Factsheet on Subsurface Storage of Oshana-Floodwater

CUVE integrated water resources management waters

Background

Subsurface water storage technology is part of the German-Namibian research project Cuve-Waters, which is establishing an Integrated Water Resources Management (IWRM) in the Cuvelai-Etosha Basin. The central-northern region of Namibia is characterized by a system of oshanas, very shallow river streams that drain north-central Namibia from north to south during the rainy season. The whole area is regularly affected by floods and droughts.

North-central Namibia can be characterised by a system of so-called oshanas draining the region from north to south towards the Etosha-saltpan

Major challenges of using the oshana water are high evaporation rates and rapid quality degradation of the water due to uncontrolled use by humans and animals. The aim of subsurface water storage is to solve these problems by storing the water in artificial, closed reservoirs made of different materials. So the oshana water is pumped into storage reservoirs with pedal pumps at the height of the rainy season, when the water quality is at its best.

The pilot plant for subsurface water storage in Iipopo

Operational Concept of the Pilot Plant

The pilot plant was established in Iipopo, a small and remote village in the Oshana region. Up to ten villagers can use the stored water for small-scale gardening. For this reason, a greenhouse and an open garden area were constructed and equipped with water-saving drip irrigation systems. All farmers were trained in how to prepare the soil for the plants, planting the seeds, supply of plants with fertilizer and water properly professionally and efficiently.

Challenges

During the pilot phase, two major challenges were identified:

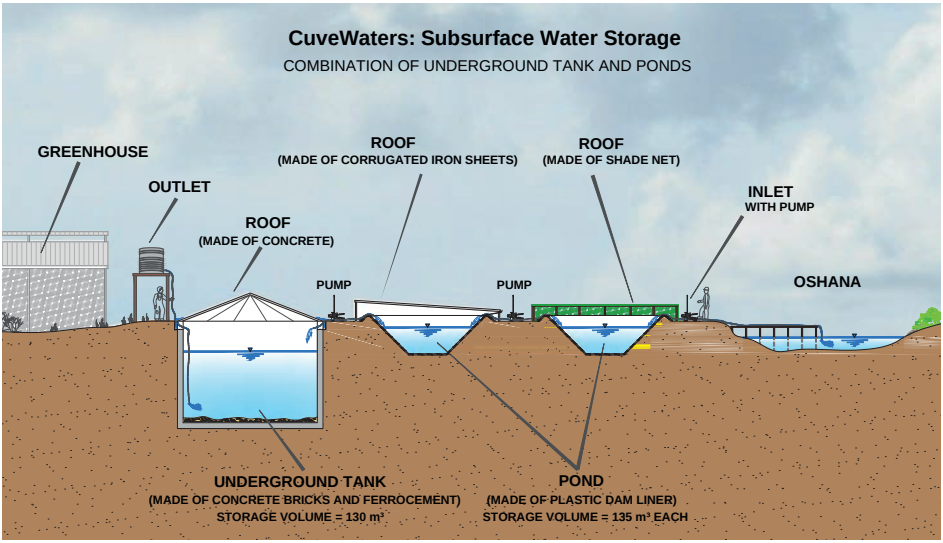
- To keep water clean over the course of the dry season
- To improve people's sensibility for water conservation issues

Benefits

- Preservation of water quality and prevention of evaporation
- Water availability during the dry season
- Resilience to climate variability
- Balanced diet and food security
- Job creation
- Income generation
- Improvement of health

Subsurface Storage of Oshana Floodwater

Subsurface water storage technology makes the oshana water available for irrigation throughout the year. Water is pumped from the oshana at the height of the rainy season and stored in underground storage tanks and covered ponds. From there it can be pumped to the gardens when it is needed during the dry season.



The pilot plant for the subsurface storage of oshana floodwater is a combination of different storage options. It consists of an underground tank (volume 130 m³) and a pond with a shade net roof and covered by corrugated iron (volume 135 m³ each). The pilot plant has a total storage capacity of 400 m³. Since the water is intended to be used for irrigation purposes, the pilot plant is equipped with a greenhouse (176 m²) and a total open garden area of 1000 m². Market-ready vegetables can be grown inside the greenhouse, since the plants are protected from direct sunlight, wind and pests.

