5689

Assessment of Public Expenditures in Agriculture in Mozambique

Project Report of the GIS component

Gina Weir-Smith

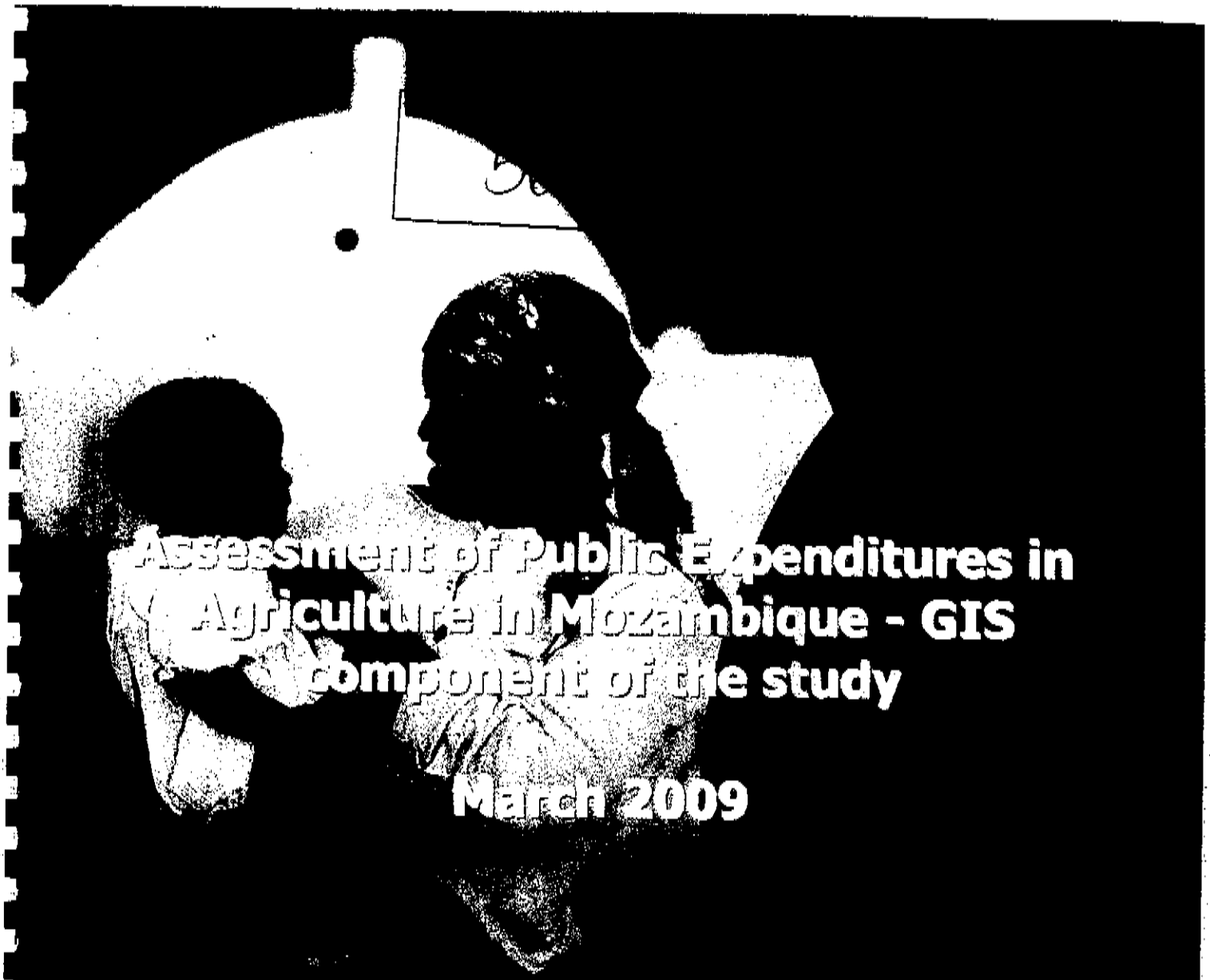
Prepared for the:

Regional Strategic Analysis and Knowledge Support System for Southern Africa (ReSAKSS-SA)

HSRC Human Sciences Research Council

Human Sciences Research Council
Private Bag X41
Pretoria, 0001
South Africa

ReSAKSS



Assessment of Public Expenditures in Agriculture in Mozambique - GIS component of the study

March 2009

Gina Weir-Smith

HSRC
Human Sciences Research Council

ReSAKSS
Regional Strategic Analysis and Knowledge Support System

Table of Contents

List of Tables

List of Figures

Abbreviations

AEO	African Economic Outlook
AgPER	Assessment of Public Expenditures for Agriculture
AU	African Union
FEWS	Famine Early Warning System
GGP	Gross Geographic Product
IAF	Household Consumption Survey
INE	Instituto Nacional de Estatistica (National Statistics Institute)
MINAG	Ministry of Agriculture
NEPAD	New Partnership for Africa's Development
PARPA	Plano de Accao para Reducao da pobreza absoluta (Action Plan to Reduce Absolute Poverty)
SALB	Second Administrative Level Boundaries
TIA	Trabalho de Inquérito Agricolha (National Agricultural Sample Survey)

1. Introduction

A study on the Assessment of Public Expenditures for Agriculture (AgPER) is being undertaken in the agricultural sector in Mozambique. The main objective of this study is to review recent public expenditures for agriculture and assess their efficiency and effectiveness. The study will also assess the sector's short-term public expenditure requirements to achieve results outlined in the country's (sub-) sector strategies.

Based on the World Development Report (Agriculture for Development, 2008), more and better investment in agriculture will achieve faster agricultural growth and increased response to better price incentives. Seeing that the Mozambique economy is largely dependent on agriculture, such investment should be optimised to achieve the best results.

1.1. Outputs

At the time of writing this report the study was in the final stages of the data collection phase. This report covers the geo-spatial activities component of the study and is therefore only a sub-component of the complete work. The AgPER study requires among others the following output:

- A series of electronic maps overlaying expenditure data with socio-economic data pertaining to the agriculture sector.

The aim of this data is to enable stakeholders to take informed decisions pertaining to agricultural growth and rural poverty reduction.

1.2. Key questions the study will seek to address

It is expected that the study will provide answers to a range of questions which can be regrouped in three clusters: (i) budget preparation, (ii) budget execution and performance; and (iii) linkages of budget (allocation and expenditure) with sector priorities. The following questions provide an overview of some of the issues it aims to address:

a. Are the levels and trends of public expenditure in agriculture conducive in meeting the strategic goals for the sector (including under PARPA)? Are they aligned with the priorities defined by the sector?

b. Based on the AU/NEPAD definition of agriculture, what is the overall share of agriculture in total public expenditures? How is Mozambique progressing towards its NEPAD commitments (Maputo Agreement)?

c. Is the spatial allocation of overall expenditure in agriculture aligned with sector strategic targets and objectives?

d. Has the funding in agriculture led to the expected growth in the sector and to rural poverty reduction?

e. Are the budget preparation process and institutional arrangements for the flow of funds conducive of timely a disbursement of public investment that takes seasonality of agriculture into account?

f. What is the nature of private investment in agriculture and what trends have evolved over the past years?

g. How does Mozambique compare with other countries in Africa on trends, levels, and quality of public spending in agriculture?

