

# Impact Evaluation of the Expansion of the Food Subsidy Programme in Mozambique

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## I. Introduction

This Policy Research Brief documents both the targeting performance of the 2008 expansion of the Food Subsidy Programme (PSA) in Mozambique and the impact of the programme in some key indicators.<sup>1</sup> The PSA's expansion in 2008 was financed by Britain's Department for International Development (DFID) and the Dutch Embassy; technical assistance to the National Institute for Social Action (INAS), the implementing agency of the PSA, was provided by the United Nations Children's Fund (UNICEF) and the International Labour Organisation (ILO). UNICEF sponsored baseline and follow-up surveys to inform the impact evaluation of the expansion, as well as the corresponding analyses of the baseline and (final) follow-up undertaken by the International Policy Centre for Inclusive Growth (IPC-IG). This evaluation aims to contribute to the debate on basic social protection in Mozambique.

## II. The Evaluation and Sample Design

Social experiments based on randomised control trials guarantee that sample observations of beneficiary and non-beneficiary populations are identical in observed dimensions (such as sex, age and wealth status) and non-observed dimensions (such as ability and risk aversion) and equally balanced across the two groups. This balance ensures that differences in outcomes between beneficiaries and non-beneficiaries are due to the effect of the programme. One can therefore establish a causal relationship between the programme and the final outcome, without having to worry about any confounding variables/factors. If a social experiment is absent or impossible, as in the case of the PSA's expansion, one has to rely on quasi-experimental methods that aim to select a comparison (non-beneficiary) group that is as similar as possible to the treated (beneficiary) group. In the evaluation of the PSA, we tried to emulate the beneficiary-selection process in places where the programme was not implemented, and we applied weighting techniques<sup>2</sup> to make the comparison group as similar as possible to the treated group.

The evaluation entailed the follow-up of both the treated group and the comparison group before the former began receiving the benefit, and then one year after receipt of the benefit so that we could apply difference-in-differences techniques—whereby the impact of the programme is determined by the difference of the differences between treated and control groups before and after the programme. This approach helps us to control for pre-programme differences in outcomes between the two groups, as well as for the effect of common factors that would have driven post-programme differences in outcomes (such as inflation, drought and floods).<sup>3</sup>

The evaluation is based on quantitative data drawn from 11 districts in seven provinces of Mozambique. The districts were selected according to three criteria: (i) being part of the 2008 expansion plan for the PSA, according to INAS lists; (ii) being in different regions of the country (North, Central and South); and (iii) logistical considerations for the fieldwork. The first phase of the evaluation consisted of a baseline survey conducted by the Metier consultancy in September–November 2008. The second phase of the evaluation took place in November 2009 and was conducted by the GSC consultancy, using the same questionnaire and sample as used in the baseline.

It is important to note that the external validity of this evaluation is limited because it is based on a sample of future beneficiaries in selected districts; it does not by any means represent the universe of PSA beneficiaries. The results here refer only to the universe of beneficiaries that should have joined the programme in 2008. Similarly, the comparison group used in the analysis does not represent the universe of all the potentially eligible population of the country in places where the programme has not been implemented.

The group of future beneficiaries (intention-to-treat) was based on a list provided by INAS. The baseline did not include households in localities where the programme was already in operation before the 2008 expansion, so as to avoid any "contamination" of the sample that could generate bias in the results. The initial idea with regard to the comparison group was to build a group of potentially eligible individuals in the same localities where the treated group would originate. This group would be based on lists, kept by the *delegações* (local INAS offices), of potential beneficiaries that had been rationed out of the programme (the so-called *candidatos*) because of constraints on the number of new beneficiaries. These lists were available in Maputo but not in the districts selected to be part of the sample. Given the unfeasibility of this approach, two alternatives were adopted: (i) enumerators actively searched for potential beneficiaries in the same localities with the help of *permanentes* (local officers of the *delegações*); and (ii) enumerators actively searched for potential beneficiaries in neighbouring localities where the programme would not be implemented during the evaluation.

