

Water for Rural Communities

How Kenyan rural communities can create their own water supplies with assistance from the Water Services Trust Fund



Kalambani pump house at the Thua riverbed.



Kiosk attendant's record of water sold.



Early morning at one of the 81 water kiosks/tap stands of the 6 water projects

**Erik Nissen-Petersen, Birgit Madsen and Munguti Katui-Katua
for**

Danish International Development Agency (DANIDA)

2006

Technical handbooks in this series :

<u>Titles</u>	<u>Contents</u>
1 Water for rural communities	Lessons learnt from Kitui pilot projects
2 Water supply by rural builders	Procedures for being rural contractors
3 Water surveys and designs	Survey, design and cost of water projects
4 Water from rock outcrops	Rock catchment tanks, masonry and earth dams
5 Water from dry riverbeds	Intakes, subsurface dams, weirs and sand dams
6 Water from roads	Rainwater harvesting from roads
7 Water from small earth dams	Ponds and small earth dams built manually
8 Water from roofs	Various types of roof catchments for domestic use

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Fetching water is one of this little girl's daily chores instead of going to school until her parents decide to improve their water supplies.

Acknowledgements

I gratefully acknowledge Ms Birgit Madsen of the Royal Danish Embassy in Kenya and Eng. Simitu, Deputy Director of Ministry of Water and Irrigation, who contracted ASAL Consultants Ltd., to implement 2 pilot water projects and later extended the pilot projects to include 4 other water projects for the new Rural Water Supply & Sanitation Programme (RWSS) in Kitui and Taita-Taveta in December 2003.

In addition, 120 committee members were trained in community organisation and financial management. They are now managing their water projects and the sale of water that amounts to about Ksh 500,000 every month. Furthermore, 113 builders have been trained as self employed contractors in construction of water projects.

The successful implementation of this work in less than 2 years is due to the excellent support and co-operation of Eng. F.K. Kyengo, Programme Coordinator of the Kenya Water and Sanitation Programme (KWSP) and Eng. Mutuku Nzesya, District Water Officer of Kitui District.

Many thanks are due to Dr. Munguti Katui-Katua for his tireless efforts in motivating and training the several thousands of community members who participated in the implementation of the water projects. Many thanks are also due to my 30 contractors and the hundreds of community members they employed to assist in constructing the water projects.

I would also like to express my thanks and admiration for members of the respective communities where the 6 projects were undertaken. They rose to the challenge by contributing local materials, long hours of hard physical labour and a willingness to be trained to manage and maintain their respective projects. As a result, some 68,000 people living in the semi-arid districts of Kitui and Taita-Taveta now have piped water within 2 kilometers of their homesteads. With their co-operative involvement, they have immensely contributed to transform themselves from marginalised communities into communities with better health and a far improved standard of economic wellbeing. As is said in Kiswahili "**MAJI NI MAISHA**" – "WATER IS LIFE".

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Acronyms

ASALCON	ASAL Consultants Ltd.
BQ	Bill of Quantity
CMTS	Community Management & Training Services
CPC	Community Project Cycle
DANIDA	Danish International Development Agency
GenSet	Generator Supplying Electricity
GI	Galvanized Iron
KWSP	Kenya Water and Sanitation Programme
MC/WSP	Main Contractor/Water Services Provider
RWSS	Rural Water Supply & Sanitation
WSB	Water Services Board
WSP	Water Services Provider
WSTF	Water Services Trust Fund
WUA	Water Users Association
USAID	United States Agency for International Development

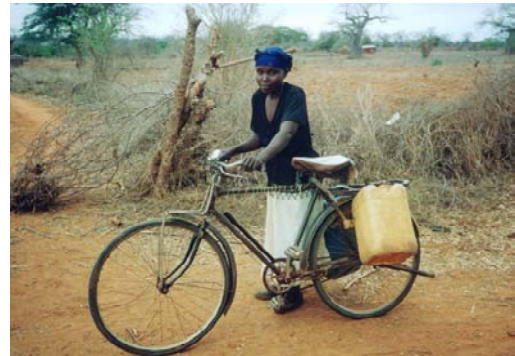
ASAL Consultants Ltd.'s field team of contractors

Community Trainer Dr. Munguti Katui-Katua
Civil Eng. Catherine Wangui Wanjihia
Eng. Mutuku Nzesya
Eng. Soita Rosaria Lumonya
Eng. Solomon Mulu
Eng. Brayson Mwambi
Field Supervisor Jacquelyne N. Ndoo
Site Manager Francis Nganga
Site Manager Paul Kariuki
Site Manager Isaac Kariuki
Site Manager James Manyili
Store-keeper Beatrice M. Ngoto
Store-keeper Sandra Ruth Ndoo
Store-keeper Francisca Mukwekwe
and some 60 artisans working as sub-contractors

Photos from the field



Water can now be bought at Ksh 4 for a jerrycan of 20 litres within 2 km of every homestead in the project area.



A woman fetching water on a bicycle bought from her earnings from working on the water projects.

Prologue

A pro-poor livelihood approach to community participation in rural drinking water development has been field tested in implementation of the Danida funded water projects (2003 – 2005) in Kitui District by ASAL Consultants Ltd. The programme is a pilot project to the joint GOK/DANIDA/SIDA funded by Kenya Water and Sanitation Programme (KWSP).

In applying a livelihood approach, development of water is seen in a holistic and context specific perspective, taking gender-sensitive cultural, political, social and economic parameters into consideration.

The approach applied is innovative with an overall objective of empowering marginalised community members and transforming them from vulnerable groups into a development resource.

The overall guiding principle to the approach is enhancement of socio-economic development through improved clean water supply.

Improved livelihood through ensuring higher income by job creation and job opportunities in implementation of the water projects is seen as a vital strategy to pursue pro-poor economic growth and human resources development.

One of the principal activities has been employment of both male and female community members for the production of low-cost raw materials for construction of the water facilities. The result of this is, besides bringing economic development to the local community, a substantial reduction in construction costs including reducing risk of corruption.

Improved income opportunities in poor communities have a direct impact on the financial capacity to ensure sustainability of the water facilities. Likewise, the cost difference between the purchase of low cost community produced raw materials and raw materials purchased at market price should be seen as a community contribution.

Another important activity has been the employment of male and female community members as workers and trainees enabling them to acquire skills training in both practical and theoretical terms.

In addition, the Water User Association members (WUA) have been trained in various aspects of business management.

The main objective of this handbook is to highlight lessons learnt in application of a community participation methodology enhancing economic development. This handbook will thus include gender specific data on community participation such as employment and training data.

Besides applying an approach where creation of employment and enhancement of income are major variables the need to see water as an economic good has been stressed throughout project implementation. WUAs have been trained to run the water facilities as businesses, where profit generating is vital in order to employ staff, ensure operation and maintenance, plan and pay for extensions.

The field-testing has been carried out in close consultation with undersigned. The Managing Director of ASAL Consultants Ltd., Mr. Erik Nissen-Petersen, has employed Dr. Munguti Katui-Katua from Community Management and Training Services (CMTS) (E.A.) to develop and conduct the management training modules for both WUA and technical employed community members and carry out follow up visits to project sites.

A major objective of the training has been to enable the artisans trained in business and management skills to obtain status as registered entities capable of being contracted as entrepreneurs and support organizations (SO) for the implementation of the new strategies for water sector development and in particular for the enhancement of their employment capacity within the economic development of their specific local areas.

The findings, conclusions and recommendations of the challenges met in applying a new approach to community participation is documented and further elaborated in this handbook produced by Dr. Munguti Katui-Katua, Erik Nissen-Petersen and undersigned.

The intention is that the pilot project findings on community participation will contribute towards paving the way for a sustainable livelihood development strategy for community participation in rural drinking water development.

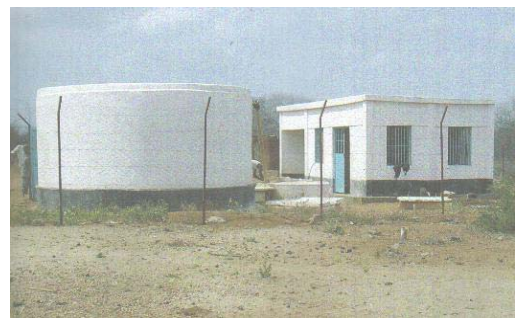
The ASAL Consultants Ltd. field team, consisting of highly dedicated and skilled staff members, has made a valuable and successful contribution in implementing the pilot testing of the approach.

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Photos from the field



A woman at her waterhole fenced with thorny branches at the Thua riverbed.



Water from the same place at the Thua riverbed is now pumped 40 km inland.

Chapter 1 - Preparations for construction and training

1.1 Gender equality in water development

The water sector is regarded as a highly relevant sector for rural women in fulfilling their practical gender role as the main providers of water for domestic use. Empowerment of women to perform their gender role in an efficient way is therefore important in order to secure sustainability in rural water use and water resources management.

In water use, it is mainly women who collect, carry and manage water for domestic use. In water resource management, women play a further and substantial role through their productive activities in subsistence and cash crop production.

Accordingly, there is a need to address gender inequalities in terms of access to, and control over water development resources. A gender perspective must be applied.

Therefore, and in order to bridge the gender gap, rural water projects should be sensitive to gender aspects, and specifically ensure women have better access to affordable and safe water, more time for productive activities, hence more nutritious food, improved health and improved livelihoods.

In the planning and design of projects, it is important to ensure responsiveness to the needs and interests of both women and men. Gender analysis and gender impact assessments should be institutionalized as common practice and thereby generate sex disaggregated data and gender specific analytical information as baseline data for accurate assessments and planning purposes.

In the project design gender specific activities should be explicit and visible in order to enhance accountability to gender equality goals. These activities could include various gender mainstreaming and women empowerment aspects such as conducting of gender specific studies, carrying out gender specific training needs assessment and implementation of capacity change activities through women specific skills training and applying gender screening of procedures and guidelines. It is essential that gender responsiveness is reflected at institutional, technical and financial levels.

With gender specific and sex disaggregated related baseline data, gender sensitive quantitative and qualitative indicators and established standards to measure the process of change should be developed and used in participatory impact monitoring.

In order to meet women's specific needs and interests, and in particular the needs of the most disadvantaged women such as female heads of households, various concerns such as the gender disparity of property rights over water use should be taken into consideration, willingness and ability to pay for water which determine access to and control over water source and water use. Being a scarce resource, water use and water resource management requires efficient management at all levels including the household level as the lowest appropriate level.

For women to participate in community management the demand on women's time and labour use need to be considered together with their bargaining power, .i.e. to what extend are their voices heard in the decision-making processes.

In water resources management women prioritize domestic water supply and irrigation structures close to their households in order to more effectively divide their time between productive and domestic responsibilities. Accordingly, their understanding of and influence in water resource management initiatives should be enhanced.

Women tend to play a less public role in community decision-making structures than men.

Projects that seek to establish and/or strengthen local capacity for planning, construction and management of water resources based management should therefore mainstream the gender dimension.

The gender dimension of issues like time and location of meeting should be considered in order to assess if they encourage women's participation and if meeting agenda's include and reflect women specific needs and interests.

Mainstreaming the gender perspective into water resource management strategies should pay attention to the complex relationship between productive and domestic use of water resources. This is relevant in development of catchment area strategies and capacity building of Water Resources User Associations (WRUA).

Gender equality aspects have, as core development issues, been mainstreamed in the implementation of the pilot projects. Likewise, gender equality has also been seen in relation to human rights issues.

1.2 History of Danida/RWSS's Pilot Water Projects in 2003 (Phase 1)

On 10th December 2003, Royal Danish Embassy (RDE) with consent from the Ministry of Water and Irrigation (MoWI) contracted ASAL Consultants Ltd. (ASALCON) to implement two pilot projects as a **Private Water Service Provider (PWSP)** for the **Rural Water Supply & Sanitation (RWSS)** programme in accordance with the Water Act of 2002. The reasons for this assignment were to :

- 1) Gain practical experience by constructing the 2 pilot projects together with their communities while also training them in operation and maintenance.
- 2) Fill the gap in construction of water projects while the ministry was shifting to the new policy of the Water Act of 2002.

The pilot projects were implemented from December 2003 to August 2004 as follows :

	Intakes	Km of pipe lines	Water tanks	Water kiosks	Wash stands	Cattle Troughs	Latrines	Rehabilitation
Kalambani-Mutha-Kitui	Shallow borehole at the Thua riverbed 2 pump houses	25 km	6	5	5	5	5	1 rock catchment dam and 2 spring intakes with 22 km of pipe lines
Mlilyoni Taita-Taveta	2 spring intakes in Sagalla	15 km	1	29	2	2	2	

Kalambani-Mutha Water Project in Kitui has a population of 15,000 people. The total cost was Ksh 29,410,308, of which Ksh 4,643,810 (15.8%) was valued as local labour and materials provided by the community, including Ksh 1,217,790 for purchase of the communities' labour and materials. That is a donor cost of Ksh 1,961 per person.

Mlilonyi Water Project in Taita-Taveta has a population of about 5,000 people. The total cost was Ksh 7,347,077, of which Ksh 1,295,646 (17.6%) was valued as local labour and materials provided by the community, including Ksh 304,754 paid in cash to them for their labour and materials. That is a donor cost of Ksh 1,469 per person.

