Clean Rivers Trust

First Thoughts on the Kakinga Community Watershed Management and Sanitation Project.

23rd April 2012.



Kakinga Lake

Introduction.

Harvey Wood from Clean Rivers Trust has been invited to see the situation regarding the lake at Kakinga in Sembabule District, Uganda by Lukanga Stanley of the District Forestry Service in collaboration of the Kakinga Community Watershed Management Group (KCWMG).

A Briefing of the project was forwarded to the UK and is appended to this short paper. The issues covered by the Briefing are briefly explored below. THE FOLLOWING COMMENTS AND IDEAS SHOULD ONLY BE SEEN AS INITIAL THOUGHTS AND NOT RECOMMENDATIONS. A visit to the site will take place between 28th April and 5th May 2012.

The catchment of Kakinga Dam is the largest of three dams in the Sembabule Rural District which total 621 hectares. These dams collect rainwater during the rain seasons April – May and October – December. The water collected is imperative to the communities of the area as there are few groundwater sources in the area. Further to this there is a mobile cattle / pastoralist use of local water supplies.

Some of the Issues.

There is a need to address several issues that are attendant to the lake. Erosion of banks; either coursed by animal and human agency accessing the lake's water, the siltation of the lake which appears to be due to high suspended solid components in the water entering the lake. Other issues including safety and vitally importantly increasing remote access to water from the lake and / or encouraging the development of 'private' harvesting of rainwater.

There are concerns regarding the water quality; increased nutrient levels and other pollution issues. There is a need to establish methods of purification of water for human use and develop education for the care and development of clean water supplies.

Regeneration of bank side vegetation and the development of a bio-diverse ecology around the lake and surrounding area is a high priority. The use of native species of flora and the development of a wild animal friendly habitat are also important.

Research in UK.

The Kakinga Dam/Lake is situated on the Kakinga stream; flowing from south to north, which when flowing empties into the Nabakazi watercourse that flows from west to east. The shallow valley of the receiving water is a seasonal to permanent wetland. The final outfall is into Lake Victoria. The southern point of Kakinga Lake is on the Equator.

The average rainfall is noted variously as about 30-35 inches or <10000mm per annum with the majority of the rain falling between October and December with another short period of rain in April/May.

The dam is situated at about 3800 feet above sea level, constructed primarily of earth with concrete spillway. It is one of the oldest structures of its type in the region and was renovated in around 2006.

The regional vegetation/ecology is noted as moist thicket to dry acacia savannah. The main grass resource of the area being Themeda triadra; known as red grass or kangaroo grass. This is recognised as a fine grass for ruminant feed.

The agricultural makeup of the region is primarily cat6tle, but with some annual crops being grown. This area of agricultural endeavour is increasing year on year.

A wide search of internet sites gave a reasonable amount of information about the region in a general manner. A number of books were acquired for the Trust's library and are listed at the end of this paper in the bibliography.

A study of the lake from satellite photographs was undertaken which raised a number of questions and started further avenues of thought. These include the heavy growth of aquatic plants or algal flowering. Sites of heavy soil erosion from rain events are apparent as is the sparse nature of trees and grass/vegetation in areas of the hills surrounding the site. Habitations were noted, but nothing could be gleaned regarding drainage or waste treatment facilities.

Action Possibilities for the Lake.

These three sections are broken down by complexity, labour and cost. The content should not be considered as more than thoughts to be considered whilst in the field.

Small Scale.

Lake areas and bank side erosion could be controlled by channelling use to set access points and create hard standing areas to protect the areas. Fencing off the rest of the bank with native thorn bush and wire would control much unwanted access. There may be problems with goats browsing young saplings.

The managing of access points to the water would be much safer for young people and the elderly as the sites of access would be frequently visited by more people.

Ground vegetation might be established by creating a meshed surface of fabric or wood so as to stop erosion and flood removal. Some plant matting; such as that made with willow (Salix) wands, will self root and establish (4 months) to create a dense barrier that will protect banks from flood erosion and reduce access problems.

Nutrient pollution may be reduced significantly by the creation of a buffer strip made up of marsh plants such as reed and Typha which would also have possible other uses when

being managed. The source for such plants may be found in the marshes to the north of the lake.

Watering animals should be away from the lake where possible to avoid excrement and other waste entering the water body. The provision of troughs for their use may be run by simple siphons that can be governed by ball cock attachments. The same sort of arrangements for humans could be considered as this would be safer than taking water directly from the lake.

