Rainwater harvesting in Tanzania, 2010

Context
Ngara and Biharamulo districts are poor and isolated districts in western Tanzania, close to the borders of Burundi and Rwanda. After three years of Concern Tanzania’s Water and Environmental Health Programme implementation, water coverage in targeted wards in the two districts is now 58% and 38% for Ngara and Biharamulo respectively. Water in schools is still low at 23% and 15%.

Women/children are the main household collectors/users of water, often walking significant distances for collection. Schoolchildren, their teachers, and families suffer from lack of water in school. Without water, school attendance is low, particularly in the hot afternoons, and academic performance is poor.

Target population
School children, their teachers, and their families

Stakeholders
The communities are at the core of the programme; as are the school management staff; and the schoolchildren. The intervention engages the local government authority, specifically the education department, the health department, the community development department, and the water department. Civil Society Organisations (CSOs) carry out the intervention – Development and Life Relief Association (DELIRA), and Tanzania Water and Environmental Sanitation (TWESA) – with support from Concern Tanzania and funding from Gorta along with other donors (IrishAid Concern General Donations and ConcernUS Private Funding). The process starts with ward level development planning with the community, schools, government departments, and CSO partners. Through the ward planning the most disadvantaged schools are identified as in need of water supply throughout the year. The school committee, comprising the teachers, and elected parents (around 30 members), works with Concern Tanzania and partners to clarify the roles and mobilise the people to source local materials.

The intervention
Drilling of boreholes for Ngara and Biharamulo schools is not feasible due to topographical nature of the programme area (dominated by hilly landscapes) with a very low water table. Roof rainwater catchments are more suitable for this region as they collect rainwater in containers as it falls from the roof. Tanks used for rainwater harvesting are a cost-effective way to supply clean water to schools that would otherwise lack water facilities throughout the year – the cost is €4,500 for one tank, (compared to €7,000 for a borehole). Plain corrugated slanted iron roofs are used to run water into gutters, then down pipes into the tank. The average size for the school roofs in Tanzania is approximately 50m x 2.5m x 2 (double roof) – making the total catchment area 250m² feeding into a 50,000 litre tank. Concern Tanzania prefers to build two tanks which can enable the collection and storage of 100,000 litres, but some schools have one, which can supply water for 10 months per year taking into account the two months when the school children are on leave (June and December).

This method of rainwater collection at schools with tin roofs has low implementation and operating and monitoring costs, suitable for poor communities. The tanks are durable and use very little materials. They can last for 30 years, providing that the construction is based on engineering specifications and materials are good quality. The community sources local materials – sand, stone, and aggregates. Concern Tanzania
provides industrial materials – cement, wire mesh, gutters, steel bars, etc.

The foundation of each tank is made of stone for durability. The tank is constructed using cement, sand, and wire mesh; it is cylinder shaped to avoid cracking in the joints. The round shape is also cheaper to construct because it requires less reinforcement. The tanks are generally built on the ground surface so that it is easier and cheaper to construct and maintain. Plastic tanks can also be used but they are less durable, and more expensive for the same 50,000 litre capacity. The inside of the cement tank is plastered with waterproof cement, which is mixed with sand, making the tank durable, waterproof, and ensuring the quality of the water. The tank has a cover made from wire mesh, cement, and sand. A manhole is constructed in the cover to enable entry for cleaning. The cleaning can be done at an interval of six months or at the beginning of every rain season by using normal blooms followed by chlorine disinfection to kill pathogens. The downpipes are connected to the tank, so water flows inside, and a tap is connected at the lower outside to release water. There is a wash out pipe from the tank which allows the tank to be cleaned.

Concern Tanzania’s Water and Environmental Health Programme supports the construction of rainwater harvesting tanks in schools in Ngara and Biharamulo districts as part of a package. The package consists:

- One or two tanks at 50,000 litre each for drinking water depending on number of pupils
- Latrines with hand washing facilities (two small 1,500 litre tanks of rainwater from roofs of latrine block)
- Child to child (C2C) method of hygiene promotion that focuses on hand washing and diseases control

The package facilitates not only the access to clean and safe water, but also improved environmental health and the uptake of good hygienic practices. The presence of the tanks in the schools enables the children to practise the good behaviours they are learning in the c2c method, and increase the impact in the school and in the communities.

Concern Tanzania has already constructed 20 tanks in Ngara, and 13 in Biharamulo, and another three are in construction. Another 12 are planned for 2011.

**Stages of building a rainwater harvesting tank**

The first step is to build the **tank skeleton**. The skeleton has a base, walls and roof, all constructed by sandwiching a 10mm steel rod sub-skeleton between two layers of 25mm square steel mesh.

A mortar mix of 1:3 cement: sand is used to **plaster**. The mortar is applied by hand. The mortar is applied to the skeleton walls. Waterproof cement is plastered on the inside.

**Sustainability and replication**

The tanks require little maintenance – only cleaning, fixing gutters if they have moved, and fixing broken taps. Training is provided to school management staff on how to maintain. As communities and school staff have been involved in the construction and sourcing materials, it is possible for this to be replicated; but the initial cost makes this unlikely to be replicated by the communities or schools themselves without funding support from a donor. However, the tanks are durable and last for up to 30 years, making this tank highly sustainable and cost effective.