The baseline sample of the treated group (intention-to-treat) comprised 1,014 households and the comparison group comprised 1,647 households. In the follow-up there was an attrition of 11 per cent that reduced the samples to 935 and 1,445, respectively. However, the sample used in the impact evaluation analysis had to be further reduced because of three problems: (i) contamination of the “intention-to-treat” group in the baseline—26 per cent of the “new beneficiaries” were already receiving the transfer in the baseline; (ii) the “intention-to-treat” list was not respected in the process of including “new beneficiaries”—some of them were never included in the programme and some of the comparison observations were included in the programme;<sup>4</sup> and (iii) some of the people who claim to be PSA beneficiaries in the surveys were not on the payroll, according to the administrative data from INAS (Lindex). These problems led us to redefine the treated group as those who reported being beneficiaries in the survey, were identified by INAS local offices as being beneficiaries, and did not receive the PSA at the time of the baseline. For the difference-in-differences analysis, moreover, the sample used was balanced: only households/individuals that were interviewed during both baseline and follow-up surveys were used in the analysis. After this cleaning process, we had a much smaller sample of 1,919 households, 546 classified as treated and 1,373 as control observations.

### III. PSA Targeting Analysis

The methodology used to assess the quality of the PSA’s targeting consists of comparing the distribution of a “well-being indicator”<sup>5</sup> for the overall rural population in Mozambique, and identifying the relative position of the sample of potential PSA beneficiaries and/or actual beneficiaries in that distribution. In order to implement this strategy we use data from the Multiple Indicator Cluster Survey (MICS) for 2008. We construct a “well-being” variable using principal component analysis that ranks households from both the MICS and PSA baseline survey according to this composite indicator representing the family’s “well-being”. Then we calculate the quintile cut-off points of the “well-being” variable for the MICS sample, and assess how the distribution of the same index for some PSA subsamples would fit within these cut-off points.

Two samples were selected from the MICS in order to assess the targeting performance: (i) the whole rural sample; and (ii) rural households with either a woman older than 55 or a man older than 60 (roughly the major categorical group that could benefit from PSA, overlooking any means-testing targeting strategy). Similarly, three groups were selected

from the PSA baseline survey: (i) all eligible rural households, regardless of their being treated or comparison observations (PSA eligible); (ii) the intention-to-treat sample—that is, the “future beneficiaries” of the initial INAS list (PSA ITT); and (iii) the actual treated observations based on the information from the follow-up survey (PSA treated).

The principal component analysis “well-being” variable was built using common variables from both the MICS and the PSA baseline survey, such as demographic characteristics (for example, sex of the head, age of the head, number of family members, number of children within some age groups, presence of orphans); quality of the housing (for example, material used in the floor, ceiling and walls, crowding); and possession of durable goods and assets (for example, radio, television, land, animal husbandry).

A comparison of the MICS rural sample and the PSA eligible sample (including both treated and control observations) reveals that, on average, the latter has smaller households and older heads of household, more elderly members and fewer children, and a smaller proportion of households with a radio, television, bicycle and animal husbandry. These figures reflect some of the programme’s eligibility criteria: old age and some level of means testing. However, in order to obtain a clearer idea of the quality of the targeting of the PSA’s 2008 expansion, it is important to have an indicator that can be compared across subsamples and with other programmes in the region and the world.

Table 1 shows the distribution of the different MICS and PSA survey samples according to quintiles of the MICS rural sample (20 per cent for each quintile as per column 1). The more concentrated the distribution of PSA beneficiaries in the lowest quintile, the more targeted the programme is. The second column (MICS eligible) shows that a categorical targeting (old age) would yield a better targeting performance than a universal programme in rural areas. Thirty-three per cent of the households with elderly heads are below the cut-off point of the first (lowest) quintile. Column 3 shows the distribution of the whole sample of treated and control groups in our survey sample (PSA eligible). The figures reveal that the survey sample has identified the extremely poor rural households in Mozambique very well. Sixty-six per cent of our sample are in the first quintile of the MICS rural distribution; more interestingly, only 9 per cent are among the 40 per cent better off. But columns 4 and 5 show an unexpected result: our sample of intention-to-treat (ITT) and treated households are not as poor—according to our “well-being” variable—as our sample of comparison households.

For the full survey sample, 66 per cent were in the first quintile, whereas for the last two subsamples “only” about 50 per cent are in the first quintile of the MICS rural distribution.