The whole compound is surrounded by 150 fruit trees to protect the area from wind and harvest fruits.

Storage capacity (m³)	
Underground tank	130
Shade net pond	135
Iron sheet pond	135
Combined capacity (total)	**400**
Gardening area (m²)	
Greenhouse	176
Open garden	1000
Fruit trees	150

Irrigation with Oshana Floodwater

With 400 m³ of floodwater stored in different tanks and covered ponds, up to ten households can grow their own vegetables and earn considerable income at local markets, thus also making an impact on the nutritional status of neighbors and other villagers.

Members of the community have to be incorporated in the planning process from the beginning. This picture shows a member of CuveWaters togehter with local stakeholders

While the greenhouse is jointly managed by ten farmers, every household has an equal share of the outside garden where it can grow its own vegetables. The main products from the greenhouse are market-ready tomatoes and green peppers which are mainly intended to be sold at local markets. In the outside garden the crops range from tomatoes to green peppers, carrots, onions, butternut, cabbage and spinach. These vegetables are for farmers' families and also for sale at local markets.

Capacity Development and Sustainability

Approximately 40 community members trained by experts from Kenya and Germany were involved in building the subsurface water storage pilot plant in Iipopo. People all over Namibia and Southern Africa could be taught to build water tanks and do gardening.

Construction material has been purchased at local hardware stores, this allows easy duplication of the plants and quick access for spare parts.

Capacity Development approaches like the training in drip irrigation construction help improve peoples knowledge and raise ownership for the technologies

Future Intended Beneficeries

- Positive developments for disadvantaged rural communities at ephemeral river streams of southern Africa
- Reduction of migration in urban areas

Meme Taimi and the farmers proudly showing the first harvest of carrots and peppers from their gardens

Farmers from Iipopo village dance at the inauguration of the pilot plant

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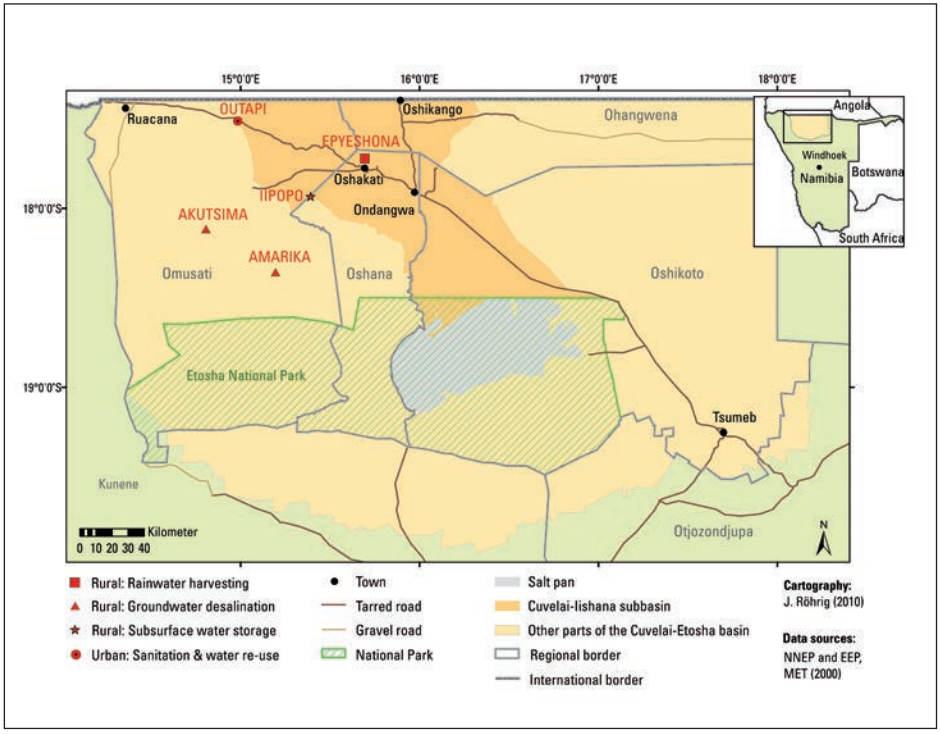

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