The WaterCompass

Results of the WaterCompass Tool. The tool was created by Practica Foundation (www.practica.org) and the Akvo Foundation (www.akvo.org), in order to assist people in choosing water technologies. We hope this tool proves useful, any comments can be send to watercompass@practica.org.

Session information
Date: Mon Apr 28, 2014
Time: 16:39:45

Options chosen

Water source
- Rainwater
- Surface water
- Groundwater

Location
- Densely populated urban
- Densely populated low-income urban
- Moderately populated urban
- Peri-urban, rural
- Remote rural

Preferred level of delivery
- Household
- Shared
- Small community
- School or institution
- Large user group

Preferred management level
- Household
- Shared
- Small community
- Municipal

Affordability
- User-financed
- Donor-financed

Intended system sophistication
- Labor-intensive
- Intermediate
- Technology-intensive

Intended use
- Drinking only
- Domestic use
- Domestic small-scale productive use

Contamination
- Pathogenic (micro)
- Pathogenic (macro)
- Arsenic
- Fluoride
- Iron
- Manganese
- Heavy metals
- Sulphate
- Chlorine
- Salts
- Pesticides
- Nitrate
- Phosphate
- Odor and taste
- Turbidity suspended solids
- Hardness
- Acidity
- Lack of oxygen

Ground formation
- Sand gravel
- Clay formations
- Compacted formations
- Soft weathered rock
- Bedrock

Water lifting
- Not required
- 0-8 m
- 8-15 m
- 15-40 m
- >40 m

Annual precipitation
- less then 200 mm
- more then 200 mm; seasonal
- more then 200 mm; year-round

Rope and bucket

Elevated storage tanks

Screening and straining

Rooftop rainwater harvesting

Short descriptions

Rope and bucket

A basic water-lifting technology for wide, shallow wells. Bucket is simply lowered into well, filled and then pulled up with the rope. The bucket is typically made of jerry cans, tires, wood or animal skin. Special option for tube wells: bailer bucket. Pulling can be aided with the application of a pulley, windlass or animal power to make water drawing easier.

Financial - Very low costs;

Institutional - Management is simple and can be done locally. A committee can be elected to manage well cleaning and fee collection. A local artisan can repair the bucket, windlass or well cover. External support needed for proper water quality checks.

Environmental - Low ecological footprint. water quality expected to be main problem, especially with uncovered wells. Rope and bucket can become dirty and cause extra contamination. During severe droughts groundwater might be too deep for using rope and bucket.

Technical - All repairs can be done locally using available tools and materials. Preventive maintenance: keeping rope and bucket clean. With windlass or pulley: greasing of bearings. Regular replacement of bucket (~annually) and rope (every 1-2 years depending on use) recommended.

Social - Awareness-raising required in relation to water quality issues: well covering, cleanliness of rope and bucket and eventual household water treatment. Pathogeniccontamination may cause diarrheal illnesses. Depending on level of effort, water-lifting may be inaccessible to children or the elderly.

Relevant remarks

Elevated storage tanks

An elevated steel, reinforced concrete, or plastic tank that uses inlet pipes to collect hillside or borehole water. System complete with pipes, a tap, screen, platform, and possibly a tower. Huge tower tanks are most popular in developed countries.

Financial - A commercial 10,000L tank: USD54-1600 (India and Australia, respectively). OM costs are minimal: cracks, corrosion control, cleaning and treatment. Other costs: boreholes, towers, or standpipes. If water sold: earn USD120/day in Kenya. Affordability depends on scale, tank material, extra costs.

Institutional - Applies to community or municipal. Best to consider scale needed to figure out costs. Caretaker recommended for OM. Commercial tanks could be considered.

Environmental - Source contaminations may include: corrosion from metal, incoming area pollutants, tank mildew build-up, and siltation. Plastic can leach chemicals (BPA) into the water anytime, causing endocrine problems. Untreated water (pathogenic) can cause diarrheal illness. Water availability contributes to CO2-absorbing agriculture.

Technical - Installation: in-outlet, overflow and washout and screened ventilations pipes. Maintenance: open/close valves every 2 months; manage chlorinator; drain/clean or de-silt tank annually; paint to prevent corrosion; repair leaks. Lifetime: plastic 25, reinforced concrete tank 30, steel tanks 45 years, respectively.

Social - Reduces fetching time for women. Water year round increases food security, climate change resilience and improves hygiene. Awareness campaign to community for support. Use discouraged by high fees, insufficient treatment or improper siting (too far from households).

Relevant remarks

Screening and straining

Water filtration method using screens or sieves made of steel with a mesh-size of 2-8cm. Often placed at surface water inlets to prevent debris or coarse material from reaching subsequent treatment processes. Microstrainers with openings of 10-60µm can be applied after screens for the removal of algae.

Financial - Costs depend on the design and the cleaning mechanism applied. Expenses can be kept low by using manual labor for cleaning and maintenance. Typically an affordable solution, but specific costs are difficult to offer as they strongly depend on region.

Institutional - Applied at (inlet of) central treatment facilities, but simple use makes it suitable for decentralized applications. Management requirements depend on cleaning mechanism. Maintenance is low, can be combined with cleaning of other facilities. Training on debris management might be required.

Environmental - Applied for surface water containing coarse particles. Debris mostly includes organic material like leaves, duckweed and algae. In vicinity of urban settlements, plastic wastes are typical. Debris needs to be properly disposed and managed according to its characteristics and volume.

Technical - A simple, but flexible technology for diverse configurations. Straight screens can be manufactured locally and cleaned manually. Cylindrical or drum strainers require mechanical cleaning (backwashing). Requires regular debris removal. Lower debris load reduces cleaning frequency.

Social - Requires no specific social campaign as the method is widespread and is not applied directly at household level. Screening only removes larger particles, therefore it cannot guarantee safe water quality. To be applied in combination with other treatment processes.

Relevant remarks

Rooftop rainwater harvesting

Rainwater can be collected from the rooftops of houses, schools or other buildings. Roofs with galvanized iron sheets work best for collection, but tiles and sheets are also acceptable. Applicable above 200 mm precipitation per annum, but long dry periods will necessitate an alternative water source. Risk of contamination with suspended solids.

Financial - Usually, roofs are already in place. If not, investment is needed for adequate roofing. If yes, these costs (RAIN? 6-12 USD/m2) might be prohibitive for household(s). Additional costs may occur in the form of household treatment or storage/conveyance facility construction.

Institutional - Optimal decentralized method; can be managed at (shared) household-level. More facilities may prompt establishment of local water committee to optimize managing. Resilience can be improved by organized - professionalized, regional-level - monitoring. Proper (micro-)credit scheme is essential for local dissemination.

Environmental - Good solution if sufficient rainfall and no other good quality water sources. Often insufficient for year-round consumption. This may require alternative water source development. Water quality might be problematic: roof corroded or contaminated with dust, leaves, insects, bird droppings, etc.

Technical - Maintenance is simple but requires regular and careful attention. Roof should be frequently cleaned, ideally after every dry period exceeding one month. The initial precipitation is not for storage, but for flush-cleaning system. Large-scale roof repairs can be executed by local craftsmen.

Social - Requires an awareness-raising campaign to acquaint potential users with this solution. Periodically, people might use unimproved sources if water yield is insufficient. Yields close to 1L per mm rainfall. Mostly used for drinking water only, because of low yield.

Relevant remarks
