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Assessing the Potential Impact on Poverty of Rising Cereals Prices:

The Case of Mali

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Abstract

Concerns have been raised about the impact of rising food prices worldwide on the poor. To assess the (short term) impact of rising food prices in any particular country it is necessary to look at both the impact on food producers (who benefit from an increase in prices) and food consumers (who loose out when the price increases), with a focus on poor producers and consumers. In Mali the impact of a change in the price of rice is not ambiguous because about half of the rice consumed in the country is imported, so that the negative impact for consumers is much larger than the positive impact for producers. By contrast, for millet and sorghum, as well as corn, the impact is more ambiguous since much of the consumption is locally produced. Using a recent and comprehensive household survey, this paper provides an assessment of the potential impact of higher food prices on the poor in Mali using both simple statistical analysis and non-parametric methods. The paper finds that rising food prices for rice, millet and sorghum, corn, as well as wheat and bread could together lead to a substantial increase in poverty, with the increase in the price of rice having by far the largest negative impact.

This paper—a product of the Development Dialogue on Values and Ethics, Human Development Network—is part of a larger study by the Africa Chief Economist Office and the Development Dialogue on Values and Ethics on the impact of the food price crisis in Africa and the policy responses available to governments. This research was started in the Africa PREM department and benefits from funding from the Africa Region Regional Studies Program as well as the Belgium and Luxemburg Poverty Reduction Partnerships. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at qwodon@worldbank.org.

Assessing the Potential Impact on Poverty of Rising Cereals Prices: The Case of Mali[1]

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1. Introduction

The issue of the increase in food prices has received renewed attention in recent months as the increase in prices worldwide has had large negative impacts on households (e.g., Ivanic and Martin, 2007; World Bank, 2008a and 2008b; IMF, 2008; Wodon and Zaman, 2008; Wodon et al, 2008). In Mali, prices for several commodities such as rice, millet and sorghum are today about 25 percent higher than they were a year ago. This has led the authorities as well as development partners to consider a range of compensatory measures that could help offset part of the negative impact on the poor of this increase in prices. However, at least from a conceptual point of view, the net impact of an increase in food prices on the poor is not obvious. Indeed, when discussing the link between rice and other cereal prices and poverty, a key issue is to assess the double and opposite impact that a change in prices can have through producers (who benefit from an increase in prices) and consumers (who lose out when the price increases).

The techniques for the analysis of the short term producer and consumer impacts of food commodity price changes are well developed in the literature. Early work in this area was conducted by Deaton (1989) using data from Thailand (see also Singh et al., 1986). Similar methods have been used in sub-Saharan Africa among others by Barrett and Dorosh (1996) for Madagascar and Budd (1993) for Cote d'Ivoire, among others. These are also the methods that we use in this paper. Most of these studies have found that food price increases tend to lead to an increase in poverty because the consumption effects dominate the production effects as many countries are net importers of food, at least in sub-Saharan Africa.

There has also been a literature on assessing whether in the medium to long term, the increase in prices is compensated by an increase in wages, among others for those workers who contribute to the production of food crops (see for example Ravallion, 1990; Boyce and Ravallion, 1991, Rashid, 2002; Christaensen and Demery 2006; and Ivanic and Martin, 2007). The findings from these studies suggest that wage offset compensate only in a limited way for the initial increase in food prices. Finally, there has also been a substantial amount of work looking at the impact of various policies to deal with food production and prices. This can be illustrated with the case of rice. Indonesia is a country that used to import substantial amounts of rice, but where restrictions were progressively placed on imports in order to help local producers, with imports of rice actually banned after 2004. Using a general equilibrium model, Warr (2005) find that the ban on rice imports raised the price of domestically produced rice, and that this led to an increase in poverty by almost one percentage point (on the Indonesia story as well as for a

more general discussion on the experience of governments in Asia to stabilize the price of rice, see Timmer and Dawe, 2007).. Another paper on Indonesia by (Sumarto et al., 2005) using panel data suggests that the practice of subsidizing rice as part of a social safety net led to a reduction in the risk for household to be poor. Papers on Vietnam by Niimi et al. (2004) and Minot and Goletti (1998) suggest that the liberalization of rice exports probably led to a reduction in poverty despite an increase in the price of rice in the country, thanks essentially to increased rice production of rice.

In this paper, our objective is to assess what could be the short-term impact on poverty of the increase in the price of cereals in Mali (for a dynamic analysis of the medium term impact of higher rice prices in Mali, see Nouve and Wodon, 2008). The impact of a change in the price of rice is not ambiguous because about half of the rice consumed in the country is imported. In the case of wheat and bread as well, the impact is also not ambiguous since wheat is imported and bread is produced from imported wheat. For these goods, an increase in price will tend to result in higher poverty in the country as a whole (even if some local producers will gain from this increase in the case of rice). For millet and sorghum, as well as for corn by contrast, the impact on poverty is less obvious as these are commodities that are produced for the most part in the country for local consumption. Overall, when considering the various cereals together, the impact of the price increase is likely to be an increase in poverty, but whether this increase will be severe depends on a number of parameters, including who consumes and produces what, and in what amounts. It is thus an empirical question to assess what might be the impact on poverty of higher cereals price in a country such as Mali.

For the sake of simplicity, we will use a number of assumptions to provide estimates of the impact on poverty of higher food prices. First, we will assume that the cost of an increase in food prices for a household translates into an equivalent reduction of its consumption in real terms. This means that we do not take into account the price elasticity of demand which may lead to substitution effects and thereby help offset part of the negative effect of higher prices for certain food items. Similarly, an increase for producers in the value of their net sales of food translates into an increase of their consumption of equivalent size, and we again do not take into account the role that the price elasticity of supply may play here. As for food auto-consumed by producers (which represents a large share of total consumption), it is not taken into account in the simulations since changes in prices do not affect households when food is auto-consumed. Poverty measures obtained after the increase in prices are then compared to baseline poverty

measures to assess impacts. This implicitly means that we do not take into account the potential spill-over effects of the increase in food prices for the food items included in the analysis on the prices for items not included.

A difficult question is whether increases in consumer prices do translate into increases in producer prices. At least two factors may dilute the impact of rising food prices on the incomes of farmers. First, production costs for farmers as well as transport costs are likely to be rising due to higher costs for oil-related products. Second, market intermediaries may be able in some cases to keep a large share of the increase in consumer prices for themselves without paying farmers much more for their crops. Because it is difficult to assess whether producers will benefit substantially from higher food prices, especially in the short term, we could consider our estimates obtained when considering only the impact on consumers as an upper bound of the impact of the rise in prices on poverty, and interpret the results obtained when factoring in a proportional increase in incomes for net sellers or producers as a lower bound of the impact.

The rest of the paper is structured as follows. Section 2 presents basic data on cereals production and consumption in Mali based on an analysis of food consumption and production using the 2006 ELIM survey for a number of food categories. In section 3, we provide estimates of the overall impact of higher food prices on poverty. A brief conclusion follows.

2. Patterns of food consumption and production

2.1. Food consumption

Cereals prices are the focus of this paper, and within cereals, we focus further on rice, millet and sorghum, and corn as these goods represent a large share of total consumption and have also experienced increases in prices in recent months. Table 1 provides summary data on rice consumption. Table 2 provides similar data for the consumption of millet and sorghum, and in table 3 data are provided on the consumption of maize.

We see important differences in the weight of the various cereals in the overall consumption basket of the population, as well as differences between various types of households in their consumption patterns. Consider first rice. For those households who consume rice, total consumption is at about 153,000 FCFA per year. Since ninety percent of the population consuming rice, the average household consumption of rice in the population as whole is only slightly lower at about 146,000 FCFA (about $300 at the current exchange rate). Knowing that the poverty line is at 149,000 FCFA per person per year, and that the average size

of a poor household in Mali is about 10.9 adults (as compared to 7.3 persons for non-poor households), the value of rice consumption among the poor on average is roughly equivalent to about one tenth of what is needed for a typical household to not be poor, which is large.

The survey does not distinguish between imported and locally produced rice, but by comparing the income received from rice production (in table 5) with the consumption of rice, one can see that the average value of the consumption of rice is about two times higher than the average income received from rice. It is likely that consumers pay a mark up over the producer price (given the need to transport and market the locally produced rice), but it is also likely that some of the rice produced in Mali is exported to neighbouring countries. Therefore, one can assume that about half of the rice consumed in the country is locally produced, which is indeed the common perception in the country. Rice is consumed as frequently in rural than in urban areas, although rural consumption of rice relies more on auto-consumption. Rice consumption is slightly less frequent in the Sikasso area (this is the cotton producing part of the country, which is also one of the poorest area), but even there close to nine persons out of ten consume rice.

In terms of the amounts consumed on average in the whole population, urban areas stand out as consuming 50 percent more rice than rural areas per household, despite the fact that rural households are larger. The lowest average amounts consumed are observed in areas where households are poorer, such as Sikasso. Clearly, rice is a good that is consumed in significantly higher amounts by the better off population as represented by the top two quintiles of consumption. In the top quintile, rice consumption per household is almost five times higher than in the bottom quintile. Although the data does not permit to differentiate imported and locally produced rice, it is likely that imported rice is more consumed in urban areas.

Table 2 provides data for millet and sorghum consumption. The average consumption of millet and sorghum in the population as a whole is 136,000 FCFA per household per year, which is of the same order of magnitude as the consumption for rice. As for rice, more than nine out of ten households consume millet and sorghum. Production as recorded in the survey is higher than for rice (see table 6), but still well below the consumption level. Given that Mali does not import much millet and sorghum, it could be that the survey underestimates local production. In terms of patterns of consumption, there is a substantial difference with rice, given the fact that consumption of millet and sorghum is lower for the bottom and top quintile, and fairly stable between the second and fourth quintile, with in general fewer differences between quintiles than for rice. Thus consumption of millet and sorghum is not done more by the poor or the better off

as the good is consumed in similar quantities by all types of households. Rural consumption is much higher than urban consumption, while the reverse was observed for rice. In terms of geographic patterns, consumption is lower in the areas of Kidal and Tombouctou than elsewhere.

Tables 3 and 4 provide consumption data for corn (maize) and wheat products. Consumption levels are substantially lower, at about 30,000 FCFA per household per year for corn, and 24,000 for wheat and related products such as bread. Slightly less than half of the population consumes corn, but the proportion reaches three fourths for wheat products. Corn is consumed most heavily in the Sikasso area, while consumption of wheat products is highest in the Kidal area. While corn consumption is not affected too much by the quintile of well-being of households, wheat products are as expected much more consumed by better off households, and this differences also reproduces itself when comparing urban and rural areas.

Together, the consumption of rice, millet and sorghum, corn and wheat products represents an outlay of about 320,000 FCFA per household per year. Using the same comparison as above, this represents about one fourth of what is needed for a typical poor household not to be poor. An increase of 25 percent of cereals price would then represent about five percent of what a poor family needs in order not to be poor. Yet this would take into account only the impact of higher prices on the cost of food, and not the extra revenues that some households would probably get as producers of food.

Beyond statistical tables, it is useful to visualize the data so as to better understand differences in consumption patterns between various households groups as defined by their level of consumption, since this is ultimately what affects the impact on poverty of price changes. We focus here on rice, millet and sorghum, and corn because these are the cereals for which average consumption is highest (especially in the case of rice and millet and sorghum), and these are also the cereals for which we observe both consumption and production in the country (as discussed below in the case of production). For the graphical analysis we use simple on-parametric techniques to present kernel estimates for various variables (this follows previous similar work by a number of authors, as noted in the introduction). All figures presented in this section as well as in following ones share a common variable for the horizontal axis, namely the level of well-being of households according to the logarithm of their consumption per equivalent adult.

Figure 1 first provides the distribution density for the logarithm of consumption in urban and rural areas as well as at the national level. As urban households are richer, the urban density is to the right of the rural density. In rural areas, the mode of the density is about a value of 12,

while in urban areas, the mode is around 13. As the distributions appear to have a normal shape, the modes are similar to the mean values. We present these figures to highlight the fact that for low values of log consumption (below 11) and for high values (above 14), the shares of the population in these areas are very low, so that in future graphs, the impact of what takes place at these extremes should be discounted by the fact that those impacts affect a very small share of the population. Said differently, what matters the most is what is taking place roughly between values of 11 and 14 on the graphs, as this will drive the overall average effects. Note also that the poverty line would be a vertical line at a value of about 12 on the graph, with some differences depending on the region considered.

