Tweed Kenya Mentoring Program
Safe Water Project Report
Obambo-Kadenge

The aim of the Safe Water Project was to install a water filtration system in the community of Obambo-Kadenge that would provide low cost, high quality drinking water from their existing polluted water source. Obambo-Kadenge is situated in western Kenya, 11 km west of Siaya, and 24 km from Lake Victoria.

Safe Water Projects are part of the Tweed Kenya Mentoring Program and are funded through Tweed Shire Council staff contributions and other funds raised in the Tweed community.

The first Safe Water Project was implemented by Dr Marty Hancock, Council's Floodplain Projects Officer, who traveled to Kenya in March 2007 and Olita Ogonjo, Desk Coordinator in Nairobi.

Project Design

The water filtration system was designed around a Skyjuice Skyhydrant unit. This unit uses a Memcor membrane microfiltration filter that filters water to World Health Organisation standard removing all disease-causing organisms. The filter has a pore size of 0.1 micron and even turbid water is turned into crystal clean drinking water. Dirty water enters the filter under the pressure of gravity and is cleaned by simple mechanical agitation.

The filtration system also included a pump to take water from the dam to a header tank, a kiosk to house filters and dispense filtered water and a storage tank.

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Arriving in Kenya

Kenya is a rich and colourful country in terms of its people and wildlife. It is also a developing country with major infrastructure and economic challenges. The capital is Nairobi and at first glance it is a modern city with the typical tall building skyline. At ground level the traffic, overcrowding, water and sanitation issues are more typical of a third world African city. Marty found the first few days in Nairobi a real culture shock but soon settled into Kenyan life with the assistance of Olita.

Marty's first task in Kenya was to arrange for the release of the four Skyjuice filters from the storage company and customs. There were many forms to fill out and much walking back and forward between buildings up to a few km apart in the equatorial heat. Finally all was in place and the filters were received and ready for transport to Obambo.

Travelling into Rural Kenya

Obambo-Kadenge is a 10 hour bus trip from Nairobi along a major highway in a very bad state of repair. Marty felt like he had been shaken to pieces by the time he arrived in Kisumo, the third largest city in Kenya on the edge of Lake Victoria. He then travelled NW a further hour to Siaya, a small rural town.

The only transport available from Siaya to the village of Obambo was Boda-Boda (bicycle taxi). The 11km along a rough dirt road takes about 1 hour. Although sitting on the back of a bicycle with all his baggage was not the most comfortable, Marty found the local transport a pleasant change from the overcrowded buses.

Obambo-Kadenge

The community of Obambo-Kadenge is a rural area relying on subsistence agriculture. There is a small central market area but most homes are scattered on small parcels of land. The typical homestead consists of a few mud and cow manure walled dwellings with thatched or iron roofs. The buildings are arranged in semi-circle with livestock (mostly cattle and chickens) in the centre. Most homes have no running water or electricity. People bath in the open out of a basin and toilet in the bush.

Marty lived with a typical village family just a few hundred metres from the project site. Although their were none of the modern conveniences that most Australians take for granted Marty enjoyed the opportunity to learn about the culture and live and eat like a Kenyan. Marty said that it was difficult to think of water the same way again when he realised that every drop of clean water he had been given for bathing had to be carried by bicycle a distance of 12km.

Water Supply

The community of Obambo-Kadenge lies on the southern slope of a shallow valley that drains West towards Lake Kanyanbola and then on through a wetland to Lake Victoria. The community has several potential water sources. The best water is rain water but most homes do not have iron roofs or tanks and so rainwater harvesting is limited. Water is occasionally collected from the lake but it is too far for everyday use. There is bore water available but it is too salty for human consumption and too hard for washing.

Most water is collected from Gona Dam. The water is fresh but very turbid (>400NTU). It is also polluted by human and livestock wastes and there is no sanitation in the catchment area. Everyday women and children walk km's to the dam to collect the filthy water. They return home carrying up to 25L on their head, a task that requires much strength and practice as Marty discovered.

Without major infrastructure development and reticulation schemes the best solution for the Obambo-Kadenge community is to treat the water of Gona Dam. Gona Dam consists of two dams approximately 0.5 Ha each. The dams are positioned on the floodplain and constructed like a turkey nest dam with banks raised above the floodplain. Marty drafted a water flow diagram of the dam area to determine how they functioned. He found that the dams functioned very poorly in terms of collecting run-off water and

storage. The bottom levels were not much above the floodplain. The dam walls were broken in several places. This appeared to be due to a combination of cattle erosion and flooding. Overall the dams were in a poor state of repair and were very ineffective.

Dominion Farms is a large rice farming venture backed by American interests approximately 10km to the west of the project site and well resourced with machinery and equipment. Marty, Olita and the Committee representatives visited the operation and confirmed with Graham Vetch, Director of Dominion Farms, that he was prepared to provide machinery if the Committee could find the funds to pay for petrol.

