Factsheet on Rainwater Harvesting in Central-Northern Namibia

CUVEwaters integrated water resources management

Background

Rainwater Harvesting is very well known all over the world as a technology which provides good quality water on a small scale, especially in developing countries. It is part of the German-Namibian research project CuveWaters, which establishes an Integrated Water Resource Management (IWRM) in the Cuvelai-Etosha Basin. Rainwater is generally collected from roofs or non-permeable surfaces on the ground and stored in tanks made of different materials. It helps to bridge water shortages during the dry season and buffers fluctuations in rainfall even during the rainy season. In CuveWaters, different types of rainwater harvesting tanks were piloted in the village of Epyeshona, near Oshakati, in central-northern Namibia. Vegetable gardens with water-saving drip irrigation systems were established next to the tanks.

The ferrocement tank constructed within the project with the little garden attached to it for the sustainable use of the rainwater harvested

Operational Concept

The CuveWaters rainwater harvesting project focuses on two technical and organizational approaches for rainwater harvesting: the household approach and the community approach.

■ Household Approach

In this approach, water is being harvested from the roof of a single household and stored in above-surface tanks made of different materials, namely ferrocement, bricks and polyethylene. All tanks in this category have a useable volume of 30 m³.

■ Community Approach

The community approach comprises six different households that work together to harvest rainwater. They named their facilities "Green Village"; it consists of an underground tank, a covered pond, a greenhouse and an open garden area.

This fact sheet focuses on the ferrocement tank (household approach) and the "Green Village" (community approach).

The greenhouse and the open garden area at the Epyeshona Green Village

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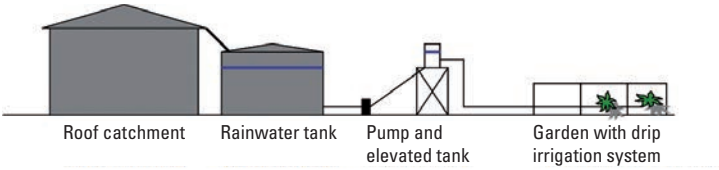
Ferrocement Tank: Household Approach



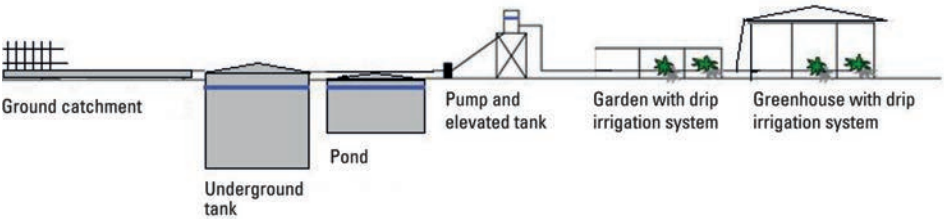
Rainwater is harvested on the roof of a house and stored in above-ground storage tanks of different materials. From there it can be pumped using a hip pump into the drip irrigation system of the garden

In the village of Epyeshona, rainwater is harvested on the roof of a typical Namibian homestead and diverted into a ferrocement storage tank. The roof has a surface area of 100 m² and the tank has a storage capacity of 30 m³. The rainwater is collected over the course of the rainy season and, if water is used wisely, can provide the household with water throughout the whole dry season. For irrigation purposes, drip irrigation was chosen to save time and water. Using a hip pump, the water is pumped to a raised tank (0.5 m³ storage capacity). From there, the water flows into the garden via drip lines. The crops are for self-consumption to improve the diet of the household members, but can also be sold at local markets to generate income. The main produce grown is spinach, tomatoes, onions and green peppers. In addition to watering gardens, the harvested rainwater can also be used for washing and cooking, but it is not suitable for drinking.

The CuveWaters blue team constructing rainwater gutters at a rural house. All rainwater harvesting structures can be made by locals once they are trained in tank construction and gardening techniques

Also for the household gardens it is possible using little greenhouses. Advantages of greenhouses are the prevention of evaporation, temperature control and protection of plants from wind and pests

"Green Village": Community Approach



Rainwater is harvested on a concrete lined ground catchment and stored in an underground tank and a covered pond. From there it can be pumped using a pedal pump into the drip irrigation system both in the greenhouse and in the outside garden