In Figures 2a to 2c, we provide data on the consumption shares for rice, millet and sorghum, and corn among the population as a whole. For rice we have an inverted U shape, suggesting that rice consumption represents a higher share of total consumption for the population with intermediate levels of consumption near the middle of the distribution. This is because the poor tend to consume on average much less rice than better off households, while for those at the top of distribution, even if rice consumption is high, total consumption is even higher so that rice consumption as a share of total consumption is low. For millet and sorghum, the consumption share is much higher for the very poor and the poor than for other households. This echoes our earlier findings in terms of the consumption levels of households (albeit this was then not discussed in terms of consumption shares) in tables 1 and 2. Thus, if one were to not include the producer side impact of higher prices on poverty into account, clearly, on the consumption side an increase in the price of millet and sorghum would likely hurt the poor more than an increase in the price of rice, both because the poor are comparatively larger users of millet and sorghum than the better off while this is not the case for rice, and because for the poor at least the share of their consumption allocated to millet and sorghum is substantially higher than that allocated to rice. In Figure 2c, the exercise is repeated for corn, with again higher consumption at the bottom of the distribution, but also with smaller shares of total consumption accounted for.

2.2. Food production

We now turn to the production side, where the data enables us to assess whom produces rice, millet and sorghum, and corn (for wheat, the products are essentially imported). As shown in table 5, a very large share of households produces rice (39.5 percent) for auto-consumption, for sales or both. Rice production is concentrated in rural areas, and especially in Tombouctou,

Segou, Gao, and Mopti. In terms of welfare status, the share of producers in the bottom four quintiles is similar at 40 percent to 50 percent, while it drops to 26 percent in the top quintile. The average income from rice in the population as a whole is substantial, at 206,000 FCFA for producers, which translates to an average income of about 81,500 FCFA per household in the population as a whole. While households in the bottom four quintiles have a similar probability of being rice producers, the amount produced among producers is as expected higher among richer households, with producers in the fourth quintile selling about two and a half times more rice than producers in the bottom quintile.

Table 4 provides the same data for millet and sorghum. The share of producers in the population is even higher, at close to 54 percent, with this time a much higher probability of production in the poorest three quintiles. Millet and sorghum production tends to be more concentrated in the areas that are not major producers of rice, although households in Tombouctou, Mopti and especially Segou have a high probability of being producers. On average, sales among producers are a bit lower to rice sales among rice producers, at about 173,000 FCFA per household. But because the proportion of millet and sorghum producers is larger, average income from millet and sorghum in the population as a whole (including for auto-consumption) is slightly higher for millet and sorghum than for rice. A big difference however between the two crops is that most of the rice produced in the country is sold, while most of the millet and sorghum produced is used by household for their auto-consumption.

3. Combining consumption and production data to assess poverty impacts

The impact on poverty of the change in food prices is the result of the combined impacts on the consumption and production sides. We first provide in this section estimates of the impact of changes in the price of rice, millet and sorghum, corn, wheat, as well as cereals as a whole. We measure likely impacts of food price increases on three poverty measures. The headcount index of poverty is the share of the population with a level of consumption per equivalent adult below the poverty line. The poverty gap takes in addition into account the distance separating the poor from the poverty line (while giving a zero distance to the non-poor). The squared poverty gap takes in addition into account the square of that distance (and thus inequality among the poor; for an introduction to the concepts of poverty measurement, see Coudouel et al., 2002).

We carry the simulations in a very simple way. First, for rice, millet and sorghum, and corn producers, we measure the additional income or the loss in income obtained from the sale of

the crops by households due to an increase or reduction in the price of the crops. We assume that this difference in income translates into an equivalent difference in the consumption per person of households used to measure poverty. We then compute again the poverty measures keeping the poverty line intact. For consumers, we do essentially the same thing, but considering also wheat products as well as cereals as a whole. That is, we estimate the increase or decrease in the cost of rice, millet and sorghum, corn and wheat products following a change in price, taking into account the actual spending of the household. In the case of a reduction in price, we then add to the consumption aggregate the reduction in the total cost of food for the household, since this reduction in cost means that the household can actually consume other goods (this is thus as if the household consumption had increased.) In the case of an increase in the price of food, we subtract from the consumption aggregate the value of this increase, since the household will have to give up other consumption goods in order to be able to purchase the food it needs. For either an increase or a decrease in the price of food we then compute again poverty with the adjusted consumption level. What determines if a household is considered as a net producer or consumer is the level of the net sales of the consumer (negative for consumers, positive for producers; auto-consumption is not taken into account on either the producer or the consumer side)

This procedure is admittedly a rough approach, but it has the merit of being simple. The approach may slightly overestimate the impact on poverty of changes in prices because we do not take into account the price elasticity of rice, millet and sorghum, corn and wheat consumption, but this price elasticity is likely to be low in any case, due to the fact that all these products are important in the diet of the population and that the prices of the various food items seem to increase jointly at least in the medium term (so that it is not clear that households can offset the loss in purchasing power associated with the price increase by shifting to other foods). Also, the approach does not take into account any ripple effects of changes in the price of the various cereals on other parts of the economy. More sophisticated methods could be used to measure the "general equilibrium" effect of a change in the price of rice (such as using a Social Accounting Matrix, as done by Parra Osorio and Wodon, 2008), but such simulations require a much larger number of assumptions, some of which are the subject of debate (especially when more complex computable general equilibrium models are used). The estimations given here thus provide "first round" likely poverty effects from lower or higher food prices paid to producing households or paid by consuming households, assuming that households don't change

their consumption and production patterns for rice as well as for the other commodities after the change in their price.

Before providing the results, one more word of caution is required. As mentioned in the introduction, it remains an open question as to the higher prices paid by consumers translate into higher prices paid to producers. If one has doubts as to producers will really benefit in the short run from higher prices, one could consider estimates based on consumption impacts only as an upper bound for the impact on poverty, and estimates taking into account both consumer and producer impacts as a lower bound.

Key results from the simulations are provided in tables 8 to 10. Consider first table 8, which is based only on data on the consumption of food. At the time of the survey, the share of the population in poverty was 47.45 percent. If the price of rice increases by 25 percent, and if we look only at the impact on the consumer side, the headcount index would increase by about one and a half percentage point to 48.9 percent. The increase for millet and sorghum is smaller at less than one point, due in part to the fact that much of production is auto-consumed. For corn, the increase is minimal, and the same can be said for wheat. For all cereals combined, the increase is 2.5 percentage points. This is large, and it would mean that some 290,000 persons would fall into poverty). The other poverty measures (poverty gap and squared poverty gap) follow a similar pattern, but with smaller increases in absolute terms since these measures are also smaller to start with. For information, we provide also the impacts for those households who consume the various foods, but in the case of rice, millet and sorghum and wheat, since most households are consumers, this does not change much the overall estimates.

If we now look at the impact of changes in producer prices in table 9, the impacts are reversed. The beneficial impact of the increase in rice prices is however smaller than the negative impact on the consumption size since perhaps half of the total consumption of rice is imported. With a 25 percent increase in prices, and if we look only at the impact on the producer side, national poverty measures would be reduced by about half a point (but there would be a larger reduction in poverty among rice producers of about four points). In the case of millet and sorghum, if the price for producers were to increase by 25 percent, the headcount index of poverty would decrease nationally by only a third of a point. For corn, the impact is one tenth of a point. The combined impact of higher producer prices for rice, millet and sorghum, and corn is a reduction in the national estimate of the headcount index of slightly less than one point.

The total impact of changes in the price of the various cereals on poverty is obtained by taking both consumers and producers into account, and the results are given in table 10. If the price of rice increases by 25 percent, the headcount index of poverty increases in the population as a whole to 48.3 percent, while if the price of millet and sorghum increases by the same percentage, the headcount index of poverty increases to 47.9 percent. In the case of corn, poverty actually decreases when prices go up, because producers tend to be poorer than consumers. For cereals as a whole though, taking into account both consumer and producer impacts, the headcount index increases by 1.7 point to 49.2 percent with a 25 percent increase in prices.

Data on the poverty impacts separately for urban and rural areas are provided in appendix. The increase in the headcount index is much higher in urban areas (at close to three percentage terms) than in rural areas (at 1.2 percentage point). When one considers the poverty gap or squared poverty gap, the difference in impact on poverty between urban and rural areas is reduced, but there remains a gap with urban areas affected more, as expected since urban dwellers are clearly net consumers of food.

As before, to understand the differences in results for rice, millet and sorghum and corn, it is useful to visualize the data. Figures 3a to 3c provide the shares of households who are net producers, net consumers, or neither for the various commodities (the last group of households does not consume nor does it produce rice, millet or sorghum, or corn). The sum of the three proportions sums to one. The pattern is as expected very different for the three types of cereals.

In Figure 3a for rice (which combines imported and domestically produced rice) the proportion of net consumers increases with the level of income (remember that most households are located in the middle of the graphs while the share of households located at the two extremes are low). Net producers are located for the most part among the poor, but even among the poor, there is a larger number of net consumers than net producers. This means that an increase in the price of rice is unambiguously going to increase poverty, with the impact on standards of living more generally being larger towards the middle of the distribution.

In Figure 3b for millet and sorghum, and in Figure 3c for corn, the pictures and messages are different. In the case of millet, there is a very large share of households in autarky especially at low levels of total consumption (this would be for the most part households who produce millet and sorghum for their own consumption). Among the rest of the population, there are more net producers than net consumers at comparatively lower levels of consumption, with a

reversal at higher levels. For corn, the proportion of households in autarky is smaller, and below the poverty line which is at a value of about 12 on the horizontal axis, we have a large number of net producers who should benefit from a price increase. Note also that these graphs give the proportion of households in various situations, but to assess poverty impact, we also need to have information on the actual quantities sold and purchased. By taking into account these quantities we can look at net incomes for the various crops at various levels of household consumption.

In Figures 4a to 4c, we provide the data on the net income from sales of rice, millet and sorghum, and corn, with net income defined as the difference between sales and purchases of the good. As expected, for rice, net income is negative for almost all households, although for the very poor in rural areas, the magnitude of the negative net income is small (it is much larger in urban areas). For millet and sorghum in rural areas and at the national level, net income is positive for the ultra-poor (those with a log consumption value below 11), but it becomes negative for many among the poor (proxied by those with a log consumption between 11 and 12), and then the curves go in larger negative territory as consumption rises. In urban areas, net income is negative throughout. For corn, the picture is a bit different, as more households below a value of log income of 12 are net sellers. Thus, the graphical analysis confirms the results obtained with the poverty simulations. That is, for corn an increase in prices could very well be poverty reducing, while for millet and sorghum, even if some among the very poor benefit, the effect of higher prices is still likely to be an increase in poverty given the fact that many more households have consumption levels in lo between values of 11 and 12 than below a value of 11.

Finally, Figures 5a to 5c provide data on the net benefit ratio for rice, millet and sorghum, and corn, with this ratio defined as the net income from the commodity divided by the consumption level of the household. The figures are very similar to those for the net income, but they are scaled in such a way that the magnitude of net income effects is compared to the total consumption level of the households. The figures clearly show a negative impact again for rice in urban areas (but a gain in rural areas), and a small benefit for part of the distribution (the very poor) in the case as millet and sorghum, as well as corn.

4. Conclusion

When assessing the potential impact of a change in the price of cereals on poverty, it is important to consider both the impact on producers (who tend to benefit from an increase in prices) and consumers (who tend to loose out when the price increases). If producers tend to be

poor and if consumers live in urban areas and are better off, an increase in the price of cereals, despite its impact on the cost of food, may well be poverty reducing. In Mali, the main cereals that are sold for consumption (as opposed to auto-consumed) are rice as well as wheat, although there is also a substantial production and consumption of millet and sorghum, as well as corn. In the case of rice, the impact of an increase in price is not ambiguous at all since about half of the rice consumed in the country is imported. In the case of wheat and bread as well, an increase in prices is poverty increasing. For millet and sorghum, as well as for corn however, price increases could be potentially poverty reducing, at least if we assume that the higher price paid by consumers translates into a higher price received by producers. In the case of corn, we do find indeed in our simulations a reduction in poverty with an increase in prices, while for millet and sorghum, because consumption levels are higher than production levels as recorded in the survey, we find that a price increase is poverty increasing.