This report aims to cover point c) by looking at the spatial allocation of overall expenditure in agriculture.

2. Background information about Mozambique

The National Statistics Institute (INE) estimates the total population for the country in 2008 would have been 20,910,302. The greatest number of people would be residing in the Zambézia province, namely 4,013,227.

In terms of the level of education there has been rapid growth in school enrolment since 1996–97, especially for children between the ages of 7 and 17 (inclusive). The percentage of children in this age group who had ever attended school increased from 61 percent to 80 percent, with particularly rapid growth in rural areas (Ministry of Planning and Finance, 2004). Although the "enrolment gap" between rural and urban areas has been narrowed considerably, it still exists and remains large.

The Mozambique economy is largely dependent on agricultural activities with up to 27% of the GGP being contributed by this sector. Other sectors that contribute above 10% to the GGP are manufacturing (15%), trade (12%) and finance (12%).

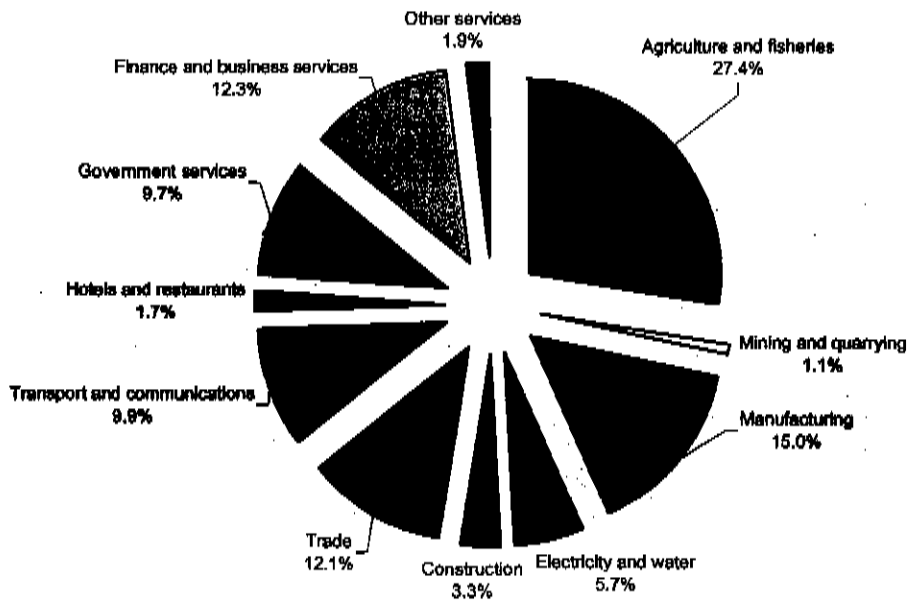


Figure 1: GGP contribution by sector in 2006 (Source: AEO 2008)

The country has experienced dramatic decreases in poverty - it dropped by 22% between 1997 and 2003 (AEO, 2008). The Human Development Report (2007) notes that the country also recorded a markedly positive macro-economic performance from 1996 to 2004 with an average growth rate of 8.5 per cent per year. It is against this background that the agriculture expenditure in Mozambique needs to be examined.

3. Data

Data was gathered from various sources via the Internet and during a fieldtrip to Mozambique in November 2008. The datasets used in this report and their origin are listed below.

Table 1: Data and sources

Dataset name	Origin	Contact
Boundaries of administrative regions (posto)	Cenacarta	www.cenacarta.com
Population centres	Global Map	www.globalmap.org and www.iscgm.org
Boundaries of provinces	Second Administrative Level Boundaries (SALB)	www.who.int/whosis/database/gis/salb/salb_home.htm.
Population data	INE	www.ine.gov.mz/
Poverty data	Household Consumption Survey (IAF)	Ministry of Planning and Finance
Agricultural statistics	Trabalho de Inquérito Agricolha (TIA) (at INE)	Michigan State University
Agriculture expenditure	AgPER group	Mr Helder Gemo, Swedish Embassy

The population centres and boundaries of provinces were sourced from international agencies via the Internet. The Global Map and SALB initiatives are well-known in the geo-spatial community and provide useful information. The local company, Cenacarta, also has a number of valuable geo-spatial datasets on its website.

Population data was obtained from the National Statistics Institute (INE). The last census in Mozambique was conducted in 1997 and therefore much of the demographic data would not be comparable with recent statistics on agriculture expenditure. The INE projections on total population for various years up to 2010 were therefore used. The INE also provided projected data per age group.

Poverty data was obtained from the report and survey done by the Ministry of Planning and Finance. The study contains poverty figures for 2003. The national poverty headcount in this study is defined as the share of the population living in poverty.

The Trabalho de Inquérito Agricolha (TIA) gathers agricultural statistics and their sample focuses on rural areas. The key information available is indexes of crop production from 2002 till 2007, based on the median crop production at the provincial and national levels. The data also indicates the number of farm holdings per province as well as the percentage holdings involved in crop production.

Agriculture expenditure was obtained from the AgPER study group and consists of the statistics gathered by various role players in the group. The expenditure is broken down into functional and investment expenditure (World Bank, 2008). The main basis for approaching the investment expenditure classification in the AgPER is the series of projects in the official classification of the Ministry of Finance. The operational (functionary) budget is dominated by salaries and the

breakdown will be approached through complementary information on number and categories of staff in the different departments or functions of Ministry of Agriculture (MINAG) and other relevant institutions. This data was collected for the period 1998 – 2007.

The attribute data collected, i.e. poverty, population, agricultural statistics and agricultural expenditure, was linked to the spatial data using the province name. Since the GIS software has a restriction of 250 fields in the Windows environment, the data was divided into two datasets. The two datasets contain the same socio-demographic statistics, but have different data on agricultural statistics (see Appendix 1 for field descriptions).

The challenge with using these various data sources is that they don't refer to the same year. This needs to be borne in mind when providing the analysis, since the situation could have changed since the date of the data collection. In order to standardize, the spatial analysis will focus on selected years, namely 2002, 2005 and 2007 for the agriculture expenditure. This allows a spread of information over time and does not overload the reader with too much information.

4. Spatial analysis

This section will deal with the data under three headings. Firstly the data will be analysed by socio-economic variables. Thereafter agricultural statistics will be discussed and lastly the agriculture expenditure statistics will be analysed.

4.1. Socio-economic characteristics

The total population of Mozambique in 2008 as projected by INE would have been 20,910,302. The greatest number of people would be residing in the Zambézia province, namely 4,013,227 (Figure 2). However, the population density (people/km^2) provides a better measure since the population is divided by the same indicator (square kilometres). Figure 3 shows that Maputo has the highest population density (100 people/km^2) while the provinces of Nampula, Zambézia and Sofala follow shortly. Niassa has the lowest population density, namely (8.68 people/km^2).

A comparison between the total population of 2002, 2005 and 2007 indicates that all provinces have increased in population during this time.