The methodology of buying local labour and materials for about 50% below market cost from the communities reduced the construction cost. Another big advantage was allowing communities to earn cash instead of the project demanding 10% cost-sharing from them. The difference between people paying and receiving cash in poor rural communities is enormous in terms of improved livelihood and development.

1.3 Four additional Danida/RWSS Water Projects (Phase 2)

On 30 September 2004, RDE with the consent of MoWI contracted ASALCON to implement 4 more water projects in Kitui District using the same methodology as in the 2 pilot projects. The required amount, Ksh 116,120,744, was donated by the RDE. One of the 4 projects was separated into two projects, namely *Kisasi Water Project* and *Katwala-Mbitini Water Project*.

The surveys, designs, construction works and training were completed after 10 months. The applied methodology of involving the communities in private construction enterprises reduced the construction cost from an estimated Ksh 116,120,744 to Ksh 93,993,418. Some of the money saved has been used for producing this series of handbooks.

However, the last part of the *Ikoo-Imwatine Water Project* was completed for Ksh 5,5 millions that was financed by the Kenya Water & Sanitation Programme (KWSP). The project was handed over to the community on 6th March 2006

1.4 Data and Socio-economic Profiles

This section gives data, history and social-economic profiles of the 6 water projects built by ASAL Consultants Ltd. for the MoWI and financed by the RDE from December 2003 to December 2005.

The contents of this handbook are based on the experience gained by implementing these projects as models of private enterprises that can be replicated by the WSTF in Kenya and elsewhere.

The present number of people who get piped water within 2 km of their homesteads is :

Projects	Number of :	People	Schools	Clinics	Markets
Kalambani-Mutha-Ndakani Water Project		18,200	9	1	6
Kisasi Water Project		13,898	5	1	5
Katwala-Mbitini Water Project		17,372	13	2	7
Mililuni-Kitho Water Project		5,698	4	1	4
Ikoo-Imwatine Water Project		8,462	12	2	10
Mlilonyi Water Project in Taita-Taveta		4,397	3	1	3
Total		68,027	46	8	35

The survey, design and construction works included the following structures :

Water Project	Water source and intakes	Km of Pipeline	Number of water tanks	Number of water kiosk/stands	Number of cattle troughs	Number of wash-stands	Number of latrine slabs
Kalambani-Mutha-Ndakani	Riverbed with 2 pump-houses	40	6	10	5	5	200
Kisasi	Riverbed with 1 pump-house	16	3	10			
Katwala-Mbitini	Riverbed with 1 pump-house	23	3	11			
Mililuni-Kitho	3 spring intakes and a wind-pump	15	4	10	2		200
Ikoo-Imwatine	Riverbed with 1 pump-house	48	6	11			200
Mlilonyi	2 spring intakes	15	1	29	2	2	
TOTAL		157	23	81	9	7	600

Health and Sanitation

Water projects	% with latrines	% without latrines	% with waste pits	% without waste pits	% boil drinking water	% do not boil drinking water
Kalambani-Mutha-Ndakani	48	52	60	56	46	51
Kisasi	64	17	75	68	74	17
Katwala-Mbitini	64	17	75	68	74	17
Muliluni-Kitho	55	45	24	72	50	42
Ikoo-Imwatine	42	58			60	56
Mlilonyi						
Average	54.6	37.8	58.5	66.0	60.8	36.6

Source : appraisal by Development Impact Consulting (DIC)

1.5 History of the six water projects

The Kalambani-Mutha Water Project was constructed by Kitui County Council in 1954 and functioned well until its collapse in 1974. From 1975 various attempts were made by Rural Development Fund (RDF), European Union (EU) and Action-Aid to revive it. They all failed.

The RDE and the MoWI contracted ASALCON to rehabilitate the project and to extend it from Mutha village to Ndakani village. The cost of construction and training was Ksh 40,460,803, including an estimated value of Ksh 5,787,369 (14.5%) for local labour and materials. The cost per person is thus Ksh 40,460,803 / 18,200 people = **Ksh 2,223 per person.**

The community organized itself into a self-help group and registered with the Ministry of Culture and Social Services (MoCSS) in June 2003. The group elected an interim management committee to oversee the implementation of the project. Sub-committee members mobilized community members during meetings and project activities.

The Water User Association (WUA) has been trained in leadership and financial management by Community Management & Training Ltd. (CMTS). The WUA is in the process of registering with the Attorney General's Office as an association. Since August 2005, the WUA has had several visits and contacts with the Tana Water Services Board (TWSB) to explore their role as a Water Service Provider (WSP).

The WUA recruited 15 skilled artisans and 62 trainees, half being females, to assist with the construction works. Many of them were trained to become self-employed contractors in line with the water sector reforms.

The Mutha area is classified as arid and semi-arid (ASAL) with very erratic and unreliable rainfall. Temperatures occasionally exceeding 40°C and high evaporation rates limit agricultural production to indigenous livestock. Mutha is a major livestock center dealing in livestock from the Orma/Somali people from the East. The population is sparsely distributed with only 2 persons per km².

Kisasi Water Project was constructed by Kitui County Council in 1962 but collapsed in 1992. The community requested the Council several times to rehabilitate and take over management but was turned down. The community organized itself into a self-help group and registered with the MoCSS in 2004.

The RDE and MoWI contracted ASALCON to rehabilitate the project. The cost of construction and training was Ksh 20,690,183, inclusive an estimated value of Ksh 2,227,398 (11%) for local labour and materials. The cost per person is thus Ksh 20,690,183/13,898 people = **Ksh 1,508 per person.**

The WUA has been trained in leadership and financial management by CMTS and has applied to register with the Attorney General's Office as an association. The WUA has had several visits and contacts with the TWSB for the purpose of becoming a WSP.

The WUA recruited 12 skilled artisans and 54 trainees, half being females, to assist with the construction works. Many of them were trained to become self-employed contractors in line with the water sector reforms.

The Kisasi area has the highest agricultural potential of the 6 water projects in the semi-arid highland of Kitui District. Agricultural production is concentrated on rearing livestock and subsistence farming of maize, cow peas, beans, pigeon peas and green grams. Kisasi is also a livestock center being situated on the trading route from eastern to central Kitui.

Katwala-Mbitini Water Project did not have any water projects until September 2004 when ASALCON was contracted by the RDE and MoWI to construct the project.

The cost of construction and training was Ksh 20,690,183, inclusive of an estimated value of Ksh 2,227,398 (11%) for local labour and materials. The cost per person is thus Ksh 20,690,183/17,372 people = **Ksh 1,191 per person.**

Katwala-Mbitini are bordering Kisasi and the agro-climatic zone is similar. The WUA has been trained in leadership and financial management by CMTS and has applied for registration as an association to the Attorney General's Office. The WUA has had several visits and contacts with the TWSB for the purpose of becoming a WSP.

The WUA recruited 14 skilled artisans and 60 trainees, half being females, to assist with the construction works. Many of them were trained to become self-employed contractors in line with the water sector reforms. The Mbitini area has the second highest potential of the 6 water projects. Agricultural production is concentrated on rearing livestock and subsistence farming.

Muliluni-Kitho Water Project was started by the community in 1966 with the support of Kitui County Council. Muliluni Spring system was constructed in 1980, while Kitho springs were built from 1984 to 1989. A hand-dug well was sunk into the bank of Thua riverbed and equipped with a wind-pump and a hand-pump in 1983. In 1984, the USAID financed Kitui ASAL programme extended the pipelines from the springs. Kitui Agricultural Programme (KAP) extended the project in 1994 but the project never served the community well.

In September 2004, ASALCON was contracted by RDE and MoWI to rehabilitate the whole system, including the windpump. CMTS conducted the management and financial training of the committee.

The cost of construction and training was Ksh 10,569,888 including an estimated value of Ksh 1,318,896 (13%) for local labour and materials. The cost per person is thus Ksh 10,569,888/5,698 people = **Ksh 1,855 per person.**

In 2004, the community mandated their management committee to explore the possibilities for rehabilitation and extension. In October the same year, CMTS trained the committee in leadership and management during which the WUA formed 3 sub-committees headed by an executive committee to assist in implementation of the project.

Muliluni is an ASAL area consisting of hills with riverbeds that drain seasonal rainwater into the Thua riverbed. According to a baseline survey, some farmers grow tomatoes and onions for sale along the Thua. Majority of the farmers are subsistence farmers while 8% of the people are employed and 14% are business people. 82% of the respondents earned below Ksh 5,000 per month.

Ikoo-Imwatine Water Project was started by the community in 1972 and followed by a series of activities such as :

June	1975	A harambee fund raising meeting produced Ksh 3,500.
July	1975	Catholic Mission gave a grant of Ksh 6,060.
April	1976	District Development Fund (DDF) gave a grant of Ksh 40,000.
June	1976	Freedom from Hunger donated a water tank worth Ksh 6,000.
July	1986	EU gave a grant of Ksh 1,660,000 for completion of the project, but the design and construction work were of such low quality that the piping burst after only 1 hour of operation. Thereafter the project was abandoned until October 2004 when RDE and MoWI contracted ASALCON.

The construction work and training started in January 2005 and was completed in January 2006 for a cost of Ksh 36,415,956 inclusive Ksh 4,000,000 (11%) for local labour and materials and Ksh 5,500,000 from the Kenya Water and Sanitation Programme (KWSP). The cost per person is thus $\text{Ksh } 36,415,956 / 8,462 \text{ people} = \text{Ksh } 4,304 \text{ per person}$. This high unit cost is due to two factors : a) the long distance with poor communication to the project, and b) a very scattered population.

According to the baseline data, the majority of the respondents are subsistence farmers, of the remainder, 10% are in business, 9% are employed and 10% are casual workers. 12% of the people earned between Ksh 5,000 and Ksh 10,000, while only 8% earned more than Ksh 10,000 monthly. The rest of the people earned less than 5,000 Ksh per month.

The project area is the largest, most arid and most remote of the 6 water projects. The only means of communication is one minibus to Kitui township that leaves the area at 3:00 am and returns at 10:00 pm, although the return distance is only 150 km. There are no other means of communication when the minibus has a mechanical problem or gets stuck on the road.

Mlilonyi Water Project was one of the first two pilot projects and is situated in Taita-Taveta District. The project, which supplies water by gravity from two springs on Sagalla Hill at 3,920 feet to the arid lowland below at 2,700 feet, was started in 1973 by a local trader. It was said that although MoWI, some NGOs and Taita-Taveta Agricultural Programme (TTAP) donated 2 water tanks and some unknown number of pipes in the late 1970s, the project was uncompleted and only partly operational.

In January 2004, ASALCON was contracted by RDE and MoWI to rehabilitate and extend the whole system. It was completed 6 months later. The committee was trained in management and financial matters related to the system by a Community Trainer, Christine Guchu Katee.

The cost of construction and training was Ksh 8,642,723 including an estimated value of Ksh 1,295,646 (15%) for local labour and materials. The cost per person is thus $\text{Ksh } 8,642,723 / 5,000 \text{ people} = \text{Ksh } 1,729 \text{ per person}$.

1.6 Labour and materials bought from the communities

The 6 water projects were implemented using a new practice of contracting two District Water Engineers, some 30 experienced artisans as sub-contractors who employed about 300 local builders and trainees, half being women, for 50% of their usual salaries. The savings by paying half salaries were recorded as part of the communities' contribution towards cost-sharing and reduced construction costs.

Excavation of trenches for pipes and back-filling were implemented by several hundreds of community members, mostly women, for 50% of the usual labour cost. The savings was also recorded as the communities' contribution towards cost-sharing and reduced construction costs.

Local materials, such as hardcore (stones) and ballast (crushed stones) were made and transported to the roads and sold to the project for about 50% of the market price by mostly elderly members of the communities. The savings were recorded as the communities' contribution towards cost-sharing and reduced construction costs.

The value of the communities' unpaid services, such as drawing and carrying water and sand from nearby riverbeds to construction sites, stores and accommodation for the 30 contractors and labour for clearing bush for roads, pipelines and construction sites were delivered free by the communities as part of their contribution.

1.7 Transport and communication

Site Managers, sub-contractors and builders used local means such as bicycles, buses, matatus and hired tractors with trailers for their transportation. Each of the 6 water projects was given 8 bicycles for the site managers and senior committee members to supervise the construction activities and for attending meetings.

Only two vehicles and a motorcycle were used for management and supervision, namely a Government of Kenya (GK) pick-up for the District Water Engineer (DWE), a GK motor-cycle for the DWE's Supervisor and the Main Contactor's (MCs) private 4WD double-cabin.

Transportation of materials : transport from hardware shops, pipe manufacturers and pumps and generator suppliers to the projects' stores was either hired from these companies or from individual local lorry owners if they were cheaper.

Hardware goods were transported from the projects' stores to the construction sites by locally hired tractors with trailers that also transported builders, water, sand, ballast, hardcore and concrete blocks to the sites. The tractors were contracted to supply 6 trailer loads of materials per day for Ksh 5,000, inclusive driver and fuel.

Communication between the MC and the 6 construction sites in the remote parts of Kitui and Taita-Taveta was implemented by either the MC travelling in his car or by his assistant travelling by bus and matatu. During the many trips, cash was paid to the contractors, instructions given verbally while the site managers and store-keepers returned payments vouchers, receipts, stock taking records, etc.