Overall, we find that an increase in the price of the various cereals of 25 percent would lead to an increase in poverty which is substantial, since the share of the population in poverty would increase by 1.7 percentage point (this would represents close to 300,000 persons falling into poverty). If the increase in prices were at 50 percent, the increase in poverty would be substantially larger, at close to 3.5 points. If the increase in prices were to affect consumers only, without benefit for producers (for example if there is no trickle down of higher consumer prices to producers due to high intermediation costs), the increase in the headcount of poverty would be even higher, at 2.5 percentage points for a 25 percent price increase, and more than five percentage points for a 50 percent price increase.

Given that the national impact on poverty may not substantial, the food price crisis could justify the implementation of compensatory measures to protect the most vulnerable households. These measures should probably not be in the form of broad import tax or value added tax cuts or food subsidies, as much of the proceeds from such measures would probably not reach the poor better than other household groups. Targeted interventions to reach poor households who are less likely to have the means to cope with price shocks would probably be more effective, as would interventions designed to increase rice production in the country (as documented in Nouve and Wodon, 2008).

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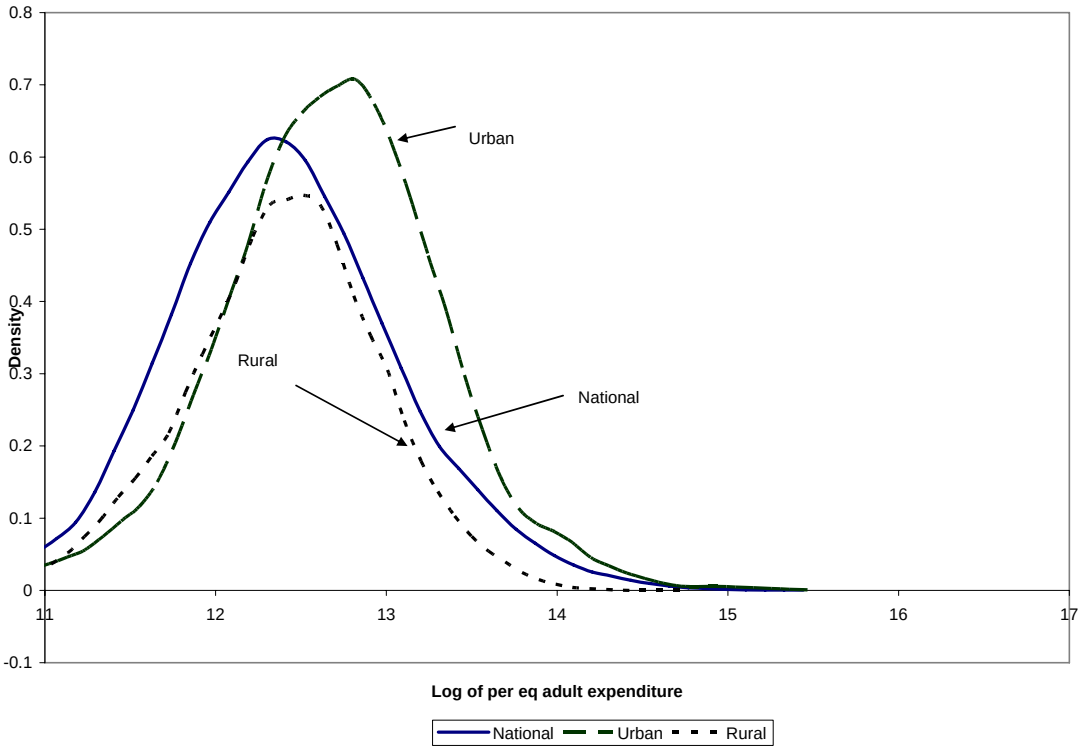
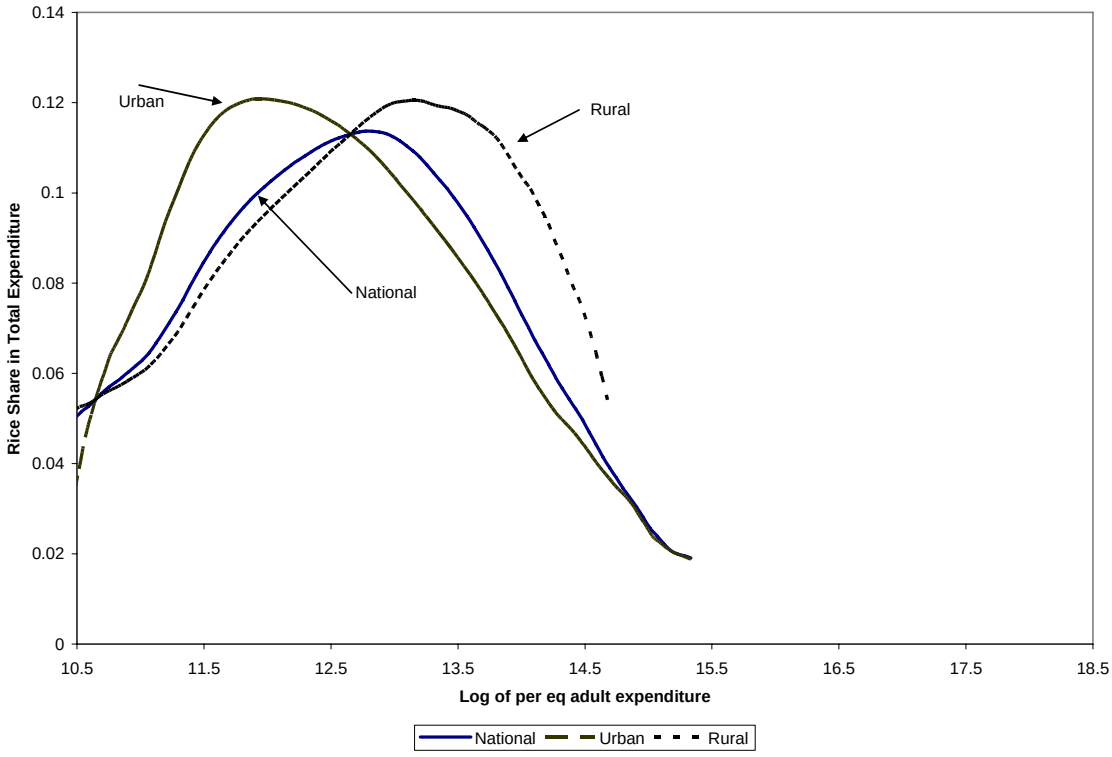
Figure 1: Rural and urban welfare distributions (in logarithm)



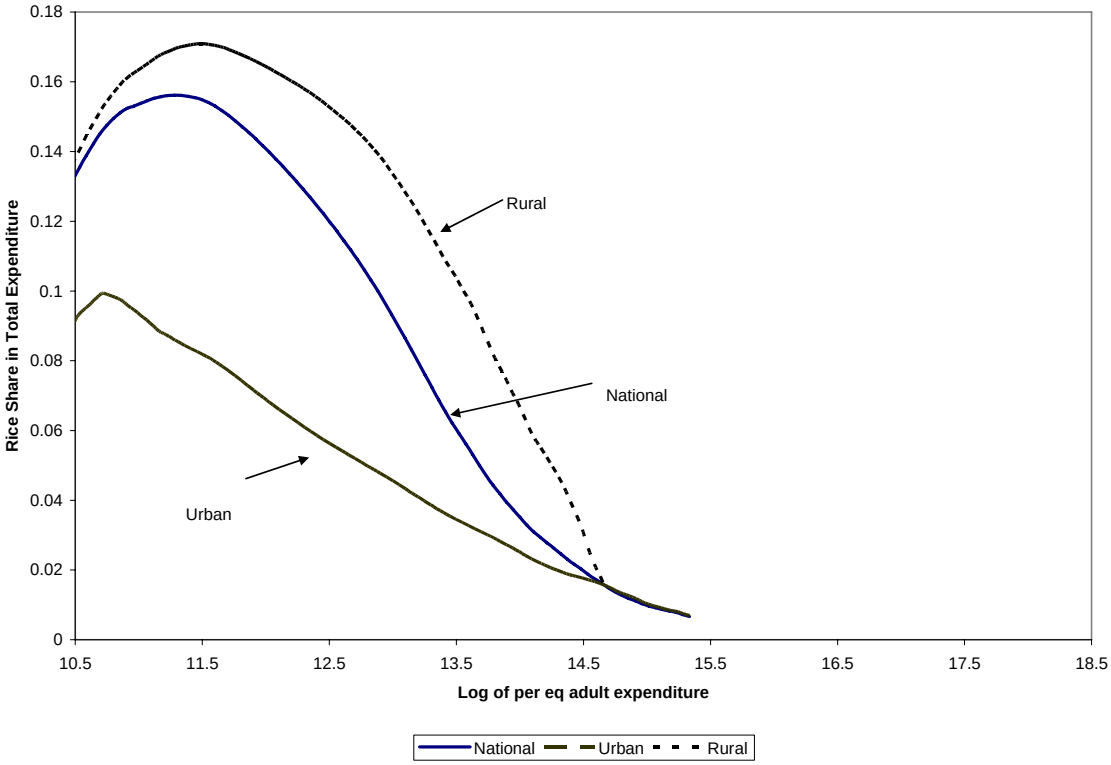
Source: Authors' estimation using ELIM 2006.

Figure 2a: Budget share of rice expenditure



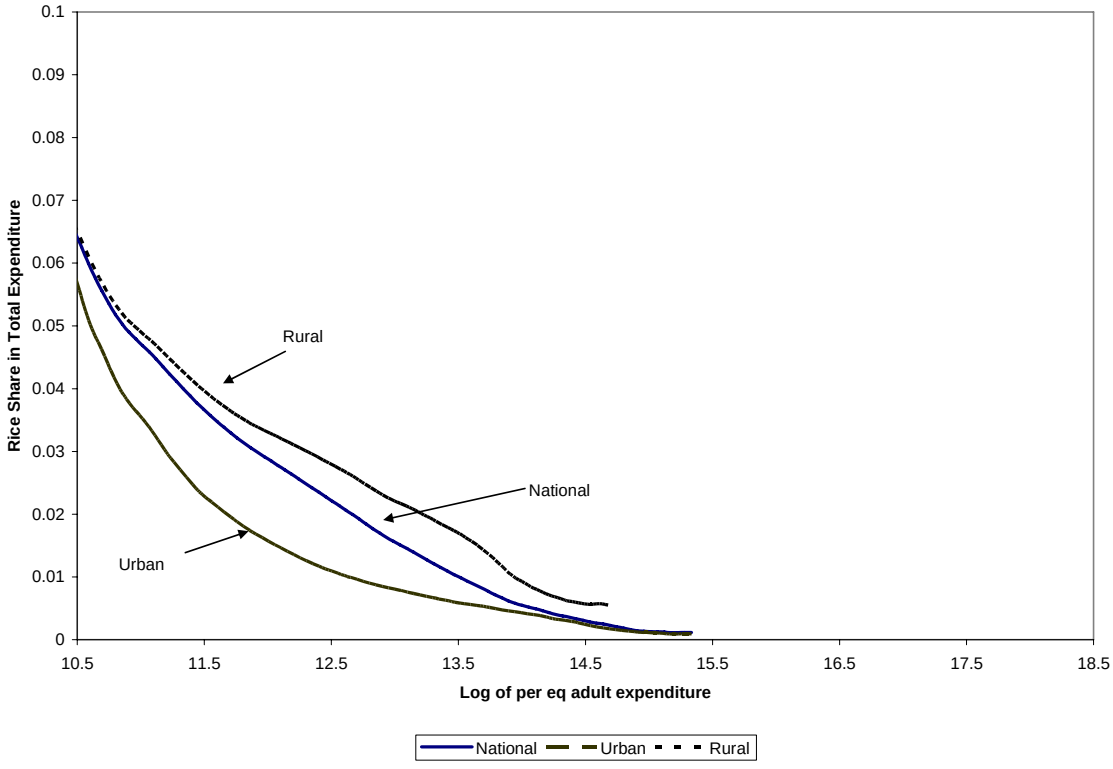
Source: Authors' estimation using ELIM 2006.

