

Research Results from the Directorate of Economics, Ministry of Agriculture

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## Sustainable land and water management in Mozambique

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In this *flash*, we summarize findings from previous studies on Mozambique that cover CAADP Pillar I about sustainable land and water management. We find that both land and water are used inefficiently and far below their potential. Access to agricultural services is low and decreasing, as well as the use of modern agricultural inputs. The role of the public sector in agriculture has not been very proactive, contributing to reduced investments both by the public and the private sectors. Better use of land and water is a necessary condition to reduce poverty, and entails reducing the gap between potential and the actual production and productivity levels. More than any other development stakeholder, the Government has enormous responsibility in stimulating agricultural growth through the design and implementation of agricultural policies and investments that are favorable and conducive to public-private partnerships that would benefit about four million smallholder farmers in rural Mozambique. We provide some examples of such investments.

### 1 Introduction

The Comprehensive Africa Agriculture Development Program, CAADP, was established by the African Union in July 2003 with the key goal of achieving an average annual agricultural growth rate of six percent by 2015. Eight years later, the Government of Mozambique signed its CAADP compact committing itself to meet the goals described in its Strategic Plan for Agricultural Development, PEDSA. These goals are consolidated into four CAADP Pillars. Development goals are put forward through the National Investment Plan for Agriculture, PNISA. In this *flash* we summarize findings from available studies covering Pillar I about land and water management. More specifically, the discussion pertains to two of the four CAADP elements for Pillar I, namely sustainable land management and agricultural water development<sup>1</sup>.

Empirical data from Mozambique show that both chronic malnutrition and poverty figures are high (about 46% and 55% in 2008/09, respectively), despite the abundance of many untapped resources<sup>2</sup>:

- In 2009 only 5.6 million out of 36 million hectares (15.5%) of potentially arable land were cultivated; and
- Only 462 thousand out of 3.3 million hectares (14%) of potentially suitable land for irrigation actually had irrigation infrastructure, and even those were only partially used.

What would encourage smallholder farmers to expand their cultivated area or to intensify?

### 2 Constraints to area expansion

Data from the National Agricultural Survey (TIA 2002) show that about **85% of smallholder farmers could acquire more land for cultivation in the village if they wanted to**. Land expansion requires mechanization of agricultural operations, whether using tractors or animal traction. **Constraints to land expansion can be grouped into three categories: incentives, ability to expand cultivated area, and technological constraints.**

Due to high food prices observed between 2008 and 2011, **smallholder farmers in rural areas of central and northern Mozambique had incentives to expand their cultivated land, but low adoption of animal traction limited significant expansion of land**. In 2012 less than 1%

<sup>1</sup> The other two elements comprise land policy and administration, and CAADP roundtable processes.

<sup>2</sup> The full list of references can be found in Cunguara et al. (2013) from which this *flash* is derived.

of smallholder farmers used animal traction in Niassa, Cabo Delgado, Nampula or Zambezia (northern provinces), compared to 39% in Inhambane, 38% in Gaza (southern provinces).

**Low adoption of animal traction in central and northern areas hinders the expansion of cultivated land.** Non-adoption of animal traction has been related to the prevalence of tsetse fly disease and cultural barriers.

**The use of tractors is still limited, especially in areas of relatively higher agricultural potential, due to poor infrastructure.** High maintenance, management and transaction costs of tractors have obstructed their use in Mozambique. In 2008, only 1.4% of smallholder farmers used tractor (0.3% in the north, 1.8% in the center and 4.6% in the south).

**Availability of family labor is another limiting factor.** Smallholder farmers may have low availability of labor, resulting from the interaction of at least three factors: massive migration to urban areas, diseases (HIV/AIDS and malaria), and competition with other household activities. The peak period in terms labor use for agricultural activities coincides with the highest malaria season, resulting in delays in cropping activities and consequently low productivity.

### 3 Constraints to agricultural intensification

The expansion of cultivated land was a major determinant of increased agricultural production between 1996 and 2002. However, TIA data show that in the following period until 2012 there was a decrease in cultivated land per household. **This suggests that in the near future land expansion may be limited and the impetus for an increase in production should be agricultural intensification.**

**The low and declining access to extension services (14.8% in 2005, 12% in 2006, 10.1% in 2007, 8.3% in 2008 and 6.6% in 2012) and research, poor quality road infrastructure, agro-processing and electricity are examples of constraints to intensification.** The low population density in rural areas results in relatively lower returns per capita on infrastructure investments.

**The national electric grid does not reach many production areas, and where it does, it is often weak.** In 2009 less than 12% of the country population had access to electrical power, and an overwhelming majority of those with access was located in urban areas, thus limiting the use of

electrical power for low cost irrigation schemes. High fuel costs also contribute to low levels of irrigation.

**The gradual reduction of public funds for irrigation investments, followed by significant increase in input prices and costs of production also contributes to lower intensification.** Additionally, **difficult access to inputs and technical assistance for maintenance and improvement of irrigation schemes** result in underutilized water resources.

**The apparent uncertainty over the ownership of irrigation schemes financed through public funds, and public services devoted to irrigation under represented at the district or community level make management and maintenance of irrigation schemes more difficult.** On average, only 34% of the existing 257 irrigation schemes in Mozambique are being used, and sugar cane represents 60% of irrigated crops. About 64% of the total irrigated area in Mozambique is located in the southern provinces, and during the period 2001-2009, only 23 hectares of irrigation infrastructure were either built or refurbished in Cabo Delgado province, compared to 2840 hectares in Maputo province and 7280 in Gaza.