Photo from the field



A strong little boy brings empty jerrycans to be lined up at the queue and filled at a water kiosk. Later, one of his parents will bring the full and heavy jerrycans home on the wheelbarrow.

Chapter 2 - First training of communities

2.1 Training programmes

In order to make the water projects self-sustainable, much emphasis was laid on practical training, *learning-while-doing*, of some 300 local artisans and trainees on the construction sites.

113 of the local builders were trained in 4 teams for 2 weeks each to become self-employed contractors by CMTS, the MC, 2 KCB Managers, a Certified Public Accountant and some sub-contractors. The venue was at ASALCON's training center in Kibwezi.

2.2 Public meetings for informing and feed-back from communities

The first training sessions took place at public meetings for the 6 communities who had presented proposals for assistance to their water projects. The meetings were called by the District Commissioner's (DC) office in order to make the meetings legal. The MC invited 20 committee members from each project for a 1 week training on management at Kibwezi and informed the committees of the conditions listed below.

The first and paramount condition was the communities would sell their local labour and local materials for half the cost to the MC and be paid in cash. The savings made would be recorded as the community's 15% contribution to the construction works.

The second condition was that the community must elect a Management Committee with 1/3 being women, who would be responsible for the community's full participation in the construction works.

The third condition was that 20 of the most senior committee members and of which 1/3 being women would attend a 1-week training course on community management of the construction works before it could be started.

The fourth condition was that the 20 most senior committee members, again 1/3 being women, would attend a 1-week training course on financial management before their project could be completed.

Some copies of the contract, seen on the next page, were given to the Chiefs and committee members for their consideration and approval before the training would start.

2.3 Contract between a community and a Main Contractor (MC)

CONTRACT

This is a contract between the..... Water Project in Location
..... Division of District, P.O. Box
Telephone..... Bank account No..... of Branch
Hereafter called the **Community**, and **ASAL Consultants Ltd.**, Box 739, 00606, Nairobi,
hereafter called the **Main Contractor (MC)**, on the community's contribution of at least
15 % cost-sharing on the construction cost of their water project. The community agrees
hereby to provide the following free of charge :

- 1) A management committee elected democratically and responsible for the community's full participation in the construction and training activities.
- 2) A store for materials and accommodation for 10 contractors.
- 3) Permission to collect water and sand from nearby riverbeds.
- 4) Capable local trainees, half of them females, who might be employed by the contractors. The contractors will pay each trainee Ksh 50 per working day. The contractors can lay off trainees without notice and compensation.
- 5) Suitable local artisans who can be employed by the contractors. The contractors will pay each artisan Ksh 150 per working day. The contractors can lay-off artisans without notice and compensation.
- 6) Make and deliver ballast (crushed stones) with a size of 1/2" to 3/4" to a road-side as requested by the MC who will pay Ksh 70 for every wheelbarrow topped with ballast.
- 7) Deliver hardcore (stones) to a road-side as requested by the MC who will pay Ksh 500 for every 3 tonnes trailer load.
- 8) Excavate trenches as required by the MC. For every 6 metres of excavated trench, the MC will pay the Trench Contractor Ksh 60 which he/she who will pay to the diggers. Back-filling will be paid with Ksh 10 for every 6 meters of trench.

On this we agree

Date.....

.....
Management Committee

.....
Main Contractor

Witnesses.....

Photo from the field



Ndakani Women Group and their drummers show their appreciation during a public meeting when agreeing on the terms for construction of their water project.

2.4 Training on community management for committee members

The one-week trainings on community management for construction were subcontracted by Dr Munguti Katui-Katua of CMTS. In total he trained 120 committee members and 113 builders, 1/3 being women, in theoretical issues. The practical training of committees and builders took place while constructing the water projects.

Part of the theoretical training during the first week was focused on the new procedures and funding for the Water Sector as explained below. The Water Act 2002 provides for the separation of the management of water resources from the supply of water and sewerage services, and the separation of operation from regulation and policy making.



Class-room training of committee members at ASALCON's training center at Kibwezi.



Martha gives a lecture on surveys.



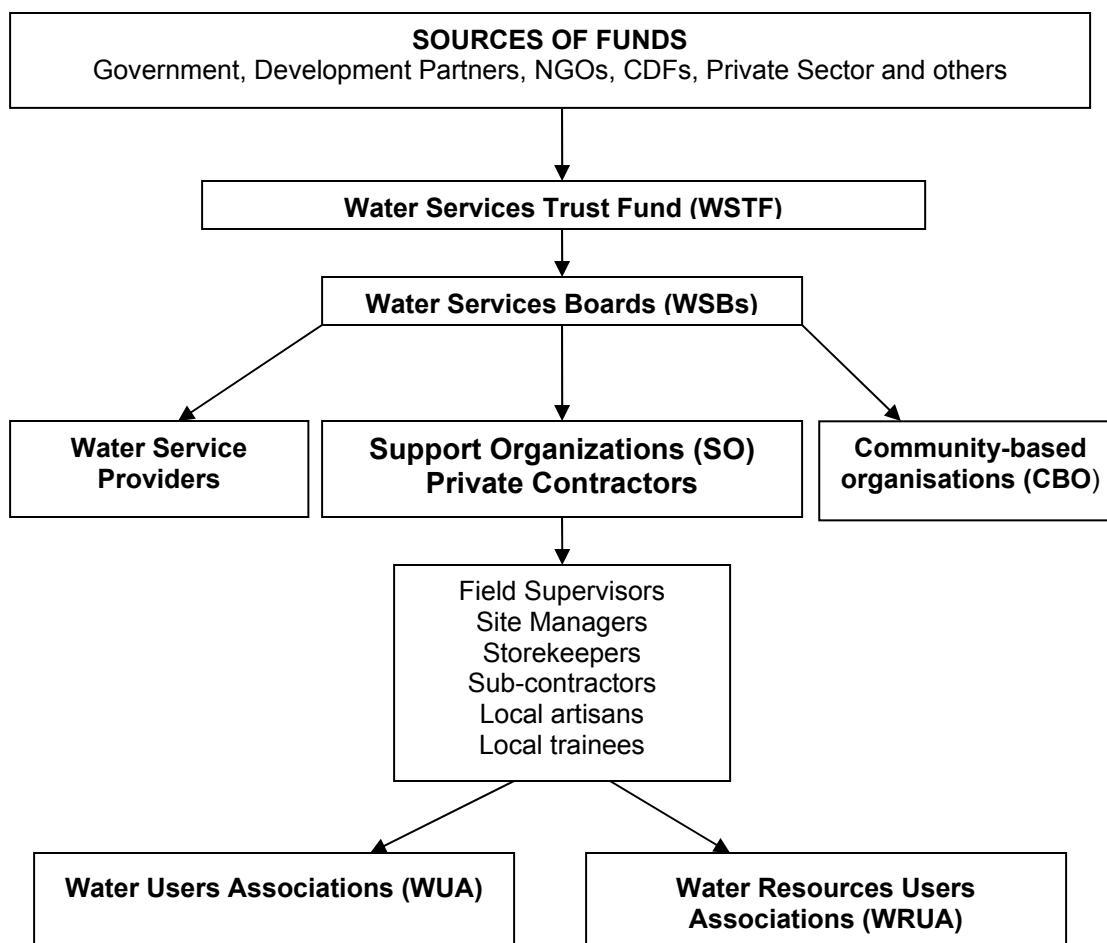
The Kitui KCB Manager explains bank procedures.

The new water institutions formed and the specific core responsibilities are listed below.

Responsibilities of Water Act 2002 Institutions

Institution	Core Responsibilities
Water Resources Management Authority (WRMA)	<ul style="list-style-type: none"> Implementation of policies and strategies relating to management water resources Water allocation, source protection and conservation, water quality management and pollution control Development of catchment level management strategies, including appointment of CAACs and their facilitation
Water Services Regulatory Board (WSRB)	<ul style="list-style-type: none"> Overseeing the implementation of policies and strategies relating to provision of water services Regulating the provision of water and sanitation services Licensing WSBs and approving appointed WSPs Monitoring the performance of WSBs and WSPs
Catchment Area Advisory Committees (CAACs)	<ul style="list-style-type: none"> Advise on water resources conservation, use and apportionment Grant adjustment, cancellation or variation of water permits
Water Services Boards (WSB)	<ul style="list-style-type: none"> Planning for improvement in provision of water and sanitation services Appointment and contracting WSPs Asset holder of central government
Water Service Provider (WSP)	<ul style="list-style-type: none"> Responsible for direct provision of water to consumers. WSP may be community groups (NGOs), autonomous entities established by local authority or the private sector
Water Resources Users Associations (WRUA)	<ul style="list-style-type: none"> To make possible community participation in the management and development of water resources and related environmental issues To serve where necessary as forum for conflict resolution
Water Services Trust Fund (WSTF)	<ul style="list-style-type: none"> Financing the provision of water services to areas without adequate water services
Water Appeals Board (WAB)	<ul style="list-style-type: none"> Adjudicating disputes within water sector
Ministry of Water and Irrigation	<ul style="list-style-type: none"> Policy formulation Overall supervision and guidance in the sector and for sourcing funds

The flow of funding for water and sanitation project by Water Services Trust Fund (WSTF) through WSBs down to the needy communities is illustrated by the chart below.



As the chart demonstrates, funds will be provided by the GoK through budgetary allocation(s) and from multinational and bilateral organizations, NGOs and the private sector to a national pool managed by Water Services Trust Fund (WSTF). The money will be disbursed to the Water Services Boards (WSBs) who will select and contract contractors through the procedures and guidelines as developed in the Community Project Cycle (CPC) framework.

Gender based composition of committee during management training

	Total persons trained	Female participation	Female in executive positions
Mutha	20	4 - 20%	1
Kisasi	9	3 - 33%	2
Mbitini	9	4 - 44%	1
Mililuni-Kitho	18	6 - 33%	2
Kaliku	18	5 - 28%	1

The final output of the management training was the signing of the contract between the committee and the Main Contractor. Thereafter the committees organised their members to assist the surveyor and to produce hardcore and ballast.

Chapter 3 - Construction of rural water projects

3.1 A Main Contractor's/Water Services Provider's (MC/WSP) work

A community that is in need of funding for rehabilitation or a new construction at their water source should contract a MC/WSP who can assist with writing up a proposal and presenting it to the Water Services Board (WSB) in their area.

After WSB has prioritised, assessed and endorsed the proposal it is sent to the Water Services Trust Fund (WSTF) requesting for funding. If funded, the WSB and the community can contract a licensed MC/WSP or a support organisation to train the community and construct their water project. During implementation of the 6 pilot projects the MC/WSP managed to accomplish the following activities :

- a) **Organised a public meeting** with the District Commissioner (DC), District Officers (DOs), Chiefs, local Member(s) of Parliament (MPs) and Councillors for each of the 6 communities during which the cost-sharing procedures were explained and the committee was invited for cooperation and training on their water project.
- b) **Contracted an engineer** to produce a *Survey and Design Report* with designs of all structures and Bills of Quantities (BQs) and costs. The reports were explained discussed and agreed upon by the communities.
- c) **Contracted a Certified Public Accountant** to present monthly *Financial Statements* based on receipts compiled in Microsoft Excel by the MC/WSP.
- d) **Contracted a site manager, a store-keeper and a trench contractor** for each of the 6 projects and introduced them to the communities. Work could then start on excavating trenches and delivering hardcore and ballast to road sides.
- e) **Obtained quotations, purchased and delivered** hardware materials, pipes, pumps, generators, etc. to the project stores
- f) **Contracted about 30 sub-contractors** for the various parts of the construction works. The Sub-contractors employed local artisans and trainees to assist them.
- g) **Managed the construction works** by means of field visits and reports from the Site Managers, Store-keepers and the project committees.
- h) **Presented monthly reports** to RDE and MoWI
- i) **Paid** suppliers, contractors and trainees using cash, cheques or bank transfers.
- j) **Contracted a community trainer** and a venue to train 120 committee members and 113 contractors in financial management before their projects were completed.
- k) **Presented a Final Report** upon the successful completion of the project.

Lessons learnt :

- 1 The community trainer should be contracted before the first public meeting.
- 2 A field supervisor should have been contracted to assist the MC/WSP.
- 3 Problems should always be solved on site by the committees and the MC/WSP.
- 4 Sub-contractors should be trained in theoretical issues before working in the field.
- 5 Work plans must not be changed unless all parties agree in writing.
- 6 Bank deposits and cheques should be used instead of cash payments.

3.2 Proposal for funding community training and construction works

The new WSB procedures recommend that when communities want to rehabilitate old water projects, or construct new ones, they must write a proposal and present it to the WSB that covers their area. The proposal should contain as much reliable data as can be found. It is recommended that such a proposal should include.

