as well as female-controlled plots in female-headed households, confirming the earlier observations in focus group discussions that typically in male-headed households, resources are likely to be controlled by husbands. However, this is only the case when commercial fertilizers are also available at the household but it is not the case when households have access to subsidized fertilizers only. Hence, the bias against female-controlled plots in

male-headed households is reduced as compared with the case when commercial fertilizer is also available at the household level.

- Access to commercial fertilizers in 2008/09 season also favour women-controlled plots in the application of fertilizers and raises the probability of application of fertilizers on the plot by 21 percent compared to male-controlled plots as well as female-controlled plots in households without commercial fertilizers. This is lower than the increase in the probability of 32 percent with household receipt of subsidised fertiliser.
- Larger plots are more likely to be fertilized than smaller plots. However, plots that belong to households with larger land holdings tend to be less fertilized. This may be due to the fact that most rural households are cash constrained to afford fertilizers and tend to be very selective on the plots that they apply fertilizers.
- Commercialisation of agricultural activities using indicators such as cultivation of tobacco and sale of maize and acquisition of commercial fertilizer in the previous season by households is positively related to the probability of the plots being fertilized. This commercialisation enables households to invest in fertilizers across the plots.
- Self reported poverty in the 2007/08 season may be one of the constraints to the 2008/9 application of fertilizers by households, with plots that belong to poor households less likely to be fertilized regardless of availability of commercial or subsidized fertilizers.
- Households' access to subsidized fertilizers in the previous season increases the probability of the plot being fertilized, demonstrating the positive cumulative effects of fertilizer adoption or continued access to subsidized fertilizers.

#### **4. Conclusion**

This paper has demonstrated that in a socio-cultural environment in which men tend to dominate the decision making process within the household over allocation of income resources, intra-household issues in the use of subsidized fertilizers are important in understanding the effectiveness of input subsidies and how they create more equal opportunities for female and male members of the household. Generally, men tend to control incomes from different sources even when such incomes are earned by female members, but there are a lot of exceptions and variations depending on the source of income and the poverty status of households.

The analysis shows that there are gender differences in the incidence of application of fertilizers to the disadvantage of female-controlled plots when households have access to fertilizers regardless of source of fertilizers. This occurs first because female headed households are less likely to use fertiliser than male headed households and second because female-controlled plots are less likely to use fertiliser than male controlled plots in male-headed households. However, such gender differentials are less evident among subsidized households, except that when subsidized households also have access to commercial fertilizers, when female-controlled plots in male-headed households are less likely to benefit from available fertilizer at the household. Although less female-headed households are likely to receive coupons, potentially joint decision making prevails when it comes to use of subsidized fertilizers within the household, hence reducing the bias against female-controlled plots. It is therefore important that analysis of gender issues in the subsidy programme goes beyond examination of differential access of subsidized



fertilizers among male-headed and female-headed households, and also includes examination of intra-household use of subsidized fertilizers.

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Annex Table 1 Descriptive Statistics of Model Variables

Variable	Mean	Std Dev	Min	Max
Application of fertilizer on the plot (0/1)*	0.6526	0.476	0.000	1.000
Female household member (0/1)*	0.2932	0.455	0.000	1.000
Female member in coupon recipient household (0/1)*	0.2192	0.414	0.000	1.000
Female member in male-headed household (0/1)*	0.0829	0.276	0.000	1.000
Female in household with commercial fertilizer (0/1)*	0.1168	0.321	0.000	1.000
Plot size in hectares	0.3832	0.291	0.100	2.400
Male-headed households (0/1)*	0.7798	0.414	0.000	1.000
Age of household head	47.138	15.45	19.000	95.000
Number of adult equivalents	4.9455	2.113	1.000	16.980
Log of household land size in hectares	0.0005	0.635	-2.291	1.929
Household that grew tobacco (0/1)	0.2293	0.420	0.000	1.000
Household that sold maize (0/1)*	0.1015	0.302	0.000	1.000
Household had commercial fertilizers in 2007 (0/1)*	0.3345	0.472	0.000	1.000
Household own assessment as poor in 2007 (0/1)*	0.8570	0.350	0.000	1.000
Household had access to safety nets 2007 (0/1)*	0.1441	0.351	0.000	1.000
Household had access to subsidized fertilizers 2007 (0/1)*	0.6522	0.476	0.000	1.000
Chitipa (0/1)*	0.1134	0.317	0.000	1.000
Karonga (0/1)*	0.0590	0.236	0.000	1.000
Mzimba (0/1)*	0.1225	0.328	0.000	1.000
Kasungu (0/1)*	0.0819	0.274	0.000	1.000
Nkhotakota (0/1)*	0.0732	0.260	0.000	1.000
Lilongwe (0/1)*	0.0546	0.227	0.000	1.000
Dedza (0/1)*	0.0609	0.239	0.000	1.000
Ntcheu (0/1)*	0.0552	0.228	0.000	1.000
Mangochi (0/1)*	0.0664	0.249	0.000	1.000
Zomba (0/1)*	0.0846	0.278	0.000	1.000
Blantyre (0/1)*	0.0573	0.232	0.000	1.000
Thyolo (0/1)*	0.0520	0.222	0.000	1.000
Phalombe (0/1)*	0.0618	0.241	0.000	1.000
Chikwawa (0/1)*	0.0571	0.232	0.000	1.000

Note: \* (0/1) indicates dummy variable.

