FANRPAN
Food, Agriculture and Natural Resources Policy Analysis Network

Policy Brief Series
Policy Brief Series 01/2010
March 2010

# The Status of Agricultural Water Use, Access, and Productivity in the Limpopo Basin — Opportunities for Poverty Alleviation

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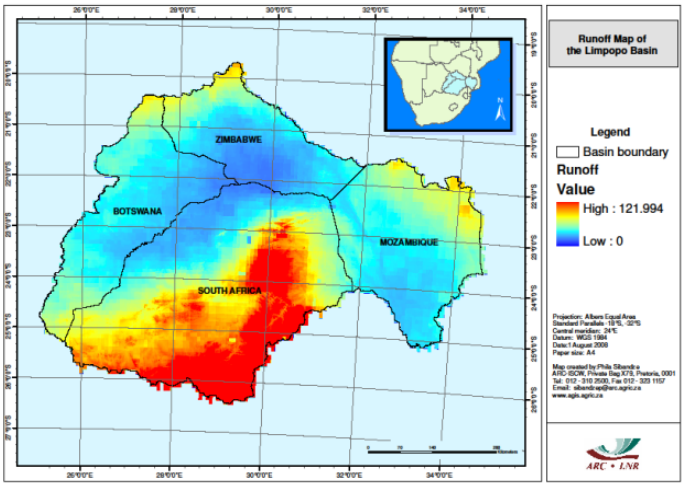
The Limpopo River Basin is home to 14,000,000 people, at least half of whom live in rural areas. Over ten million South Africans live in the basin - nearly 25% of the national population. The remaining population live in Botswana - one million people, nearly 60% of the national population - Mozambique and Zimbabwe. While there are no major cities located on the river, several major urban areas in or adjacent to the basin impact water availability including quality.

Chronic risk of inadequate, or ill-timed, agricultural water supply is a crucial issue to smallholder farmers in the basin. Reducing this vulnerability is especially important given the high levels of rural poverty and limited capacity to deal with droughts and floods that severely affect poor communities.

Major economic activities in the basin include agriculture, mining, forestry, and tourism, with the importance of each sector varying across the basin. Agriculture contributes over 22% of national GDP in Mozambique and Zimbabwe—the poorest basin countries, and around 3% in Botswana and South Africa. Rain fed agriculture supports most the basin's rural inhabitants. Grassland covers over 55% of the basin land area and uses over 50% of basin surface water. Much of this land is used as low input grazing as part of dominant crop-livestock systems. Rain fed crop production covers 40% of basin area and uses 40% of available water.

The Limpopo Basin experiences water shortages in seasonal and spatial deficits, rather than overall limited availability. While sufficient water may exist at a basin scale, it is often not available where the rural poor can make use of it, when they need it most. Water scarcity in the basin is exacerbated by highly variable climate. Rain falls during a short, intense rainy season, resulting in the majority of basin runoff occurring in short-lived flood peaks and severe and long-duration droughts. Vast quantities of basin rainfall remain un-captured and unavailable to agriculture. If climate change models are correct, much of the basin can expect more erratic rainfall patterns in the future.




Rainfall in the Basin varies from 200-1500 mm with much of the northern and western areas receiving less than 500 mm per year. The majority of rainfall arrives between November and February and rain days per year seldom exceed 50.

Agriculture employs a majority of the population in both Zimbabwe and Mozambique, and nearly half (45%)

in Botswana. Only 10% of the South African labour force was engaged in agriculture in 1998, but many of South Africa's nearly 12 million basin residents are rural poor.

**Key Policy Messages**

- Physical water scarcity in the Limpopo Basin is compounded by economic scarcity in rural areas.
- Little investment has been made to deliver available water to those in need, either for domestic, subsistence, or commercial uses.
- The rural poor in the Basin have few resources to invest in developing water resources.
- Although it is often difficult to establish causality between water scarcity and poverty, the association is quite clear in many parts of the Limpopo Basin.