Figure 2b: Budget share of millet and sorghum expenditure



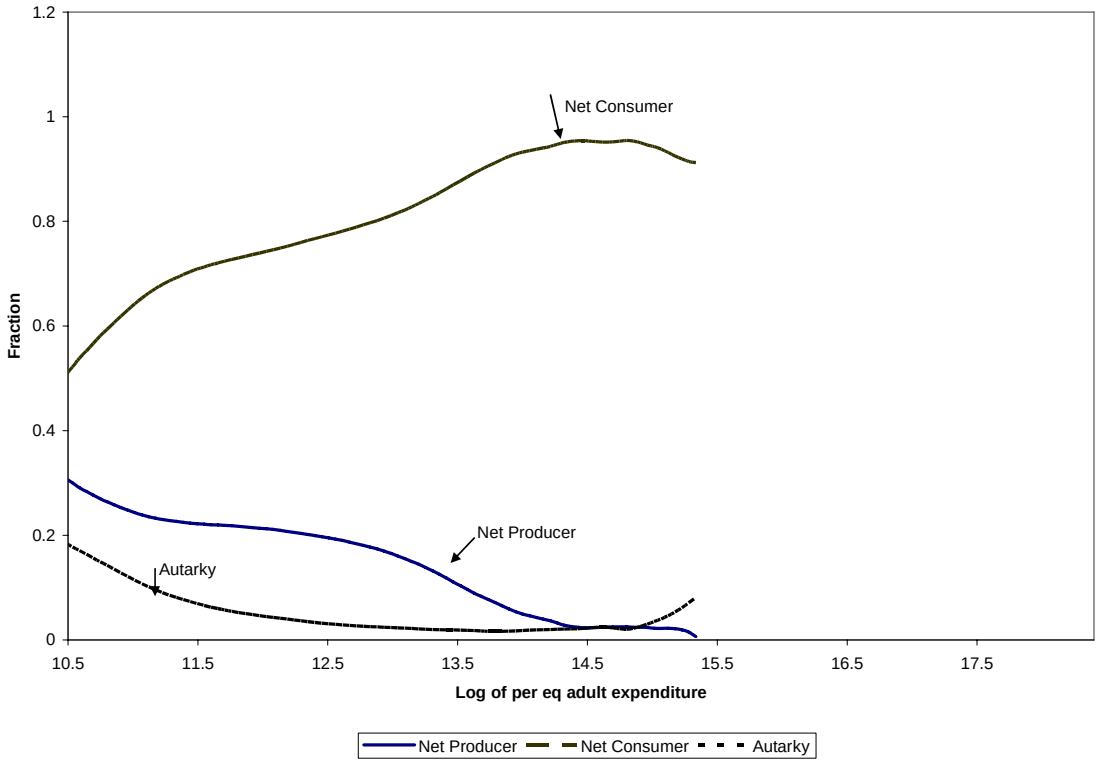
Source: Authors' estimation using ELIM 2006.

Figure 2c: Budget share of corn expenditure



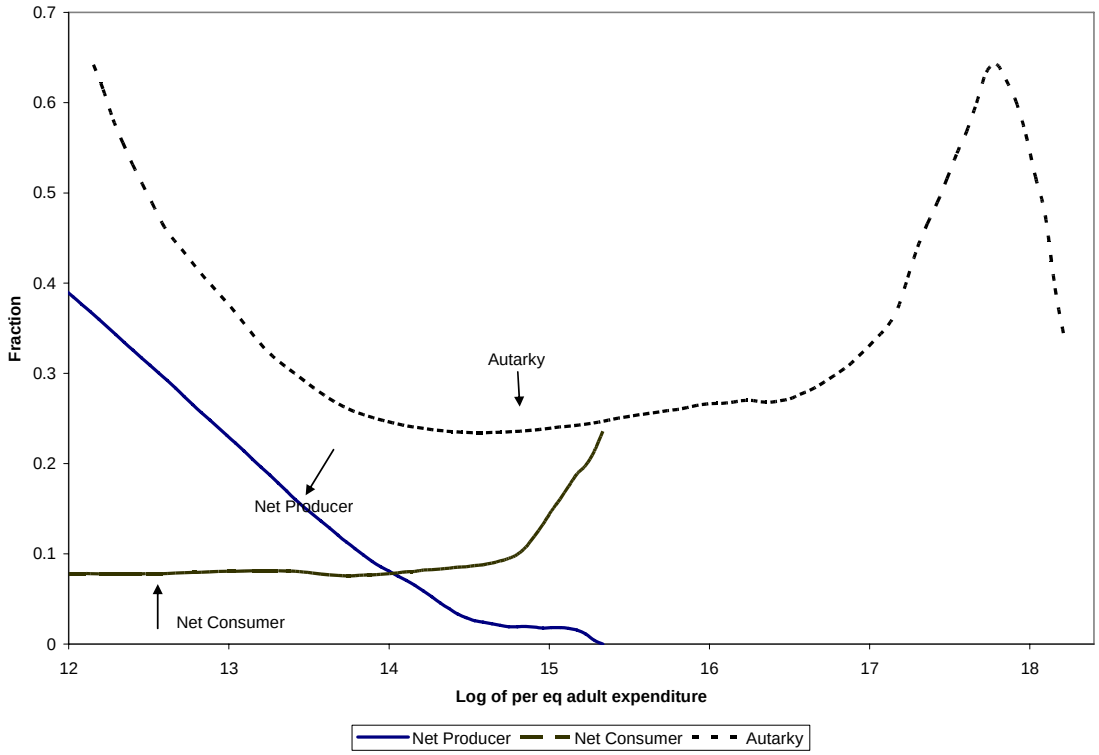
Source: Authors' estimation using ELIM 2006.

Figure 3a: Net producers, net consumers, and autarky households for rice



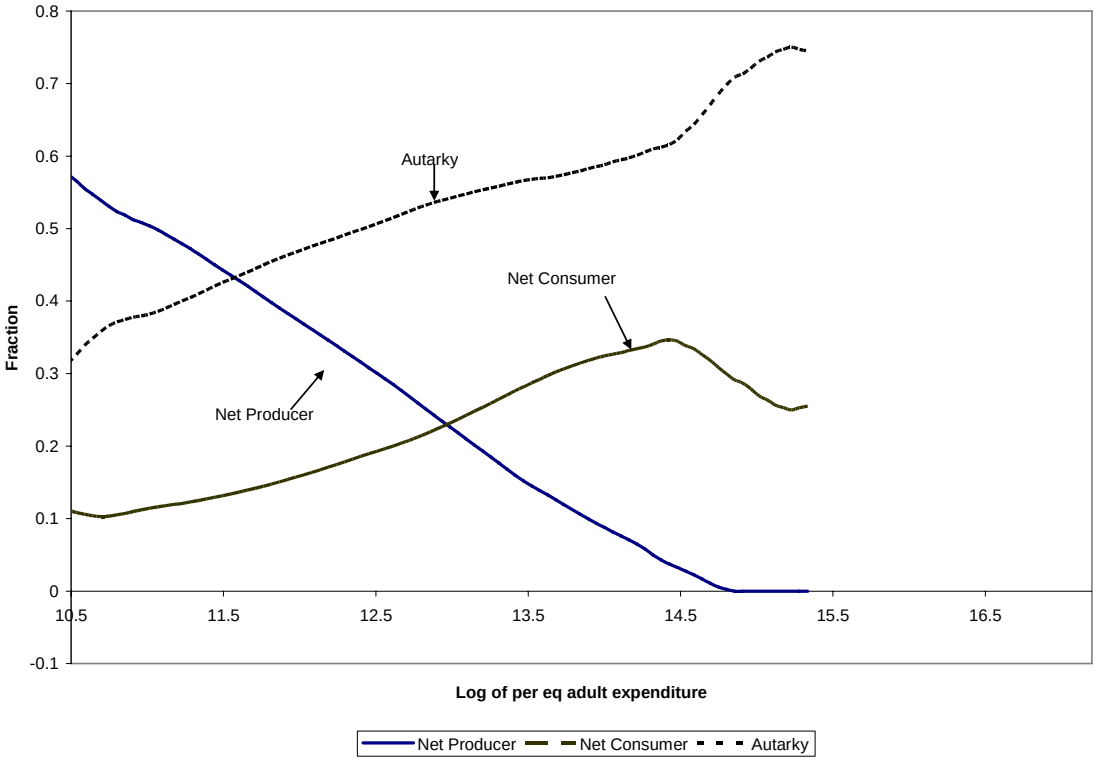
Source: Authors' estimation using ELIM 2006.

Figure 3b: Net producers, net consumers, and autarky households for millet and sorghum



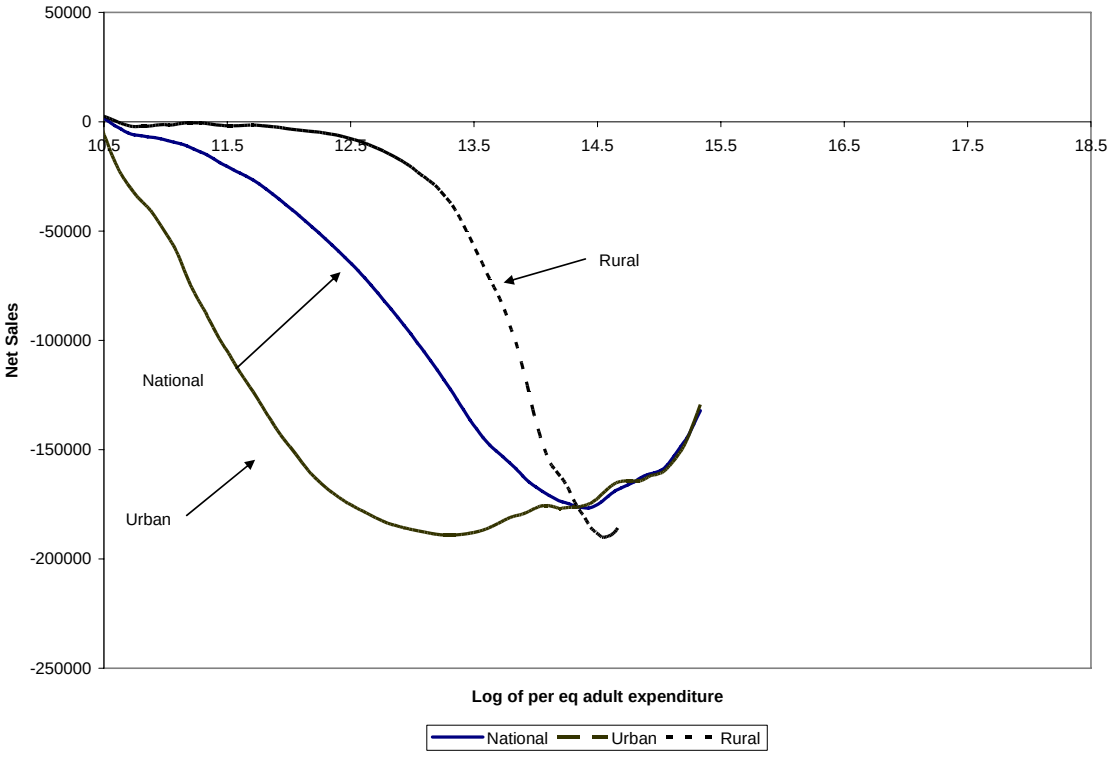
Source: Authors' estimation using ELIM 2006.

Figure 3c: Net producers, net consumers, and autarky households for corn



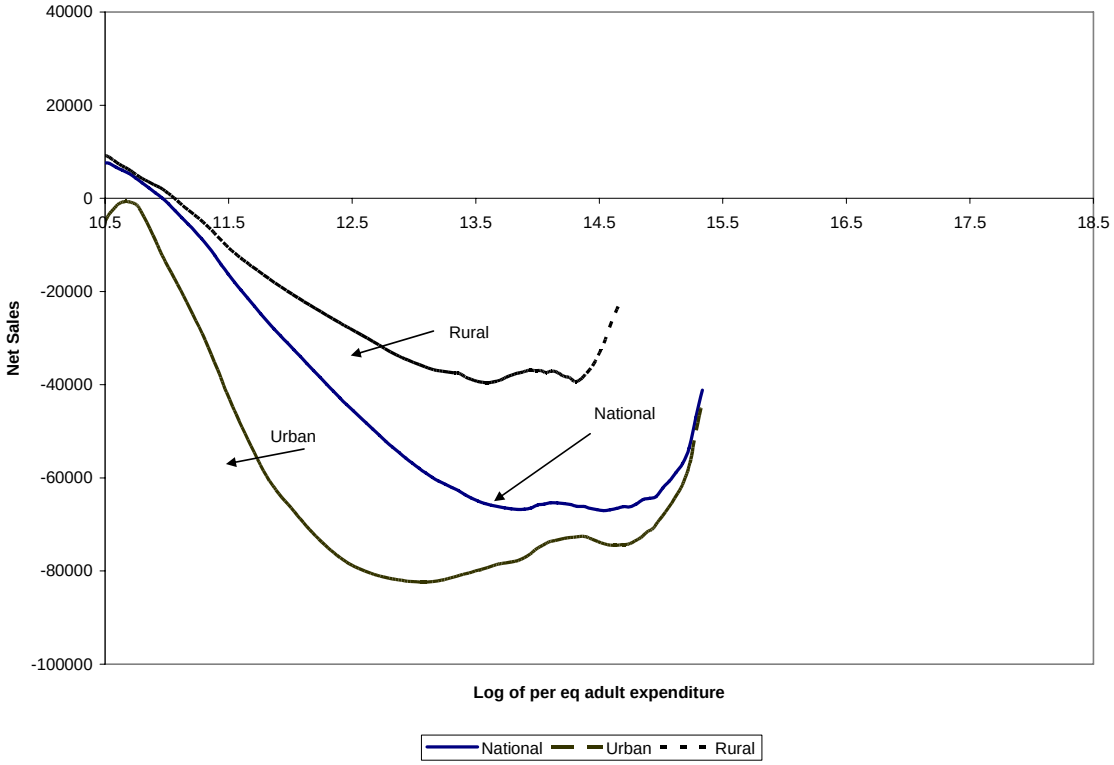
Source: Authors' estimation using ELIM 2006.

