The Kalamino Cistern – A reliable and affordable roof-water harvesting system for households with severe drinking-water supply constraints

Context

Helvetas Swiss Intercooperation, Ethiopia has been implementing both the **Beles SUNRise Project** (BSP) and the accompanying **Rural Roof Water Harvesting Initiative** (RRWHI) in Tigray Region in Ethiopia since 2010. The BSP is a rural livelihood development project implemented in close collaboration with the Regional Bureaus of Agriculture & Rural Development, Water Resource Development, Woman Affairs and Youth & Sport.

Picture: Unprotected water sources, a major cause of water-born diseases and poor health in areas with severe water scarcity.

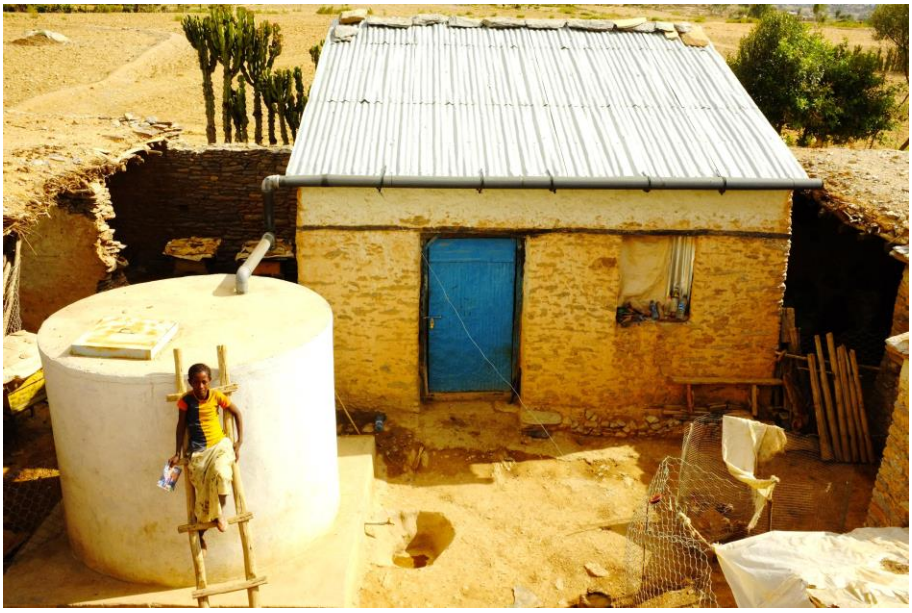
The BSP project team has developed an innovative solution to overcome the severe drinking-water constraints prevailing in many parts of the region: The rapidly growing number of houses with corrugated iron sheet roofs provides a reliable opportunity for roof-water harvesting for household drinking-water supply.

The **Kalamino Cistern** was developed over a 3-year period starting in 2009 and funded by the Swiss Agency for Development and Cooperation (SDC), Swiss Solidarity and Ethiopian Enterprises (EE). Since then more than 1000 cisterns have been constructed in Tigray and Amhara Regions for households with severe drinking-water supply constraints.

The **Kalamino Cistern** has a water storage capacity of 7200 liters. If used with 130 % efficiency – i.e. by using water during the 3-month rainy season which is then subsequently replaced – the cistern can supply up to 9000 liters of safe drinking water in a normal year, or 5 liters of drinking water per person in a five-person household every day of the year.

Impact

- Significantly improved household drinking-water supply and family hygiene
- Reduced workload for women and female children
- Enhanced household climate resilience
- Skill development
- Institutional capacity development
- Creation of local job opportunities



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Tigray National Regional State Bureau of Water Resource Development

Schweizerische Eidgenossenschaft
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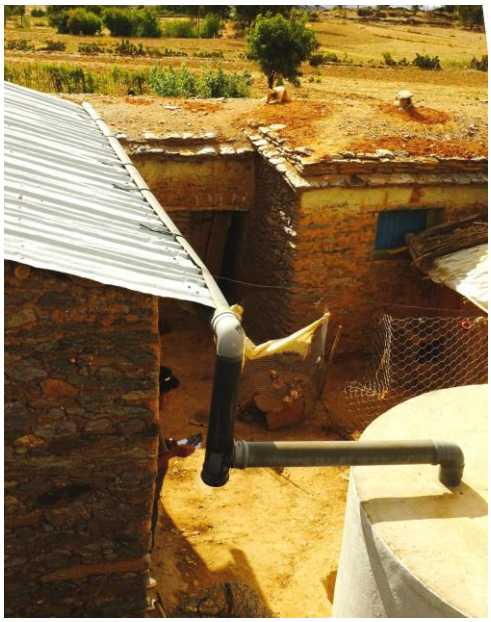

Pictures above: Roof catchment and first splash discharge installation

Roof-water is collected in a slid-open PVC pipe attached to the corrugated iron sheet roof. A first splash discharge outlet (red circle) allows users to discharge dirty roof-water for a short while when rainfall starts. The outlet is then closed manually, and clean roof-water is collected in the cistern.

Management

The project provides two weeks' practical training on the construction of the **Kalamino Cistern** roof-water harvesting system to young men and women from project communities. Normally six **Community Technicians** are trained per project community. A pair of trained Community Technicians are equipped with the required molds and tools. Cistern construction is carried out by the technicians who get paid USD 60 per completed cistern (ETB 1,200) on contract basis. Construction is regularly supervised by project experts. A pair of trained technicians can construct 4-6 **Kalamino Cisterns** per month. Users receive training on operation and management of the system, and are organized into Water Sanitation & Hygiene Committees (WASHCOs). Water quality sampling and periodic chlorination is arranged by the District Water Resource Development Office. Beneficiary households pay an average monthly water fee of USD 0.5 (ETB 10.-) which is used for maintenance costs.

Remaining challenges

Previous roof-water harvesting initiatives failed to a large extent, mainly due to inappropriate technical designs and management shortcomings. Hence, this household-based, roof-water harvesting system is still subsidized (85%). Decentralized construction poses a challenge to timely material supply and supervision. Further efforts are needed, aimed at disseminating the technology at cost by private enterpreneurs in order to create new employment opportunities.

Note: For more technical information, refer to the construction guideline.

A house with a corrugated roof area of 20 m^2 can harvest approximately 9600 ltrs of rain-water per year (with 600 mm annual rainfall and 80% of roof-water harvested – 1mm of rainfall = 1 ltr per m^2).

Description

- Used for household drinking-water supply
- Water storage capacity 7200 ltr
- Super slim ferro-cement cistern wall (only 8 cm thick)
- Low cost: USD 375 (ETB 7,500) → Only USD 52.- (~ ETB 1,040) per m^3 water storage (cost excludes the corrugated iron roof). A PVC tank of the same volume costs approximately USD 100 (ETB 20,000)
- Minimum corrugated roof catchment required: 15-20 m^2

Management

- Training of Comt. Technicians
- Establishment of WASHCOs
- Water quality control
- Cost sharing / recovery
- Job creation

Picture: Practical training of Community Technicians

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