Decentralising water supply – Subsurface storage of Oshana floodwater in the Cuvelai-Etosha Basin of central-northern Namibia

CUVEwaters integrated water resources management

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Introduction

The Cuvelai-Etosha Basin in central-northern Namibia is characterised by a system of so-called Oshanas, very shallow ephemeral rivers which drain the whole basin from north to south towards the Etosha saltpan. Rainfall patterns in the region are very unpredictable and vary from 100 mm/a to 1000 mm/a with an average of 470 mm/a. Almost all rainfall occurs in summer between October and April. Evaporation is very high while the infiltration in natural groundwater aquifers is very low.

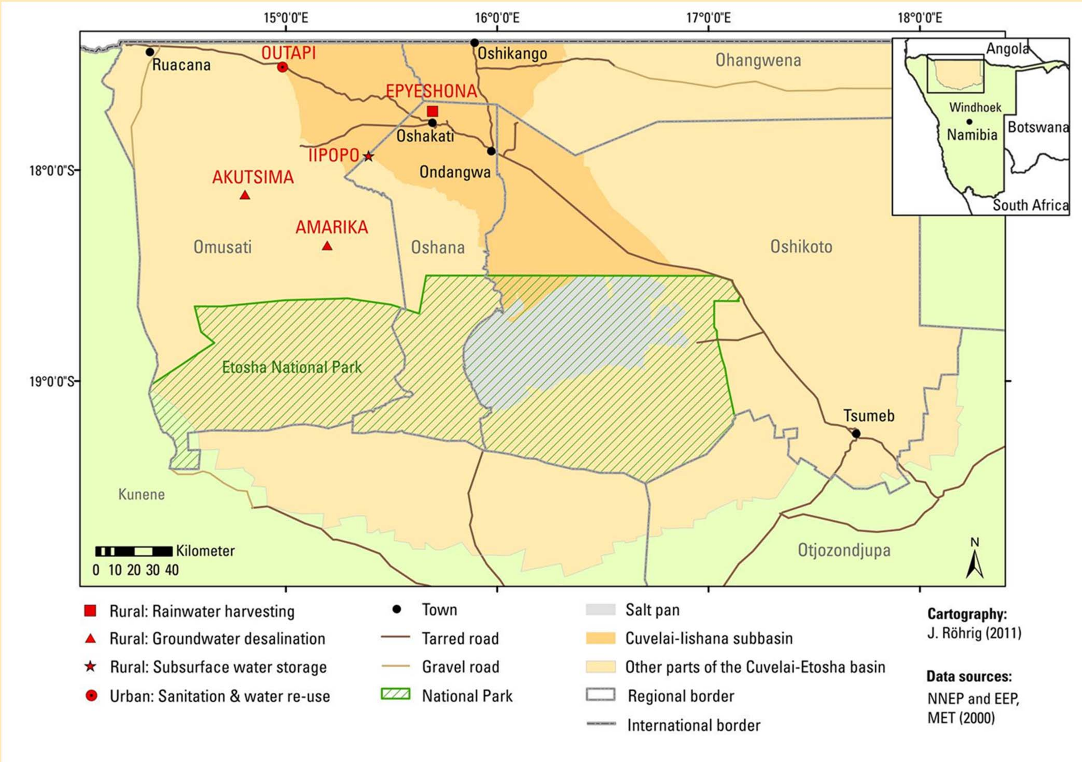

Figure 1: CuveWaters pilot villages in central-northern Namibia

The current water supply system via pipelines is fed by the Namibian-Angolan border river Kunene. Other water sources in the region are Oshana water, water from hand dug wells or shallow excavation dams. Water from these sources is of low quality, especially towards the end of the dry season, and affected by high evaporation rates (2700 mm/a). Livelihoods in the region mainly depend on small-scale livestock farming and rain fed agriculture (mainly pearl-millet).

