Factsheet

CUVE integrated water resources management waters

Floodwater Harvesting in Central-Northern Namibia

Challenge

The landscape of central-northern Namibia is shaped by a system of so-called Oshanas. Coming from southern Angola, these very shallow ephemeral river streams branch far out into the countryside and reach the Etosha Salt Pan during flood events. Water quality in the Oshanas is fairly good only during the rainy season. It deteriorates rapidly during the dry season due to evaporation as well as pollution from humans and animals. To establish new gardens and irrigate them during the dry season with Oshana floodwater of appropriate quality, harvesting and storage techniques had to be introduced. Further challenges were to establish a new culture of crop production and build up a reliable group of novice farmers. Local staff also needed to be trained in construction and maintenance work, locally available construction material needed to be found, and the new system had to be implemented with local organisations and institutions.

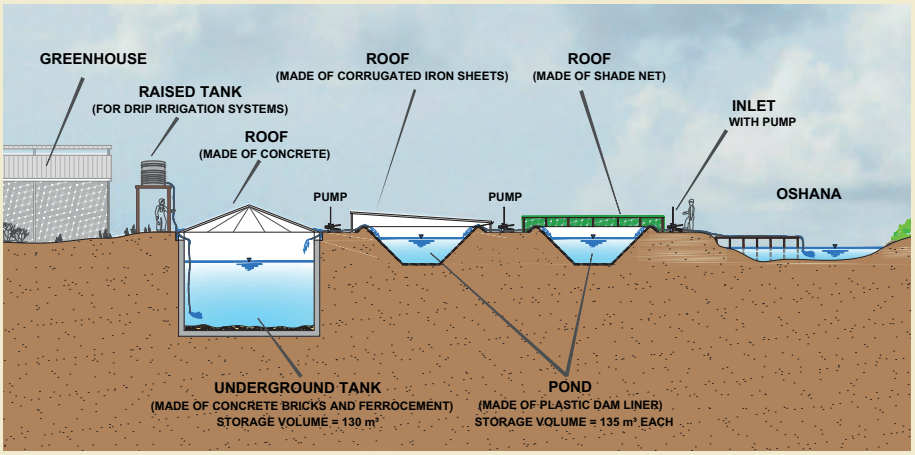
Approach

The aim of floodwater harvesting is to store floodwater in artificial closed ponds and tanks built next to an Oshana. To this end, the Oshana water is pumped into the storage reservoirs with a motor pump at the height of the rainy season, when the water quality is at its best. At the pilot plant in Iipopo, a water-saving drip irrigation system distributes the stored water to a greenhouse and an open garden area. The greenhouse and parts of the outside garden are jointly operated, meaning that the farmers share their work and revenues equally. Farmers also have their own field which can be used for self-consumption or market production of fruits and vegetables. Ten women from Iipopo and neighbouring villages cultivate these gardens and the greenhouse for small-scale horticulture. All farmers were trained in how to prepare the soil and plant the seeds, how to supply the plants with fertiliser, and how to use the water efficiently. To increase the water harvest, rainwater is collected from the roofs of the ponds and the greenhouse (see Factsheet for Rainwater Harvesting in Central-Northern Namibia). Because the region sometimes suffers from long periods of extreme drought, the pilot plant is also connected to the central pipeline system to bridge periods of water shortage.

Floodwater harvesting pilot plant at Iipopo next to an Oshana

Communal Approach for Floodwater Harvesting

The pilot plant for the storage of Oshana floodwater is a combination of different storage options (see figure below). It consists of an underground tank and two ponds, one with a shade net roof and one covered by corrugated iron. The pilot plant has a total storage capacity of 400 m³. The water is intended to be used for irrigation purposes in the greenhouse and in an open garden area. Market-ready vegetables can be grown inside the greenhouse, since the plants are protected from direct sunlight, wind, and pests.



Source: Christoph Treskatis

Findings

- Floodwater harvesting is restricted to places close to the main Oshanas, since water availability during the rainy season is more reliable here than in the distributaries.
- Cost-benefit as well as sustainability analyses showed that water ponds made of dam liner with roofs made of shade net are recommended materials for water storage.
- The lower water quality compared to rainwater harvesting does not seem to have a negative effect on the crops.
- Nearly all materials for construction can be obtained from regional hardware shops.
- Ponds, greenhouses and irrigation systems can be constructed by local staff supervised by trained technicians.

