Water User Associations

Community Organisation in Kisumu, Kenya

Master Thesis of Erik Siepman

SANA

Sustainable Aid in Africa International

TU Delft

Delft University of Technology

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In cooperation with:
Sustainable Aid in Africa International

Thesis Committee:

- *Prof. dr. ir. W.A.H. Thissen (TU Delft, Policy Analysis)*
- *Dr. ir. B. Enserink (TU Delft, Policy Analysis)*
- *Dr. J.F.M. Koppenjan (TU Delft, Public Management)*
- *A.O. Adongo MA (SANA International, Kisumu)*

Sustainable Aid in Africa International

Delft University of Technology

Foreword

This master thesis on the subject of Water User Associations for Community Organisation represents the concluding part of my studies at the faculty of Technology, Policy and Management of Delft University of Technology in the Netherlands. A large part of this research was performed in cooperation with Sustainable Aid in Africa International (SANA) in Kisumu. The aim is to determine how SANA can contribute to the improvement of living conditions of the inhabitants of slums in Kisumu. The process has been challenging and highly instructive for me.

Many people have been of much support during the coarse of this research. First of all, I would like to thank SANA for giving me the opportunity to carry out this study in Kenya. It has been a great experience to get to know the work one does in the interesting field of rural and urban development. Alfred Adongo, Patrick Alube, Rosemary Moi, James Mutuku, James Ontoigo, Jacky Njoroge and Collins Awuor, thank you very much for the great time!

The thesis committee consists of Wil Thissen, Bert Enserink, Joop Koppenjan and Alfred Adongo. I would like to thank the whole committee for its input, support and feedback during the project. For their time, and valuable remarks on the case I want to thank all the respondents in and around Kisumu who were willing to discuss the subject of my thesis. The University Fund Delft and the Faculty Technology, Policy and Management financially supported this research project. Last, I want to thank two people for their help during the preparations in the Netherlands: Maurits Ertsen and Matthijs Toot. The project would not have been possible without your help.

For questions or comments you can contact me on ErikSiepman@hotmail.com.

Delft, March 2004,

Erik Siepman

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Executive summary

The inhabitants of the slums in Kisumu do not have enough safe drinking water. The main causes of this situation are the bad economical situation, and the fact that Kisumu Municipal Council was not willing to improve the existing water supply system. The capacity of this water system is not sufficient and besides that, the treatment plant and distribution network have not been maintained properly in the past. The inhabitants of the slums have to pay high tariffs for water, or use other unreliable sources like shallow wells.

SANA International is a non-governmental organisation, which performs water and sanitation projects in the surrounding rural areas of Kisumu. With donor money, SANA builds small water supply systems, which are later on handed over to the inhabitants of the villages. The management of the system is done by some members of the community, who are trained for this task. Several evaluations have concluded that the projects of SANA are sustainable.

The attitude of the municipality towards the poor has improved, mainly due to the national elections in 2002. That is why SANA was given permission to establish a small water supply system in a slum in Kisumu. The system consists of a borehole, from which the groundwater is pumped to a tank. From this tank the water is distributed to several water kiosks, where water users can fill their jerry cans and pay for the water. The system supplies about 3000 people with their daily need of drinking water. The operational management is done by a water user association. This small water supply system raised the following question for this research project:

To what extent is the rural approach of SANA useful for the improvement of the water availability in the slums of Kisumu?

In order to answer this question the situation in Kisumu has been analysed to determine which aspects should be taken into account to make the urban water system sustainable. Besides that, alternative management arrangements were analysed to see whether a water user association should fulfil the management of the water supply system. Other possible actors, who could perform are the Kisumu Municipal Council, a non-governmental organisation or a private company.

The main roles in an operational water supply system are the supervisor and service provider. The service provider is doing the operational tasks, like maintenance and water sales. The supervisor is responsible for the system and checks the water quality and reliability of the supply. Other tasks are the protection of the source for over-extraction or pollution and to avoid poor people to be excluded from the water system. The water users have a voice towards the supervisor, which means that they can complain about the service provider. The supervisor can use its' control to direct the service provider. The water users also have client power, towards the service provider, because they can go to another provider to buy the water. This is only possible if the water users do not have an individual connection.