- a) **The name, postal address and telephone number** of the community organization that presents this proposal. Preferably, the community should have elected a committee and registered it with the Ministry of Social Services.
- b) **The name and location of the water project** stating village, Sub-location, Location, Division, District and the distance in kilometers, or miles or cost of busfares, from the water project to the 3 nearest towns so that the project can be plotted on a map.
- c) **The type of water project** ; such as an earth dam, a sand dam, a subsurface dam, a rock catchment dam, a hand-dug well, a bore-hole, gravity-flow from a spring, etc.
- d) **The number of potential water users** : the number of people and livestock who will use water from the particular water project, as well as the amount of acreage that may require water for garden irrigation.
- e) **The state of the water project**; Is it a new project or an old project? Is it operational ? If not, then why not ? What does it need for repair, extension or replacement ? Add any other information that could be useful to WSB.
- f) **The name of a main contractor or an organization** they would prefer to assist them with the construction work and financial training for operation and maintenance.
- g) **The amount of labour, materials and cash** the community can provide as part of the cost-sharing of construction and/or rehabilitating their water project.
- h) **The estimated cost of construction of the project** ; such as the length of water pipelines, number of kiosks, tanks, replacement of pumps, engines, etc. Average cost of various types of structures are shown on the next page.

Lessons learnt :

- 1 Proposed work and their cost estimates should be as accurate as possible to avoid overspending and incomplete implementation due to exhausted funding. For that purpose the table on the next page shows the construction cost and value of community contribution for various types of structures for water projects.
- 2 Remember to add 15 % to the construction and training cost to cover expenses on management, survey, design, training and other over-heads.
- 3 **Community contribution** should amount to at least 15% of the construction cost.

3.3 Cost of water structures built to MoWI design in Kitui in 2005

Type of structures of MoW&I design of high quality with steel doors, steel windows, reinforced concrete, the best pumps, generators etc. that can last longer than the estimated lifespan of 20 years for the projects	Construction Costs ; builders materials, procurements from the communities and transport Ksh	Community contribution by selling labour and materials for 50% below market price Ksh	Total cost construction works, including community contribution Ksh	MoWD cost estimates in 2004 Ksh
A 6" x 9" x 18" concrete block	49	20	69	
A 9" x 9" x 18" concrete block	74	30	104	
A latrine slab, 122 x 122 cm	545	74	619	
A fence concrete post	478	67	545	850
A 25 cubic metre tank	195,813	64,603	260,416	337,180
A 50 cubic metre tank	313,700	86,365	400,065	444,525
A 100 cubic metre tank	605,380	192,210	797,590	719,560
An elevated 50 cu.m. steel tank	1,236,019	41,602	1277,621	2,800,000
An elevated pump house	502,930	181,170	684,100	1,017,800
A water kiosk with concrete roof	88,424	29,546	117,970	99,610
A valve chamber for air-valves, etc	6,877	3,734	10,611	11,794
A rectangular cattle trough	33,091	18,524	51,615	62,600
A circular cattle trough	9,046	3,213	12,259	
A washing stand for clothes	18,389	8,019	26,408	
Nzeeu subsurface dam built of soil	68,600	35,250	103,850	1,027,000
Nzeeu well-intake at riverbed	159,040	53,120	212,160	993,086
Mwiwe sand dam built of masonry	320,860	90,160	411,020	1,027,000
Fence around a pump house, 150 m	84,508	25,258	109,766	123,225
Excavating trenches, laying 6 metres of UPVC pipes and back-fill	From 219 to 7,155 for 6 m	From 108 to 180 for 6 m	From 327 to 7,335 for 6 m	
Excavating trenches, laying 6 metres of GI pipes and back-fill	From 813 to 12,718 for 6 m	From 132 to 204 for 6 m	From 945 to 12,922 for 6 m	
65 KVA Atlas Copco generator			1,198,220	2,170,000
Submersible Grundfoss pump, 260 m			1,009,760	550,000
100 m borehole w. casing & gantry			678,100	1,753,150

Lessons learnt:

- 1 The standard of structures should be stated on the BQs with their costs to avoid over-expenditure.
- 2 The cost differences between the actual cost of generators and pumps and the MoWI estimates vary greatly. The cost of drilling bore-holes also vary from one company to another –and remember- the bill has to be paid even if the bore-hole is dry or has salty water.
- 3 Quotations must always be very specific and obtained from at least 3 suppliers.

3.4 Presentation of proposals to Water Services Boards

There are 7 Water Services Boards (WSBs) offices in Kenya where proposals for water projects can be presented.

Athi Water Services Board, P.O. Box 45283, 00100 Nairobi

Tana Water Services Board, P.O. Box 1343, Nyeri

Coast Water Services Board, P.O. Box 90417, 80100 Mombasa

Lake Victoria South Water Services Board, P.O. Box 3325, Kisumu

Lake Victoria North Water Services Board, P.O. Box 673, Kakamega

Rift Valley Water Services Board, P.O. Box 220, Nakuru

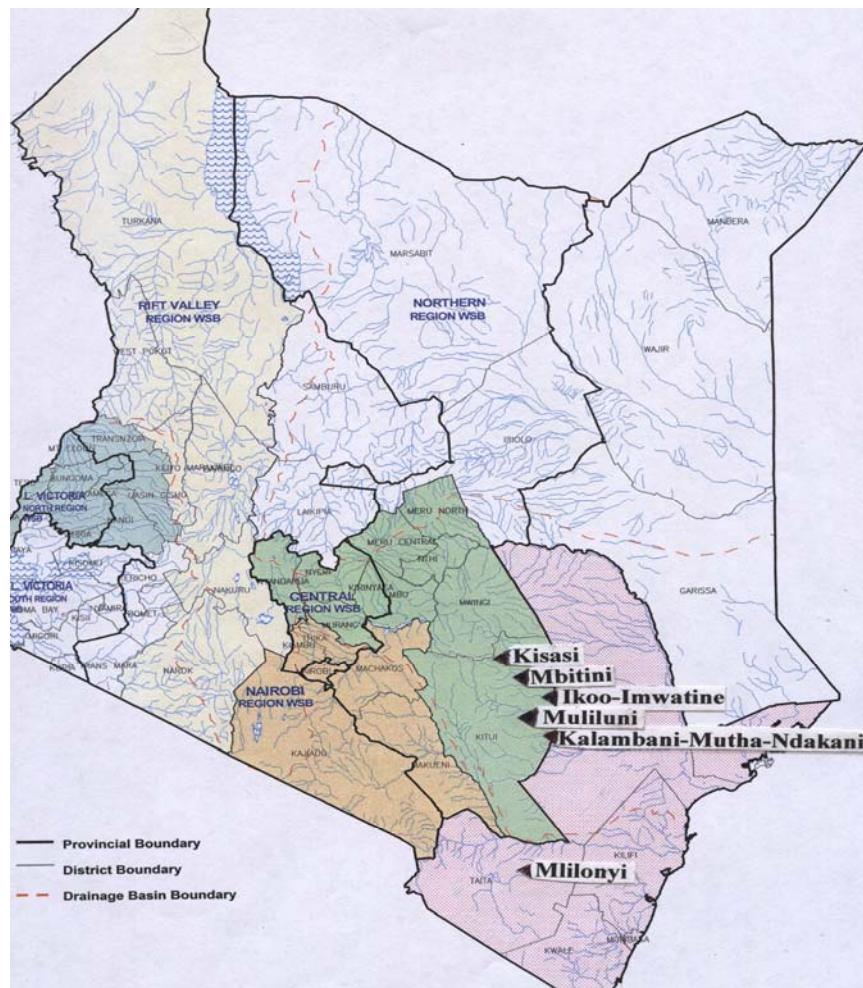
Northern Water Services Board, P.O. Box 495, Garissa

Other useful addresses :

Water Services Trust Fund, P.O. Box 49699, 00100 Nairobi

Water Services Regulatory Board, P.O. Box 41621, 00100 Nairobi

Water Services Management Authority, P.O. Box 45250, 00100 Nairobi



A map showing the Water Services Boards (WSBs) areas and the 6 water projects constructed for RDE, MoWI and the communities involved.

It is recommended that two or three committee members and their preferred MC/WSP present the project proposal by hand to the WSB office that covers their area to ensure that the proposal fulfills the required conditions.

The WSB will prioritize and assess the proposal. If it is found viable, it might be endorsed and forwarded to the Water Services Trust Fund (WSTF) for financing. If the WSTF approves the proposal, and funds are available, the WSB and the community will contract a licensed WSP, who can be a private main contractor, a community based organization (CBO) or a non-governmental organization (NGO), to rehabilitate or construct the water project.

Should there be any disputes concerning the project or the WSP, the Water Appeals Board (WAP) might be contacted to solve the problem.

Lesson learnt :

- 1 Since WSB procedure was introduced on 1st July 2005 in accordance with the Water Act of 2002, it is advisable to follow-up on a proposal every second month, or so, in order to learn and adhere to any changes in procedures that may occur.

Photos from the field : a well-intake with infiltration pipes



The river-intakes at Kisasi, Mbitini and Ikoo consists of a small diameter hand-dug well sunk inside a wide-diameter hand-dug well.



The river-intakes at Kisasi and Mbitini are connected to several perforated infiltration pipes laid under the sand.

3.5 The Community Trainer's work

When a proposal has been granted the required funds from WSB and a MC/WSP has been contracted, the project can be implemented in cooperation with the community.

The successful implementation of a project depends mainly on good relationship between the contracted builders and the community. An experienced community trainer should therefore be contracted by the MC/WSP. It was found that the following procedures were accepted and followed without problems.

- a) The project committees should be ***elected democratically*** by the community and of which about 1/3 should comprise of women.
- b) The committee must declare in writing that all the project structures on access roads to the water project are ***declared public property***. All land disputes must be resolved before the construction work can start.
- c) The committee should compile a list of names of local artisans from where the sub-contractors can hire local artisans for 50% of their normal salary. The other 50% salary is recorded, but not paid, as part of the community's cost-sharing.
- d) The committee should also compile a list of local persons, half being females, who might be trained as store-keepers, masons, plumbers, carpenters and painters, while working on the construction. Each trainee is employed at Ksh 100 per working day but is paid Ksh 50 and the balance is recorded and taken to be part of the community's cost sharing.
- e) The local artisans and trainees who had worked satisfactorily for a minimum of 3 months were given 2 weeks theoretical training and a certificate.
- f) Elderly community members collected stones, called hardcore, for the construction works and placed them in heaps along nearby roads from where the MC/WSP bought it for Ksh 500 for every full load of a 3 tonne tractor trailer.
- g) Elderly community members also crushed stones to ballast of a size of 1 inch and sold it for Ksh 70 for every topped wheelbarrow to the MC/WSP.
- h) Stores and rooms for the sub-contractors were provided free of charge.

Lessons learnt :

- 1 The community trainer should be contracted by the MC/WSP to be his/her representative on all community matters.
- 2 The assignment should start with the first public meeting and last until the projects have been completed and handed over to the communities after 3 months of operation without problems.

3.6 The Surveyor's work

The first activity in the field after the MC/WSP has been contracted is for him/her to contract either an engineer or a surveyor, or both to start surveying the project.

- a) A surveyor is contracted to measure the locations, lengths and gradients of the **rising mains**, which is the pipe from the riverbed intake to the **head tank** that is always situated at the highest point in the project area. The other pipelines, called **distribution lines**, which deliver water by gravity from the head tank to other tanks and kiosks, will be surveyed in the same way.
- b) The main purpose of this work is to determine where water can flow by gravity or has to be pumped. The option of pumping is, of course, the most expensive in terms of construction, operation and maintenance.
- c) Surveyors need straight lines without obstructions for surveying. It is the communities duties to clear the required bush and obstructions as part of their cost-sharing.
- d) Back in the office, the surveyor will draw the locations of pipelines with their gradients and positions. Air-valves are placed at the highest points and wash-outs at the lowest points.
- e) The resistance of the water pumped into the rising mains pipe is calculated and combined with the lengths, gradients and frictional loss. The result is known as **the head**. If a head is, say 90 meters, it means that the pump must be able to push water through the pipes to a height of 90 meters above the intake. The pressure in water pipes is measured in **bars**. One bar is equal to the pressure of 10 meters height of water. Therefore the pressure is 9 bars in this example.
- f) Water pipes are manufactured in galvanized steel (GI) and plastic (UPVC) in several thicknesses, called **classes**. The weakest and cheapest class of pipes is **Class A**. Attempts to install a cheaper and weaker class of pipe than required will result in bursting of pipes. Attempts to replace the more expensive GI pipes with the cheaper UPVC pipes will also cause pipe bursts because UPVC pipes are weaker.
- g) Where a pump is required for the pipeline it must be capable of pushing water through the rising main pipe up to the head tank. If the head is too high for a pump, a second or third pump, called **Booster pump**, can be installed along the rising main. Booster pumps may double the cost of construction and operation.
- g) The Surveyor will compile all data in a **Survey Report** which will be explained to the community and, hopefully, be agreed upon by all during a public meeting.

Lesson learnt :

- 1 Surveyors must not deviate from the pipelines and structures described in the project document funded by WSB, even if powerful or influential persons try to change it.