Figure 4a: Income per capita (net sales) from rice production



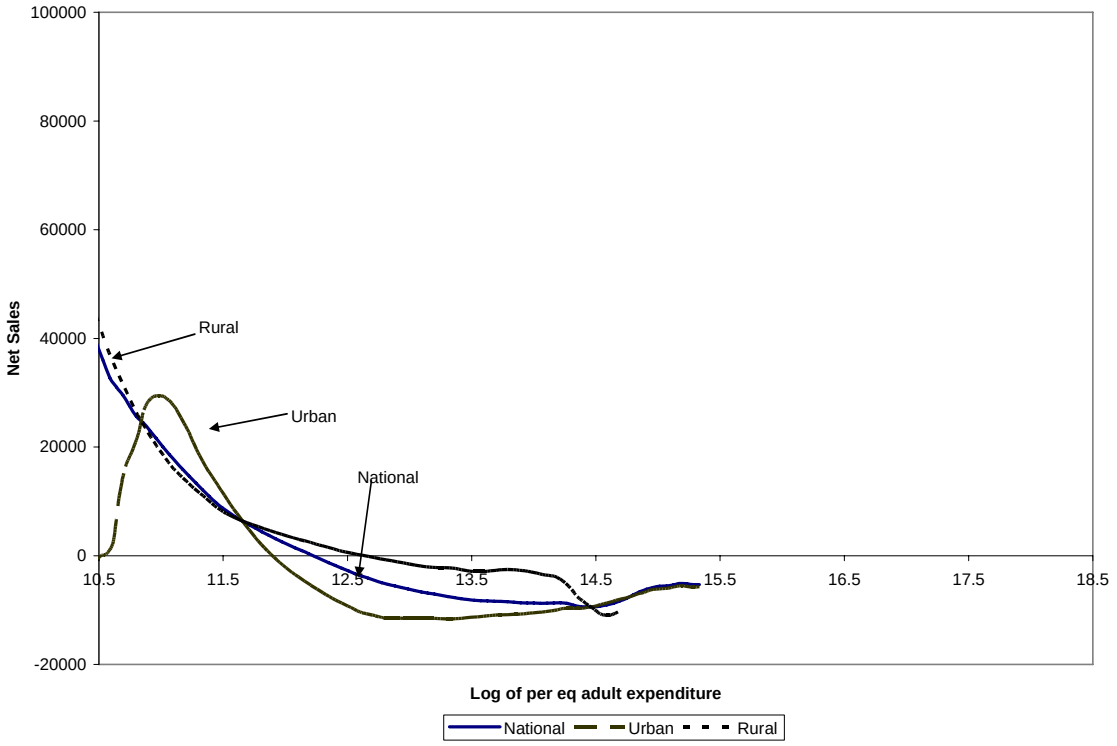
Source: Authors' estimation using ELIM 2006.

Figure 4b: Income per capita (net sales) from millet and sorghum production



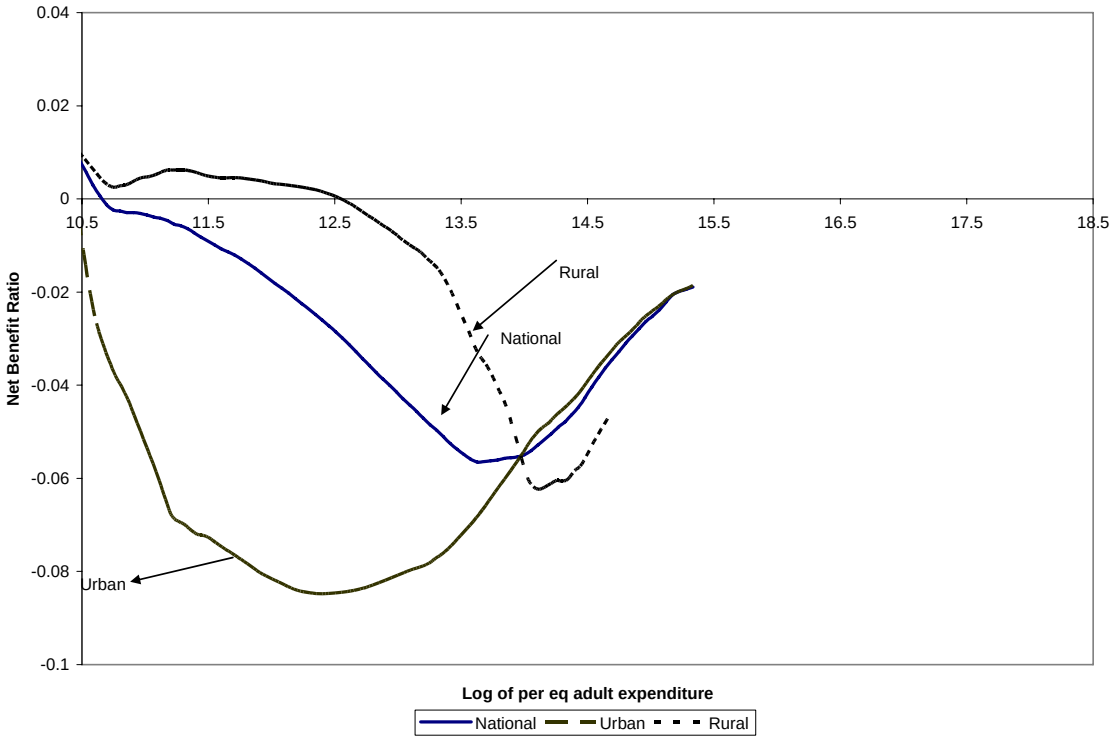
Source: Authors' estimation using ELIM 2006.

Figure 4c: Income per capita (net sales) from corn production per equivalent adult



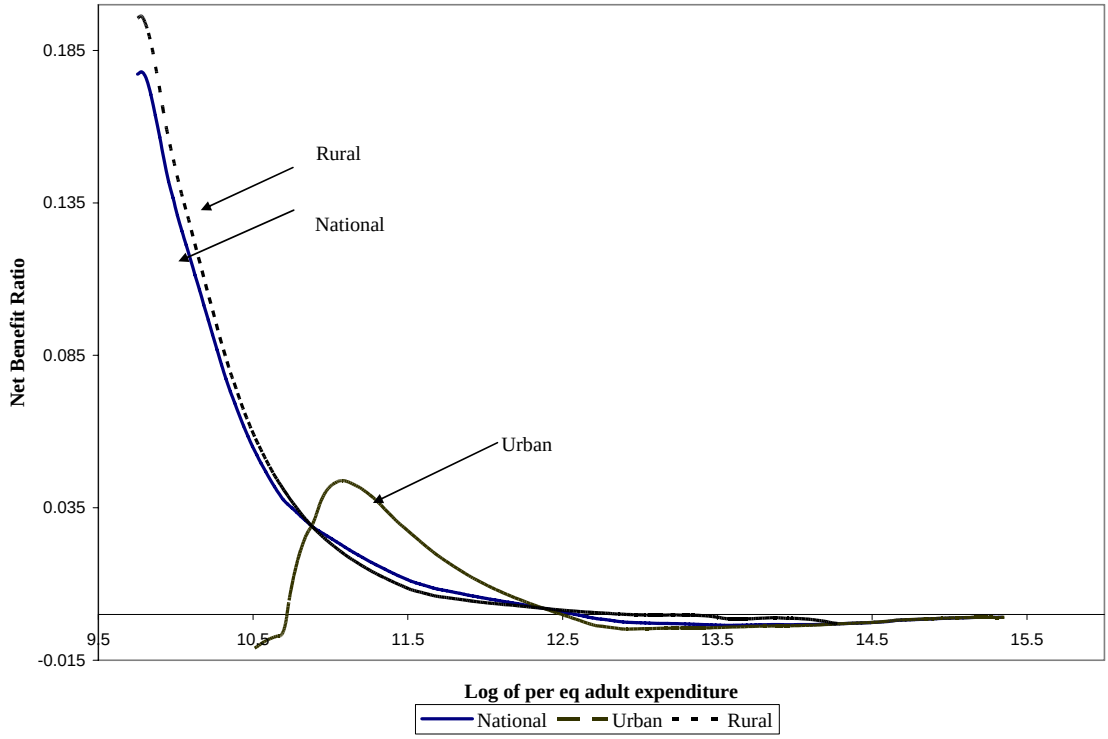
Source: Authors' estimation using ELIM 2006.

Figure 5a: Net benefit ratio for rice



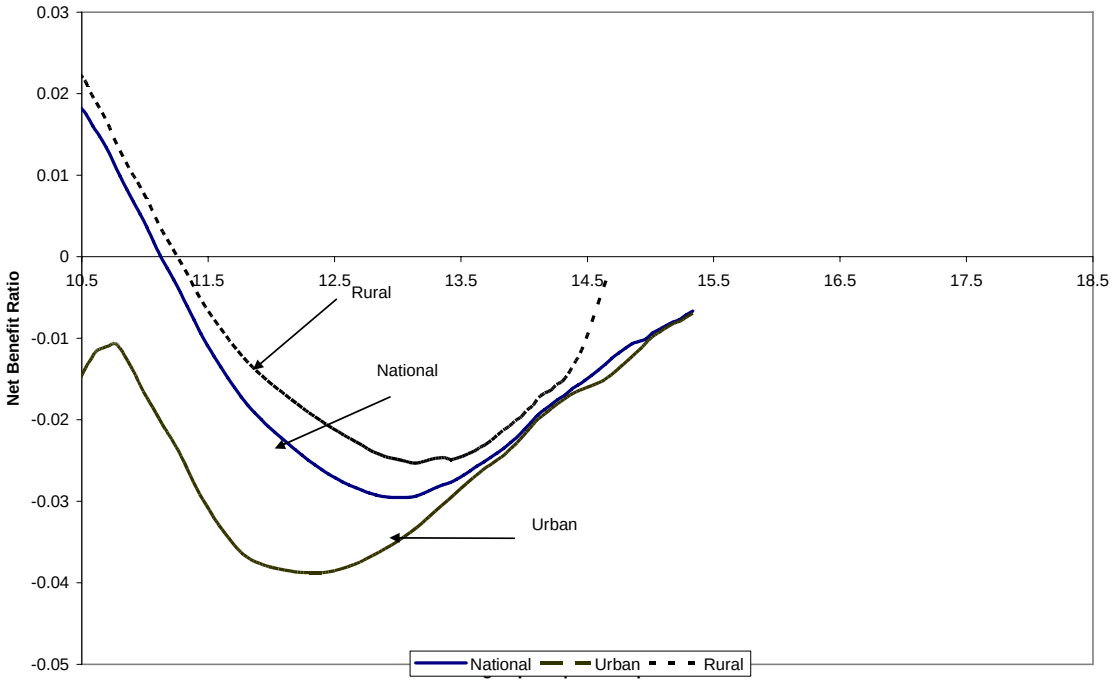
Source: Authors' estimation using ELIM 2006.

Figure 5b: Net benefit ratio for millet and sorghum



Source: Authors' estimation using ELIM 2006.

Figure 5c: Net benefit ratio for corn



Source: Authors' estimation using ELIM 2006.