**Non-effective government policies contribute to inefficient use of water, and poor planning and project implementation result in rapid deterioration of infrastructure.** In some cases, limited knowledge of salinity or lack of commitment to environmental protection by government employees and decision-makers contribute to worsening soil salinity.

**The agro-climatic diversity of Mozambique brings challenges for agricultural intensification.** Historically, Mozambique has enacted a multitude of national development plans. These usually lack specific implementation strategies to explore the often unique potential of each agro-climatic zone or region of the country.

**Availability and access to fertilizers and other inputs remains low and often decreasing** (4.7% of smallholder farmers used chemical fertilizers in 2006, 4.1% in 2007 and 2008, and only 2.8% in 2012). Private sector investment decisions guide input market development, while the Government has not been very proactive.

#### 4 Investment priority

Access to bank credit or access to local district investment funds (known as FIILs) could be potential candidates to minimize some of the problems identified. The fact that access to credit is low and perhaps decreasing (4.7% of rural households in 2007, 2.6 percent in 2008, and only 2% in 2012) suggests that profitability issues of agricultural investments and risk reduction should be considered more seriously. The following eight steps are fundamental to design an effective land and water intervention conducive to poverty reduction and food security:

**i) Invest in improving smallholder farmers' ability to intensify and expand the cultivated land:**

Investments in animal traction (dip tanks, livestock rearing promotion activities, staff training, etc.) should be accompanied by a strong research and extension component. Experiences from neighboring countries such as Zimbabwe and Zambia, particularly from areas of similar agro-climatic conditions, should be explored and shared. With sufficient public investment, it was possible to eradicate tsetse fly disease in Gowke, Zimbabwe.

**ii) Invest in service centers which would be units directed to service provision related to animal traction and use of tractors:**

smallholder farmers would be able to rent animal traction and tractor equipment through those service centers. These service centers would be targeting the use of animal traction, but also fostering the use of tractors. The emphasis on animal traction derives from the fact that, unlike the use of tractors, it has proven profitability over time. Also, historically the adoption of animal traction precedes the use of tractors. Meanwhile, management of these service centers would have to be well defined.

**iii) Explore the agricultural potential in central and northern provinces, while creating incentives for farmers to produce more:**

Some of the incentives include investments in agro-processing and other value-chain activities. The impact of these investments would be greater the closer they are to the high production areas. This suggests that investments should be tailored according to agricultural potential of each region of the country.

**iv) Investments in agriculture in central and northern Mozambique possess a greater potential to reduce poverty because this is where the majority of the poor lives. The impact of these investments could be further enhanced if such investments include improvement of the existing market infrastructure, connecting**

**regions of high production to those of lower production potential.**

**v) The Government should be more proactive in developing input markets.** Mozambique can learn from other developing countries, such as Kenya, where public investment in roads resulted in a reduction of the distance between production areas and input markets. This in turn resulted in massive adoption of chemical fertilizers and other non-subsidized inputs. Public investment in Mozambique in primary, secondary, and tertiary roads would create favorable conditions for the private sector to invest in input shops, thus reducing the average input cost and making inputs more readily available and accessible.

**vi) Invest more in irrigation, making the distinction between the south, centre, and north of Mozambique.**

These investments in irrigation should consider various aspects, including salinity and management of irrigation infrastructure. Investments in large irrigation schemes tend to be relatively expensive; alternative and less expensive but equally effective irrigation models should be considered. At present, emphasis is given to large irrigation schemes that only benefit a few smallholders.

**vii) The promotion of small-scale irrigation methods or conservation agriculture has some potential to reduce poverty.**

Although water harvesting techniques are well-described in the international literature, these are practically nonexistent in Mozambique. These methods are part of a necessary adaptation to climate change.

**viii) The proportion of agricultural budget to total public expenditure should be at least doubled.**

Mozambique has not achieved the CAADP goal of allocating at least 10% of the national budget to agriculture. During the period 2004-2006 the agricultural sector received an average of six percent of the national public budget. Furthermore, in 2007 agriculture received only 3.7% of the total public expenditure.

#### 5 Summary and policy implications

In this *flash* we review studies on Mozambique about land and water management, and implications for poverty reduction. The main goal was to inform CAADP on the agricultural progress (or lack of it), constraints, and opportunities for agricultural growth and poverty reduction.

The necessary ingredients to reduce poverty are there and are well known. Mozambique is only using a sixth of its arable land and water resources. Specific positive experiences from other African countries exist, and these should be explored and their usefulness analyzed in the context of Mozambican smallholder farmers.

Agricultural development ranks first in development programs in Mozambique, but there is considerable gap between agricultural potential and actual production. Reducing this gap should be the role of both the private and the public sector. However, the latter should create favorable conditions that are conducive to profitable investments by the private sector, and thus reducing poverty.

Mozambique possesses distinct agro-climatic conditions. This diversity is rarely reflected in national development plans. Land and water resources are used inefficiently and below their potential. Access to extension services is low and decreasing, and the use of modern inputs follows a similar trend. The public sector has not been proactive in agriculture, thus contributing to reduced investments, both private and public sector. Poverty reduction depends necessarily on improved land and water use, and in this process the Government, more than any other development stakeholder, is responsible for the design and implementation of agricultural policies more favorable and conducive to public-private partnerships which would benefit about four million of smallholder farmers in rural Mozambique.

Future studies should look at other natural resources, such as forestry and how aspects such as deforestation, uncontrolled fires, and large land grabbing projects affect agricultural production and productivity.

## References

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