BRICK TANKS FOR RAINWATER STORAGE

What is this Action Sheet about?

Everyone needs clean water for household uses. People in the Arid and Semi Arid Lands and especially women and girls, spend about one third of their time looking for water from as far as 20km away. In many cases it is from polluted water sources. During the rainy season a lot of water falls on the roofs of houses. As described in Action Sheet 13, this water can be harvested and stored in tanks. Small tanks can be made of clean barrels or other containers. Larger tanks are usually built of ferrocement (See Action Sheet 21) or bricks. If bricks are produced locally, using bricks rather than cement can reduce the costs of tank construction. This Action Sheet gives guidelines on the construction of brick tanks.

What size of tank do we need?

The size and choice of tank depends on:

- Availability of funds
- Amount of water required by household between rain seasons
- Roof catchment area
- Total Seasonal rainfall

See also Action Sheet 13: Roofwater harvesting

Once you've worked out the size of tank, this formula allows you to calculate the number of bricks that you need (for a cylindrical tank):

Number of bricks to be laid in one layer (X)

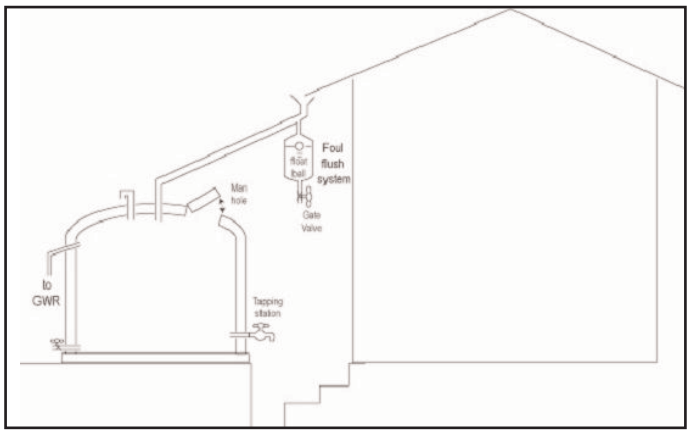
= Circumference of tank ÷ length of single brick

Number of bricks required for tank height (Y)

= Height of tank ÷ height of single brick

Total number of bricks = X × Y

Where should we build the brick water tank?



Above ground roofwater harvesting tank (Image: SearNet)

- A minimum of 1.2m from the foundation wall of the house to minimize the length of gutters and also a void dampness in the buildings
- Tanks should not be located near a pit latrine/toilet or rubbish or on an anthill
- Avoid building the tank next to a tree as the roots may undermine the foundation and dry leaves will block gutters
- The height of the gutters should be higher than the proposed tank height

How do you build a brick tank?

STEP 1. FOUNDATION

- Clear the site free of bushes, tree stumps etc. to facilitate the ease of construction
- Excavate foundation down to a firm ground depending on soil type
- Fill it with hard core and compact well to level
- Cut the reinforcements (weld mesh) to fit the floor slab area, tie with binding and place in position
- Place the outlet and washout pipes tying them on to the reinforcement with binding wire. The pipes should project by 25cm into the proposed water tap area
- Place a 2.5m long GI (galvanised iron) pipe exactly at the centre vertical to help the builder keep circumference when placing the bricks. Also fix the project reinforcement for the king post in position at the centre
- Prepare a 1:2:4 concrete and compact it well to fill all voids to form a slab of 100-150 mm thick, covering all the reinforcement and piping as necessary
- Cover the newly cast slab with sacks or polythene sheet to keep it wet to cure at least for 1 day

STEP 2: WALL CONSTRUCTION

- Bricks can be laid in different ways i.e. lengthwise, across or both mixed depending on the desired wall thickness and size of bricks available to make a strong water tank
- Remove the sacks/polythene and using a binding wire attached to the centre pipe, mark out 2 circles corresponding to the outer and inner diameter of the proposed brick wall
- Soak bricks to be used in water overnight
- Prepare a 1:3 mortar (cement: sand) and make a weak mix of water and cement and pour along the marked strip where the bricks are to be laid
- Lay the bricks in the strip making sure that all joints are about 1 cm thick. Fill with mortar and compact well, while checking verticality of bricks
- Build the brick wall making sure not to construct more than 1m high or 7 courses per day. A maximum tank height of 2m is preferable
- Place a 2” overflow pipe at the top of the tank and build one extra course above it

STEP 3: PLASTER AND ROOFING

- Apply rough plaster on the inside of the tank with 1:3 (cement: sand) mortar to obtain an even surface. Then place a chicken wire mesh over the rough plaster and then apply the final coat of about 1 cm thick with cement slurry (‘nil’) to make it watertight. Special cement (waterproof or other sealant) could be used where necessary
- Provide a roof structure (concrete or iron sheets) to exclude dust, and sunlight, but with a suitable access manhole near the inlet down pipe
- Fix the gutters ready to harvest rainwater from all sides of the roof (See Action Sheet 13: Roofwater harvesting)

ACKNOWLEDGEMENTS: This Action Sheet is based on the SEARNET Rainwater Harvesting Technologies Database entry on Brick Tank. (www.searnet.org/rhtdatabase.asp?pn=3)

FOR FURTHER INFORMATION

CONTACTS

Aquamor www.aquamor.tripod.com/index.html

GHARP - Greater Horn of Africa Rainwater Partnership[http://www.gharainwater.org/index.html

International Rainwater Catchment Systems Association (IRCSA) www.ircsa.org

International Rainwater Harvesting Alliance www.irha-h2o.org

IRC - International Water and Sanitation Centrewww.irc.nl

Practical Action (formerly known as ITDG) www.practicalaction.org/

SEARNET - Southern and Eastern Africa Rainwater Network www.searnet.org

Water Aid www.wateraid.org

WELL (WEDC) www.lboro.ac.uk/well/index.htm

BOOKS

Rainwater Catchment Systems for Domestic Supply, J. Gould, and E. Nissen-Petersen, IT Publications, 1999 (Available at Practical Action (ITDG) Resource Centres or from www.developmentbookshop.com)

The Rainwater Harvesting CD, H. Hartung, Margraf Publishers, 2002 Available by emailing: info@margraf-verlag.de or HansFHartung@aol.com