Table 1: Rice consumption in Mali for different household groups, 2006

	Percentage of households consuming			Average consumption for all households			Average consumption for households with positive consumption		
	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total
All	82.20%	38.50%	95.10%	106,264.57	39,639.63	145,904.20	129,290.57	102,881.81	153,440.03
Residence area									
Urban	93.30%	19.60%	96.00%	171,547.58	14,430.79	185,978.38	183,803.39	73,606.23	193,772.14
Rural	75.50%	49.80%	94.60%	67,299.98	54,685.70	121,985.67	89,091.18	109,757.41	129,006.10
Region									
Kayes	88.90%	24.50%	95.40%	109,893.48	9,957.25	119,850.73	123,573.18	40,570.47	125,605.61
Koulikoro	79.90%	31.10%	93.70%	90,337.99	17,629.43	107,967.42	113,085.18	56,680.58	115,179.77
Sikasso	77.10%	32.00%	89.40%	60,452.56	17,606.31	78,058.87	78,458.20	54,998.14	87,316.51
Ségou	72.40%	52.60%	96.70%	76,444.23	48,060.66	124,504.90	105,593.58	91,372.99	128,719.45
Mopti	87.70%	47.50%	96.70%	111,418.89	69,796.45	181,215.34	127,099.69	147,071.86	187,359.78
Tombouctou	78.10%	70.80%	97.80%	88,144.03	122,662.75	210,806.78	112,911.94	173,185.98	215,465.30
Gao	81.70%	51.70%	97.90%	159,453.73	85,852.87	245,306.61	195,236.78	166,030.19	250,564.86
Kidal	99.30%	10.40%	99.30%	201,732.66	4,498.24	206,230.91	203,185.17	43,310.52	207,715.80
Bamako	94.30%	15.10%	95.90%	201,619.48	9,575.45	211,194.94	213,827.44	63,301.80	220,238.63
Quintile									
Q1	65.90%	41.00%	87.90%	22,811.22	21,468.60	44,279.82	34,640.33	52,307.88	50,385.83
Q2	77.70%	43.20%	94.90%	53,176.76	40,056.87	93,233.63	68,471.18	92,808.03	98,267.83
Q3	81.10%	48.10%	95.70%	86,490.69	52,960.09	139,450.78	106,639.09	110,215.71	145,694.09
Q4	83.20%	41.00%	96.60%	117,981.55	48,836.13	166,817.67	141,728.09	119,088.93	172,773.52
Q5	93.40%	25.70%	97.30%	186,913.28	31,995.06	218,908.34	200,193.16	124,531.98	224,969.84

Source: Authors' estimation using ELIM 2006.

Table 2: Millet and sorghum consumption in Mali for different household groups, 2006

	Percentage of households consuming			Average consumption for all households			Average consumption for households with positive consumption		
	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total
All	65.80%	52.90%	91.00%	57,707.51	78,094.34	135,801.86	87,677.81	147,703.45	149,153.08
Residence area									
Urban	79.40%	26.90%	88.40%	68,675.63	21,316.04	89,991.67	86,505.74	79,230.87	101,854.02
Rural	57.70%	68.40%	92.70%	51,161.11	111,982.84	163,143.95	88,640.02	163,784.73	176,072.59
Region									
Kayes	51.40%	67.70%	91.00%	47,363.89	122,121.98	169,485.86	92,167.77	180,406.70	186,201.56
Koulikoro	58.60%	73.70%	94.80%	62,123.73	134,332.16	196,455.89	106,092.76	182,160.38	207,288.59
Sikasso	34.50%	64.30%	79.80%	14,373.50	91,588.62	105,962.12	41,669.61	142,516.41	132,858.56
Ségou	64.30%	55.00%	94.00%	44,103.07	80,295.56	124,398.63	68,612.18	145,887.83	132,365.69
Mopti	87.60%	51.70%	97.70%	94,695.56	74,001.27	168,696.83	108,125.43	143,248.41	172,620.14
Tombouctou	78.30%	39.70%	87.00%	49,946.46	24,439.19	74,385.64	63,820.40	61,624.04	85,498.63
Gao	91.80%	26.30%	94.30%	91,119.48	14,043.52	105,163.01	99,297.43	53,335.23	111,536.47
Kidal	38.90%	5.70%	42.20%	26,701.72	1,416.54	28,118.26	68,625.52	24,992.43	66,618.44
Bamako	86.80%	16.40%	91.00%	82,602.02	7,722.35	90,324.38	95,194.28	47,105.36	99,274.81
Quintile									
Q1	42.60%	73.40%	87.60%	25,911.89	91,306.84	117,218.73	60,764.43	124,468.88	133,836.50
Q2	57.20%	70.50%	92.90%	41,725.15	105,180.62	146,905.77	72,919.83	149,173.31	158,192.34
Q3	61.20%	64.80%	93.00%	58,529.32	111,379.59	169,908.91	95,575.94	172,013.97	182,710.06
Q4	69.20%	48.00%	90.70%	67,669.66	79,811.85	147,481.52	97,773.89	166,220.25	162,646.38
Q5	83.60%	26.90%	90.70%	75,461.63	29,760.69	105,222.32	90,282.78	110,452.22	116,073.06

Source: Authors' estimation using ELIM 2006.

Table 3: Corn consumption in Mali for different household groups, 2006

	Percentage of households consuming			Average consumption for all households			Average consumption for households with positive consumption		
	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total
All	21.20%	33.00%	48.10%	8,322.46	21,979.48	30,301.94	39,273.56	66,654.80	63,018.39
Residence area									
Urban	34.10%	13.20%	42.00%	14,183.10	9,014.41	23,197.52	41,650.15	68,407.95	55,256.50
Rural	13.50%	44.80%	51.70%	4,824.49	29,717.77	34,542.27	35,699.30	66,346.95	66,778.31
Region									
Kayes	25.10%	54.60%	70.60%	9,259.89	33,016.04	42,275.93	36,878.54	60,483.50	59,917.70
Koulikoro	13.30%	50.30%	58.00%	3,552.65	27,992.64	31,545.29	26,787.73	55,597.68	54,364.83
Sikasso	37.10%	71.20%	90.70%	22,855.75	81,110.92	103,966.67	61,663.67	113,899.93	114,569.77
Ségou	11.90%	23.80%	33.70%	3,497.97	4,767.49	8,265.46	29,499.56	19,989.54	24,507.50
Mopti	13.30%	14.50%	24.40%	3,439.66	3,786.25	7,225.91	25,925.79	26,149.35	29,658.65
Tombouctou	8.90%	9.60%	16.30%	1,238.85	1,362.21	2,601.06	13,929.48	14,198.70	15,941.03
Gao	20.50%	1.90%	22.10%	5,158.79	885.74	6,044.52	25,165.03	46,733.75	27,298.29
Kidal	9.40%	0.70%	9.40%	2,459.44	50.33	2,509.76	26,233.99	7,040.00	26,770.81
Bamako	40.50%	7.40%	43.50%	15,125.78	2,334.42	17,460.21	37,356.38	31,674.81	40,096.08
Quintile									
Q1	9.30%	49.10%	53.50%	2,706.66	24,508.26	27,214.92	29,084.81	49,951.54	50,837.66
Q2	14.80%	42.60%	51.20%	5,217.82	29,494.45	34,712.27	35,325.74	69,160.13	67,851.52
Q3	17.90%	40.90%	51.40%	8,161.21	29,720.05	37,881.26	45,611.14	72,713.82	73,751.90
Q4	22.30%	29.30%	45.60%	9,197.36	23,089.27	32,286.63	41,214.13	78,669.09	70,804.25
Q5	32.70%	16.10%	43.10%	12,575.49	9,666.79	22,242.28	38,415.70	60,090.62	51,596.29

Source: Authors' estimation using ELIM 2006.

Table 4: Wheat and bread consumption in Mali for different household groups, 2006

	Percentage of households consuming			Average consumption for all households			Average consumption for households with positive consumption		
	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total	Purchase	Auto consumption	Total
All	72.90%	6.40%	74.00%	23,114.22	921.54	24,035.76	31,695.91	14,334.69	32,493.31
Residence area									
Urban	82.90%	4.80%	83.60%	36,533.92	1,194.34	37,728.26	44,053.31	24,972.86	45,137.62
Rural	67.00%	7.40%	68.20%	15,104.58	758.72	15,863.30	22,560.10	10,237.35	23,248.55
Region									
Kayes	75.80%	4.80%	77.00%	34,309.36	997.85	35,307.22	45,273.90	20,933.59	45,842.73
Koulikoro	76.30%	9.90%	77.40%	18,550.55	1,008.97	19,559.51	24,322.94	10,225.70	25,270.15
Sikasso	81.30%	6.20%	82.00%	18,345.41	443.23	18,788.64	22,558.31	7,194.62	22,907.07
Ségou	61.40%	8.60%	63.20%	16,919.90	567.06	17,486.96	27,537.75	6,566.75	27,657.89
Mopti	72.40%	3.00%	72.90%	12,482.85	159.57	12,642.42	17,235.26	5,256.15	17,330.43
Tombouctou	60.60%	13.10%	63.40%	20,545.55	3,039.99	23,585.55	33,884.62	23,132.59	37,184.97
Gao	50.30%	1.60%	50.30%	22,242.48	217.86	22,460.34	44,184.46	13,323.13	44,617.23
Kidal	93.90%	5.40%	96.20%	118,776.22	553.87	119,330.08	126,556.77	10,213.64	124,016.15
Bamako	88.40%	2.80%	88.40%	42,512.07	1,835.95	44,348.02	48,100.76	65,150.48	50,178.07
Quintile									
Q1	58.00%	4.80%	58.60%	7,404.80	440.82	7,845.61	12,768.96	9,173.68	13,398.24
Q2	64.40%	6.00%	65.80%	11,438.34	513.66	11,952.00	17,757.23	8,499.00	18,171.29
Q3	66.50%	8.20%	68.00%	16,233.94	634.08	16,868.01	24,401.63	7,688.97	24,823.89
Q4	74.80%	8.10%	76.10%	24,609.11	1,194.38	25,803.50	32,895.10	14,719.66	33,908.27
Q5	88.90%	4.90%	89.50%	42,123.95	1,401.56	43,525.51	47,395.67	28,784.88	48,622.97

Source: Authors' estimation using ELIM 2006.

Table 5: Rice Income in Mali for different household groups, 2006

	Percentage of households receiving income			Average income for all households			Average income for households with positive income		
	Auto consumption	Sales	Total	Auto consumption	Sales	Total	Auto consumption	Sales	Total
All	38.50%	12.49%	39.49%	39,639.63	41,835.37	81,475.00	102,881.81	334,831.00	206,293.50
Residence area									
Urban	19.60%	3.83%	20.06%	14,430.79	14,013.19	28,443.98	73,606.23	366,354.90	141,808.60
Rural	49.80%	17.67%	51.10%	54,685.70	58,441.21	113,126.90	109,757.41	330,757.80	221,402.30
Region									
Kayes	24.50%	2.49%	24.90%	9,957.25	1,676.04	11,633.29	40,570.47	67,219.67	46,722.14
Koulikoro	31.10%	2.65%	31.81%	17,629.43	2,513.26	20,142.69	56,680.58	95,001.69	63,327.95
Sikasso	32.00%	5.87%	32.66%	17,606.31	7,820.18	25,426.48	54,998.14	133,207.00	77,849.48
Ségou	52.60%	29.53%	53.52%	48,060.66	174,259.90	222,320.60	91,372.99	590,135.80	415,367.50
Mopti	47.50%	11.38%	49.51%	69,796.45	31,723.79	101,520.20	147,071.86	278,774.60	205,055.40
Tombouctou	70.80%	38.94%	73.44%	122,662.75	34,265.89	156,928.60	173,185.98	87,992.68	213,676.90
Gao	51.70%	22.02%	52.92%	85,852.87	18,117.87	103,970.70	166,030.19	82,296.15	196,451.50
Kidal	10.40%	0.00%	10.39%	4,498.24	0.00	4,498.24	43,310.52	0.00	43,310.52
Bamako	15.10%	0.23%	15.13%	9,575.45	1,045.17	10,620.62	63,301.80	450,000.00	70,211.27
Quintile									
Q1	41.00%	12.44%	42.44%	21,468.60	23,810.04	45,278.64	52,307.88	191,352.50	106,684.60
Q2	43.20%	13.38%	44.14%	40,056.87	38,529.16	78,586.02	92,808.03	288,066.60	178,025.20
Q3	48.10%	18.62%	49.83%	52,960.09	64,117.68	117,077.80	110,215.71	344,413.80	234,936.30
Q4	41.00%	14.92%	41.58%	48,836.13	60,887.89	109,724.00	119,088.93	408,077.90	263,888.00
Q5	25.70%	5.74%	26.18%	31,995.06	22,178.38	54,173.43	124,531.98	386,168.30	206,901.40

Source: Authors' estimation using ELIM 2006.