Implementing the Safe Water Project

One of the first steps for implementing the Safe Water Project was the development of a representative Committee from the community. Olita did a great job of pulling this together and when Marty arrived the Committee had been instrumental in overseeing the site selection and land acquisition, construction of the kiosk, tank stand and windmill.

Olita and Marty spent hours with the Committee discussing security, maintenance, operation and water costs. The Committee was a bit overwhelmed by the technical aspects of construction and had very little experience with managing projects, but were motivated to see the Safe Water Project succeed.

Challenges

Project Management in a poor, rural Afican community is full of challenges. Equipment and Tradesmen provided one of the major challenges. Basic tools such as screw drivers, hammers and spanners were not readily available, and even the plumber and builder employed by the project had very few tools. With such a limited range of items at our disposal, undertaking the construction of a water filtration system became a huge challenge.

The Committee selected a 'qualified' plumber by the name of Edwin from several applicants, a nice young fellow who was keen to help. Edwin was, unfortunately, not well equipped with tools and relevant experience.

After going through the installation with Edwin, Marty realised that this project was way out of his past experience and spent much of his time working closely with Edwin to complete the plumbing.

Plumbing in Kenya is made more difficult by the fact that most plumbing is done in GI. The system Marty designed was predominantly GI around the pump, tanks and filters and PVC running the distance from the pump to the Kiosk. Another challenge: plumbers in Kenya have to cut thread for every join of GI pipe with a hand held threading tool. This was incredibly slow and made what in Australia would have been a one day job into 5 days of cumbersome and challenging plumbing.

The other major challenge was pumping water to the header tank. Olita discussed the pumping options with several businesses in Nairobi and after discussion with the Committee decided that petrol would be too expensive, and that a wind generator and electric pump would be the most sustainable option. A business by the name of Genetron was contracted to build a windmill and install a generator, charge controller, inverter, battery bank and electric pump.

On Marty's arrival the windmill and generator were installed and the pump they had brought out from Nairobi was a small 0.5 hp pump that would not pump anywhere near the volume required.

After a long discussion late into the night, Genetron offered to purchase a petrol pump for the project and redesign the wind system.

A 5.5 hp Honda petrol pump was purchased in Kisumo the next day. After struggling for the best part of the day with priming the pump the 4000L tank was filled in under 30 minutes.

For future projects the pumping will have to be carefully considered and the cheaper petrol pump option reconsidered.

Filter Installation and Training

The filters were easy to install although connections were a bit cumbersome. They also had a few problems getting the top screw on caps to seal well. The filters worked well from the start and removed all turbidity from the water.

Marty spent several days going through the filter maintenance and operation with the operators. The language barrier made progress slow but by the time Marty left they were operating the filters well. The operators will be testing and recording the filter flow rate regularly and this will assist with providing advice on filter cleaning and rejuvenation frequency. The biggest problem is the high turbidity which will mean more frequent cleaning than is normally required.

Training was undertaken at three levels. The Committee received a general overview and some detail on the most critical aspects of filter and pump maintenances. A small subcommittee, along with the three Committee-selected operators, received comprehensive training. Skyjuice provide operation manuals and copies of these were provided to the Committee and operators.

Opening Day!

The opening day for the Safe Water Project was very rewarding and a huge relief for Marty. The plumbing and pumping issues were resolved sufficiently to allow full operation of the filters and on Saturday 17 March the kiosk was opened and people were collecting water to take back to their homes.

It was a real pleasure for Marty to watch the surprised and happy faces collecting clean water.

On Saturday afternoon a ceremony was held with Marty as the Guest of Honour. The ceremony was a series of skits, songs, dances and speeches. Marty had an interpreter for the speeches and was proud to hear village leaders describe what the project and safe water meant to them. The significance of safe water to the overall health and prosperity of the community was not lost on the leaders.

Kenya has major water quality and sanitation issues, particularly in rural areas. There is certainly the need if further Safe Water Projects can be developed. Marty's experience provides valuable insights on how these grass-roots level projects can be implemented through the desire of one community to help another.

Safe Water Project Budget

Income	
Tweed Shire Council Staff Contribution Scheme	$7,940
Tweed Community	$4,110
Major Sponsors	$14,500
Total	**$26,550**
Expenses	
Skyhydrants 4 @ $3500 (discounted as Skyjuice contribution)	$5,500
Airfare, insurance	$2,024
Freight Brisbane to Nairobi	$612
Windmill	$7,700
Tanks	$1,790
Construction and labour	$5,354
Plumbing	$1,340
Freight and taxes	$480
TKMP	$500
Accommodation & travel	$1,250
Total	**$26,550**

Our major sponsors and supporters included Tweed Shire Council and staff, Skyjuice Foundation, International River Foundation, Murwillumbah Seventh Day Adventists Church, Hayes Steel, Central Engineering, Solo Resource Recovery, Scandinavian Cone Company, Dickinsons, Martin Albrecht, Murwillumbah Central Rotary Club, Native Foresters and numerous community members.

The Tweed Kenya Mentoring Program and the community of Obambe-Kadenge thank you.