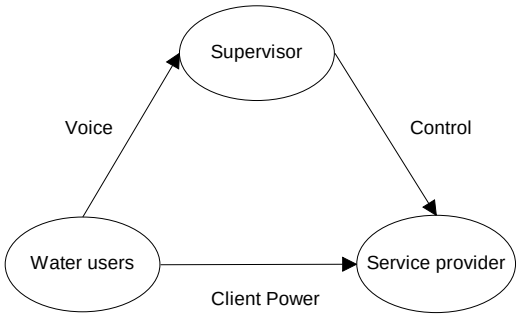


Figure 1. Roles in an operational water supply system

Which actor should initiate the improvement of the water supply?

The inhabitants of the slums have several sources of water, but especially in the dry season the yields are not enough to fulfil the needs. The first option to increase the available water quantity is to expand the capacity of the central water supply system, which extracts water from the large nearby lake Victoria. This municipal system has recently been privatised, and the current service provider is the Kisumu Water and Sewerage Company, Kiwasco. Kiwasco and the municipality indicated that they will not be able to supply all slums with water, so that is why they allowed SANA to implement a small community-managed system. Another option could be to allow a private investor to build a system and sell the water, but then a powerful regulator is needed to avoid problems like over-extraction of water and excessive pricing. The government is not able to act this powerful at the moment, because they miss the required skills. That is why the second option, in which SANA builds a small community-managed system, seems to be the best.

Which actor should be the supervisor?

After implementation SANA usually hands over the water system to a committee of representatives of the water users, but in Kisumu, they can also hand it over to the municipality. The owner of the system can fulfil the role of supervisor and service provider, but the owner can also hire other people to be the service provider. Accountability is an important aspect in those decisions. The water users, who have the biggest interest in the well functioning of the water system, should be able to keep the service provider accountable for the services. This means that they have countervailing power to make the service provider improve the services. In figure 1, two routes of accountability are shown, direct and indirect via the supervisor.

In many countries the municipality fulfils the role of supervisor, because they represent the water users. However, in Kisumu, it would be better if a committee of representatives of the water users perform this role. The municipality has ignored the interests of the slum inhabitants for many years, but now this situation seems to improve. However, it is not clear whether the municipality is really willing to stand for the interests of the slum inhabitants, so it would be better if the inhabitants could supervise their own water supply. The committee will benefit by a good water system, because their family and friends live in the supplied area. This creates a strong incentive to do a good job. The committee should be trained by SANA, as they might not have the financial or technical skills to perform the supervisory task. Furthermore the committee should be visited on a regular basis by SANA, or other experts, so they can discuss problems that have arisen in the previous period.

Which actor should be the service provider?

The service provider fulfils the operational tasks, like maintenance and water sales. This can be done by the water users on a voluntary basis, or by employees who are hired and receive a salary, or by a company that hires the system on a contractual basis. The first option is not the best because volunteers do not have financial incentives that stimulate the operators to sustain the service. A way to do so is by giving them a salary that is related to the water revenues. Furthermore the volunteers might not have the required financial and technical skills. The third option is not the best, as it is difficult to formulate a contract with a private company without the committee to loose too much power. Crucial decisions about network extension or access for poor people will be taken by the committee, who are advised by the experts if necessary. The second option therefore seems to be the most suitable.

Figure 2 provides an overview of the role allocation in the proposed water supply system. SANA assists the water users to establish a water user association. They organise elections where the water users compose a water supply committee. SANA trains the committee for their managerial tasks. After that employees are hired for the operational tasks, for example managers, technicians, shop attendants and security officers. The last group of actors are the external professional facilitators, who could be representatives of the municipality or non- governmental organisations, like SANA. These facilitators monitor aspects like maintenance, source protection, financial management, access of the poor and other relevant aspects. They advice the committee about certain aspects, or the committee can ask them for assistance. In case the committee is not functioning properly, the facilitators could advice the water users to choose other people in the next elections. Another aspect the facilitators should monitor is the cohesiveness of the association, as there might be a chance that problems arise because of ethnical or social troubles.

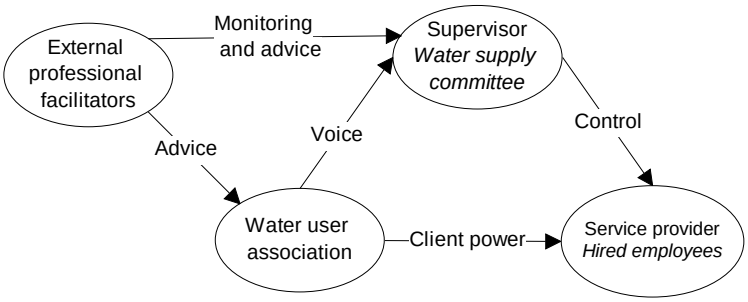


Figure 2. Roles in the proposed operational water supply system

The main objective of the water user association should not be the establishment and management of their own water supply system, but the increase of the water availability in the slums. If the water users are organised they can have a stronger voice towards the government or donor organisations. In case the municipality wants to help them, the water user association can decide to work together with the municipality on improvement of the water supply. Furthermore the association can involve other actors in the implementation process, like the existing water suppliers Kiwasco and water vendors, but also institutions like schools, health centres and churches.