Table 6: Millet and sorghum income in Mali for different household groups, 2006

	Percentage of households receiving income			Average income for all households			Average income for households with positive income		
	Auto consumption	Sales	Total	Auto consumption	Sales	Total	Auto consumption	Sales	Total
All	52.90%	13.97%	53.80%	78,094.34	14,987.44	93,081.79	147,703.45	107,315.80	173,018.60
Residence area									
Urban	26.90%	3.28%	27.42%	21,316.04	3,574.41	24,890.45	79,230.87	108,924.00	90,777.55
Rural	68.40%	20.34%	69.54%	111,982.84	21,799.39	133,782.20	163,784.73	107,161.00	192,372.00
Region									
Kayes	67.70%	20.57%	68.14%	122,121.98	24,916.44	147,038.40	180,406.70	121,154.60	215,799.40
Koulikoro	73.70%	8.84%	74.76%	134,332.16	8,392.64	142,724.80	182,160.38	94,992.07	190,899.90
Sikasso	64.30%	13.47%	66.21%	91,588.62	12,829.96	104,418.60	142,516.41	95,216.78	157,701.40
Ségou	55.00%	23.48%	56.27%	80,295.56	30,793.69	111,089.30	145,887.83	131,140.40	197,424.10
Mopti	51.70%	17.49%	51.84%	74,001.27	13,702.06	87,703.33	143,248.41	78,337.38	169,165.00
Tombouctou	39.70%	12.92%	41.48%	24,439.19	11,937.62	36,376.80	61,624.04	92,371.10	87,696.58
Gao	26.30%	5.04%	27.08%	14,043.52	3,226.20	17,269.72	53,335.23	63,953.33	63,767.09
Kidal	5.70%	0.00%	5.67%	1,416.54	0.00	1,416.54	24,992.43	0.00	24,992.43
Bamako	16.40%	0.59%	16.51%	7,722.35	909.88	8,632.23	47,105.36	154,417.50	52,286.93
Quintile									
Q1	73.40%	24.76%	76.39%	91,306.84	22,964.82	114,271.70	124,468.88	92,734.27	149,582.40
Q2	70.50%	20.83%	71.35%	105,180.62	17,906.77	123,087.40	149,173.31	85,954.71	172,511.20
Q3	64.80%	16.04%	65.36%	111,379.59	16,461.86	127,841.50	172,013.97	102,640.10	195,584.30
Q4	48.00%	12.41%	48.51%	79,811.85	15,621.36	95,433.21	166,220.25	125,917.10	196,730.40
Q5	26.90%	3.90%	27.41%	29,760.69	7,485.61	37,246.30	110,452.22	191,796.90	135,900.90

Source: Authors' estimation using ELIM 2006.

Table 7: Corn income in Mali for different household groups, 2006

	Percentage of households receiving income			Average income for all households			Average income for households with positive income		
	Auto consumption	Sales	Total	Auto consumption	Sales	Total	Auto consumption	Sales	Total
All	33.00%	6.34%	33.60%	21,979.48	9,259.97	31,239.45	66,654.80	146,112.90	92,967.98
Residence area									
Urban	13.20%	1.99%	13.58%	9,014.41	8,227.37	17,241.78	68,407.95	414,377.10	126,956.00
Rural	44.80%	8.94%	45.55%	29,717.77	9,876.28	39,594.05	66,346.95	110,533.50	86,919.95
Region									
Kayes	54.60%	10.74%	55.52%	33,016.04	8,182.98	41,199.02	60,483.50	76,166.44	74,205.51
Koulikoro	50.30%	5.72%	51.05%	27,992.64	2,512.82	30,505.46	55,597.68	43,894.40	59,757.40
Sikasso	71.20%	20.19%	72.98%	81,110.92	50,507.05	131,618.00	113,899.93	250,176.80	180,360.00
Ségou	23.80%	4.31%	24.30%	4,767.49	1,833.74	6,601.23	19,989.54	42,571.72	27,163.02
Mopti	14.50%	0.60%	14.51%	3,786.25	165.79	3,952.04	26,149.35	27,557.26	27,234.33
Tombouctou	9.60%	2.29%	10.47%	1,362.21	1,015.81	2,378.02	14,198.70	44,431.14	22,716.80
Gao	1.90%	0.00%	1.90%	885.74	0.00	885.74	46,733.75	0.00	46,733.75
Kidal	0.70%	0.00%	0.71%	50.33	0.00	50.33	7,040.00	0.00	7,040.00
Bamako	7.40%	1.45%	7.37%	2,334.42	963.08	3,297.50	31,674.81	66,305.63	44,742.41
Quintile									
Q1	49.10%	13.97%	50.43%	24,508.26	20,431.49	44,939.75	49,951.54	146,204.30	89,112.31
Q2	42.60%	9.42%	43.39%	29,494.45	23,861.67	53,356.13	69,160.13	253,358.80	122,970.70
Q3	40.90%	7.80%	41.98%	29,720.05	6,475.10	36,195.16	72,713.82	83,054.02	86,221.02
Q4	29.30%	3.85%	29.51%	23,089.27	2,927.30	26,016.57	78,669.09	76,080.76	88,156.43
Q5	16.10%	1.49%	16.31%	9,666.79	1,391.71	11,058.50	60,090.62	93,440.88	67,795.41

Source: Authors' estimation using ELIM 2006.

Table 8: Impact of a change in the price of cereals on consumers- National

	-25%	-12.5%	No change	12.5%	25%	50%	100%
			Rice				
Poverty, population as a whole							
Headcount index of poverty	46.09	46.62	**47.45**	48.18	48.93	50.22	53.02
Poverty gap	16.28	16.46	**16.66**	16.87	17.10	17.62	18.82
Squared poverty gap	7.83	7.92	**8.01**	8.11	8.21	8.45	9.07
Poverty, rice consumers							
Headcount index of poverty	42.31	42.97	**43.99**	44.88	45.81	47.39	50.84
Poverty gap	13.82	14.05	**14.29**	14.55	14.84	15.47	16.95
Squared poverty gap	6.22	6.32	**6.43**	6.55	6.68	6.98	7.75
			Millet and Sorghum				
Poverty, population as a whole							
Headcount index of poverty	46.56	46.91	**47.45**	47.99	48.22	49.36	51.23
Poverty gap	16.36	16.50	**16.66**	16.82	16.99	17.36	18.25
Squared poverty gap	7.86	7.93	**8.01**	8.09	8.18	8.37	8.85
Poverty, millet and sorghum consumers							
Headcount index of poverty	34.95	35.51	**36.37**	37.23	37.61	39.43	42.43
Poverty gap	10.39	10.63	**10.87**	11.13	11.41	12.00	13.42
Squared poverty gap	4.38	4.50	**4.62**	4.75	4.89	5.20	5.97
			Corn				
Poverty, population as a whole							
Headcount index of poverty	47.41	47.45	**47.45**	47.51	47.51	47.58	47.90
Poverty gap	16.61	16.63	**16.66**	16.68	16.70	16.75	16.86
Squared poverty gap	7.98	8.00	**8.01**	8.02	8.04	8.06	8.13
Poverty, corn consumers							
Headcount index of poverty	35.60	35.80	**35.80**	36.09	36.09	36.46	38.03
Poverty gap	11.28	11.40	**11.52**	11.63	11.75	12.00	12.53
Squared poverty gap	5.15	5.21	**5.28**	5.35	5.42	5.56	5.88
			Wheat and bread				
Poverty, population as a whole							
Headcount index of poverty	47.03	47.29	**47.45**	47.53	47.61	47.76	48.33
Poverty gap	16.56	16.61	**16.66**	16.70	16.75	16.86	17.07
Squared poverty gap	7.96	7.98	**8.01**	8.03	8.06	8.12	8.23
Poverty, wheat and bread consumers							
Headcount index of poverty	43.02	43.37	**43.59**	43.69	43.80	44.00	44.78
Poverty gap	14.68	14.74	**14.81**	14.87	14.94	15.08	15.37
Squared poverty gap	6.95	6.99	**7.02**	7.06	7.09	7.17	7.32
			All identified cereals				
Poverty, population as a whole							
Headcount index of poverty	44.85	46.05	**47.45**	48.84	50.09	52.79	58.41
Poverty gap	15.87	16.24	**16.66**	17.11	17.62	18.76	21.67
Squared poverty gap	7.62	7.80	**8.01**	8.23	8.48	9.05	10.68
Poverty, food consumers							
Headcount index of poverty	43.34	44.59	**46.05**	47.51	48.80	51.63	57.49
Poverty gap	15.01	15.40	**15.83**	16.31	16.84	18.03	21.06
Squared poverty gap	7.07	7.26	**7.47**	7.71	7.96	8.57	10.26

Source: Authors' estimation using ELIM 2006.

Table 9: Impact of a change in the price of cereals on producers- National

	-25%	-12.5%	No change	12.5%	25%	50%	100%
			Rice				
Poverty, population as a whole							
Headcount index of poverty	48.25	48.02	**47.45**	47.04	46.94	46.42	46.02
Poverty gap	17.12	16.83	**16.66**	16.55	16.46	16.34	16.16
Squared poverty gap	8.33	8.10	**8.01**	7.96	7.91	7.85	7.75
Poverty, rice producers							
Headcount index of poverty	49.46	47.67	**43.31**	40.15	39.39	35.41	32.36
Poverty gap	19.15	16.95	**15.59**	14.75	14.13	13.17	11.78
Squared poverty gap	10.56	8.79	**8.08**	7.68	7.36	6.86	6.12
			Millet and Sorghum				
Poverty, population as a whole							
Headcount index of poverty	47.78	47.65	**47.45**	47.45	47.15	46.92	46.20
Poverty gap	16.84	16.74	**16.66**	16.57	16.48	16.32	16.04
Squared poverty gap	8.13	8.07	**8.01**	7.95	7.90	7.80	7.64
Poverty, millet and sorghum producers							
Headcount index of poverty	69.92	69.11	**67.90**	67.90	66.04	64.64	60.18
Poverty gap	26.66	26.07	**25.52**	24.98	24.46	23.46	21.74
Squared poverty gap	13.77	13.37	**13.00**	12.65	12.32	11.73	10.76
			Corn				
Poverty, population as a whole							
Headcount index of poverty	47.48	47.46	**47.45**	47.33	47.33	47.24	46.92
Poverty gap	16.81	16.73	**16.66**	16.58	16.52	16.41	16.23
Squared poverty gap	8.19	8.09	**8.01**	7.95	7.91	7.82	7.70
Poverty, corn producers							
Headcount index of poverty	80.13	79.95	**79.83**	78.27	78.27	77.09	72.96
Poverty gap	36.14	35.12	**34.12**	33.14	32.43	31.02	28.61
Squared poverty gap	21.22	19.94	**18.94**	18.21	17.62	16.58	14.98
			All identified cereals				
Poverty, population as a whole							
Headcount index of poverty	48.50	48.25	**47.45**	46.92	46.44	45.60	44.35
Poverty gap	17.47	17.00	**16.66**	16.38	16.17	15.79	15.18
Squared poverty gap	8.64	8.24	**8.01**	7.84	7.71	7.48	7.14
Poverty, food producers							
Headcount index of poverty	61.69	60.83	**58.07**	56.22	54.58	51.67	47.35
Poverty gap	23.89	22.28	**21.07**	20.13	19.38	18.07	15.97
Squared poverty gap	12.71	11.32	**10.51**	9.94	9.47	8.68	7.51

Source: Authors' estimation using ELIM 2006.