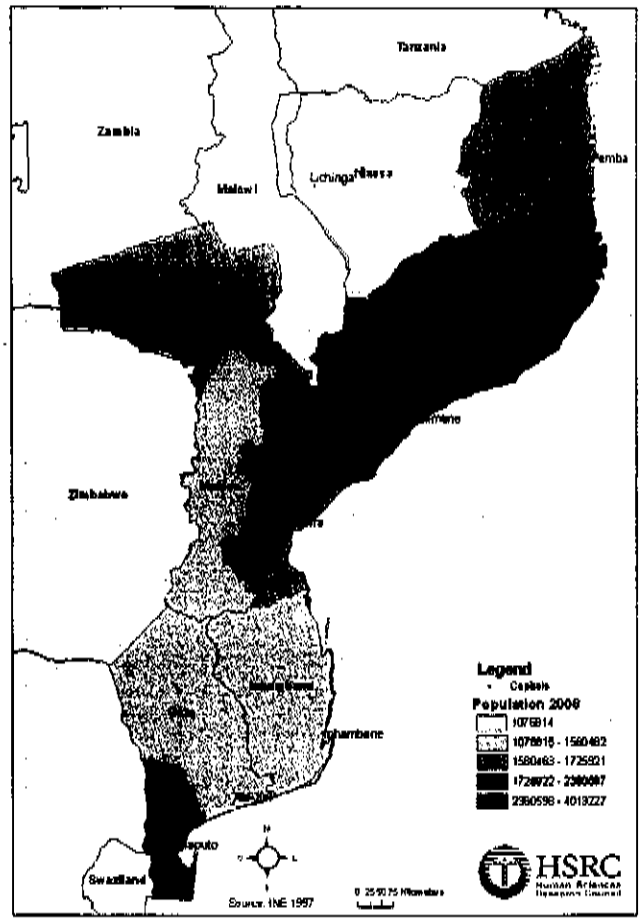


Figure 2: Total population 2008 (Source INE)

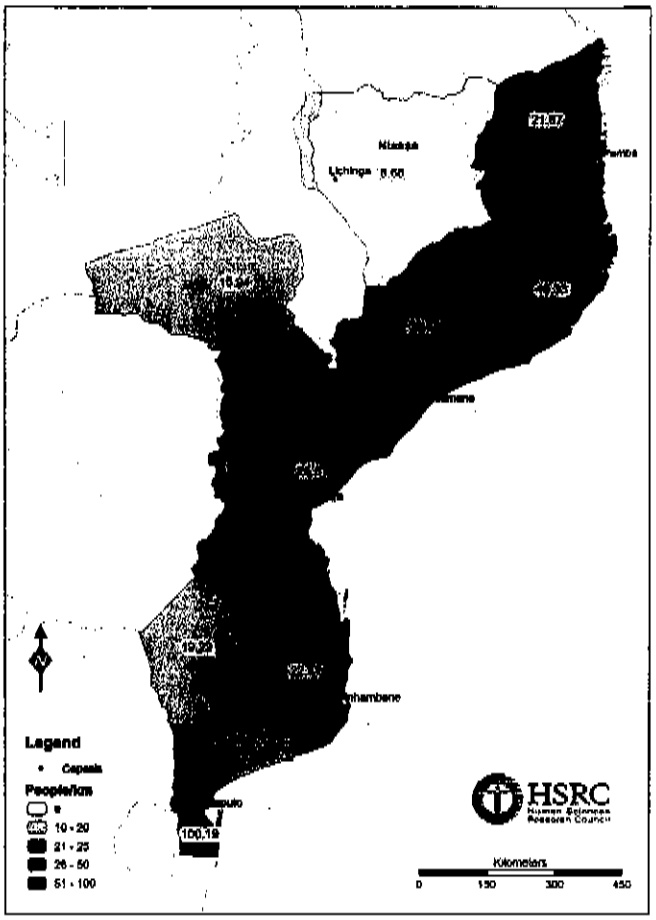


Figure 3: Population density 2008

The dependency ratio is an indicator of economic burden on the population. This figure indicates how many people of non-working age are dependent on those of working age (15-64 years). The value is expressed as a percentage[1].

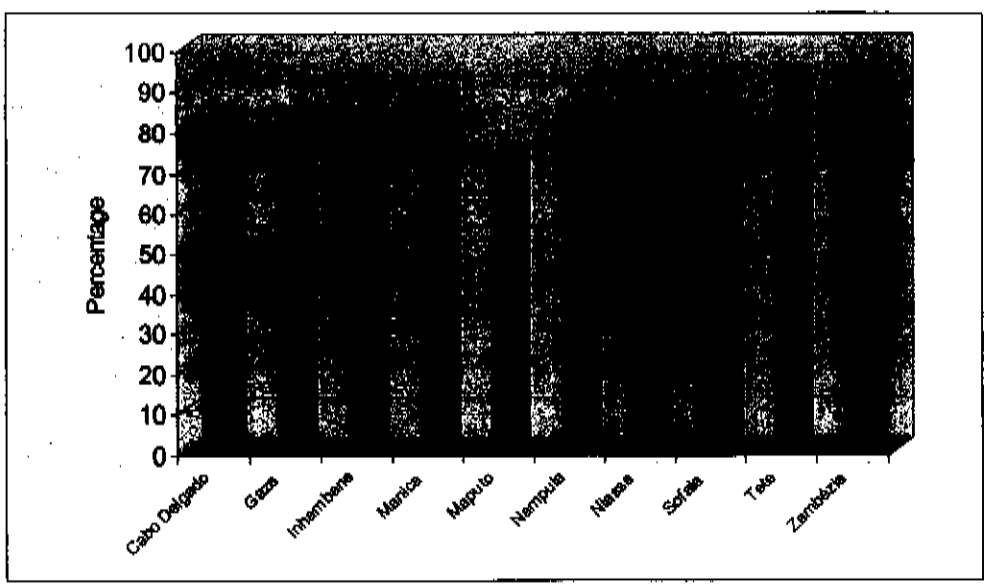
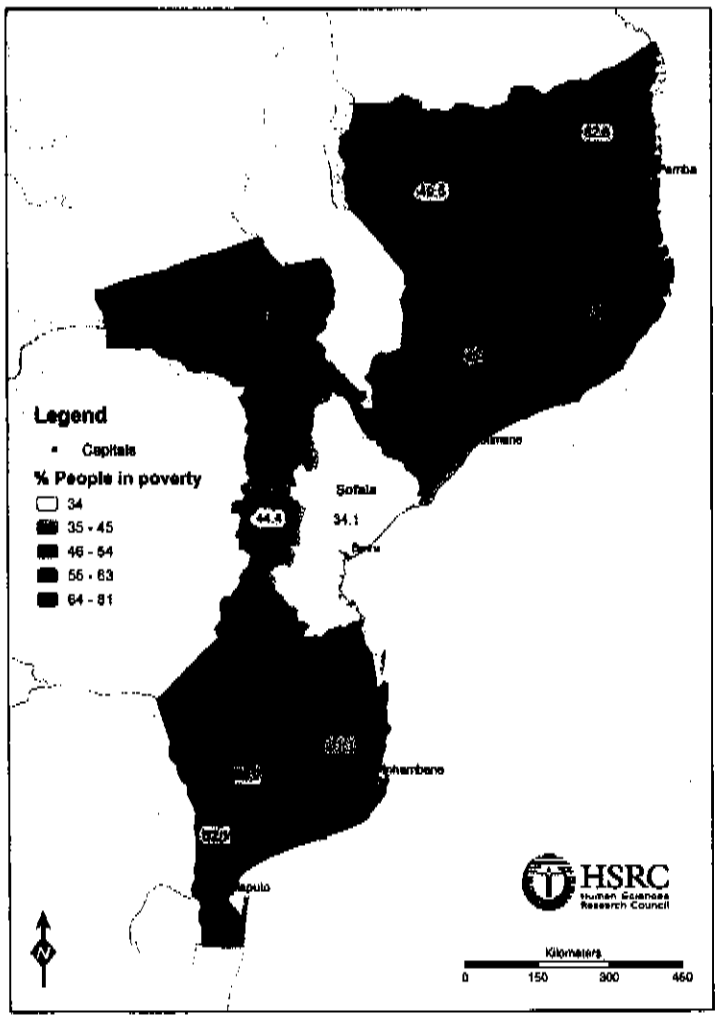