Neighbourhood development association

The lack of water is not the only problem in the slums. Other aspects that harm the living conditions are the bad sanitation, drainage, health care and security. The underlying causes of the lack of these services are the bad economical situation and the poor functioning of the government. When the inhabitants of the slums are organised in a water user association, this could be transformed into a neighbourhood development association. The neighbourhood development association can address the lack of services, but also stimulate income-generating activities. For example by asking non-governmental organisations for training in small business and credit provision. Furthermore the association empowers the inhabitants towards the government, so they can ask for assistance and a pro poor attitude. Together the municipality and association can decide how they should address a certain problem.

1. Introduction

This chapter provides an introduction to the thesis. First the problem will be described, followed by the problem definition, background of the research and methodology of this research project. The chapter will conclude with a guide for the reader, which explains the structure of this report.

1.1 Problem description

Kisumu is a city in the west of Kenya bordering Lake Victoria[1]. Despite the large amount of fresh water available in Lake Victoria, the inhabitants of Kisumu are lacking drinking water, which harms especially the poor people in the slums. An important reason for this is that 50% of the 32 million inhabitants of Kenya live below the poverty line, which means they have to live of less than 1 euro a day. Population growth and the bad economical situation cause a lot of unemployment[2]. People from rural areas move to the cities like Kisumu, where they hope to find a job. They settle in slums, where living conditions are poor, as there is not enough clean drinking water, health facilities, or other services. Another aspect that strongly contributed to the water shortage is the political resistance of the Kisumu Municipal Council that used to have large financial interests to maintain its' monopoly on the urban water supply [BGA, 2002].

This situation is changing as a result of the national elections in December 2002, which caused a political "revolution". President Daniel Arap Moi and his party had to make way for the National Rainbow Coalition of President Mwai Kibaki. The 25 years of Moi's regime have been very bad for the economical situation, so an important challenge of the new government is to revive the economy. One of the bottlenecks is the bad functioning of the government, which employs many incompetent corrupt officials because of patronage [Bindra, 2003]. Also in Kisumu the functioning of the government officials will have to be judged.

The new government has removed the monopoly for water supply of the Kisumu Municipal Council. The National Water Act prescribes the privatisation of all drinking water companies. In August 2003, the water department of the municipality was privatised and Kiwasco was established; the Kisumu Water and Sewerage Company. The new management is now rehabilitating the existing supply system and is expected to receive financial support from a French donor in January 2004.

However, this financial support is not sufficient to extend the network to the slums and to supply the slum inhabitants with piped water. Thus, Kiwasco allowed the local non-profit organisation SANA to drill a borehole in one of the poor outskirts to supply the community with fresh water. The available daily yield of ground water is that big, that at least 4000 people can be supplied with it. The boreholes in other locations of the city are likely to give a comparable high yield. To manage the water supply system, SANA decided to establish a water user association. This type of community-based organisation appeared to be effective to SANA during many years.

The main goal of the research is to determine whether a water user association should manage the water system and how it can contribute to improvement of the living conditions in the poor areas of Kisumu. This leads to the following research question:

To what extent is the rural approach of SANA useful for the improvement of the water availability in the slums of Kisumu?

The focus of this research is mainly on water, but lessons from the water sector are expected to be useful for other aspects of development, like health, security and income generation.

[1] See Annex 6 for a map of the research area.
[2] More statistical information on Kenya can be found in annex 7.

1.2 Background of the research

The idea for this research subject was created during an internship that I did with Sustainable Aid in Africa International (SANA) in Kisumu in Kenya. SANA is a small non-governmental organisation (NGO) that performs water and sanitation projects in the rural areas of the Nyanza province. When the projects are implemented they are handed over to the community, who are from that moment on responsible for operation and maintenance. A water and sanitation committee is set up: members of the community are elected to be educated to manage the water system. This is possible, because the systems have a small number of users as well as use simple technologies.