Table 10: Impact of a change in the price of cereals on consumers and producers-National

	-25%	-12.5%	No change	12.5%	25%	50%	100%
			Rice				
Poverty, population as a whole							
Headcount index of poverty	46.85	47.13	**47.45**	47.72	48.34	49.11	51.04
Poverty gap	16.73	16.63	**16.66**	16.75	16.90	17.27	18.23
Squared poverty gap	8.15	8.01	**8.01**	8.05	8.11	8.28	8.78
Poverty, rice consumers							
Headcount index of poverty	42.85	43.39	**43.99**	44.63	45.43	46.76	49.44
Poverty gap	14.03	14.12	**14.29**	14.50	14.75	15.32	16.66
Squared poverty gap	6.34	6.36	**6.43**	6.54	6.65	6.92	7.63
Poverty, rice producers							
Headcount index of poverty	48.13	46.57	**43.31**	40.71	40.20	38.09	35.16
Poverty gap	18.89	16.82	**15.59**	14.84	14.31	13.50	12.37
Squared poverty gap	10.42	8.74	**8.08**	7.72	7.44	6.99	6.36
			Millet and sorghum				
Poverty, population as a whole							
Headcount index of poverty	46.87	47.16	**47.45**	47.98	47.91	48.78	50.12
Poverty gap	16.54	16.59	**16.66**	16.73	16.82	17.02	17.61
Squared poverty gap	7.98	7.99	**8.01**	8.03	8.07	8.16	8.47
Poverty, millet and sorghum consumers							
Headcount index of poverty	35.09	35.70	**36.37**	37.21	37.51	39.18	41.87
Poverty gap	10.48	10.67	**10.87**	11.09	11.33	11.84	13.09
Squared poverty gap	4.43	4.52	**4.62**	4.73	4.85	5.11	5.79
Poverty, millet and sorghum producers							
Headcount index of poverty	68.92	68.78	**67.90**	67.90	66.23	65.07	62.37
Poverty gap	26.42	25.95	**25.52**	25.11	24.71	23.96	22.70
Squared poverty gap	13.64	13.30	**13.00**	12.71	12.45	11.99	11.28
			Corn				
Poverty, population as a whole							
Headcount index of poverty	47.44	47.46	**47.45**	47.39	47.39	47.39	47.38
Poverty gap	16.77	16.71	**16.66**	16.60	16.57	16.51	16.42
Squared poverty gap	8.16	8.07	**8.01**	7.96	7.93	7.88	7.81
Poverty, corn consumers							
Headcount index of poverty	35.60	35.80	**35.80**	36.09	36.09	36.46	37.93
Poverty gap	11.33	11.42	**11.52**	11.61	11.71	11.92	12.37
Squared poverty gap	5.17	5.22	**5.28**	5.34	5.40	5.52	5.79
Poverty, corn producers							
Headcount index of poverty	80.13	79.95	**79.83**	78.27	78.27	77.35	73.26
Poverty gap	36.05	35.08	**34.12**	33.19	32.52	31.19	28.94
Squared poverty gap	21.17	19.92	**18.94**	18.23	17.66	16.66	15.12
			All identified cereals				
Poverty, population as a whole							
Headcount index of poverty	45.96	46.73	**47.45**	48.32	49.19	50.89	55.13
Poverty gap	16.66	16.58	**16.66**	16.83	17.11	17.81	19.90
Squared poverty gap	8.23	8.03	**8.01**	8.06	8.17	8.48	9.65
Poverty, cereals consumers							
Headcount index of poverty	44.44	45.26	**46.05**	47.04	47.96	49.83	54.40
Poverty gap	15.75	15.71	**15.83**	16.05	16.37	17.17	19.44
Squared poverty gap	7.63	7.47	**7.47**	7.56	7.70	8.08	9.36
Poverty, cereals producers							
Headcount index of poverty	59.45	58.89	**58.07**	57.61	57.51	56.60	55.99
Poverty gap	23.18	21.92	**21.07**	20.47	20.07	19.44	18.91
Squared poverty gap	12.32	11.14	**10.51**	10.10	9.80	9.34	8.92

Source: Authors' estimation using ELIM 2006.

Annex table 1: Impact of a change in the price of cereals on consumers- Urban and Rural

	-25%	-12.5%	No change	12.5%	25%	50%	100%
			Rice				
Poverty, Urban							
Headcount index of poverty	23.81	24.36	**25.51**	26.68	27.37	29.01	32.39
Poverty gap	7.36	7.55	**7.76**	7.99	8.26	8.84	10.26
Squared poverty gap	3.19	3.26	**3.35**	3.44	3.55	3.79	4.46
Poverty, Rural							
Headcount index of poverty	56.42	56.95	**57.63**	58.15	58.93	60.05	62.59
Poverty gap	20.41	20.59	**20.78**	20.98	21.20	21.68	22.79
Squared poverty gap	9.99	10.08	**10.17**	10.27	10.37	10.61	11.21
			Millet and sorghum				
Poverty, Urban							
Headcount index of poverty	24.82	24.99	**25.51**	25.74	25.80	27.10	28.86
Poverty gap	7.59	7.67	**7.76**	7.85	7.94	8.15	8.63
Squared poverty gap	3.27	3.31	**3.35**	3.39	3.43	3.53	3.75
Poverty, Rural							
Headcount index of poverty	56.65	57.08	**57.63**	58.30	58.63	59.69	61.61
Poverty gap	20.43	20.60	**20.78**	20.98	21.19	21.64	22.71
Squared poverty gap	9.98	10.07	**10.17**	10.27	10.38	10.62	11.22
			Corn				
Poverty, Urban							
Headcount index of poverty	25.43	25.51	**25.51**	25.64	25.64	25.76	26.51
Poverty gap	7.70	7.73	**7.76**	7.78	7.81	7.87	8.01
Squared poverty gap	3.31	3.33	**3.35**	3.37	3.39	3.42	3.51
Poverty, Rural							
Headcount index of poverty	57.61	57.63	**57.63**	57.65	57.65	57.71	57.81
Poverty gap	20.74	20.76	**20.78**	20.80	20.83	20.87	20.96
Squared poverty gap	10.15	10.16	**10.17**	10.18	10.19	10.22	10.27
			Wheat and bread				
Poverty, Urban							
Headcount index of poverty	25.15	25.43	**25.51**	25.55	25.73	25.91	27.04
Poverty gap	7.67	7.71	**7.76**	7.80	7.85	7.94	8.15
Squared poverty gap	3.31	3.33	**3.35**	3.37	3.39	3.43	3.53
Poverty, Rural							
Headcount index of poverty	57.17	57.43	**57.63**	57.72	57.75	57.89	58.21
Poverty gap	20.68	20.73	**20.78**	20.83	20.89	20.99	21.21
Squared poverty gap	10.11	10.14	**10.17**	10.20	10.23	10.29	10.41
			All identified cereals				
Poverty, Urban							
Headcount index of poverty	22.46	24.13	**25.51**	27.23	28.76	31.34	37.07
Poverty gap	7.09	7.40	**7.76**	8.17	8.65	9.75	12.66
Squared poverty gap	3.05	3.19	**3.35**	3.53	3.73	4.23	5.75
Poverty, Rural							
Headcount index of poverty	55.24	56.22	**57.63**	58.87	59.98	62.74	68.31
Poverty gap	19.94	20.35	**20.78**	21.26	21.78	22.94	25.85
Squared poverty gap	9.74	9.94	**10.17**	10.41	10.68	11.29	12.97

Source: Authors' estimation using ELIM 2006.

Annex table 2: Impact of a change in the price of cereals on producers- Urban and Rural Areas

	-25%	-12.5%	No change	12.5%	25%	50%	100%
			Rice				
Poverty, urban							
Headcount index of poverty	25.65	25.65	**25.51**	25.47	25.40	25.39	25.33
Poverty gap	7.89	7.82	**7.76**	7.74	7.74	7.73	7.71
Squared poverty gap	3.48	3.38	**3.35**	3.34	3.34	3.34	3.33
Poverty, rural							
Headcount index of poverty	58.74	58.40	**57.63**	57.05	56.93	56.18	55.62
Poverty gap	21.40	21.02	**20.78**	20.63	20.51	20.33	20.07
Squared poverty gap	10.58	10.29	**10.17**	10.09	10.04	9.94	9.80
			Millet and sorghum				
Poverty, urban							
Headcount index of poverty	25.58	25.55	**25.51**	25.51	25.41	25.41	25.17
Poverty gap	7.79	7.77	**7.76**	7.74	7.73	7.70	7.65
Squared poverty gap	3.35	3.37	**3.34**	3.33	3.31	3.27	1.45
Poverty, rural							
Headcount index of poverty	58.08	57.90	**57.63**	57.63	57.24	56.90	55.95
Poverty gap	21.04	20.91	**20.78**	20.66	20.54	20.32	19.93
Squared poverty gap	10.34	10.25	**10.17**	10.09	10.02	9.89	9.67
			Corn				
Poverty, urban							
Headcount index of poverty	25.51	25.51	**25.51**	25.27	25.27	25.27	25.05
Poverty gap	7.91	7.83	**7.76**	7.68	7.67	7.66	7.62
Squared poverty gap	3.57	3.43	**3.35**	3.32	3.31	3.30	3.29
Poverty, rural							
Headcount index of poverty	57.66	57.64	**57.63**	57.56	57.56	57.43	57.06
Poverty gap	20.94	20.86	**20.78**	20.71	20.63	20.48	20.22
Squared poverty gap	10.33	10.25	**10.17**	10.10	10.03	9.92	9.75
			All identified cereals				
Poverty, urban							
Headcount index of poverty	25.68	25.76	**25.51**	25.23	25.11	25.11	24.46
Poverty gap	7.91	8.08	**7.76**	7.66	7.63	7.57	7.48
Squared poverty gap	3.48	3.73	**3.35**	3.31	3.29	3.25	3.20
Poverty, rural							
Headcount index of poverty	58.72	59.04	**57.63**	56.98	56.34	55.11	53.58
Poverty gap	21.22	21.83	**20.78**	20.43	20.13	19.60	18.76
Squared poverty gap	10.45	10.92	**10.17**	9.95	9.76	9.44	8.97

Source: Authors' estimation using ELIM 2006.

Annex table 3: Impact of a change in the price of cereals on consumers and producers- Urban and Rural Areas

	-25%	-12.5%	No change	12.5%	25%	50%	100%
			Rice				
Poverty, urban							
Headcount index of poverty	23.95	24.47	**25.51**	26.63	27.27	28.60	31.81
Poverty gap	7.50	7.61	**7.76**	7.98	8.24	8.81	10.17
Squared poverty gap	3.32	3.30	**3.35**	3.44	3.54	3.78	4.44
Poverty, rural							
Headcount index of poverty	57.48	57.65	**57.63**	57.51	58.11	58.62	59.96
Poverty gap	21.02	20.82	**20.78**	20.82	20.92	21.20	21.97
Squared poverty gap	10.39	10.19	**10.17**	10.19	10.24	10.37	10.80
			Millet and sorghum				
Poverty, urban							
Headcount index of poverty	24.89	25.19	**25.51**	25.71	25.72	27.03	28.72
Poverty gap	7.62	7.68	**7.76**	7.83	7.91	8.09	8.52
Squared poverty gap	3.30	3.32	**3.35**	3.38	3.41	3.49	3.67
Poverty, rural							
Headcount index of poverty	57.07	57.35	**57.63**	58.30	58.20	58.87	60.04
Poverty gap	20.68	20.73	**20.78**	20.86	20.95	21.17	21.83
Squared poverty gap	10.16	10.16	**10.17**	10.19	10.23	10.33	10.69
			Corn				
Poverty, urban							
Headcount index of poverty	25.43	25.51	**25.51**	25.40	25.40	25.52	26.05
Poverty gap	7.86	7.81	**7.76**	7.71	7.73	7.77	7.88
Squared poverty gap	3.54	3.41	**3.35**	3.34	3.35	3.38	3.45
Poverty, rural							
Headcount index of poverty	57.64	57.64	**57.63**	57.59	57.59	57.54	57.28
Poverty gap	20.90	20.84	**20.78**	20.73	20.67	20.56	20.39
Squared poverty gap	10.30	10.23	**10.17**	10.11	10.06	9.97	9.84
			All identified cereals				
Poverty, urban							
Headcount index of poverty	22.83	24.23	**25.51**	27.01	28.39	30.69	36.17
Poverty gap	7.41	7.55	**7.76**	8.07	8.51	9.54	12.28
Squared poverty gap	3.43	3.32	**3.35**	3.48	3.67	4.12	5.56
Poverty, rural							
Headcount index of poverty	56.70	57.16	**57.63**	58.21	58.84	60.26	63.93
Poverty gap	20.95	20.77	**20.78**	20.90	21.10	21.65	23.43
Squared poverty gap	10.46	10.22	**10.17**	10.19	10.25	10.51	11.54

Source: Authors' estimation using ELIM 2006.