Solutions for rural schools in Tanzania

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Building 30,000 litre ferro-cement water tanks and gutters for rainwater harvesting

Rainwater harvesting is not practiced by schools or households and there is no knowledge and skills within rural villages to start it independently. Yet through rainwater harvesting communities, schools and households could solve some of their water problems independently without waiting for the government to construct large infrastructure for water. And even if water pipes are constructed at some point, it still makes sense to collect rainwater (rainwater is free, and collecting it from the roofs through gutters will also reduce erosion around buildings – a huge problems in many schools and households). E.g. Liana (NGO) projects have demonstrated that rainwater harvesting activities are very eagerly received and they start to spread due to high demand.

The photo shows a 30,000 litre water tank being built in 2014 by Liana builders. With a roof area of 300 sq m guttered and an annual rainfall of 800 mm, the tank collects a total of 174,375 litres of water in a year (with a considerable overflow in April and May). It means that in a school of 250 students each student can use 1.5 litres of water per day during nine months of the year and 3.25 litres of water during March, April and May. Thus it covers much of the need of the school, but some water will still need to be carried from elsewhere, unless two tanks are built.

The total cost of a tank and gutters is just below €1000 (incl. materials, labour and average transport).

Establishing a hand washing facility near toilets, and education on hand hygiene

One of the most important criteria for a hand washing facility in a rural school is that it is simple to use, durable by its structure and mechanisms, and easy to repair locally. E.g. water taps break easily and seals wear out regularly, and if not repaired promptly, leak out precious water. A simple hand washing facility can be constructed from recycled plastic oil jerry cans hanging on a wooden or metal rail from their handles; basins embedded in the ground to collect waste water (not in the design in the photo); and ropes and pieces of wood for the 'pedal mechanism'. The photo depicts a facility without the possibility of collecting waste water. The design should be improved by embedding basins in the ground just below the jerry cans (embedding is necessary, otherwise wind will blow away empty basins). Waste water can be used in schools for growing tree seedlings.

The facility should be opened with an educational session and a ceremony with all the students present in order to draw attention to its importance and meaning. Project facilitators need to assist teachers and selected students in organising these happenings. Leaflets about rainwater harvesting and hand hygiene will be designed and copied and given to each student to take home. Children are an important means to educate the whole community as they will tell family members at home what they have learned at school. More educational sessions should be organised to follow. These can concern

both the importance of hand hygiene and the relationships of lack of hygiene and transferrable diseases, and the importance of using recycled water.

Building a stove that reduces firewood consumption and has a chimney to eliminate smoke from the kitchen

As every school in Tanzania is obliged to cook a meal to its students, there is an urgent need to build efficient stoves that reduce firewood consumption and eliminate health problems caused by smoke. The stove depicted in the photo below is built using burned bricks and cement. Schools that have built these stoves within Liana projects have reported very large savings, up to 75%, in firewood use compared to tree-stone fire. The size of the stove depends on the size of the pots they use to cater for the number of children in the school. Pots are immersed inside the stove up to their brim, thus flames and hot fumes heat the pots also from the sides making the model very effective. The fire chamber is relatively small, thus it makes it impossible to load excessive amounts of firewood. The cost of a stove is about €230 depending where the bricks are bought and transported from. Some schools do not have a building for the stove as food is cooked outside. However, at least a shed with a roof and a cement floor is necessary. The cook and the children helping in the kitchen will be guided on how to use the stove.

Starting a tree nursery using recycled water, transplanting in school premises and protecting wild seedlings, and environmental education

Schools will be using large amounts of firewood even if they shift to using a proper stove. Thus it is essential that schools start to grow trees for firewood. An educational approach is a natural approach for schools. Through children's activities at school the whole community can be sensitised about the importance of growing trees for firewood. Recycled waste water from the hand washing facilities will be used to water these nurseries. After the initial training to environmental club teachers, club members will start their nursery at each school. Each group will make a plan on the practicalities and responsibilities of taking care of the nursery. Students will also learn how to transplant and protect the seedlings from domestic animals. They will learn to protect wild seedlings in the school premises in order to nurture natural regeneration. More training sessions and support is offered to teachers separately along the process so that they are able and confident to guide students. Seeds for nurseries will be initially sourced from the Tanzania Tree Seed Agency, but also later collected by trainers, teachers and students. Preference is given to indigenous tree species. Environmental club students together with their teachers will design awareness raising events to be delivered at their school to all students, for example during morning assembly times. These concern the importance of trees in the ecosystem and the importance of being self-sufficient in firewood.