Rural poverty—those living below $1 per day—varies considerably across the basin. Mozambique is considered the poorest basin country, Botswana the wealthiest, and South Africa and Zimbabwe between the two. Pockets of extreme poverty dot the basin and poverty rates over 90% can be found in Mozambique, with slightly lower rates in South Africa and Zimbabwe.

The rural poor in the Limpopo Basin inhabit dispersed settlements in areas with low and unpredictable rainfall, often on degraded land. They lack adequate road access to economic centres, water and sanitation systems, and institutions able to deliver services. Unemployment amongst the rural populations is high with low household incomes and purchasing power; high levels of illiteracy and HIV/AIDS exacerbate the situation.

Historical inequitable distribution of land, water, and economic resources has created a mosaic of rural poor across the Limpopo Basin. Pockets of wealth in urban centres and highly productive commercial farms are juxtaposed with much larger areas of poverty, particularly in rural areas. Not all rural poor depend on agriculture, but the majority in Mozambique and Zimbabwe do, as well as many of their neighbours in Botswana and South Africa.

Limpopo Basin agriculture ranges from large-scale, privately-owned, commercial ventures to small-scale, subsistence crop and livestock production on communally-owned land.

The rural poor engaged in subsistence agriculture in the Limpopo Basin operate in a low input-output system; this minimizes risks caused by climate variability and helps make the most of their limited resources. The systems are characterized by limited use of inputs such as fertilizer and certified seed, low levels of management, and limited linkages to markets.

Small-holder agriculture is typically limited by insecure land tenure, low-level technologies, risky water supply, and limited access to other production resources, such as labour and cash. Moreover, the soils are often degraded and depleted of nutrients.

The main land use in the basin is mixed crop/livestock farming. These mixed systems on communal land dominate the small-holder sector. Livestock are crucial to livelihood security, acting as a buffer against economic shocks. They also have cultural significance for smallholders, amongst whom ownership of livestock is an indicator of wealth. Cattle are used to pay bride-price, to acquire and store wealth, spread the risk in mixed farming systems, as draught power, and for meat and milk.

Livestock are typically managed in low-input systems of extensive grazing of poor-quality feed in a variable climate. Stock access surface water or water provided via windmill, hand pump or other mechanism. They graze communal pastures during the day and are guarded in kraals at night. Milk production, which is used primarily to meet household needs, is low. Small-holders mostly have local breeds of cattle that tend to be low producers, but are generally well-adapted to the basin conditions of high temperatures, low-quality diet, ticks, and other parasites.

Herd size and overall animal numbers are heavily affected by frequent drought conditions in the Basin that reduce fodder quantity and quality, and water availability. Movement of stock as a drought-avoidance strategy is hampered by land tenure structures and also because severe droughts generally affect large areas. Yet farmers in many parts of the basin are reluctant to sell cattle to reduce stocking rates, preferring to maximize herd size as a safety net for use in times of drought.

Limpopo Basin water productivity, the value of crop produced per unit of water, is generally low compared to other basins. It is variable within the basin with pockets of high value productivity. The highest water productivity in the basin is found in a highly commercial

area of South Africa. Unexpectedly low water productivity was found in Mozambique where water stress is low, suggesting that water is not the limiting factor to high value productivity there. Water productivity differences across the basin result from variable productivity as well as variable market access and prices.