Figure 4: Dependency ratio per province (Source INE)

[1] The figure used here refers to the 2005-2010 period.

The dependency ratio is an important indictor, because as it increases, there may be an increased cost on the productive part of the population to maintain the upbringing and pensions of the economically dependent. There are also direct impacts on financial elements like social security. Figure 4 indicates high dependency ratios (above 50%) in all provinces. Tete has the highest rate at 94% while Maputo has the lowest (72%). These high values also indicate that a sustained, high economic growth is required in the country to maintain the dependents.



A further indicator of socio-economic status is the poverty headcount. The definition used here refers to the share of the population living in poverty. The poverty headcount is the highest in Inhambane (81%), while four other provinces, Cabo Delgado, Gaza, Maputo and Tete, have rates of higher than 55%. The province with the lowest poverty headcount is Sofala with 34%.

Figure 5: Poverty headcount (Source IAF)

An important indicator developed by the Ministry of Agriculture is the percentage adults who indicated agriculture as their primary occupation. This graph indicates that significant numbers of adults are in this occupation with Maputo having the lowest percentage, namely 49%.

It is mainly the provinces further north that have the highest percentages of adults working in agriculture, namely Niassa (89%), Tete (85%), Nampula (82%) and Cabo Delgado (81%). This graph (Figure 6) also illustrates the little diversification of economic activities in the provinces. The country is largely dependent on agriculture and investment in agriculture will therefore have an important effect on the majority of the population.

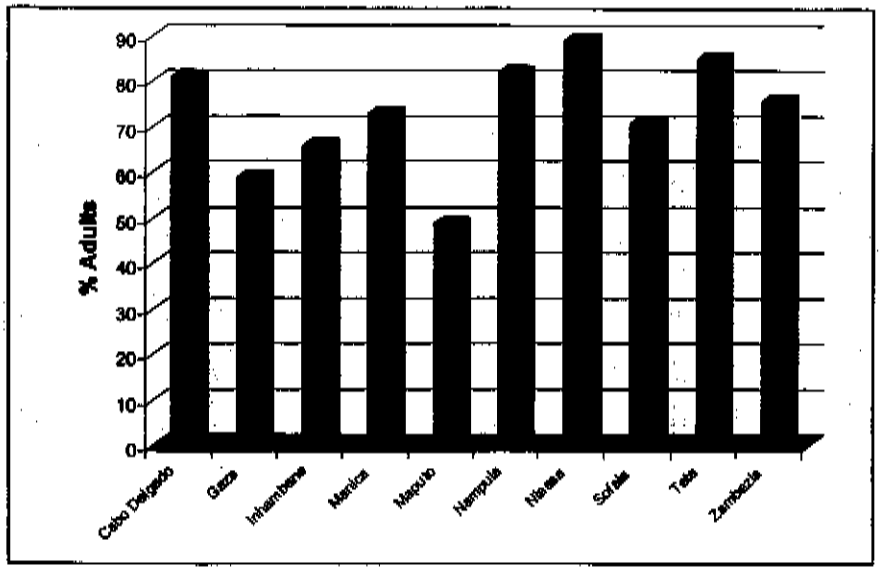


Figure 6: Percentage adults in agriculture in 2002 (Source Boughton)

4.2. Agricultural statistics

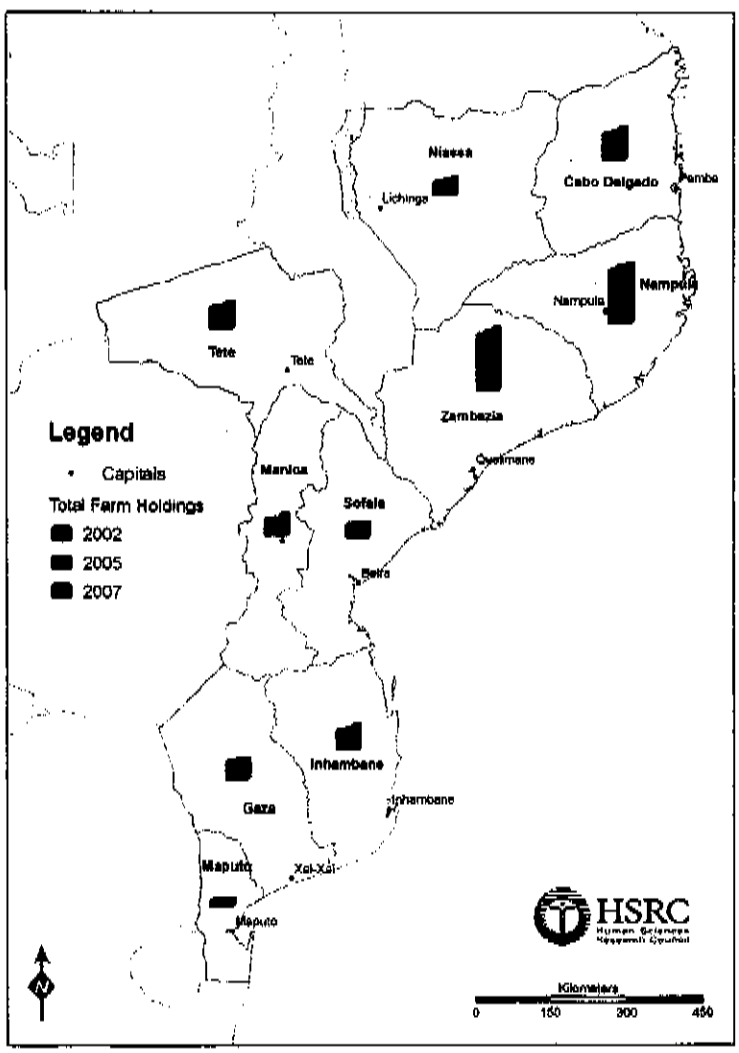


Figure 7: Total number of farm holdings per province (Source TIA)

Several indicators on agricultural statistics were collected and these were predominantly from TIA. Some of these will be analysed here to obtain an overview of the agricultural situation in Mozambique. NEPAD defines 'agriculture' as crops, livestock, forestry, and fishing. Statistics were not readily available on all of these components and analysis will therefore focus only on the available data.