3.7 The Engineer's work

An engineer will be contracted to produce the following data :

- a) Estimate the **Population projection & water demand** based on the Survey Report, which will show whether the yield from the water source is sufficient to meet demand. The demand will be estimated for every 5 years until it reaches 20 years because water projects should function and have sufficient yield of water for at least 20 years.
- b) Check and approve the surveyor's **hydraulic calculations** that involves calculating the head and frictional losses that will determine the required diameter, classes and numbers of GI and UPVC pipes with their air-valves, wash-outs.
- c) Calculate the **pumping head pump power requirement**, which consists of the delivery head, frictional losses, height of head tank over intake plus 10% residual head. This calculation is required to determine the required pump power in KW, the discharge flow rate in cubic meters per second (M^3/S). The final result will show the required KVA that the generator must produce for powering the pump.
- d) Provide standard and MoWI-approved designs and BQs of the structures required for the project, such as: intake, water tanks, water kiosks, air-valves, wash-outs, etc. All the above information and data to be compiled in a **Design Report** with annexes.
- e) Should a bore-hole be required, a **Hydro-geologist** can be contracted to survey the underground for possible groundwater using an electro-sensitive instrument. To the disappointment of many, the instrument cannot tell the difference between fresh and salty water.
- f) The engineer will explain the Design Report to the community during a public baraza. If all agree on the report after having discussed it, the MC can contract his/her sub-contractors and obtain quotations (prices) from at least 3 hardware suppliers. The supplier who has the lowest prices and who can deliver within a given time will be given the order.
- h) The engineer might also be contracted to supervise the construction work in the field and to produce a **Completion Report** upon successful completion.

Lessons learnt :

- 1 Engineers should try to design the structures as simply as possible without lowering the quality for the purposes of reducing costs of construction, operations, maintenance and repairs.

3.8 The work of a Certified Public Accountant

MCs and WSPs handle large amounts of money to pay for fees for sub-contractors, procurement of tools, materials, bank charges and monthly 5% tax deduction from sub-contractors' fees exceeding Ksh 24,000 per month, the Main Contractor's fees and his company's tax, VAT, etc.

- Receipts for all payments must be dated, signed, filed and accounted for on monthly basis. Should any receipt be lost, there will be a loss in the account which the MC will have to pay for him/herself. It is therefore important that a Certified Public Accountant is contracted to manage the accounts.
- The MC will contract an experienced and Certified Public Accountant to compile **Monthly Summaries** and **Quarterly Financial Statements** based on the MCs filed receipts and monthly summaries in Microsoft Excel as well as taking care of tax and VAT records and payments.
- The MC will establish a current bank account with a cheque book under the name of the water project. Preferably, he/she should be the only signatory to the account in order to avoid delays, lack of accountability and transparency. It is preferable that each project should have its own account to avoid confusion.
- Receipts for bought items with dates, names and signatures must be filed for all payments whether by cash, cheques or bank transfers. The receipts are glued onto A4 papers, numbered and filed in a spring file with the name of the project.
- Thereafter the number, dates, items and amounts of the receipts are entered in the various columns using the Microsoft Excel programme and as shown below.

Receipt Number	Date	Items	Local labour	Local material	Sub-contractors	Hard-ware shops	Transport, teleph.	Training	Cheque number
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3.9 Reduced costs and value of the communities' contributions

	Mlilonyi	Mutha-Ndakani Ksh	Kisasi & Mbitini Ksh	Mililuni-Kitho Ksh	Ikoo-Imwatine Ksh	Total Ksh
50% on materials	86,500	435,060	425,630	9,610	272,695	1,315,995
50% on labour	656,146	3,729,672	2,370,822	601,763	1,517,551	8,875,959
25% by using tractors instead of lorries	45,500	667,300	550,665	85,895	331,640	1,681,000
Training allowance	128,300	106,028	218,174	130,128	129,070	711,700
Value of free material	379,200	849,309	889,500	405,000	882,500	3,405,509
Total	1,295,646	5,787,369	4,454,796	1,318,896	3,013,816	15,990,163

3.10 Total grant, expenditure and value of community contribution

	Grants	Expenditure	Value of community contribution	Total Expenditure and value
	Ksh	Ksh	Ksh	Ksh
Phase I				
Royal Danish Embassy 29/11/03	6,030,000			
Royal Danish Embassy 13/02/04	10,000,000			
Royal Danish Embassy 23/04/0	13,601,400			
Royal Danish Embassy 24/09/04	274,336			
Kalambani-Mutha Water Project		22,217,712	4,643,810	26,861,522
Mlilonyi Water Project		4,735,617	1,295,646	6,031,263
Management		2,913,907		2,913,907
Total for Phase I	29,905,736	29,867,236	5,939,456	35,806,692
Phase II				
Royal Danish Embassy 13/10/04	66,783,267			
Royal Danish Embassy 19/01/05	27,173,313			
Kalambani-Mutha-Ndakani Water P.		9,906,936	1,143,559	11,050,495
Kisasi and Katwala-Mbitini Water P.		36,924,570	4,454,796	41,379,366
Mililuni-Kitho Water Project		9,250,992	1,318,896	10,569,888
Ikoo-Imwatine Water Project		27,286,198	3,013,816	30,300,014
Contractors' training		4,517,792		4,517,792
Management		6,409,807		6,409,807
Total for Phase II	93,956,580	94,296,295	9,931,067	104,27,362
Phase III				
KWSP 1/11/05	5,500,000			
Ikoo-Imwatine Water Project		5,198,785	119,640	
Total for Phase III	5,500,000		119,640	5,318,425
GRAND TOTAL	129,362,316	129,362,316	15,990,163	145,352,479

Photos from the field



A sand dam with its spillway built in stages downstream of the Mbitini intake to raise and increase the volume of sand and water.



A subsurface dam was built of soil downstream of the Kisasi intake to raise the waterlevel in the sand.

3.11 A work plan for construction of a new water project

A MC can prepare his/her work plan when the community has approved in writing the *Survey Report* and *Design Report*, solved all land cases and agreed, also in writing, that nothing can be changed, added or subtracted from the numbers and locations of the intake, pipelines, water tanks, kiosks, valves, etc.

Work plans are usually drawn on graph or millimeter paper or simply in an exercise book with squared pages as shown below :

Activities	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Public meeting with community	-							
Training on community management	-							
Survey of pipelines, etc.		---						
Design, BQs		---						
Site Manager and Store-keeper based at the project		-	-----	-----	-----	-----	-----	-----
Procurement of local materials, hardcore and ballast and delivered to sites		-	-----	-----	-----	-----	-	
Quotations and procurement from hardware shops delivered to project stores		-	-----	-----	-----	-----	--	
Sub-contractors construct structures and pipelines while training local artisans and trainees			-----	-----	-----	-----	-----	-
Training on financial management, Pump Operators, Kiosk Attendants, Line Controllers and others							-----	--
Water project is completed, operational and handed-over								-----

3.12 The work of sub-contractors, local artisans and trainees

Sub-contractors are experienced engineers, technicians and artisans who are known for their high quality work and co-operation with community groups.

Sub-contractors are contracted for a certain fee to design and/or construct specific structures. Their fee covers all expenditures such as paying salaries for their hired artisans and trainees, tools, transport, accommodation, food, medical expenses, etc. The fees are paid in installments listed in the contracts and signed by the sub-contractors and the MC as shown below.

CONTRACT					
<p>This is a contract between Mr, ID No, Pin No, P.O., Telephone, Bank account No hereafter called the Tank Contractor, and ASAL Consultants Ltd., P.O. Box 739, Sarit 00606, Nairobi, hereafter called the Main Contractor, on the following agreements for construction of a 50 cubic water tank for the.....Water Project :</p>					
<p>The Tank Contractor will :</p> <ol style="list-style-type: none"> 1) Construct the water tank according to the design and instructions given by the Engineer and the Site Manager. 2) Employ, train and pay local masons Ksh 150/day and local trainees Ksh 50/day, half being females from the community to assist with building the water tank. 3) The Tank Contractor is not an employee of the Main Contractor, therefore no other benefits or compensation, than the fee stated below, will be provided. The Tank Contractor is responsible for paying his/her tools, taxes, transport, accommodation, food, medical expenses and all other costs that he/she may incur in connection with this contract. 4) This contract can be cancelled with 7 days written notice by either the Main Contractor or the Tank Contractor. If the contract is cancelled, the Tank Contractor can only claim Ksh 200 for each working day minus the payments he may already have received. 					
<p>The Main Contractor will:</p> <ol style="list-style-type: none"> 5) Pay the Tank Contractor Ksh 66,150, minus 5% tax for monthly payments exceeding Ksh 24,000 as shown below. 					
Payment schedule	Payments minus 5% tax	Cheque	Date	Signature	
Foundation is excavated	Ksh 10,000				
Roof is concreted	Ksh 20,000				
Tank is completed	Ksh 26,150 – 5% = Ksh 1,308				
No leakage in full tank	Ksh 10,000				
Total	Ksh 66,150 – 3,308 = 62,842				
<p>6) Deliver all required materials for the tank to the construction site.</p>					
On this we agree.....		Date			
.....				
Tank Contractor		Main Contractor			

A maximum fee for each type of construction works, as shown below, was agreed upon by the MC and the 113 contractors who attended 2 weeks theoretical training courses.

Type of structure of MoW&I design	Fee including hired artisans and trainees for 1 unit (Ksh)
A 6" x 9" x 18" concrete block	8
A 9" x 9" x 18" concrete block	10
A latrine slab, 122 x 122 cm	121
A fence concrete post	100
A 25 cubic metre tank	47,250
A 50 cubic metre tank	66,150
A 100 cubic metre tank	113,400
An elevated pump house	100,800
A water kiosk with concrete roof	12,180
A valve chamber for air-valves, etc	1,418
A rectangular cattle trough	8,600
A circular cattle trough	2,400
A washing stand for clothes	8,543
Nzeeu subsurface dam built of soil	37,800
Nzeeu well-intake at riverbed	43,400
Mwiwe sand dam built of masonry	69,400
Fence around a pump house, 150 m	6,900
Excavating trenches, 60 cm deep x 45 cm wide	20% of Ksh 60 paid for 6 metres to community = Ksh12 per 6 metres
1" UPVC pipe	Ksh 36 per 6 metres length
2" UPVC pipe	Ksh 48 per 6 metres length
3" UPVC pipe	Ksh 60 per 6 metres length
4" UPVC pipe	Ksh 72 per 6 metres length
1" GI pipe	Ksh 60 per 6 metres length
2" GI pipe	Ksh 72 per 6 metres length
3" GI pipe	Ksh 84 per 6 metres length
4" GI pipe	Ksh 96 per 6 metres length

The fees paid to pipe-layer contractors are inclusive of final preparation of trenches and installation of all fittings. 50% of the fees are paid when all pipes are laid. The other 50% is paid when the work is completed and without leakages. All monthly payments exceeding Ksh 24,000 had deductions of 5% made to cater for income tax.

Lesson learnt :

- 1 The fees for MC, WSPs, community trainers, surveyors, engineers, accountants, site managers, store-keepers and field supervisors should be calculated as a certain percentage of the total construction and training cost of a water project to avoid repeated negotiations for each assignment.

3.13 Training local builders to become self-employed contractors

Sub-contractors should have their first theoretical training after the committees have been trained and before starting the construction works. The training would deal with the paper work that is part of contractors' works, such as ; contracts, payment vouchers, receipts, purchasing procedures, bank procedures and store-keeping and delivery of materials.

Those participants who had an ID card were assisted to obtain a Pin Number and a bank account. The most experienced participants were booked for Trade Test III and encouraged to register their own company for which names were searched and some approved. Each contractor who passed the examination was issued with a certificate showing his/her points achieved in practical and theoretical performance.

The 113 trained builders are expected to operate as contractors/support organizations to the communities. The New Water Act of 2002 encourages the formation of support organizations and individual operators who will help local water user associations in various aspects of water management including assisting in proposal preparation.

While the sub-contractors were being trained, the communities assisted the surveyor, solved land disputes and prepared hardcore and ballast for the construction works.

Water Services Boards will also be contracting contractors to act as community support organizations, whose role will be to provide support to the communities to develop quality proposals to improve water and sanitation services.

The support organizations will also assist the communities to submit the proposals and secure approvals from WSBs and WSTF. Once financial grants from WSTF have been secured, each support organization will be required to support the community to successfully implement water and sanitation schemes.

After the schemes have been completed the support organizations will continue providing capacity building support to the communities to ensure they successfully manage the water and sanitation projects over the long-term.

The other service that contractors could offer is to form Quality Monitoring Advisory Teams (QMAs) because WSBs do not have the staff or capacity to monitor water and sanitation projects that will be funded by WSTF.

Therefore, each WSB will select and contract QMAs on part-time basis. The QMAs will be composed of an engineer and a social development expert who will be undertaking quality monitoring visit to communities funded by WSTF.

Lesson learnt :

- 1** Sub-contractors should have at least one week theoretical training before field work.

3.14 Computer training for 9 female Store-keepers and Site Managers

Merry Computer Training College trained 9 females being the field supervisor, a site manager and 7 store-keepers in the following computer programmes ; introduction to Micro-Computers, Ms-Windows, Ms-Word, Ms Excel, Ms Access, Ms PowerPoint, Internet and Email.

The training took place for a period of 2 weeks in Kitui town. Each participant received a certificate from the Computer Society of Kenya.

The site manager who is a civil engineer, also learnt AutoCad, a computer drawing programme that is very useful for illustrating technical drawings for the handbooks that are now being produced for the RDE.

Photo from the field



The head tank for the Kalambani-Mutha-Ndakani Water Project was constructed near the top of an inselberg called Yawia, which means *A Stone*. All materials were carried up on the backs of women. 50 kilo bags of cement were cut into two halves of 25 kg each to ease their work.

3.15 Completion of water projects and official handing-over

A couple of months before the water projects were completed the committee members were trained in financial management by CMTS as described in the following section.