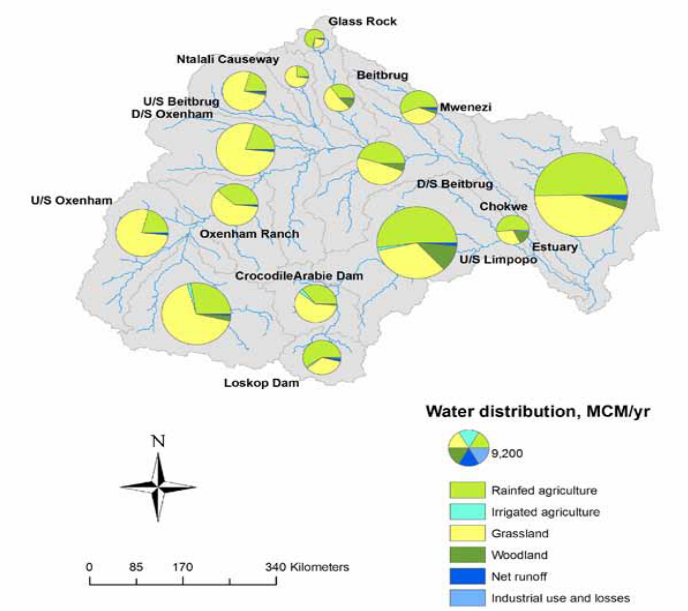



Fig 1. Water distribution by sub basin & rainfall use

Rainfall over much of the Limpopo is highly variable within and between years, so that farmers who rely on rain fed agriculture are vulnerable. Those with resources to invest in storage and water-saving technology are better able to withstand the chronic weather-related shocks. Yet few small-scale, resource-poor farmers have the resources to make the necessary investments, which many see as a risky venture.

**RECOMMENDATIONS**

- Small-holders in the Limpopo Basin who depend on agriculture for their livelihoods face a host of ecological and economic challenges. Yet intervention packages, ranging from technologies to institutions, can be tailored to address their priority needs. This will take a concerted, combined, and coordinated effort on the part of regional and national bodies to make their development a priority.

- At the farm level, increasing water-use efficiency and reducing runoff from the system must be balanced against wider effects on sub-basin water availability. These issues are site specific and require further research to determine the best mix of approaches and technologies for increasing productivity while improving water-use efficiency of the whole system.

- At the national level, because water resources are scarce, there is competition for water with high-value interests, such as mining and tourism, having priority over agriculture. This further increases the vulnerability of farmers to drought and unpredictable climate by assigning them the water that remains after all other needs have been met. Moreover, the design of water-supply infrastructure and water allocation are both based on historical data that do not reflect recent or current changes in the rainfall patterns, which further disadvantages agriculture.

Given agriculture's role in rural development and poverty reduction, allocation of water for agriculture should be re-examined by each basin country in an effort to reduce supply risks for agricultural producers. This implicates policy, budgeting, and planning arms of government to prioritize risk reduction as an important step toward poverty reduction. It may be, however, that the approach of Botswana and South Africa of providing safety-net grants for the rural poor may be a viable option where the limited overall supply of water can be more productively used elsewhere.

At the basin scale, the Limpopo River Basin Commission (LIMCOM) has a vital role to play in overall basin assessment, monitoring and planning. The benefit-sharing approach to river basin management has potential to alleviate poverty and help secure livelihoods in the Limpopo. This approach to maximizing benefits to be shared equitably could ease current pressures on the resource and act as a buffer against climate, economic, and political change so common in the region.

The policy environment for management of natural resources in the four Basin countries has developed over the last 15 years, but further attention is needed in the following areas:

- Strengthen LIMCOM's capacity to plan and monitor water use and quality;
- Develop a secure framework of land tenure and water rights for rural populations to encourage investment and sustainability;
- Price and prioritize the use of water by small-holders to ensure their economic viability; and
- Plan for water resources development with an eye toward the variation from the historical record of current and future precipitation scenarios.

**Further Reading:**

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**Disclaimer:** The work reported in this publication was made possible through support provided by the Regional Center for Southern Africa, U.S. Agency for International Development, under the terms of Cooperative Agreement No. 690-A-00-05-00185-00. The opinions expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Agency for International Development

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The Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) is an autonomous regional stakeholder driven policy research, analysis and implementation network that was formally established in the Southern Africa Development Community (SADC) in 1997. FANRPAN was borne out of the need by SADC governments who felt that comprehensive policies and strategies were required to resuscitate agriculture. FANRPAN is mandated to work in all SADC countries and currently has activities in 13 Southern African countries namely Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.



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