Subsurface storage of Oshana floodwater

Within the CuveWaters project, which is sponsored by the German Federal Ministry of Education and Research, different small-scale water supply and sanitation technologies are implemented in central-northern Namibia. Through this approach, the water supply in the region is decentralised and more water is made available for the local population. In the village of Iipopo, pilot plants for the storage of Oshana floodwater were implemented together with trainees from the local community in September 2011. The trainees received training in tank construction as well as in the construction of greenhouses and other gardening infrastructure.

The overall storage capacity of the pilot plants constructed in Iipopo is 400m³, while three different storage tanks are tested: A 130m³ underground tank made of ferrocement and bricks with a concrete dome roof as well as two ponds made of dam liner, one with a corrugated iron roof and one with a shade net cover. The capacity of the two ponds is 135m³ each.

By storing the water in subsurface, covered reservoirs, evaporation and quality degradation over the course of the dry season are minimised, which are major drawbacks of all natural water sources as well as most other artificial water storage technologies in the region.

The water is pumped with a pedal pump from the nearby Oshana at the height of the rainy season, when water quality is best. As the water stored will be used for irrigation purposes a greenhouse as well as outside garden plots were also implemented.

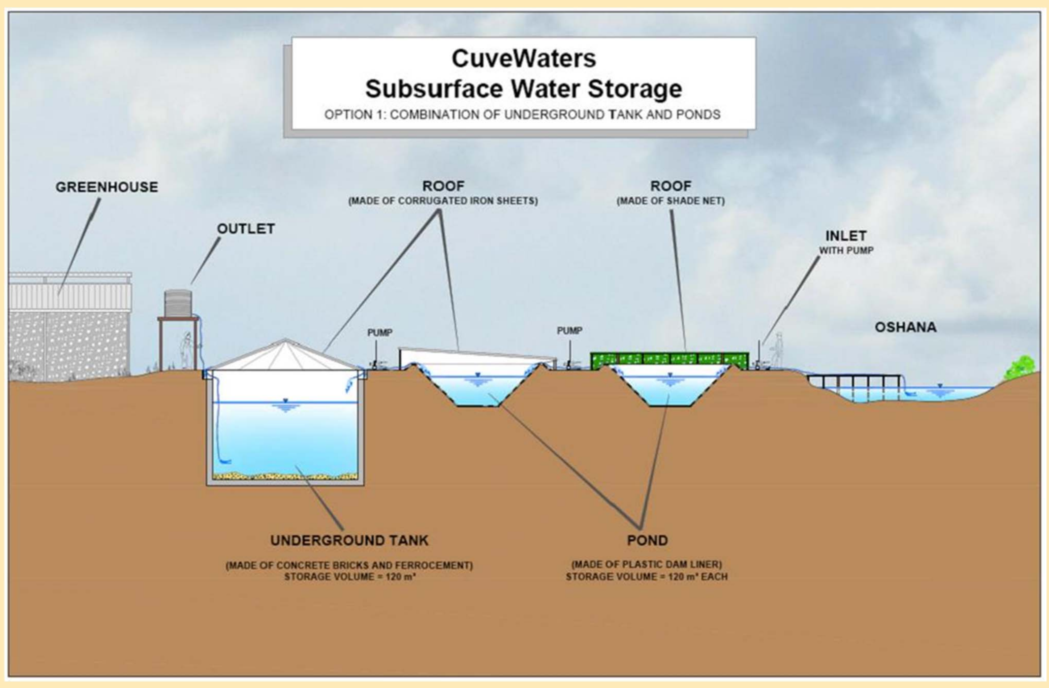

Figure 2: Overview of pilot plants constructed in the village of Iipopo (Treskastis,2011)

Way Forward

The water provided will be of medium quality and is intended to be used for micro-scale gardening purposes by local users. The community of the pilot village will therefore select ten user households which will then receive intense training in all fields of vegetable gardening and water usage. At the same time, all gardens will be equipped with water saving drip irrigation systems. The performance of the pilot plants will be monitored over a timespan of three years.

Figure 3: Subsurface water storage in Iipopo

Figure 4: Training of local users in the construction of water storage tanks

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