This can either be because the neighbouring localities where the programme was not yet implemented are poorer, or because of an inadequate performance by the *permanentes* in targeting the poorest within the localities where the programme was implemented. Looking separately at the distribution of the comparison group in localities where the programme was implemented and in localities where it was not implemented, we found that the relative distribution of the comparison group in localities with the programme is very similar to the distribution of the treated group (51 per cent within the first quintile of

Table 1  
Targeting Indicators

Rural	MICS rural (1)	MICS eligible (2)	PSA eligible (3)	PSA ITT (4)	PSA treated (5)
<b>Quintile distribution</b>					
Q1 (lowest)	20	33	66	50	51
Q2	20	19	15	19	20
Q3	20	16	10	16	15
Q4	20	13	5	9	8
Q5 (highest)	20	19	4	7	6

Source: MICS, 2008 and Baseline Survey, 2008.

the MICS rural sample); in the localities where the programme was not implemented, they are much poorer (81 per cent within the first quintile of the MICS rural sample).

These results, though they are confined to the 2008 expansion plan, suggest that some level of geographical targeting could be necessary to improve the programme's performance, and raises the question of how localities are selected to participate into the programme within districts.

Overall, these results suggest that "age of the head of the household" is a reasonable criterion to identify poor households in rural areas, since elderly heads are more likely to be poor. They also indicate that our sample is very much concentrated among the poorest households in the rural areas, but this concentration is much higher for our comparison group, suggesting that geographical targeting can be an efficient way of improving the targeting of the PSA, even within districts.

Using the information in Table 1, one can apply the methodology of Coady et al. (2004) to derive a targeting index that can be used to make comparisons across programmes. The index consists of dividing by 20 the percentage of each of the subsamples of interest that is within the first quintile of the benchmark distribution (for example, MICS rural). The higher the value of the index, the better the targeting performance. If the distribution is neutral in distributive terms, the index would be equal to 1; if it is pro-poor, it would be above 1; if it is below 1, it is anti-poor. Coady et al. (2004) calculated this index for several programmes around the world. In comparative terms the PSA is quite well targeted, since the world average is 1.22 for social programmes in general, and 1.8 for cash transfer programmes in particular.

Using the distribution of MICS rural, this index is 2.48 for the PSA ITT and 2.69 for the PSA treated, much higher than the worldwide averages. Even using the MICS eligible distribution as a benchmark, the performance of PSA is still very good at 1.59 and 1.88, respectively. The PSA's performance is not as good as a similar programme in Kenya, but it is better than one in Malawi (see Table 2). To sum up, the results of this exercise indicate that the PSA has a good targeting performance, but there is some evidence that it could be improved via better designed geographical targeting.

#### IV. Description of the Sample Used in the Impact Evaluation

The households in our sample of potentially eligible beneficiaries, including both treated and comparison observations, are not very large; on average they have about three members. About 60 per cent of them do not have any member aged between 18 and 55—that is, they have no adults who could make their livelihoods and support the elderly and the children. Sixty per cent of the households are headed by women and 70 per cent of them are widows. The average age of the head of the household is more than 65. These figures reflect the fact that the great majority of the potential beneficiaries are elderly people living mostly on their own or with little help (at least within their own households) from relatives. It is also important to note that about 15 per cent of the households have a disabled person and that 20 per cent of the households have at least one person living with chronic disease. These figures also reveal the high degree of vulnerability of these households and highlight the importance of the other eligibility (categorical) criteria of the programme.

Out of a balanced sample of 1,524 children, 87 (6 per cent) are double orphans (both father and mother are dead) and are therefore eligible for the indirect benefit of 50 meticais. However, 230 children (15 per cent) have lost one parent.

These figures show that the criterion of double orphanhood used to determine who is eligible for the indirect benefit can be quite restrictive. Although only 40 per cent of the households have children, 60 per cent of these households have grandchildren living with grandparents who are household heads. About 19 per cent of all households (40 per cent of households with children) have children whose parents are alive but who do not live with them, largely because of high migration among the young adult population in rural areas. These children, though not orphans, live with grandparents who, given the characteristics of our sample, are very likely to live in extreme poverty. It is important to highlight, however, that the number of children living in households with potential PSA beneficiaries is much lower than the number of children in rural households in Mozambique.<sup>6</sup> Because of these demographic features and the strict rules for children to qualify as indirect beneficiaries, only 11 per cent of our beneficiary sample (according to administrative information from Lindex) receive more than the basic benefit of 100 meticais.