The organizational concept of the Green Village is fairly new to Namibia, since different households are cooperating, sharing work and benefits. In the case of the community facility constructed in the pilot village of Epyeshona, six households are running the facility. The "Green Village" has two underground storage tanks, one is made of ferrocement and bricks and can store up to 120 m^3. The rainwater for this tank is collected in a concrete-lined ground catchment with a surface area of 470 m^2. The second storage option is a pond made of dam liner (volume 80 m^3) and a roof made of shadenets. The water for the pond is collected on the roof of a greenhouse (160 m^2) which is a further component of the "Green Village". Beside the greenhouse, the users of the facility irrigate a garden with a surface area of 900 m^2. To conserve water, the greenhouse and the open garden area are equipped with water-saving drip irrigation systems. These pump water to an elevated tank (1 m^3 storage capacity) using a pedal pump, then the water flows to the gardens and the greenhouse via drip lines. The greenhouse is jointly managed by all six households. In addition, each farmer has an equal share of the large outside garden area of 150 m^2 for his own use. The main greenhouse crops are tomatoes and green peppers. In the outside garden tomatoes, onions, spinach and carrots are being harvested.

The users have to be trained in all aspects of gardening. Benefits are capacity development, income generation for rural communities and job creation

Capacity Development and Sustainability

All the rainwater harvesting tanks of the CuveWaters project were built by Namibians trained by experts from Kenya and Germany. Training manuals and further courses will be developed in the near future. Material for the construction, operation and maintenance of the tanks and gardens is all available locally, either within the village or in hardware stores. People all over Namibia and Southern Africa could be trained in tank construction and operation as well as gardening.

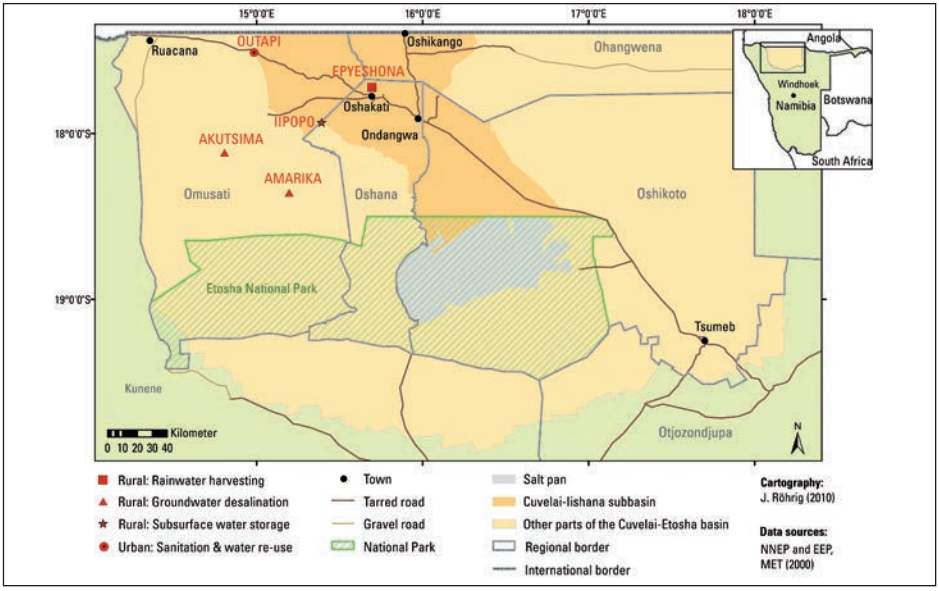
Benefits and Costs

- Job creation (system designer, tank constructors and gardeners)
- Income generation through the sale of fruits and vegetables: 100,000 N$ per year for community (Green Village) and 12,000 N$ per year for individual household
- Improved nutritional status of families within disadvantaged rural communities
- Availability of good quality rainwater during the dry season for washing and cooking
- Impact to the health of the younger population in particular and to save on medical costs
- Extend school visiting times and provide higher individual education
- Individual/household approach: Total investment costs vary from 12,000 to 18,000 N$, depending on labor and material costs and additional costs for the garden sites of 2,700 N$. Operation and maintenance costs are 100 N$ for the tank and 300 N$ for the water supply system of the garden patches per year.
- Community approach (Green Village): Total investment costs of 115,000 N$ and an additional 4,700 N$ for the garden. Operation and maintenance costs of 150 N$ (tank) and 380 N$ (garden) have to be factored in per year.

In balance it can be concluded if the government supports the initial construction of tanks, maintenance, gardening equipment, seeds etc. can be financed by the household and community respectively.

Contact

Alexia Krug von Nidda
cuvewaters@isoe.de
Phone: +49 (0)69 707 6919-20
www.cuvewaters.net



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