In terms of the total number of farm holdings in all provinces, a steady increase over a number of years has been experienced. The exception is Gaza where the total number of farm holdings diminished by 5% between 2005 and 2007.

The highest numbers of farm holdings are in the northern provinces of Nampula, Zambézia, Cabo Delgado and Tete. One would therefore expect

greater agricultural production from these provinces. The greatest percentage of adults active in the agricultural sector also reside here.

In order to investigate the relationship between agriculture and the spatial data it is important to consider the types of crop being produced. Boughton (2006) found that increases in crop income played a dominant role for the bottom 60% of earners, and have been of equal importance to off-farm income growth for the next 20% (the fourth quintile). This increase in cropping income has been associated with substantial diversification of cropping patterns across all income groups, with the average number of crops grown increasing by about 75%.

Agricultural production is an important income source for most poor rural households, and data from the Famine Early Warning System (FEWS) shows growth in per capita cereal crop production of about 26% from 1996 to 2002. While crop production data is not a particularly good measure of welfare it does provide useful information to supplement data found in other sources.

Similar findings from the Ministry of Planning and Finance (2004) shows that the real median crop income in Nampula was 63 percent higher than the national average, whereas in Zambézia it was only 75 percent of the national average. Further analysis from the TIA indicates relatively sharp increases in the median crop income in Niassa, Zambézia, Tete, and Sofala, and all of these provinces also experienced large reductions in poverty (Ministry of Planning and Finance, 2004). In Manica there was modest growth in the median crop incomes, but rapid poverty reduction. As for declines in living standards, the TIA shows median crop incomes falling in Cabo Delgado, where poverty has increased according to the IAF. The relationship between crop income and poverty seem to be a complex one.

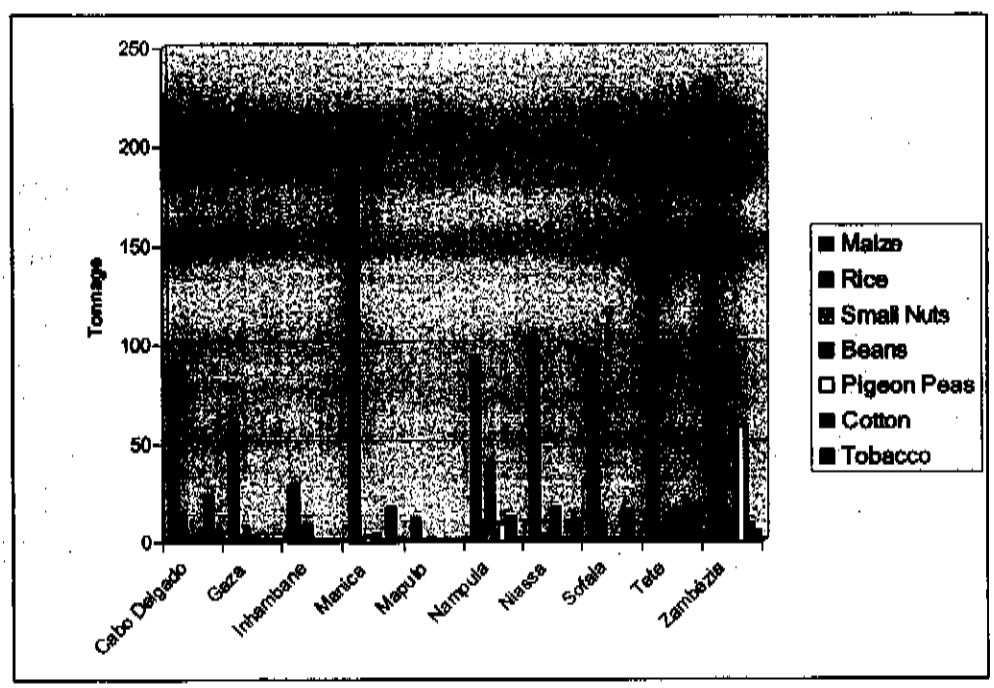


Figure 8: Major crop production in tonnage per province for 2007 (Source TIA)

The annual total production of cereals (maize, sorghum, millet, and rice) from the 1994–95 season through the 2001–02 season shows a doubling of cereal production over this period (Ministry of

Planning and Finance 2004). With the exception of 1999–2000, this increase showed a remarkably steady pattern of growth. The exception can be ascribed to severe flooding which wiped out thousands of hectares of crops.

The national agricultural survey shows that in 2007 the major crop produced in all provinces was maize (see Figure 8). The provinces of Zambézia, Tete and Manica had the largest production of maize. Zambézia is also the province with the largest diversity of crops being produced and these include maize, rice, pigeon peas, beans, cotton, small nuts and tobacco. Tete and Nampula have the second largest variety of crops.

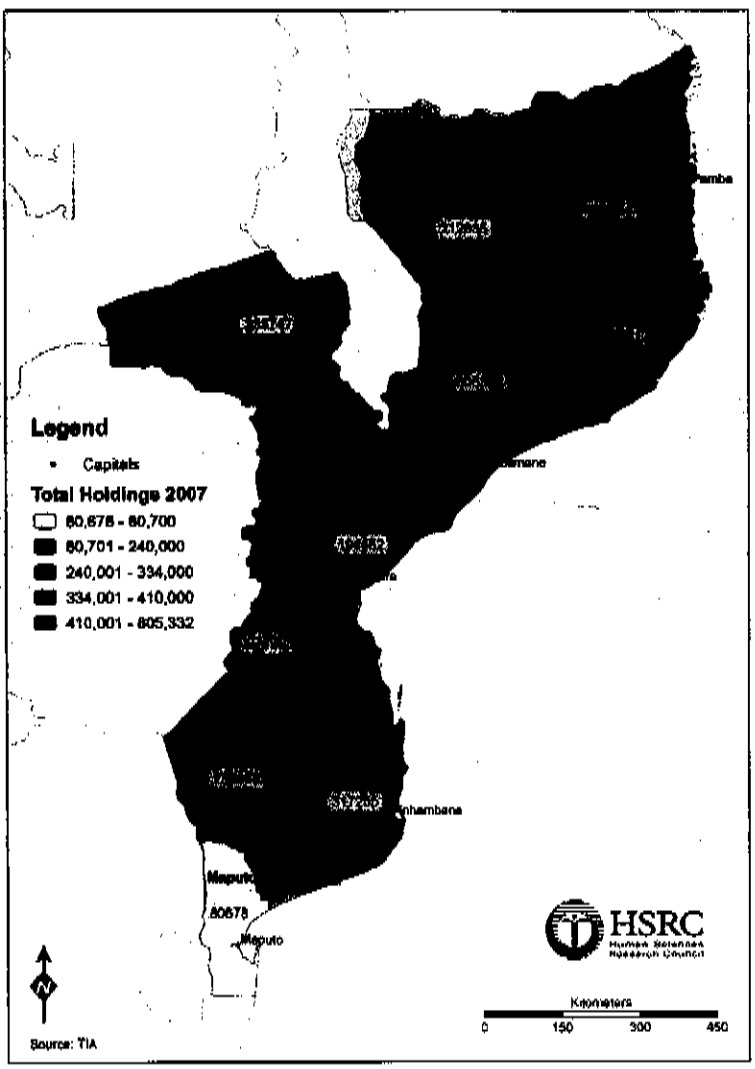


Figure 9: Total number of farm holdings 2007

The provinces with the largest number of farm holdings were Zambézia (805 332) and Nampula (752 129). Maputo province has the smallest number of holdings and is also not a major producer of crops. Cabo Delgado has the third largest number of farm holdings. Sofala, Niassa and Gaza have the second lowest number of farm holdings in the country.