If animals are to use the lake as a water supply directly their use should be limited to the water exit end of the water. Human use would be confined to the first half of the lake. This is by no means good practice but may be better than what takes place at the moment.

Medium Scale.

Slight alterations to agricultural practises would allow flood creating rainfall to distribute itself more evenly across the land surfaces, thus avoiding the creation of head gully erosion.

To aid revegetation of areas a method of folding off parts of the land might be considered so as to allow growth and establishment. This would allow a demonstration of good practise and encourage methods of fold pasture/grassland management by area to avoid over grazing. This would further help the water in the lake and its siltation problems.

In areas of the lake catchment where the rain cascades down the hillside bringing high loadings of mud that will silt up the lake bunds could be constructed to impede the flow encouraging a slowing down of the water velocity and its destructive nature. These impediments would act as traps for the silt and could be developed over time into agricultural areas of value.

Looking at satellite images of the lake there appears to be a large growth of aquatic growth; possibly water hyacinth (?) that is starting to dominate the southern part of the impoundment. This does need to be removed to a great extent. There are uses for the plant as cattle food, both fresh and as a silage constituent. It is though laborious to remove, harvesting sounds better and makes the task seem more worthwhile.

Large Scale.

The need to channel much of the flood water away from the lake and habitations during the peek periods of rainfall could be achieved by putting a set of water channels in place on the hillsides that allowed for heavy rains to be moved away from the ‘at risk’ areas. This might allow ad hoc new fresh water storage capacity to be created; or at least water bodies suitable for livestock use.

Water Harvesting.

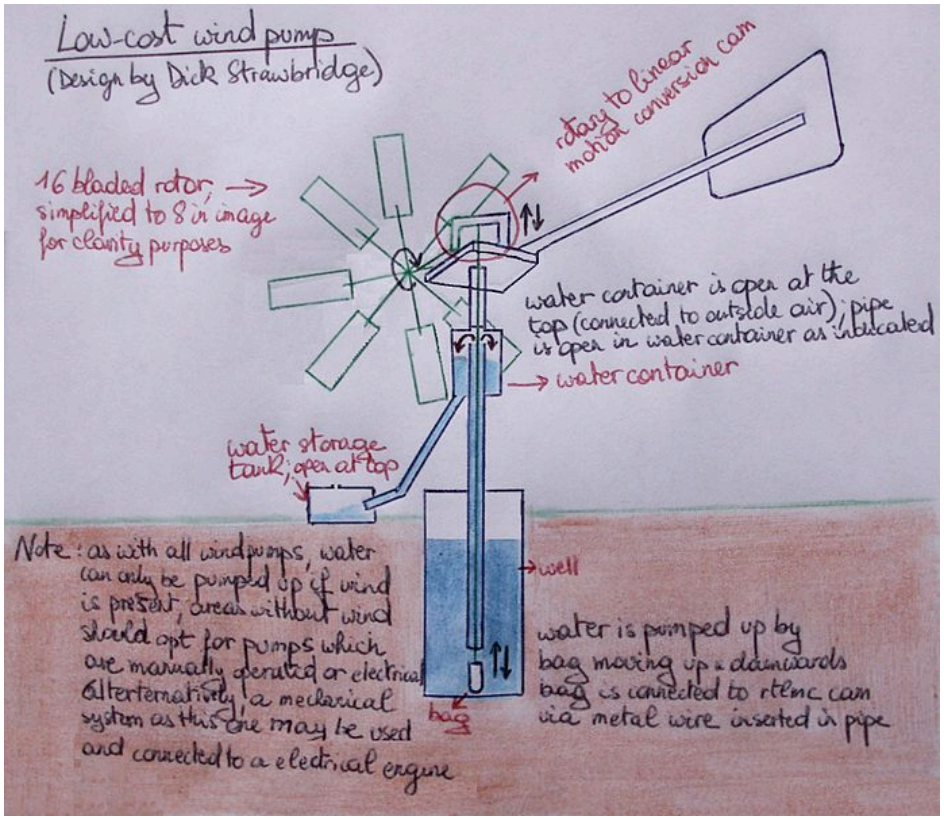
The majority of methods are well known though there may be problems for people taking the first steps, also in some communities the ownership of personal supplies of near perfect water can be an issue with regard to protection of property.