Type of costs	Material costs for the pilot plant	Calculated costs for roll-out (per plant)
Investments for construction		
Underground tank (130 m³)	N$ 42,000	N$ 32,000
Shade net covered pond (135 m³)	N$ 23,000	N$ 20,800
Corrugated iron covered pond (135 m³)	N$ 31,000	N$ 24,500
Garden (1,000 m³), including drip irrigation	N$ 47,000	N$ 35,250
Greenhouse (176 m²), including drip irrigation	N$ 43,000	N$ 30,000
Operation and minor maintenance (per year)		
Infrastructure (e.g. tanks, ponds, fences)	N$ 1,500	N$ 1,125
Garden (drip irrigation system, seeds, fertilisers, pesticides)	N$ 2,500	N$ 1,875

Due to various reasons, costs during pilot plant implementation are much higher compared to the calculated investment costs during roll-out. Calculated roll-out costs presume that materials for construction (initial investment and renovation) as well as for operation and maintenance are purchased in larger quantities and under optimal conditions. Especially in case of roll-out, it has to be kept in mind that all infrastructural components are modular and other floodwater harvesting plants could also only be composed of shade net covered ponds, which would also be the recommendation of the projects' research. The minor maintenance costs in both cases presume that good and regular maintenance (renovation) work is carried out. N$ 1,000 ≈ € 77 (May 2015)

Benefits and Risks

Benefits

- Harvesting and storing water mitigates the risks of climate change, mainly dry spells during the rainy season, and allows almost continuous vegetable crop production during the dry season.
- The diet and health situations of families have improved.
- Knowledge about agriculture and irrigation has been further developed.
- Ten permanent jobs have been created, leading to more self-confidence of the new farmers and to economic autonomy.
- Households have additional income from selling crops on the market.
- Maintenance, gardening equipment, seeds etc. can be financed by the group members.

Requirements and risks

- The costs listed are material costs only. Additional costs during implementation for: local workers, construction management, tools, training in horticulture and team management.
- Governmental financial support is needed for the initial construction and later renovations of structures.
- Future rain- and floodwater harvesting projects must be linked to upcoming Namibian policies.
- Risk of project failing due to problems within the group, mismanagement, restricted financial resources or minor technical problems.

Farmers from Iipopo Green Village seeding plants

Harvest of carrots at Iipopo Green Village

Success Factors for Implementation

Starting point

- Demand for additional water for local small-scale irrigation farming
- Sustained interest within the community to build and run floodwater harvesting tanks as well as gardens / small-scale farms

Social and organisational

- Training in group management: binding rules for common tasks, working times, how to market the products, maintenance
- Combination of different age groups of women & men to ensure continuity
- Women taking the chance to earn their own money and expand their skills, being supported to take over full responsibility
- Communication with the local group members in their native language
- Short distances to homesteads and customers
- Long-term guidance of the group during all activities for five years

Technical

- Assistance in accounting / bookkeeping and marketing the products
- Step-by-step farming training during at least one growing period: Fertilisation, pest control, building fences and daily maintenance
- Training in long-term maintenance of tools and other facilities to avoid extensive repairs
- Outside technical support from agricultural and technical extension services to solve technical problems
- Additional water supply to ensure that gardens are maintained during very dry years
- Sufficient soil quality
- Strong fence to protect against animals (> 1.5 m)
- Access to materials and spare parts in the region

Rain- and Floodwater Harvesting Toolkit

For more detailed information, the project has developed the CuveWaters Rain- and Floodwater Harvesting Toolkit. It is intended for organisations and private persons interested in establishing rain- and floodwater harvesting projects and contains detailed information on their implementation as well as construction manuals for all kinds of storage tanks and irrigation infrastructure. The CuveWaters Rain- and Floodwater Harvesting Toolkit can be downloaded at: http://www.cuvewaters.net/Toolkits.112.0.html

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