In terms of crop production in 2007 (see Figure 10) Zambézia dominates with producing 22% of all crops in the country. Tete (17%) and Manica (16%) are the second largest crop producers. Nampula with 12% is the fourth largest producer while the other provinces all contribute below 10% to the total crop production. Maputo province again has the lowest contribution with 1%.

These figures are important to start making an analysis in terms of the most productive region. For example, Zambézia not only has the highest number of holdings, but it also contributes the largest percentage to the total crop production. On the other hand, Maputo is not the most important province in terms of agricultural production. These factors need to be considered for the possible investment in agriculture.

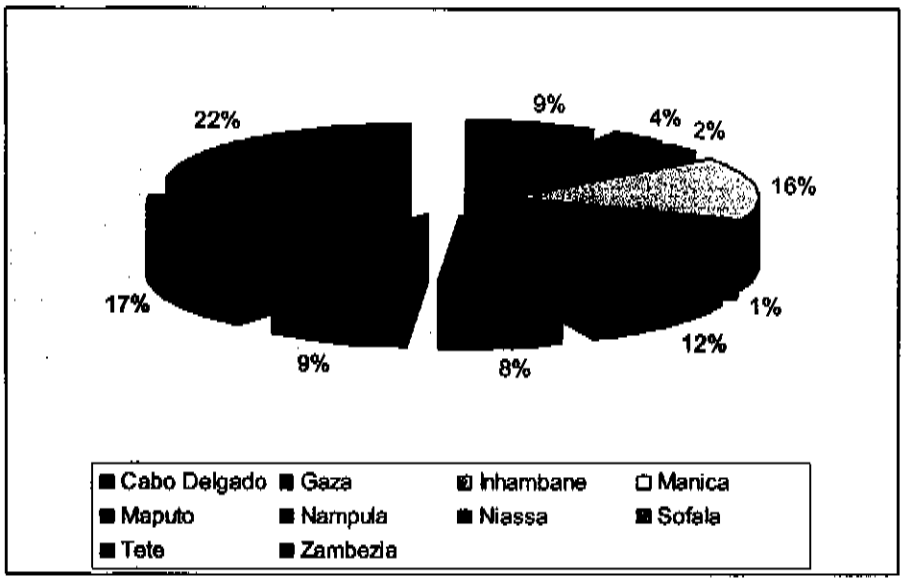
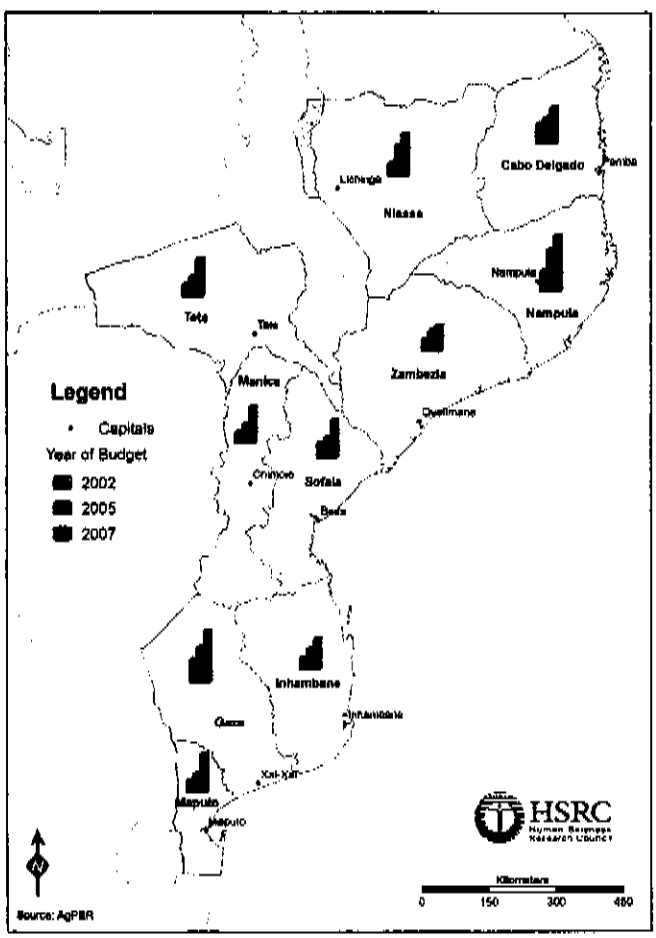


Figure 10: Provincial crop production as percentage of total crop production in 2007

4.3. Agricultural expenditure

The AgPER working group has gathered some preliminary figures on public expenditure in agriculture. These figures are broken down into two components, namely functional and investment expenditure. A spatial comparison of these statistics will be done in this section.



The operational agricultural budget of 2002, 2005 and 2007 is compared in Figure 10. There were significant increases in the operational budget between 2005 and 2007 in the provinces of Tete, Manica, Sofala, Gaza and Maputo. The reason behind these increases need to be investigated. However, a steady increase over time is shown in all provinces. The province with the highest operational budget in 2007 was Nampula while Gaza had the second highest.

Despite having a small number of adults working in agriculture and a low crop production, Maputo province had quite a large budget in 2007 – the fourth highest in the country. This could be a reflection of the large percentage of people working in for example the national department of agriculture.

Figure 11: Operational budget compared from 2002-2007

When comparing the total operational budget to the total population, the statistics take on another dimension. In Figure 12a Nampula and Gaza has the largest operational budget, but the total population of Gaza is much lower than that of Nampula. Similarly, Zambézia has the largest total population but the total operational budget is the lowest in the country. This reflection could be a function of the budget being centrally allocated in Maputo.

Mapping the investment budget in terms of the total population (Figure 12b) shows that the largest budget (>MT60 000) was in Inhambane while Cabo Delgado had the second highest budget.