The most valuable supplies are from roofs, followed by water harvesting in plastic sheets, either laid in ground hollows or suspended from tree branches and piped to storage.

Water storage vessels should always be covered, to avoid insect/mosquito breeding infestation, and have two emptying points the lower one to remove sludges, dust from roofs and leaves. The second outlet tap to be higher up the vessel to take water for household use.

Containers for water storage should be as close to it place of use as possible and as large as is convenient. They can be at ground level or below ground. The second type of storage is likely to be considerably more expensive and harder to keep clean.

Types of vessel suitable can be cement/brick and plastered/waterproofed internally, plastic drums, cleaned oil barrels. If any container is thought too small they can be joined to other vessels by piping so as to increase storage capacity. The creation of 'tank farms' may be considered desirable for remote communities and isolated buildings.



Idea of low cost wind pump.

Water Distribution.

The lowest cost of distributing water over large distances is by gravity; the problem of filling the tank and the actual construction cost of a raised water storage vessel or water tower being the major factors.

Filling tanks can be achieved over short lifts with wind driven screw pumps. Electric pumps are now inexpensive and, if not abused, trouble free. Solar and wind power generators can be used to operate the motors. The costs of such mechanisms can be the biggest factor in deciding on more rudimentary methods. Maintenance can also require outside contractors which can be costly and technicians hard to get when required.

Water tanks may be made out of timber and butyl rubber sheet; they can be built by a competent carpenter. The main expense in such a construction being the rubber sheeting. Cement and brick constructions are, in many locations, the best construction materials, but are usually the most expensive options. Iron or galvanised sheet can also be used very satisfactorily if maintained correctly.

Water distribution can be achieved over considerable distances to standpipes connected to the tank by simple flexible plastic piping. This would allow for less time being spent water carrying on a daily basis.

Sanitation.

In European eyes the natural value of western style sanitation is obvious, elsewhere in the world the collection and treatment of human wastes has a different set of issues to overcome. Local, ethnic and religious taboos are strongly held by people in some areas. In many areas there is a phobic reaction to the collection of human waste in pits or containment systems. This can prevent system management such as emptying or employing the wastes for purposes such as agriculture. Sanitation has to be customised to local needs and customs and at least with the support and involvement of the community as stakeholders. This support being vital to the goal of reducing defecation in unregulated areas and the use of poor facilities that lead to health and pollution risks.

Pit latrines being the most common facilities need to be sited if possible so as not to course pollution to water resources. The design of such facilities needs consideration with the use of twin pips as an ideal option. The use of ash and vegetable leaves amongst the human waste can within a short period of one pit being closed and the other opened for business being excavated not as foul smelling sewage, but pungent compost.

The use of raised floors and tanks so as to facilitate the emptying and removal of waste to a designated area for composting is another option, but needs to be undertaken on a regular basis to avoid foul odours and liquids over topping the containers that would stop the facilities use altogether.

The smaller the number of persons using a toilet facility the better for its upkeep as there can be a personal, family, or group pride in its proper care and function.

The treatment of human waste and its liquid fraction can be achieved using plant matter such as reeds and sedges in reed beds that take up much of nutrient into their biomass.

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* denotes publication available in the Clean Rivers Trust library.

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Appendices.

1.

The Republic of Uganda

KAKINGA COMMUNITY WATERSHED MANAGEMENT AND SANITATION PROJECT

CONCEPT PAPER BRIEF

Project Title *: Kakinga Community Watershed Management and Sanitation Project*

Project Site *: Kakinga Watershed Area, Sembabule Rural District, Uganda*

Executing agency: *Community Watershed Management Unit/District Forestry Services*

And Kakinga Community Watershed Management Group (KCWMG)

