School Challenge 2011/2012

Learning about Rainwater Harvesting

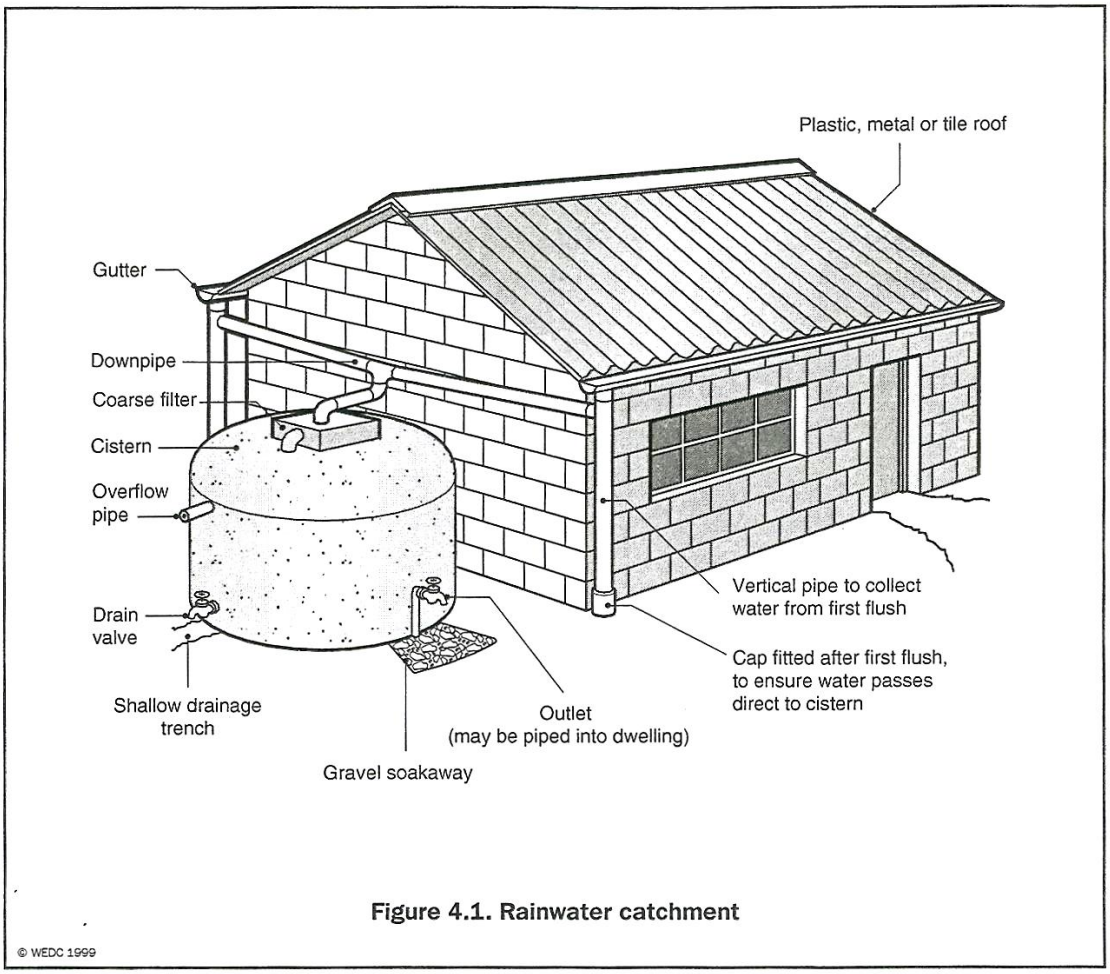

Figure 4.1. Rainwater catchment

Source: Smith, Michael, Water and Environmental Health Module Notes, WEDC, Loughborough University. 2005.

- **Where does rainwater go when it falls on the ground or on a roof?**
  When rain falls, it can (1) **Run-off** to nearby streams, creeks or other water bodies (2) **Evaporate** into the atmosphere or (3) **Soak into the ground**. To use rainwater as way of supplying water, the **rainfall needs to be collected and stored safely** to prevent contamination and to minimize loss of water by evaporation into the atmosphere.

Sammy Oleku from MEDEC in Kenya inspects a household rainwater tank under construction.

- **How are rainwater harvesting systems made?**
  There must be **a catchment area** such as a roof to "catch" rainfall, a network of **pipes or gutters to direct the water** and a **storage tank** where water can be stored safely and accessed when needed by a **tap**. Tanks are often made from cement with steel bars or mesh to strengthen the tank. They can also be made of heavy plastic and purchased similar to a garden rain barrel. The cement tanks are made by masonry experts who shape the tank with the steel bars and mesh then cover it with layers of cement. In Kenya, a women's group is being **trained by the masonry artisans to build their own household tanks**. They will **move from house to house as a group, helping each other** to build the tanks.

- **Can it work in different climates and seasons?**
  Rainwater harvesting as a method of water supply works best in areas where rainfall occurs regularly throughout the year. In most places, **rain tends to fall in greater quantities in certain seasons of the year**. Many countries have defined "wet" and "dry" seasons while some places have a "warm" and "cold" season or some combination of these. All of these **climate and seasonal characteristics need to be examined** when planning for a rainwater system to determine if it can work, be the one source of water supply or add greater quantity of water along with an existing supply from wells or piped systems. If temperatures drop below freezing – rainwater harvesting is likely not be the best option!

- **How is the size of tank determined and what happens when there is no rainfall?**
  The size of the storage tank is very important for the system to work effectively and efficiently. If the **tank is too big, it is wasteful in construction costs but, if the tank is too small, not enough water can be collected to provide water supply through the dry season**. The size of a storage tank is determined by monthly and seasonal rainfall data for the area, the number of people to use the water, the area of the roof catchment and the consumption of water per person**. Household tanks are about 10,000 litres while school tanks can be 20,000-30,000 litres.** People also learn to conserve water in order for it to last through the dry season until the rainy season starts again. In times of drought – when no rainfall happens for a long time – water could be brought by tanker truck to fill the tanks but this is very expensive and not possible in all places.

- **Is rainwater clean to drink and how is the system maintained?**
  Collecting rainwater and keeping it clean are two of the main challenges of both the design of the system and for the people maintaining the rainwater harvesting system. There is a **risk of dust, debris and other material that can contaminate the water** being on the roof catchment area and being washed into the storage tank with the first rainfall. Steps must be taken to **prevent this with the first rainfall of the season**, or "first flush," being diverted away from the storage tank. The roof can be cleaned with this first rain and dirt washed away. Then the gutters or pipes can be reconnected to direct the next rainfall to the storage tank. The tank itself needs to be covered or enclosed to **limit the amount of sunlight**. Darkness in the tank helps to **discourage growth of algae** in the water. **Screens to filter out debris** need to be in place where pipes or gutters connect to the tank. The **quality** of rainwater harvesting systems and resulting water supply will depend on **proper construction, dedicated people maintaining the system** and **awareness of good hygiene practices to keep clean water safe and clean**.

Students of Magesho Primary School in Karatu District, Tanzania in front of their school rainwater tank that holds 30,000 litres of water (2006 with partner CPAR).

This household rainwater harvesting tank in Kajiado region of Kenya holds 10,000 litres of water (2009 with partner MEDEC).

References: 1. *Smith, Michael, Water and Environmental Health Module Notes, WEDC, Loughborough University. 2005.*
2. *The Worth of Water, Technical Brief 11 – Rainwater Harvesting*
3. *Practical Action, Technical Brief Rainwater Harvesting*