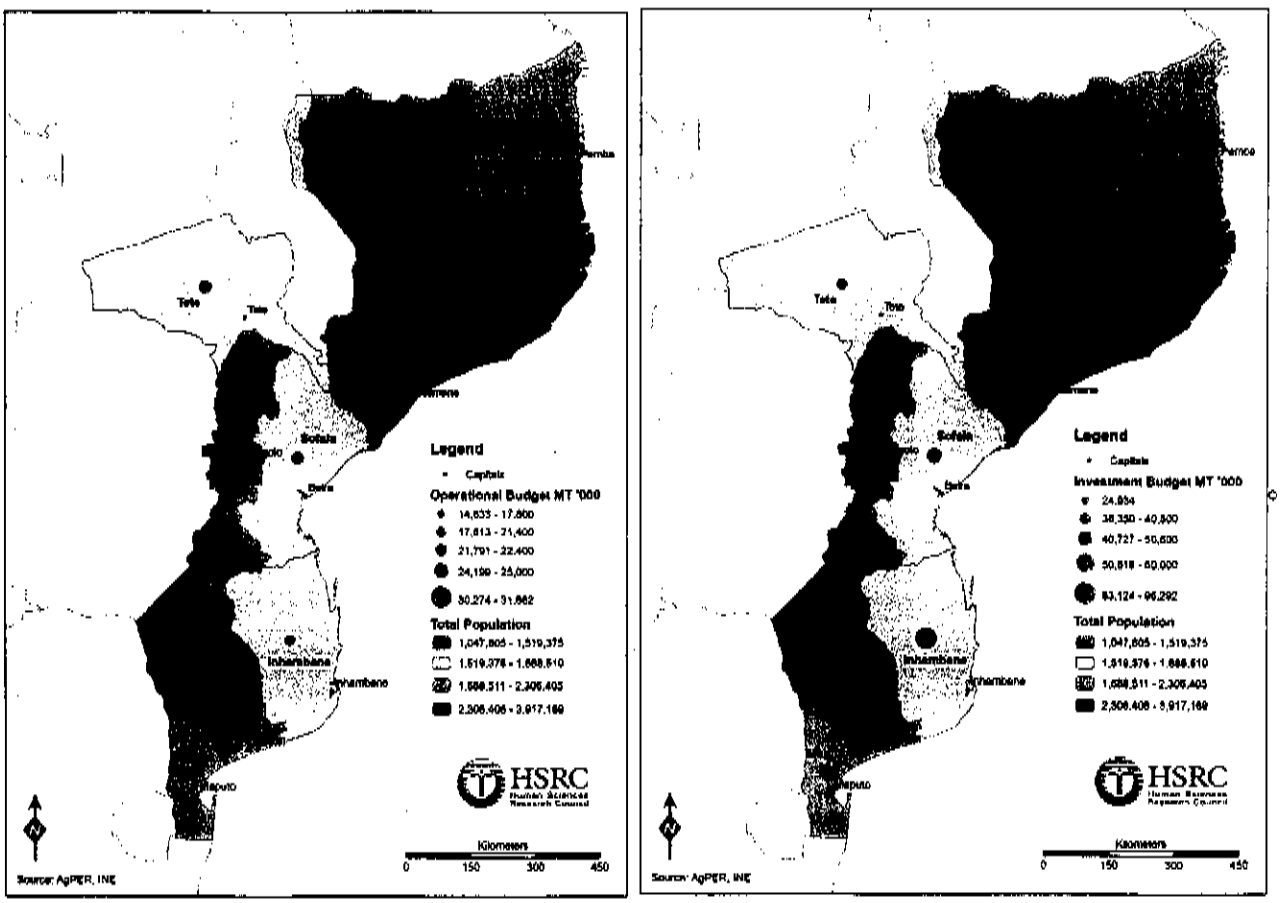


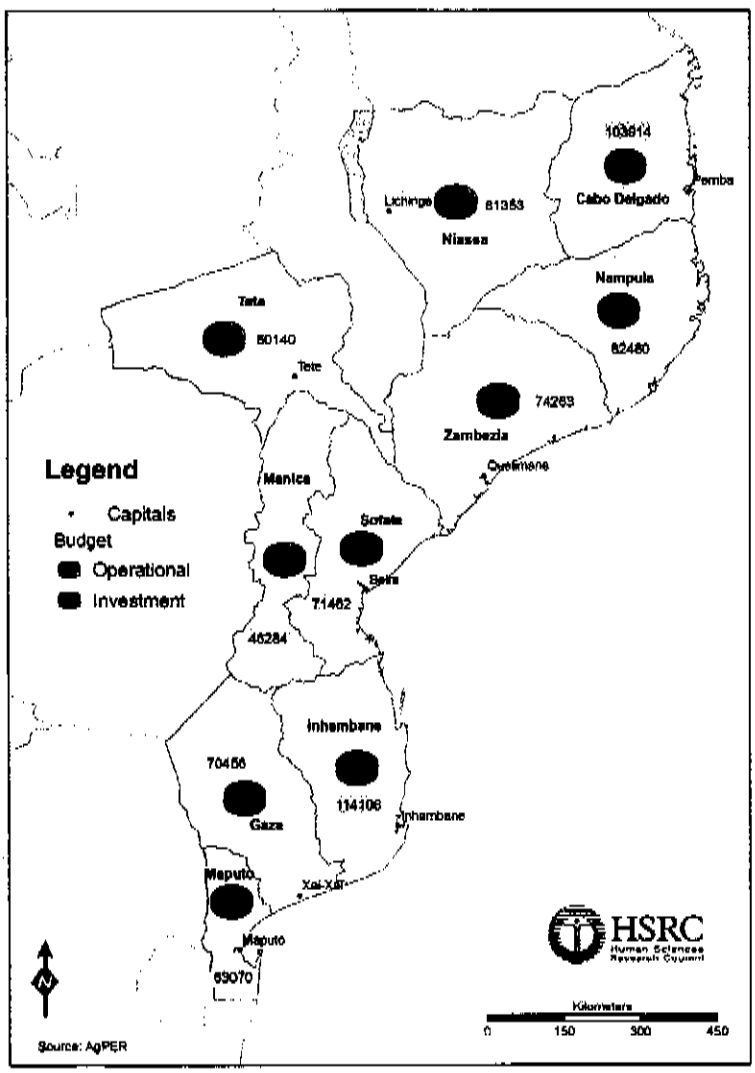
Figure 12a&b: Operational budget and Investment budget versus total population 2007

The total population of these two provinces are relatively smaller than others. Zambézia, Niassa and Nampula had investment budgets of between MTn50 800 and MTn60 000. Although Niassa has the smallest population of these provinces, it has the highest percentage of adults in agriculture (89%). This seems to be the one province where the value of projects in agriculture seems to match the people involved in the sector. Manica had the lowest investment budget (<MTn38 000) while 73% of its adults are in agriculture.

The investment budget is based on specific projects in agriculture and might reflect a closer resemblance to the total population. The investment budget figures also tend to be higher than the operational budget. To compare the operational budget with the total population might not be a good indicator since the first is a reflection of staff salaries.

In terms of answering the question whether 'the spatial allocation of overall expenditure in agriculture is aligned with sector strategic targets and objectives' it is very difficult to conclude on, because no data on sector strategic targets and objectives were received. It is therefore only the agricultural expenditure data that can be analysed spatially.

No data on the nature of private investment in agriculture was received and this component of analysis is also not analysed in this report. It might however be reflected in other components of the study.



When comparing the investment and the operational agricultural budget for 2007, the trends show that the investment budget was highest in Inhambane (MTn96°,292) and (MTn83°,124) in Cabo Delgado. This budget was the lowest in Manica (MTn23°,934). The budget division between investment and operational was fairly equal in Manica and Gaza (see Figure 13).

The operational budget was the largest in Nampula (MTn31 662) and the smallest in Zambézia (MTn 14 633). Inhambane had the largest total budget (including investment and operational) at MTn114 106. The smallest agricultural budget for 2007 was in Manica (MTn46 284).

The direct investment in agriculture is shown by the investment budget, in which case Inhambane received the greatest benefit.

