

**DEVELOPMENT OF A TECHNOLOGICAL PACKAGE FOR  
SUSTAINABLE USE OF DAMBOS BY SMALL-SCALE FARMERS**

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**DEVELOPMENT OF A TECHNOLOGICAL PACKAGE FOR  
SUSTAINABLE USE OF DAMBOS BY SMALL-SCALE FARMERS**

by

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**Dedicated to Mum and Dad (Posthumously)**



(Mugabi Dambo: Photo by A.E.Daka)

*"Water resources, and the related ecosystems that provide and sustain them, are under threat from pollution, unsustainable use, land-use changes, climate change and many other forces. The link between these threats and poverty is clear, for it is the poor who are hit first and hardest."*

**Source: Ministerial Declaration, 2<sup>nd</sup> World Water Forum, The Hague, March 2000.**

## **ABSTRACT**

The sustainable use of Dambos for crop production using a technological package is presented. Dambos which are known as vleis in South Africa and Zimbabwe, fadamas in West Africa and mbugas in East Africa are identified as potential environments and key-resource areas for alleviating poverty and hunger in arid and semi-arid areas where drought occurrences are characteristic and limit upland crop production. Dambos present themselves as environments with soil moisture potential and high water tables ranging from 50 - 100 cm below the ground surface for most part of the year. Particular difficulties arise in abstracting this water for use to irrigate crops in Dambos. Most small-scale farmers use a rope and a bucket to draw water from hand dug wells. These methods are labour intensive and thus limited lands are cultivated by small-scale farmers.

This study has identified, modified and introduced a treadle pump as a technology for lifting water from shallow water tables such as in Dambos. The treadle pump also lifts water from rivers, swamps, wells and dams within a suction lift of 0-8 m to the intended place of use i.e. vegetable garden, domestic application, livestock watering and in construction. The study has further investigated and introduced the clay pot as a water saving device. The clay pot sub-surface irrigation technology saves between 50 and 70 % of water as compared to conventional watering can and bucket systems. This technology can combine well with the treadle pump by using the latter to refill water in the former, thus making it easy to fill the system once the water is depleted.

The use of the treadle pump has demonstrated its impact on the society in many ways. Firstly: the small-scale farmer is now able to increase the size of his/her garden from 0.1 ha irrigating using watering cans/buckets to between 0.25 ha and 0.5 ha using the treadle pump. With this innovative way of irrigating, farmers have thus been able to diversify cropping. Secondly: farmers have been able to increase household income from a meager US\$125 without a treadle pump to US\$850 and US\$1700 on a 0.25 ha piece of land with a treadle pump on a 300% cropping intensity (growing crops three times a year). This has helped the country reduce on imported vegetables and thus save

the much needed foreign exchange. Thirdly: the technology has contributed to employment creation, notably from the manufacturing point of view where artisans are employed to make the pump and carpenters to make the wooden parts. On the output side for buyers (merchants/hawkers) and transport contractors who trade and transport the produce.

The study essentially alludes to the great impact the treadle pump has made by noting the brand naming of the pump as 'Chova pump' by the small-scale farmers. Chova is a local name, which means to boost one's income or to pedal signifying the manner in which the pump is operated. Dambos, cover about 3.6 million hectares of land in Zambia and are suitable environments for application of the treadle pump. The potentials and limitations of Dambos are highlighted and the impact of their use using treadle pumps elucidated. Marketing of Dambo produce is discussed with respect to the adoption of the technology. The study notes that Dambos are highly accessible with no land tenure limitations. Thus the more than 800,000 small-scale farmers in Zambia have an opportunity to utilize Dambos for crop production and help reduce poverty and food insecurity at household level.

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I would like to thank the International Foundation of Science for awarding me a Research Grant from 1992 to 1997 to study Dambos indepth. It is from this work that the hydro-dynamic evolution of water tables, the movement of water and its fate in Dambos became clear from a technical point of view.

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