Proponent *: Clean Rivers Trust - UK*

Project duration *: Two (2) years*

Project Description

Sembabule Rural District of Uganda is comprised of three (3) community watershed areas totaling to 621ha of both land and water sources. These watershed areas enclose three man-made water dams, of which Kakinga Water dam is the biggest and the oldest. These water dams are rain fed during April-May and October – December rain seasons every year. Due to severe scarcity of water springs and underground water sources in Sembabule District and its location within Ankole-Masaka cattle corridor, the area is characterized by relatively longer dry spells between January and April and between June and early November, a period during which household water ponds completely dry up and households become totally dependent on the major community water dams. This results into over exploitation of the major community water resources and excessive trampling of the surrounding vegetation by both humans and their domestic animals. Consequently, over the years, areas surrounding Kakinga water dam have been greatly degraded so that during rainy seasons, run off from up hills result into heavy deposition of soils and foreign materials into the dam causing flooding to the neighboring communities and related hazards. Labor is periodically mobilized by the community to excavate deposited soils/silt from the dam manually, not only to maintain clean water, but also to have enough of it reserved to take the community and their domestic animals through the dry seasons. However, with the unfolding effects of climate change, the intensity of rains has increased so much so that the deposition into Kakinga water dam can no longer be managed by manual excavation. Our community therefore sensed the need to significantly reduce the amount of deposition into Kakinga water dam not only to reduce flooding and its effects on the community, but also to make the water resources of the dam more suitable and convenient for human and animal consumption through the following undertakings;

- Re-vegetate Kakinga water dam banks with soil conserving indigenous tree species and a suitable surface cover vegetation

- Establish and construct convenient, safe and suitable separate water harvesting points for humans and domestic animals
- Establish water pumping machinery, delivery pipes and related household water supply systems to pump water to distant homesteads in order to reduce human and domestic animal pressure and contamination of the dam
- Introduce suitable and affordable household-based water purification technologies
- Avail affordable and appropriate rain water harvesting and treatment tools to suitable homesteads including water storage facilities
- Design and disseminate information about safe water harvesting, storage and purification practices

Project Objective(S)

- To significantly improve the hygienic standards, amount, sustainability, safety and accessibility of Kakinga dam Water resources to the community of Kakinga Watershed area
- To increase, re-stock, enrich and sustain the vegetation cover around Kakinga water dam banks not only to reduce run off in to the dam, but also to restore natural habitats of aquatic and terrestrial animal species that depend on water for reproduction and survival

Community benefits

- Improved health and reduced susceptibility to water borne diseases
- Increased and sustainable water supply
- Reduced community venerability to flooding
- Reduced risks of drowning by humans especially children and domestic animals during water harvesting

Community participation

Kakinga Watershed Management and Sanitation Project will be coordinated by the District Forestry Services under the Community Watershed Management (CWM) unit together with competent project partners duly assisted by the Kakinga Community Watershed Management Group (KCWMG). The latter is composed of six (6) community members and was formulated to monitor, advice and report any illegal activities by community members to concerned officers and its role will be crucial in protecting, harmonizing and sustaining project undertakings and properties during and after the project.

Project Objectives, Outcomes and Planned Outputs	
Objective 1: To significantly improve the hygienic standards, amount, sustainability, safety and accessibility of Kakinga dam Water resources	
Outcome 1.1: *Achieve the lowest level of water contamination during water harvesting by community members and their domestic animals*	
Output 1.1.1: *Construct separate water harvesting points for both humans and animals, separated by the maximum possible distance*	• Contract water engineer/constructor • Fund planning and construction works
Output 1.1.2: *Install water pumping machinery, avail appropriate storage and water purification/treatment technologies*	• Procure appropriate storage and water treatment equipment, avail them to suitable homesteads and educate community members on proper use.
Output 1.1.3: *Regular supervision, monitoring and sensitization of community members on the usefulness and appropriate utilization of project interventions during and after the project*	• Develop suitable teaching materials • Avail teaching aids • Strengthen the capacity of KCWMG to carry out its advisory, monitoring and reporting roles
Objective 2: *To increase, re-stock, enrich and sustain the vegetation cover around Kakinga water dam banks not only to reduce run off in to the dam, but also to restore natural habitats of aquatic and terrestrial animal species that depend on water for reproduction and survival*	
Outcome 2.1: *Significant reduction of surface run off into the existing water dams and the resultant flooding and its effects to the livelihood of Kakinga Community as well as increased biodiversity along the banks*	
Output 2.2.1: *Re-vegetate, enrich and sustain 12ha of degraded Kakinga water dam banks with indigenous soil conservation tree species and a suitable ground vegetation*	• Design re-vegetation work plan and budget • Fund re-vegetation and maintenance of

cover	banks • Protect re-vegetated banks against trampling/physical damage • Strengthen the capacity of KCWMG to carry out its advisory, monitoring and reporting roles
<u>Output 2.2.2:</u> *Protect re-vegetated banks against trampling/physical damage*	• Erect suitable live fence re-enforced by barbed wire

MAP SHOWING LOCATION OF KAKINGA WATER DAM

SSEMBABULE DISTRICT SUB-COUNTIES