Annex Table 2 Marginal Effects from Probit Estimates of Intra-Household Fertilizer Use

Dependent Variable: Plot controlled by member in household was fertilized (0/1)	Model 1 All Households		Model 2 (subsidy/commercial)		Model 3 (subsidy only)	
	dF/dx	t-ratio	dF/dx	t-ratio	dF/dx	t-ratio
Female household member (0/1)*	-0.2844	-3.50 <sup>a</sup>	0.0780	1.30	0.0401	0.42
Female member in coupon recipient household (0/1)*	0.3502	13.09 <sup>a</sup>	-	-	-	-
Female member in male-headed household (0/1)*	-0.2848	-3.32 <sup>a</sup>	-0.1581	-2.03 <sup>b</sup>	-0.0730	-0.65
Female in household with commercial fertilizer (0/1)*	0.2154	7.30 <sup>a</sup>	0.0729	2.66 <sup>a</sup>	-	-
Plot size in hectares	0.4308	12.59 <sup>a</sup>	0.4664	11.99 <sup>a</sup>	0.4502	8.42 <sup>a</sup>
Male-headed households (0/1)*	0.1223	1.65 <sup>c</sup>	0.0535	0.84	0.0120	0.12
Age of household head	-0.0008	-1.45	-0.0003	-0.64	0.0000	-0.07
Number of adult equivalents	-0.0043	-1.12	-0.0085	-2.37 <sup>b</sup>	-0.0086	-1.66 <sup>c</sup>
Log of household land size in hectares	-0.2389	-15.05 <sup>a</sup>	-0.1672	-13.34 <sup>a</sup>	-0.2527	-11.52 <sup>a</sup>
Household that grew tobacco (0/1)	0.1368	6.88 <sup>a</sup>	0.1067	6.19 <sup>a</sup>	0.0755	2.51 <sup>b</sup>
Household that sold maize (0/1)*	0.1255	4.90 <sup>a</sup>	0.0817	3.59 <sup>a</sup>	0.0937	2.82 <sup>a</sup>
Household had commercial fertilizers in 2007 (0/1)*	0.1510	8.59 <sup>a</sup>	0.0776	4.58 <sup>a</sup>	0.0101	0.31
Household own assessment as poor in 2007 (0/1)*	-0.0630	-2.99 <sup>a</sup>	-0.0447	-2.29 <sup>b</sup>	0.0069	0.22
Household had access to safety nets 2007 (0/1)*	0.0109	0.49	0.0017	0.08	0.0276	0.96
Household had access to subsidized fertilizers 2007 (0/1)*	0.1698	9.44 <sup>a</sup>	0.0570	3.05 <sup>a</sup>	0.0389	1.43
Chitipa (0/1)*	0.0763	1.94 <sup>b</sup>	-0.0967	-1.68 <sup>c</sup>	-0.0884	-1.19
Karonga (0/1)*	0.1417	3.76 <sup>a</sup>	0.0422	0.79	0.0800	1.27
Mzimba (0/1)*	0.2646	8.18 <sup>a</sup>	0.1273	2.89 <sup>a</sup>	0.0988	1.60
Kasungu (0/1)*	0.1706	4.47 <sup>a</sup>	0.0119	0.22	0.0064	0.09
Nkhotakota (0/1)*	-0.0047	-0.11	-0.1683	-2.56 <sup>a</sup>	-0.1323	-1.68 <sup>c</sup>
Lilongwe (0/1)*	0.2040	5.47 <sup>a</sup>	0.1012	1.99 <sup>b</sup>	0.0758	1.05
Dedza (0/1)*	0.1518	3.98 <sup>a</sup>	0.0036	0.06	-0.0249	-0.33
Ntcheu (0/1)*	0.2550	7.32 <sup>a</sup>	0.1348	3.03 <sup>a</sup>	0.1515	2.37 <sup>b</sup>
Mangochi (0/1)*	0.2147	6.23 <sup>a</sup>	0.1130	2.37 <sup>b</sup>	0.1182	1.93 <sup>b</sup>
Zomba (0/1)*	0.2391	6.96 <sup>a</sup>	0.1049	2.26 <sup>b</sup>	0.1404	2.38 <sup>b</sup>
Blantyre (0/1)*	0.2655	8.15 <sup>a</sup>	0.1609	3.89 <sup>a</sup>	0.1749	3.15 <sup>a</sup>
Thyolo (0/1)*	0.2732	7.69 <sup>a</sup>	0.1658	3.85 <sup>a</sup>	0.1800	3.01 <sup>a</sup>
Phalombe (0/1)*	0.2927	9.52 <sup>a</sup>	0.1485	3.49 <sup>a</sup>	0.1582	2.72 <sup>a</sup>
Number of observations		4727		3551.0		1944
Wald chi2(25)		1071.1		593.7		392.0
Prob > chi2		0.000		0.000		0.000
Pseudo R-squared		0.2281		0.1826		0.2003

Notes: (\*) dF/dx is for discrete change of dummy variable from 0 to 1. Superscripts a, b and c denote statistically significant at 1%, 5% and 10% level, respectively.