Theoretical training of the best 113 of the local builders and trainees of which 1/3 being women, took place during the last month of construction works when the labour demand was at its lowest. This training was very much appreciated by the participants. Many of them had only gone to primary school for a few years. A few could not write their own names.

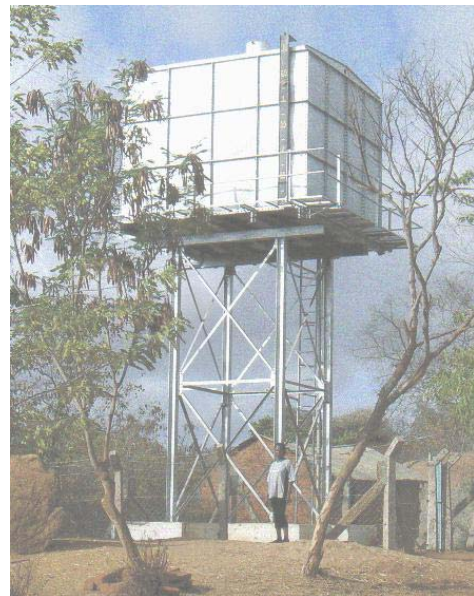
Also during the last months of construction works, other trainees learnt to operate and maintain the diesel generators and the electric pumps. Other trainees were trained in line patrolling of the water pipelines and to repair any pipe bursts.

When everything had been functioning for a week without any leakages the running of the project was handed over to the committee by the MC. The chairman of each project gave a written declaration that from now on the committee was responsible for the operation and maintenance of the projects.

The official handing over, also called commissioning and inauguration, of the Kisasi Water Project was done by the Hon. Kenyan Minister of Health. The Under-Secretary in the Ministry of Foreign Affairs, Denmark and the Danish Ambassador to Kenya commissioned the Katwala-Mbitini Water Project on Friday 14th October 2005.



157 km of trenches were excavated and pipes laid in the trenches and back-filled for the 6 water projects.



An elevated 50 cubic metre water tank was installed as head tank for the Kisasi Water Project.

Chapter 4 - Training on financial management

4.1 Training on financial management

During this training, the Water Users Associations (WUAs) were exposed to various aspects related to financing of the water projects including :

- Community fund-raising – how to raise their own revenues for their own project
- Record keeping
- Revenue collection procedures, control and monitoring
- Budgeting and forward planning
- Understanding the total cost of running the project(s)
- Setting water tariffs which was the most discussed subject.

4.2 Calculating water tariff

A water tariff is calculated as follows : the total cost of running a water project + 40% contingencies for unforeseen expenses divided by the number of jerrycans the project can deliver.

Example 1 : estimated cost of 120,000 jerrycans of 20 litres of water in 1 month

Item	Cost calculation for 1 month	Ksh
Diesel	6 litres x 8 hours x 30 days = 1,440 litres @ Ksh 60 =	86,400
Service of generator	Monthly service with new filters, new oil, etc	15,000
Watchman	Monthly salary for 1 Watchman @ Ksh 2,000	2,000
Pipeline repair team	Monthly salary for 3 plumbers @ Ksh 2,000 PVC glue, pipe fittings, etc	6,000 10,000
Allowance	Sitting allowance for 18 committee members @ Ksh 200	3,600
Pump Operators	Monthly salary for 2 Pump Operators @ Ksh 2,500	5,000
Kiosk Attendants	Monthly salary for 10 Kiosk Attendants @ Ksh 2,000	20,000
Stationery, etc		5,000
Bank charges	Ledger fee, depositing income, cheques, etc.	2,000
Transportation for buying fuel	Bus fares for 3 persons for 4 trips @ Ksh 300 = Ksh 3,600 Bus fare for 7 drums of diesel @ Ksh 500 = Ksh 3,500	7,100
Miscellaneous		5,000
	Cost of running a water project in 1 month	167,100
	Plus 40 % to be banked for unforeseen expenses	66,840
	Total cost of running a water project for 1 month	233,940

On average, the 4 water projects with pumps deliver 10 cubic metres per hour. If water is pumped for 8 hours, then 80 cubic metres, equivalent to 4,000 jerrycans of water will be delivered in 1 day and **120,000 jerrycans in 1 month**. When the monthly cost of Ksh 233,940 is divided by the 120,000 jerrycans of water delivered in a month, the result is Ksh 1.9495 say **Ksh 2 per jerrycan of water**.

Another important factor in calculating the cost of a jerrycan of water is the demand for water. If a project delivers more water than can be sold, it will lose money because all the salaries have to be paid. The monthly demand for water must therefore be calculated as follows :

Example 2 : estimated demand for jerrycans of water in 1 month

The 5 water projects	Estimated demand in jerrycans, exclusive livestock
Kalambani-Mutha-Ndakani	18,200 people x 10 litres x 30 days/20 litres = 273,000 jerrycans
Kisasi	13,898 people x 10 litres x 30 days/20 litres = 208,470 jerrycans
Katwala-Mbitini	17,372 people x 10 litres x 30 days/20 litres = 260,580 jerrycans
Mililuni-Kitho	5,698 people x 10 litres x 30 days/20 litres = 85,470 jerrycans
Ikoo-Imwatine	8,462 people x 10 litres x 30 days/20 litres = 126,930 jerrycans
Total, excl. livestock	63,630 people x 10 litres x 30 days/20 litres = 954,450 jerrycans

Compare this Example 2 to Example 1 where it is estimated that if it costs Ksh 233,940 to deliver 120,000 jerrycans of water in a month, then one jerrycan of water will cost Ksh 2 -and that includes a saving of 40 % to be deposited in the bank.

Some might say that instead of saving the recommended 40% and depositing it in a bank, it would be better to just save 10% so that cost of a jerrycan of water can be cheaper. The committee of Mbitini did exactly that and the whole community had no water in their pipes during the dry month of September.

The reason was that the Pump Operator for the Katwala-Mbitini Water Project did not operate the generator as he had been taught. Therefore when the generator stopped functioning so did the pump. It took almost a month to collect enough money to repair the generator because too little money had been deposited in the bank account.

Example 3 : a case study from Kalambani-Mutha-Ndakani Water Project

The new tariff, Ksh 4 for a jerrycan was effected on 21 st June 2005		
Total income from sales at Ksh 2 from 1 st – 20 th June	Ksh	84,377
Total income from sales at Ksh 4 from 21 st – 30 th June	Ksh	62,180
Monthly membership fee for 644 persons @ Ksh 20	Ksh	12,880
Total income for the month of June 2005	Ksh	159,437
Total expenditure in the month of June 2005 :		
Diesel purchased	Ksh	86,500
Salaries/other expenditures	Ksh	35,123
Salaries due for payment	Ksh	4,500
Total expenditure for June 2005	Ksh	126,123
Profit from membership and sale of water in June	Ksh	33,314

Please note that when the project was selling water for Ksh 2 per jerrycan the project could not deliver sufficient water. Therefore nobody wanted to pay their membership fee and the project could not pay its employees and could not buy more diesel –and so on.

When the price was increased to Ksh 4 for a jerrycan on 21st June, the project could deliver water every day and 644 people paid their membership fee.

Within 10 days the project had made a profit of Ksh 33,314.

4.3 Budgeting

A good financial system must be supported by a budget that realistically reflects expected income and expenditure. Budgets act as a control system so that project funds are not used for activities beyond the purchasing power of the project. Where budgets are not prepared and followed, the chances of misappropriation, misallocation and over expenditure of finances become quite high. Again without a budget, it is not possible to plan how money collected will be used. It is also difficult to know who should account for what expenditures. Budgets are an important element in financial management. The WUAs have been trained in these aspects.

Example 4 : a budget for 8 months

	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Salaries	6,200	6,200	6,200	6,200	6,200	6,200	6,200	6,200
Allowances						1,000	1,000	1,000
Casuals		500						
Transport	400	400	400	400	400	400	400	400
Licence								
Registration		1,000						
Spare parts		1,000						
Lubricant		200						
Wind mill				10,000				
Spares			1,500				2,000	
Stationery		2,000					300	
Office acc.	6,000							
Office rent	300	300	300	300		300		300
Total	12,900	11,600	8,400	16,900	6,600	7,900	9,900	7,900

All the WUA committees were taken through the process of preparing budgets as it was felt this will become a major activity for the water projects when the formalities between the WUAs and

when the new WSB institutions are completed. Of course, the income must always be way above the expenditure or the project will go bankrupt.

Example 5 : budget for a diesel pumping system

Item	March	April	May	June	July
Diesel	54,000	54,000	54,000	54,000	54,000
Gen-set kit	15,000	2,000	2,000	17,000	-
Pipeline maintenance	20,000	5,000	5,000	5,000	20,000
	15,000	30,000	30,000	30,000	30,000
Allowances	8,000	8,000	8,000	8,000	8,000
Stationery	5,000	2,000	2,000	1,000	1,000
Maintenance (O + M)	2,500	15,000	1,500	-	-
Licenses	-	6,000	-	-	-
Transport					
Diesel	3,000	3,000	3,00	3,000	3,000
Committee	16,000	16,000	16,000	16,000	16,000
Materials	2,000	1,500	1,00	1,000	1,000
Bank	-	5,000	-	-	-
Miscellaneous	2,000	2,000	2,00	2,000	1,000
B/Deposit	59,000	52,400	49,800	54,800	53,600
Total	206,500	183,400	174,300	191,00	187,600

Photo from the field



A kiosk attendant's daily record for sale of water is being checked by committee members to ensure accountability and transparency.

4.4 Why should users pay for water and sanitation services ?

This is obviously a very complex question and opinion varies from full cost recovery to partial cost recovery. It is generally accepted that the community should assume an increased financial responsibility for the development, operation and maintenance of water supplies and sanitation.

In an effort to increase water accessibility most governments have tended to subsidize the poor but in a situation where the system is centrally managed, subsidies tend to benefit the rich while the poor continue to pay more for water and sanitation services. Community management will thus ensure a proper targeting of the subsidies to the disadvantaged groups.

However, for those who believe that community financing for water and sanitation services is necessary, the following constitute some of the arguments why users should pay for water and sanitation services :

- Available capital funds are inadequate to achieve full coverage.
- If the local people themselves do not cover their systems costs, it is unlikely that anyone else, be it government or donors will be able to do so on an adequate and long-term basis in most communities.
- The providers of the service may be unresponsive to the users' preferences
- Facilities may be in frequent disrepair because maintenance is weak, capital expenditures are not made in time, workers may not be in a hurry to get things done.
- Available public funds are inadequate to meet recurrent costs.
- Social and economic benefits of improved water and sanitation services are too indirect to justify free services.
- Subsidies disempower users by denying them service
- Subsidies discourage cost effectiveness and development of low cost solutions
- Evidence of demand and willingness to pay is strong with many poor people already paying high rates for services, which at times are not regularly available.
- Properly regulated user charges mean the poor will pay less and get better and more consistent services.
- Payments increase sense of value and commitment among users.
- User payments maximize the use of available resources.
- User payments improve quality and standards of service.

Ability and willingness to pay

Users of water and sanitation facilities can only pay for operations and maintenance costs if they are willing and able to pay. The degree of willingness to pay is however determined by a combination of factors some of which are :

- Income
- Service level
- Standard of service
- Perceived benefits
- Opportunity cost of time
- Acceptability of existing service

- Confidence in the service agency
- Community cohesion
- Policy environment
- Perception of ownership and responsibility
- Institutional framework
- Transparency and financial management

Community financing : options and methods

The range of options is very broad and they are applicable to piped water supplies as well as point-source systems. For ease of comprehension, the options have been placed in distinct categories namely :

- Commercial options
- Voluntary funds, general community revenue, co-operative funds
- Rating options
- Flat rates, graded rates, mixed systems and water metering
- Vending
- Indirect options
- Taxation

Attendance of Financial Management Training by Gender

	Total	Female	%	Female Executive position
Mutha	21	5	24	1
Kisasi	20	8	40	2
Mbitini	20	8	40	1
Mililuni-Kitho-Inyuu	20	6	30	2
Ikoo Imwatine (Kaliku)	20	8	40	1

Photos from the field



Kalambani pump house at the Thua riverbed.



Water kiosk and water tanks at Kisasi.

4.5 On-site training of management committees

It is well known that what is learnt in classrooms is understood better when made practical in the field. This is often the case in rural Africa where incidents and accidents occur unexpectedly.

Due to lack of modern communication methods, such as postal services, telephones and email, it is difficult to react quickly to any unforeseen incident. Often the problem is put aside in the hope that it will solve itself ; sometimes it does but not with complicated diesel generators and electric water pumps.

For example, the Mbitini generator would give a powerful electric shock when touched in certain place. *“Nothing to worry about”* said the pump operator, *“because we just don’t touch that part”*.

Another example is that some weeks after that dangerous circuit was repaired, the generator began to lose power. For a couple of weeks the generator refused to generate any electricity at all. People waited for 4 days without water in the pipes and lost hope on the generator producing electricity again. The problem was found to be that the pump operator did not let the generator accelerate to full revolutions before switching on the heavy load of the pump.

A third example is that when checking on the level of oil in the generator at Kalambani, the level was far too low and the oil was of cheap dirty quality. If the generator would have been operated for a few days more, it would have been damaged. The chairman went to the treasurer to get money to buy new oil and for the bus-fare for the 240 km return trip to Kitui. Next day the chairman was in Kitui but without money because the treasurer was not found at home or in the neighbourhood. In the meantime, the pipes and kiosks were without water. These kind of problems are now solved with the network of cell phones covering most of the 6 project areas.