It is also important to look at the livelihood strategies of those in our sample, and at some important outcomes that could be affected by the transfer, such as (food) expenditure and number of meals per day. In line with the rural nature of the sample, 87 per cent of households own some small plot of land (*machamba*), but only 24 per cent grow more than one crop and only 7 per cent sell any production surplus. A considerable amount of the consumption of these households comes from this subsistence agriculture. Traditional crops such as manioc and maize predominate. About 35 per cent of the households report some animal husbandry, but only 7 per cent sell some output from this activity. Only 6 per cent of the households have another economic activity unrelated to agriculture or animal husbandry.

The number of working members in the household is an important indicator of the livelihood strategy. About 25 per cent of children aged between five and nine, and 65 per cent of children between 10 and 17, are doing some "productive" work. They can work in the *machamba*, sell some goods or do other odd jobs. Children's work is mostly unpaid and consists basically of family work. The elderly also work, even those who are PSA beneficiaries, and have a higher probability of working than adults aged between 18 and 59.

Table 2  
International Comparison of PSA Targeting Performance

Coady et al. (2004)	All programmes	Cash transfer programmes
	1.22	1.80
Handa et al. (2010)	Full sample	Eligible sample
Kenya	3.38	2.04
Malawi	1.44	1.80
	MICS rural	MICS rural eligible
PSA-ITT	2.48	1.59
PSA treated	2.69	1.88

Source: Coady et al. (2004); Handa et al. (2010); and authors' calculations using MICS, 2008 and Baseline survey, 2008.

The vulnerability associated with gender is evident, as there is a significant difference between the total expenditures of female- and male-headed households. Female-headed households spend roughly a third of what male-headed households spend. Food expenditure accounts for 50 per cent of overall expenditure, a proportion that is lower than that reported for the country as a whole: 75 per cent, according to the 2008 National Family Budget Survey (Ministry of Planning and Development, 2010). This difference can be explained by the fact that food is mainly produced for own consumption in our sample.

The average number of meals per day is about two. It is possible to identify some differences in the number of meals within households. Men eat more regularly than women; adults eat more often than the elderly; and children on average eat more meals per day than adults. The anthropometric measures, however, point to severe nutritional problems that can negatively affect children's health, their performance at school and their future productivity.

Most of those aged 15 to 17 have attended school at some time in their lives, but the grade-for-age distortion is high and there is a high drop-out rate. Moreover, girls have a lower probability of ever having attended school than boys in all age groups.

## V. PSA impacts

We report only the results of the impact estimation for which it was possible to identify some statistical significance between treated and control groups in our sample.

Though a general impact on overall expenditures is not shown, there has been a relative increase in spending on food as a proportion of total expenditures. The overall impact was an increase of 22 per cent in the basic food share for the treated observations. This impact was much higher for households with a female head (32 per cent) and households with a married head (38 per cent). The food expenditure item that increased the most was manioc and wheat flour, at 13 per cent. This led to a 15 per cent increase in the probability that a household consumes flour. Expenditures on cereals have increased by 6 per cent. Again, female-headed households have experienced a higher increase than the average.

In line with this result, we also found that the PSA increases the probability that adult women and boys will eat more meals per day. As with the nutritional status of children, we found that inadequacy of weight-for-height has fallen by 30 per cent. But we are cautious with this result because we could not find similar improvements for other indicators.

As with livelihood indicators, the results show a reduction in the probability that boys aged between five and nine do some work, and an increase in the probability of work among adult members of the households, particularly adult woman. The result for men is driven by the increased probability of the elderly working. This higher probability of work for women, however, does not occur in the intensive margin, since weekly hours worked in the *machamba* (farming) are actually reduced by seven hours.

In sum, the outcomes for which it was possible to identify a PSA impact reveal that the programme has had an impact on food-share expenditure and that this impact was higher for female-headed households. It also shows that meal regularity, one of the dimensions of food security, has also been positively affected, at least for adult women and boys.

Table 3

## Estimation Summary of PSA Effect on Relevant Outcomes

Outcomes	Effect estimation	
Basic food expenditures share		
Average	22%	***
Female-headed households	32%	***
Male-headed households	7%	*
Married household head	38%	***
Single or widowed household head	13%	***
Probability of flour consumption	15%	*
Extra meal odds ratio		
Adult women	4.47	**
Male children 5–9 years old	3.18	*
Low weight-for-height - acute malnutrition	-30%	**
Probability of working		
Male children 5–9 years old	-29%	**
Male adult or elderly	17%	**
Adult women	24%	*
Number of working hours in the <i>machamba</i>		
Female adult or elderly	-7.00	*
Male adult or elderly	-6.68	*

Source: Baseline survey, 2008 and Follow-up survey, 2009.