Figure 13: Comparison of operational and investment budget 2007

The province which received the greatest input in terms of investment was Inhambane, Zambézia and Cabo Delgado (Figure 14). In Manica and Gaza a much lower investment input exists, which means lower expenditure in agricultural projects per se. Besides this the total budget of these provinces, together with Tete and Maputo, are significantly lower than others.

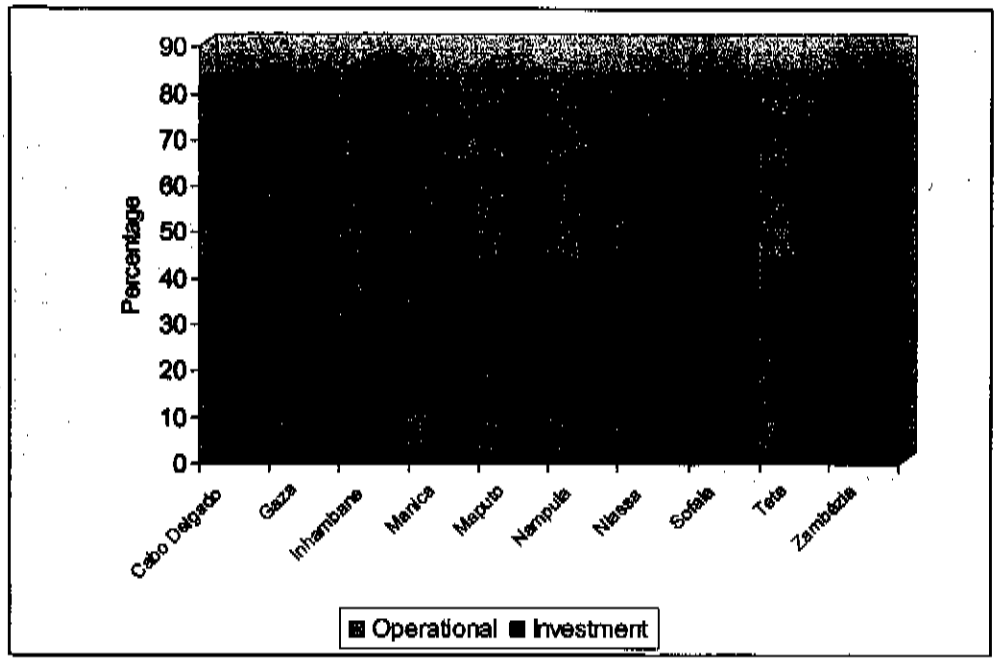


Figure 14: Operational and investment budgets as percentage of the total budget in 2007

5. Conclusion and recommendations

Due to data short comings, some of the questions posed at the beginning of the study, could not be answered. For example, the question on whether the funding in agriculture has led to the expected growth in the sector and to rural poverty reduction could not be addressed by this specific component of the report, since no data referring to rural poverty by province was found.

However, according to the Ministry of Planning and Finance (2004), rates of poverty declined substantially in the period between 1996-97 and 2002-03. The goal set out in the PARPA of a poverty rate of 60% by 2005 has, in all likelihood, already been achieved. This comment by the Ministry of Planning and Finance leads to the belief that poverty in general has declined, but no evidence for rural poverty reduction is found.

Furthermore, no data on private investment in agriculture and subsequent trends were identified so this question remains unanswered in terms of a spatial analysis. Comparing Mozambique with other African countries in terms of trends, levels, and quality of public spending in agriculture, was not covered by this part of the report, since no statistics were readily available.

In terms of socio-economic characteristics and the spatial distribution of these, Tete has the highest dependency ratio at 94%. The population density is the highest in Maputo province and the second highest in Nampula, Zambézia and Sofala.

The poverty headcount is the highest in Inhambane (81%) while the lowest poverty headcount is in Sofala with 34%. It is mainly the provinces further north that have the highest percentages of adults in agriculture (Tete, Niassa, Cabo Delgado, Nampula).

Based on the spatial analysis, Tete stands out because of its very high dependency ratio and the high percentage of adults working in the agricultural sector. Although Inhambane has the lowest poverty headcount, it is well targeted in terms of investment agricultural expenditure.

Niassa seem to be well-balanced because the value of projects in agriculture seems to match the percentage people involved in the sector. Even though it has the smallest population, it has the highest percentage of adults in agriculture (89%).

Maize is the dominant crop produced in all provinces. Money should be invested in maize production in order to create increased work opportunities and improve skills. At the same time however, investment in other successful crops should encourage diversification so that there is not a sole-dependency on maize.

Recent global reports have highlighted the need to prioritise agriculture in budgetary expenditure. The World Development Report (2009) indicates that providing incentives to agriculture and allied activities are appropriate for states that are still mostly rural.

According to the Human Development Report (2007), a rethink of the agricultural development strategy in distribution of the state budget, should be taking into account agriculture's importance in the economy and nutrition for the majority of Mozambicans.

In terms of future exercises of this nature, it would be useful for data to be broken down to a sub-provincial level, e.g. postos. Such detailed data will allow for more targeted interventions and analysis. The challenge would be to find whether all data required for analysis is available at this spatial level. A more detailed analysis, would however require a longer time period to gather and analyse data and a strategic decision needs to be taken in terms of this aspect.

Based on the factors laid out in this report, there are certain provinces that are more vulnerable due to socio-economic conditions and therefore need to be targeted. Together with findings of other components of this study, a joint decision on priority provinces should be made.

6. References

African Development Bank. 2008. *African Economic Outlook* (AEO). Available at: http://www.afdb.org/pls/portal/docs/PAGE/ADB_ADMIN_PG/DOCUMENTS/ECONOMICSANDRESEARCH/MOZAMBIQUE_AEO2008_EN.PDF. Accessed 25 June 2008.

Boughton, D., et al. 2006. *Changes in Rural Household Income Patterns in Mozambique, 1996-2002, and Implications for Agriculture's Contribution to Poverty Reduction.* Ministry of Agriculture, Maputo. Available at: http://www.fanrpan.org/documents/d00307/Rural_household_income_Dec2006.pdf. Accessed 22 September 2008.

Human Development until 2015: Reaching for the Millennium Development Goals. 2007. Available at: http://hdr.undp.org/en/reports/nationalreports/africa/mozambique/name,3298,en.html. Accessed 5 February 2009.

Ministry of Agriculture. 2008. *Trabalho de Inquérito Agricolha* (TIA): *Rascunho de Quadros do TIA 2002-2007.* Maputo.

Ministry of Planning and Finance. 2004. *Poverty and Well-Being in Mozambique: The Second National Assessment.* Maputo.

World Bank. 2008. *Information note – Mozambique Agriculture Public Expenditure Review.* Maputo.

World Development Report. 2008. *Agriculture for Development.* Available at: http://siteresources.worldbank.org/INTWDR2008/Resources/WDR_00_book.pdf. Accessed 5 January 2009.

World Development Report. 2009. *Reshaping economic geography.* Available at: http://siteresources.worldbank.org/INTWDR2009/Resources/4231006-1225840759068/WDR09_bookweb_1.pdf. Accessed 8 January 2009.

Appendix 1