The community trainer visits the projects every second month and checks the records for sale of water, purchases of diesel and oil, payment of salaries, etc. Furthermore, he also explains to the people why it is important to keep transparent records and why oil and filters must be changed in the generator at certain intervals.

The democratic ways of taking decisions is also explained over and over again. Although tiresome, and sometimes frustrating, the good results of all this training are obvious. Every month about 68,000 people are benefiting from the 6 water projects. Some Ksh 500,000 is collected, recorded and banked from the sale of water.

Chapter 5 - Operation and maintenance

5.1 Design considerations for water projects :

- a) **Technology** – does the community have the required skills and expertise to operate the system and undertake repairs promptly ?
- b) **Cost recovery** – can the payments for water give a surplus so that the project can be self-sustainable and recover capital cost ?
- c) **Spare parts** – are spare parts available and affordable?
- d) **Demand responsive** – does the project meet the demands of local people or is it externally driven ?
- e) **Hygiene and environment** – is waste disposed without pollution ?

5.2 Record Keeping

Record keeping is an important part of financial management. Records are tools that the management uses to show what operation and maintenance requires and how to do it. Records of transactions show :

- 1) revenue from sales of water,
- 2) records of all expenditures, and
- 3) the balance.

Records also provide information about management meetings, work programmes, schedules, work manuals and controlling operation and maintenance.

5.2.1 Types of records for a pump-house

A management team should be able to :

- 1) Implement a simple system to control inventories of spare-parts, diesel, oil, etc.
- 2) Set up a store with stock-cards for spare-parts, tools and other items.
- 3) Display a schedule for service of the equipment, components and structures.
- 4) Display a map of the intake, pipelines, tanks, kiosks and valve chambers.

5.2.2 Staff and their records

The committees should discuss the types of records and who should keep the records.

Secretary	Treasurer	Accounts clerk	Store-keeper	Pump Operator
Meeting records	Cash book	Cash book	Stock cards	Service records
Members register	Payment records	Ledger book	Requisition and order books	Service and maintenance records for pump and generator
Correspondence	Receipt books	Inventory book	Delivery books	
Receipts books	Invoices	Invoices	Fuel records	Fuel records
Payment records	Cheque book	Statement book	Inventory books	
Application forms	Deposit slips			

5.2.3 Record Designs

Stock Card for fuel

Date	Fuel litres received	Date issued	Litres issued	Balance	Received by
5/3/2005	210	6/3/2005	50	160	Mutua
6/3/2005		7/3/2005	20	140	

Debtors Book

Date	Our invoice No.	Quantity Litres	Description	Name	Amount Ksh	Signature
5/3/2005	0007	70	Diesel	M.W.S.P.	3,500	Mbuta

Inventory Form

Date	Item type	Quantity	Value Ksh	Total Ksh
1/3/2005	Jembe	70	100	7,000
	Panga	50	120	6,000
				13,000

Pump Operator Form

Date	Start reading	Stop reading	Running Hours
1/1/2005	000	004	4
1/1/2005	004	006	2

Photo from the field



Rainwater harvested from Yawia Rock Catchment Dam is gravitated down to a kiosk.

5.3 Maintenance of structures

What to maintain	How to maintain
1. Catchment Area	Plant trees to control soil erosion Ensure soil contouring Enforce rules/regulations on river management Create awareness on environmental conservation Encourage use of sanitary facilities
2. Intake (Source)	Fencing intake structure
3. Storage Tanks	Fence the area around the tanks Inspect regularly Clean tanks wearing gloves and gumboots Plant grass, not trees, around the tanks
4. Distribution pipes	Inspect and repair any leakage
5. Water Kiosks	Fence around kiosks Plant grass and flowers around kiosks Keep the kiosks and their area clean Provide sanitary facilities
6. Pump House	Fence around pump-houses Keep the area clean and plant grass and trees Do not smoke in pump-houses
7. Generator and pump	Check oil level and battery water every morning Service the generator promptly after every 500 hours of use
8. Cattle Troughs	Clean the troughs every day Ensure the valves are working
9. Valve chambers	Keep them covered and preferably locked Repair or replace worn-out or damaged valves
10. Washing Slabs	Keep the drainage clean
11. Latrines	Ensure general cleanliness

5.4 Opening a bank account

The participants were introduced to the two most popular accounts by the KCB Managers of Kitui and Kibwezi branches.

Current Account

The benefits for operating a current account are: country-wide Automated Teller Machine service (ATM), no minimum balance, bank statements at regular intervals or on request and both cheques and cash can be deposited at any branch of KCB.

Savings Account

The benefits of a saving account: a minimum balance of Ksh 1,000, ATM card, bank statement on either yearly basis or on request and cash can be deposited at any branch. The requirements to open a saving account are similar to those of current account.

Other types of saving accounts briefly introduced to the participants are Minor account, Student account, Simba savings, Golden account and Golden plus account.

Opening a bank account

The steps for opening a bank account are :

- 1) Bring 2 colour passport photos
- 2) ID card or passport and photocopy of it
- 3) Letters from two referees having a bank account in the bank
- 4) Fill in a request form for opening an account
- 5) Sign a specimen signature card
- 6) Deposit at least Ksh 1,000 for a saving account or at least Ksh 10,000 for a current account

Requirement for Individual Accounts

The bank has to ascertain that the person has contractual capacity, i.e. he or she is sane, 18 years or above and name of employer, if employed.

Third Party Mandate

When a bank customer intends to delegate authority of running his/her account to another person, authority given is referred to as **third party mandate**. The mandate expresses in terms what powers have been delegated. The details of this mandate include the name and specimen signature of the agent. The authority/mandate becomes void on death, bankruptcy and mental disability of the customer.

Bank Charges

The participants were informed about bank charges for saving accounts which are a monthly ledger fee of Ksh 300 if the balance is below Ksh 3,000. If the balance is between Ksh 3,000 and Ksh 50,000 the monthly charge is Ksh 200. Balances above Ksh 50,000 do not attract ledger fee charges. Other charges include withdrawal over the bank counter of Ksh 102 per withdrawal and Ksh 20 for using an ATM card.

Participants were given time to brainstorm on the type of bank accounts suitable to them. After deliberation they agreed to open a Saving Account with Kenya Commercial Bank. Danida through ASALCON provided the minimum deposit for opening Saving Account of Ksh 1,000 for each participant. They were shown in detail how to deposit cash and cheques into their account and how to use an ATM card to withdraw money.

Chapter 6 - Baseline study

By using a community approach to implementation, the RWSS projects generated substantial cash inflows into the communities through employment of local contractors and artisans, purchase of local materials, and payment for labour.

Enterprising and hard working people got the opportunity to improve their incomes. One person in Kalambani said the project had been a blessing. When the contractor requested for local materials ballast, he and his sons embarked on the exercise with great determination –working long hours. At the end of the construction, he had earned Ksh 30,000. He saved the money to improve his house and purchased livestock. According to him, life has changed and he need not beg for a living anymore.

Several of the kiosk attendants come from poor families –some are orphans or single mothers. With the employment, they took care of their siblings and undertook other improvements thus changing their family living conditions.

6.1 Water as catalyst for socio-economic development

Poverty has varied definitions such as income inadequacy, deprivation of basic needs and rights, lack of access to productive assets and general deprivation. Water is seen as central to efforts aiming at countering these unacceptable living circumstances. Where water is inadequate, households experience long hours in search of water and often consume water of poor quality. This was the case in these rural communities.

Used as an economic resource, water has the potential of raising income levels through various productive uses. For instance, in all the projects various water dependent agricultural and entrepreneurial activities have been started such as vegetable growing and brick making.

6.2 Water as a business enterprise

The financial management training was aimed at creating business minds and orientation. Water is a commodity for sale just like any other commodity. Since it attracts a cost in production, its sale should be seen to attract a level of return above the cost of production. Just the same way traders will sell their products for a profit, so should the sellers of water. The difference being that water is also a social good and a necessity and should not be inaccessible due to cost for the very poor in a society. And this is the defining criteria for water tariffs.

In other words, water should be sold at a competitive price but at the same time “no one should be denied water due to their inability to pay”. This means that the water committee (interim water service provider) must operate as an astute business entity knowing when to apply the “no payment no water” principle.

6.3 Impact of Project and Lessons Learnt : Socio-economic status of project areas

Discussion with community, committees and local leaders show that the poverty is far from being reduced. The general perception is that relatively speaking the rich are about 10%, the medium 30% and an overwhelming 60% of the population is poor. There is a general consensus that Mutha has a higher poverty level owing to its environmental conditions and location, followed by Kaliku (Ikoo-Imwatine) while Kisasi, Mbitini and Muliluni-Kitho-Inyuu are seen to be relatively better off.

The main socio-economic activities in all the project areas are crop production and livestock keeping. Due to the failure of crops over the last 3 years, livestock keeping has gained greater significance. However, the water and sanitation projects have brought new opportunities and potential to engage in improvement of livelihoods.

6.4 Cross-cutting issues in water supply and sanitation programmes

It is important to link water service improvements to other social issues such as gender, human rights, HIV/AIDS and poverty. In water and sanitation projects these issues need to be considered and addressed from planning and design stage of the project through all stages of project cycle.

6.5 Gender equality

Gender and sex are sometimes mistaken to mean the same; gender and sex were defined to make the participants understand the difference. **Sex** refers to the state, quality of being male or female and the biological features that accompany being male or female. Sex differences between male and female are; genetically determined, largely universal and generally constant. **Gender** on the other hand refers to culturally defined, socially formed roles and responsibilities between men/boy and women/girl. Genders role are highly variable across cultures and continually subject to change.

6.6 Gender issues in water and sanitation

It is widely acknowledged that women play a key role in collection and management of domestic water. As custodians of family health and hygiene and providers of domestic water and food, women are the primary stakeholders in household water and sanitation. However, decisions on water supply and sanitation technologies, location of water points and operations and maintenance systems are mostly made by men.

ASAL Consultants was keen on gender equality during project implementation as such both men and women were trained in various technical and theoretical professions such as planning, decision making on technology, siting of water structures, setting of water tariff, trainings and operation and maintenance. Obstacles that prevent women from participating in water issues such as development meetings should be identified and removed. Issues such as venue and timings for meetings should be set in consultation with women.

6.7 Human rights

Human rights can be defined as those basic standards without which people cannot live in dignity as human beings. Human rights form the foundation of freedom, justice and peace. Some of the human rights characteristics are, that they are inherent, they are universal and they are inalienable.

6.8 Human rights issues in water and sanitation

Safe water for domestic use is one of the basic human rights and it is the responsibility of every government to ensure this basic right is adequately available to all citizens for purpose of a healthy and productive nation. The World Health Organization (WHO) has set standards for the minimum quantity of water per person per day for a healthy life. The standards are; a range of 20–40 litres of water per day per person as the minimum requirement for drinking and sanitation uses ; an overall basic requirement of 50 litres of water per person per day as minimum standard to meet four basic needs of drinking, sanitation, bathing and cooking. These standards underscore the importance of supplying safe water to poor communities who are denied their rights to enjoy adequate quantity and quality of water, especially in rural areas.

6.9 Poverty

Participants defined poverty as inability to access and afford basic needs such as food, shelter, water and education. It should be noted that there is no single definition of poverty because it is a multi dimensional concept with many definitions. Different communities perceive poverty differently hence different meanings. Poverty is relative and can be said to be region or community specific.

6.10 Poverty issues in water and sanitation

Literature shows that there is strong positive correlation between water and poverty, such that lack of water services causes and traps people in poverty. On the other hand poverty makes it extremely difficult to access safe water supply. When implementing water projects, it should be understood that users include both community members who are better off and less well off economically.

Rural water supply targets the poor, therefore when setting water tariff one should keep in mind equity, affordability and willingness to pay. Water is both a social and economic good, social good in the sense that no individual should be denied water because he/she is poor to the extent that he or she cannot afford it. Water as economic good means it should be sold to cater for recurrent costs of operation and maintenance and to generate income. The payment for water should be flexible to allow the poor even to pay in kind and also to have waiver systems for those too poor to afford the set tariff.

6.11 HIV/AIDS

HIV stands for Human Immunodeficiency Virus while AIDS means Acquired Immunodeficiency Syndrome. Participants discussed ways of transmitting HIV from an infected person to an uninfected person. HIV is in peoples blood, semen, vaginal fluid and breast milk. There are four most common ways HIV is spread. (i) by having unprotected anal, vaginal or oral sex with someone who is infected with HIV (ii) by sharing needles or syringes with someone who is infected with HIV (iii) blood transfusion from HIV positive person to HIV negative person (iv) from mothers to their babies before the baby is born, during birth or through breast-feeding –Mother to child Transmission.

6.12 HIV/AIDS issues in water and sanitation

Clean and quality water is essential for prolonging life of those infected by HIV/AIDS because they require high standard of personal hygiene. Water and sanitation related diseases such as diarrhoea further weaken the health of those infected. Women and young girls are the primary collectors of water. If the water sources are far they are exposed to the risk of rape and infection of HIV/AIDS, hence the need to provide water near to the households. Communities should consider provision of adequate water to HIV/AIDS patients because researches have confirmed clean water and decent sanitation and hygiene facilities can prolong the lives of those infected by HIV/AIDS.