\*\*\* 99% confidence that the number is different from zero.

\*\* 95% confidence that the number is different from zero.

\* 90% confidence that the number is different from zero.

We also found weak evidence of a positive impact on nutrition outcomes for children below the age of five. Given that the programme's objective is to protect the ability of the destitute to acquire food, which potentially has an impact on food regularity and, possibly, on the children's nutrition indicator, the programme seems to be reaching its main objective to some extent. Moreover, the positive impact on the probability of working is a sign that the programme does not generate a disincentive to work, even for younger adult members of the households. Indeed, what should be of concern is that the elderly in our sample have a very high participation rate and the PSA transfers do not seem to have the effect of allowing them to work less or not to work at all.

## VI. Concluding Remarks

The impact evaluation of the 2008 PSA expansion showed that the programme is to some extent achieving its main objective of alleviating the food insecurity of beneficiary households. Although for most beneficiaries the transfer is small—about US\$3 per month (100 meticaís), which is less than the amount in similar programmes in other sub-Saharan African countries—it was possible to identify increases in the regularity of meals and in the share of food expenditures, as well as some weak evidence of a reduction in at least one of the indicators of malnourishment for children below the age of five. In addition, the programme

does not diminish the labour supply and seems to reduce child labour among boys.

Assuming that the 2008 expansion is representative of the evolution of the programme, three important issues that are highlighted in this evaluation should be addressed in order to heighten the programme's impact and improve the quality of its targeting. The first is the issue of indirect beneficiaries. Although 60 per cent of eligible households have no children below the age of 18, most of those that do have children do not qualify as indirect beneficiaries because of the strict criterion of double orphanhood. Allowing for more flexible rules, such as single orphanhood and other living parent not residing in the household, could at least help grandparents guarantee better living standard for these children and help boost some of the impacts we found in the evaluation.

The second issue is related to targeting. The evidence of the targeting analysis shows that the programme is well targeted and the targeting indicators are within the international averages. It seems, however, that some improvement can be made through better geographical targeting within districts.

The nature of our comparison group allowed us to assess the targeting within the localities where the programme was being implemented, but also between neighbouring localities with and without the programme. This assessment revealed that the localities where the programme had not been implemented were much poorer, according to our well-being indicator, than the ones in which the programme was being implemented.

This finding relies heavily on the nature of our comparison group sample, which is not representative of all the potentially eligible in the localities, but which was selected by the enumerators with the help of the *permanentes* and/or using the criteria that (according to the operation manuals) should be applied to choose beneficiaries.

The third issue refers to the difficulties we had in undertaking this evaluation because of the inadequate way in which the administrative information is collected, recorded and stored. The current system, Lindex, is not reliable and cannot be used

easily to monitor programme implementation. For instance, it is not possible to produce some aggregate information on the number of beneficiaries that were excluded from the programme, the reasons for exclusion and how many beneficiaries received the benefits with delay. This lack of control over key programme information partially explains the contamination of the intention-to-treat sample and unexplained changes in treated and comparison status during the implementation of the programme. Given this experience with the evaluation of the 2008 PSA expansion, we believe that in order to guarantee more and better programme impacts, an important first step should be to improve the PSA's administrative information and its registering and monitoring tools. ■

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1. For a brief description of the programme, see Soares et al. (2009).
2. The weight is based on the probability of being treated. Those comparison observations with a higher probability of being treated given a set of observed characteristics receive a higher weight in the regression analysis, adjusted for the sampling weights.
3. This approach is implemented using a regression-based analysis following Hirano et al. (2003) and Abadie (2005).
4. It is possible that the involvement of the *permanente* in the identification of the comparison group may have prompted some of the *delegações* of INAS to revise the initial lists of new beneficiaries.
5. We use a well-being measure because the MICS has no information on income or consumption that would allow us to have an income/consumption distribution to assess the PSA's targeting performance.
6. See baseline report for a discussion of this issue. The PSA is not necessarily the best instrument to target children living in extreme poverty, for two reasons: (i) the lower proportion of children in households potentially eligible for the programme; and (ii) the double orphanhood eligibility criterion for the indirect benefit.

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