6.13 Major conclusions and recommendations

Based on the outcomes of training and follow-up monitoring on the progress being made, several conclusions and recommendations can be made :

- a) The training on both leadership and financial management has created greater understanding and appreciation of their roles and responsibilities. It is important to keep regular monitoring and follow up to ensure that transparency, accountability and democratic governance are sustained.
- b) The revenue collection processes and procedures put in place involving the kiosk attendants, revenue clerks, the treasurer and the management committee appear to be working well. Nonetheless, complacency could give room to inefficiency and fraud. There is need for more training for kiosk attendants, revenue clerks and treasurers to keep and maintain up-to-date standard records.
- c) The management committees have been exposed to the provision of the New Water Act (2002) and are aware that as interim water service providers, they need to maintain links and partnership with the Water Services Board. However, more education on this is necessary. It is proposed that the Water Service Board should organize a two-day seminar with the management committees to further define this partnership.

- d) The place and importance of cross-cutting issues – poverty, HIV/AIDS, gender and human rights –in water and sanitation pose new challenges to the water user associations. It is recommended that further training and education on these issues should be considered so that benefits reach the poor and vulnerable in society.
- e) Many local contractors have been trained from the 6 project areas creating a big pool of skilled and semi-skilled persons with various backgrounds. At Mutha, Ikoo and Mbitini, builders have made their own associations and are carrying out contract works. While these persons are expected to take up their roles as support agents/organizations as required under the Water Act, they require more support to rise to this level.
- f) The communities have benefited from the pro-livelihood implementation methodology with increased participation of women and youth in employment, empowerment and skills training. It is recommended that this low-cost and pro-poor livelihood approach should be promoted and adopted by KWSP.
- g) The operation and management costs of the project appear to be within the socio-economic abilities of communities. Unfortunately, evidence shows that the living circumstances of many households have been deteriorating. It is important to promote productive uses of water to improve lives. This calls for periodic assessment of the financial status of the projects in order to provide guidance and support as necessary.
- h) There may be good case for clustering some projects for example Mbitini and Kisasi to achieve economies of scale and greater efficiency. Such steps need to be discussed in great depth with the relevant committees and communities.

Photos from the field



Fatigue and sore muscles were forgotten when the drummers took action.

Epilogue

The life of thousands of women, men, girls and boys in the remote and dry areas of Kitui district has changed and improved dramatically since they got access to clean and safe water. The change and improved livelihood only happened through the community's own input and determination. They provided hard labour, commitment and persistence. They took the opportunity when the challenge arose. They made an effort and they made the difference.

During the past two years, the women at Kalambani-Mutha-Ndakani Water Project in Kitui told me stories of their life before and after access to clean and safe water. The young women employed in the project and posted to work in the area with no comfort and scarcity of food told me other stories they had heard of or experienced themselves.

The stories are about women who do not know their rights and even if they did, it would not make any difference to their daily life, as they still have to fulfil their gender roles. In general, the women in Kalambani are too oppressed to claim their rights. All the stories are about suffering and survival. All the stories have a happy ending due to access to clean and safe water.

Some women told me that they used to start their journey to fetch water around 2-3 in the morning. They would walk with their donkeys and children to assist them, to the hills to fetch water from the spring. After reaching the spring they would wait in a long queue not only for hours, but for days and nights, before they could draw water. Waiting was a tormenting experience, as they found themselves exposed to sexual harassment by men who only came to the spring in order to prey on women. Besides, they were hungry as they were unable to bring enough food due to the poverty they suffered. At night they were also afraid of wild animals and snakes. The cold at night was unbearable and kept them awake. They would rather not talk about it, but rape was the custom during those nights while waiting to draw water.

The women would often spend 3 days in the hills before returning with 8 jerrycans of 20 litres each of water. They returned exhausted and shattered only to find their huts in a mess, smaller children neglected and their husbands missing.

After another 3 days and the journey would start again. That was the life year after year for generations of women.

It was the men at Kalambani who first told me about the danger of rape their wives were exposed to when fetching water at night. They used it as an argument for why they prioritized water facilities.

I always wondered why the men didn't escort their wives to the hills or why they didn't fetch the water. I never got any answer when I asked about it. I knew the answer anyway. Fetching water for domestic use is a woman's duty and responsibility. Values, traditions, norms and practices are difficult to change. Gender roles are often difficult to question and challenge.

I was told of an incidence with a young woman, who carried a sick baby to the dry waterbed where she had to dig for water. The men watering their livestock and digging for water to sell were not letting her near the water hole in the riverbed and she kept on waiting for more than 10 hours before she in a humble way approached a man to ask for his permission to dig for water. He felt extremely offended, got violent about her lack of obedience and started to beat her up and tear her rag of clothes apart. Left naked she was taken care of by other women, who were also waiting at the water hole, but she had to wait for another 4 hours before she could get water. Her offence was that she had tried to break the gender role.

Life at Kalambani was in general hard as nothing seemed to function properly. The farming was poor, business almost non existent. There were many unwanted pregnancies. Livelihood strategies were at their lowest. There was almost no hope.

At a big community meeting, *baraza*, in October 2003, prior to starting up the project, community members expressed surprise and astonishment when they realised that someone from outside cared about them and wanted to assist them with getting water supply. They could hardly believe it was true -but true it was. They saw it and they were willing to participate.

In the early days of project implementation, I remember a woman who was more than 80 years of age, jumping up and down the deep excavation that the community members, including herself, were digging for the new pump house. Other older women and men would sit day and night preparing ballast and hardcore for the construction of the water tanks.

There was an incident where an elderly woman slipped on her way up the hill with a heavy block fastened with a strap, the Akamba way, around her forehead. The strap fell on her throat and nearly strangled her, but she got back on her feet again and continued the trip, carrying construction materials uphill to the water tank. That work went on from before dawn till after ten at night, day after day until the tank was built.

The commitment and the determination was seen in the acceleration of the construction work. 40 kilometres of trenches were dug and water pipes installed, 6 water tanks and 10 water kiosks were constructed. Community members were trained in technical work and in managerial and financial aspects on how to run the new water facilities in a way it would generate income for maintenance, repair and extension.

Today, there is clean and safe water to be purchased from water kiosks all over the areas of Kalambani, Mutha and Ndakani. Since then, life has changed for the better.

Clean water nearby has made livestock production and a better business life possible. A new hotel and restaurant are under construction and Kalambani will soon be able to cater for visitors doing business in the area. Lorries are sent from Mutomo which is 30 kilometers away and the nearest town to Kalambani, to be filled up with jerrycans of water purchased from the water kiosks at Ksh 4 per jerrycan of 20 litres and to be sold in Mutomo.

Children, boys and girls alike, are no longer taken out of school to fetch water in the hills. Women can now look after their families, avoid the fear of rape when fetching water and engage in business.

One woman told me that she has opened a small shop selling food. She is able to cook because she lives next to a water kiosk. She earns an income of Ksh 200 a day. The water kiosk attendants, usually young women, keep records of sales of water and it is not unusual to sell water for Ksh 3,000 a day.

The impact of empowerment of women and poverty alleviation through economic development initiatives due to access to water, is evident in several cases.

Most of the water kiosk attendants are living proof of this.

One of them I talked with is a young, single mother. Both her parents died of Aids and she is now responsible for taking care of her younger siblings. She worked as a trainee during project implementation. Her job was to help digging trenches, carrying construction materials to the sites and to work with the subcontractors in general as organised and coordinated by the site manager. She made a daily income of Ksh 50. It was her first time ever to have an income.

After project completion the Water User Association (WUA) interviewed her for the job as one of the water kiosk attendants and she got it. She keeps the water kiosk open 5 hours a day and according to the record book where the metered water sales are neatly recorded, the daily sales are sometimes as high as Ksh 3,000. The water is sold for Ksh 4 a jerrycan. Her salary is Ksh 2,000 a month. She has now been employed for 3 months.

The young water kiosk attendant told me that her life and that of her siblings has changed and improved beyond recognition : “As orphans we were not able to eat every day, but life is good now”.

The District Water Engineer is convinced that the Kalambani-Mutha-Ndakani Water Project is sustainable. With monthly sales of around Ksh 240,000 a profit of Ksh 70,000 is deposited into the bank account. The engineer suggests that the Water User Committee (WUA) invest the profit in poverty oriented economic initiatives through micro-credits to women.

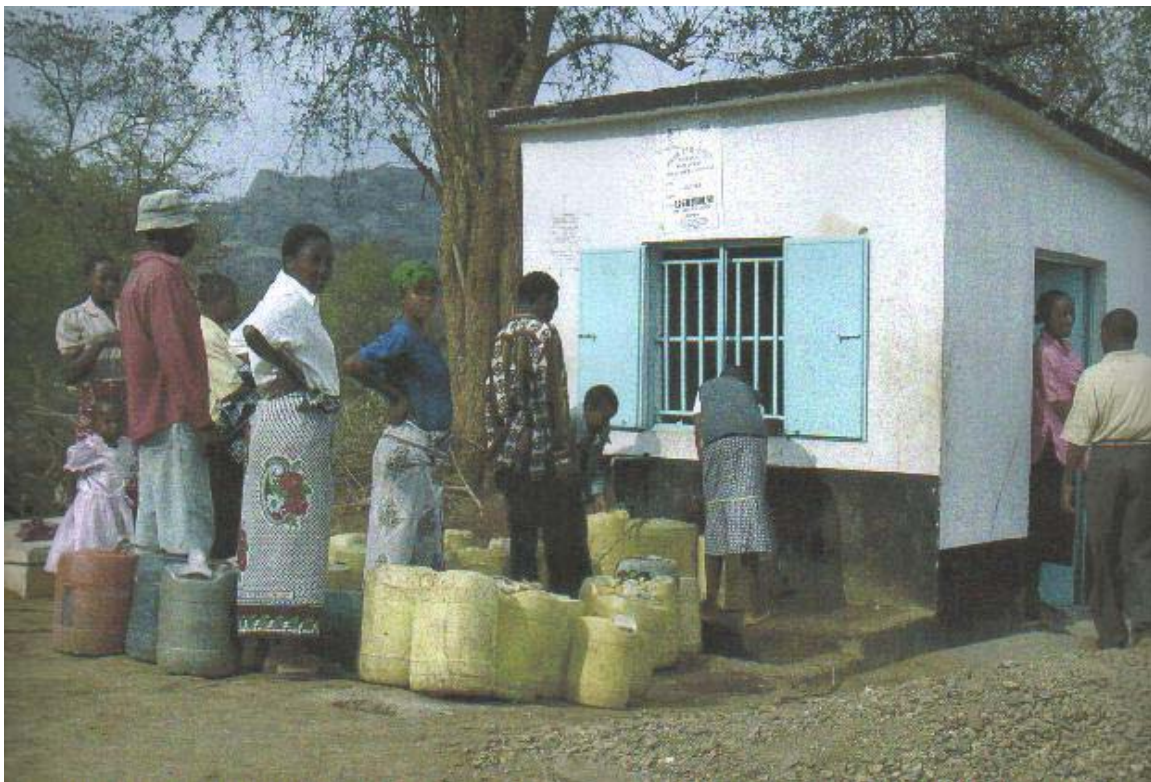
After the training and experience gained in running and managing the project, the WUA is now well prepared to discuss further investment with the Tana Water Service Board with whom they expect to be registered as a service agent.

There is already a need for construction of one more water tank, which will cost Ksh 50,000. Likewise, there is also a need to get a larger booster pump in order to be able to fill the tank in the hills in fewer hours. The water tank serves 15,000 people.

Kalambani-Mutha-Ndakani Water Project and the 5 other projects have changed things generally for the better.

The business life is starting to boom in particular on market days. New buildings are under construction. People wear better clothes. Women are no longer frightened when fetching water, as they do not have far to walk and then only in daytime.

Access to clean and safe water made all the difference.





Early morning in Taita-Taveta where women and children line up in front of a tap-stand and await their turn to have their jerrycans filled.



A close-up of the tap stand where Ksh 2 is paid into the cup on the roof of the tap-stand for every 1 jerrycan of 20 litres.

ASAL Consultants Ltd. (ASALCON) was registered as a private consultancy firm in Kenya in April 1990. The main objective of the firm is to promote *affordable water supply in arid and semi-arid land* (ASAL).

This objective is achieved by utilizing a maximum of local skills and local materials to survey, design, construct and maintain low cost and sustainable water projects. The applied methodology and procedures are documented in manuals and handbooks in several countries over the last 30 years.

ASAL Consultants Ltd. is offering professional services on proposals, surveys, designs, construction, training and evaluations on all types of community water supply systems as well as on rainwater harvesting and soil & water conservation.

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Community Management Services Ltd. (CMTS-EA) was established with a regional orientation in Kenya in 1991. The firm specializes on social and economic aspects of development promoting community management of resources and peoples participation in decision making.

CMTS-EA has collaborated with governments, international agencies, NGOs and community based organizations in water, health, sanitation, hygiene, environmental conservation and poverty analyses projects across Africa. CMTS advise and provide technical and institutional support in these fields.

CMTS-EA specializes in carrying out participatory appraisals, social assessments, community training and conduction large scale household surveys to provide both qualitative and quantitative information.

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