During the internship I learned that it is possible to continue the development process of the rural communities with a water and sanitation committee. When the rural communities are organised it becomes possible to consider other relevant problems, for example the limited financial income. Now the water is used as a resource for food and livestock.

Due to the changing political climate in Kenya it appeared to be possible to realise water projects in the slums of Kisumu. This research is meant to find out whether these urban water supply projects should be managed by a water user association. These associations have a number of goals, namely:

- the participation of the citizens in their own development;
- a stronger voice to try to make the government fulfil the citizens' rights;
- the possibility of cooperation with other actors;
- implementation of services for better living conditions;

One of the guidelines for the design of the water user association is that SANA's good relationship with the government should not be disturbed. That is why it is important to involve the government in an early stage of the plans. Another aspect that should be borne in mind is that the majority of SANA's projects are funded by international donors, because the communities cannot afford it and SANA does not have other sources of money besides the project funding. In practice this means that the donor needs to be convinced of the need and sustainability of the project, which usually takes a lot of time and effort. Finally, it is necessary to bear in mind that corruption is a widespread problem in Kenya; despite the attention the new government is currently giving to it. A good design of the process and organisation should have institutional "checks and balances" that minimise this risk. This section about SANA gives some guidelines for the design of a Water User Association. These are the main ones:

- the good relationship with the government should be maintained;
- it should be possible to arrange the funding;
- beware of corruption.

The guidelines are neither a warranty for success, nor strict regulations that cannot be ignored, but based on SANA's experience it is advisable to bear these prerequisites in mind. The guidelines should be considered as a set of criteria with which the design of the process and the association structure can be evaluated to estimate the chance that the design will be successful.

1.3 Methodology

This section describes the methodological design. In other words, it explains how the research is done and why it is done that way.

1.3.1 Demarcation

The main question in this research is:

To what extent is the rural approach of SANA useful for the improvement of the water availability in the slums of Kisumu?

This formulation of the main question represents the demarcation of the research. The focus of the project is on water, community-based development and urban development. The first subject is water, which is meant for consumption and domestic use. The availability of water is an important condition for good living conditions, but other things are also necessary, like electricity, drainage, health facilities and income generating activities. In order to be able to make an in-depth analysis I decided to focus on drinking water and set aside the other conditions for a good livelihood.
The second subject is community-based development, which means that the citizens try to improve their own living conditions. Other types of development are driven by the government. Because SANA was the starting point of my research I focused on their community-based approach. The role of the local government in the urban development is very relevant and therefore was analyzed, but not in as great detail as the community.
The third important subject in the research question is rural and urban development as the rural approach of SANA was used as the base to develop an urban solution. The differences between the rural and urban situation should be clear to be able to adapt the rural approach. Here no choice was made for rural or urban, but both situations were taken into account.

1.3.2 Research structure

This demarcation applies to whole the structure of my research as well as the report. An overview of the structure is given in figure 1.1. Every block in figure 1.1 represents a phase in the research, in which a sub-question is answered, that in its turn contributes to answering the main research question.

1. A theoretical framework is made on the general characteristics of the implementation process and operational management structure of water supply systems. This framework is used in the rest of the report to analyse the rural and urban situation. The questions addressed in this phase are: What are the roles in the implementation and operation of a water supply system, who can perform these roles and what are the criteria to measure the success of a water supply system?

2. The theoretical framework is used to analyse the rural approach of SANA. Guidelines are formulated that contribute to the success of the rural projects, which are used later to design the urban approach. The questions addressed in this phase are: What are the problems in the rural areas? What is the rural approach of SANA and is this approach successful? Why is it successful, or why not? And how could the approach be improved?

3. The water problems in Kisumu and its underlying causes are analysed. The questions addressed in this phase are: How is the current water supply system organised? What are the drinking water problems in Kisumu? And what are the causes of these problems?

4. The rural situation is compared to the urban situation in order to determine whether the rural approach can improve the urban living conditions. The questions addressed in this phase are: What are the differences between the rural and urban water problems? And how should the rural approach of SANA be adapted to be successful in the urban setting?

5. The water systems in other cities are analysed to gather experiences that could be used in Kisumu. The questions addressed in this phase are: What cities had a problem situation that is similar to the situation in Kisumu? How did they organise their water supply? And what lessons can be learned from those cases?

6. All information is integrated into an organisational design for the management of a water supply system, and its implementation process. In other words, the rural approach of SANA is adapted to the urban conditions. The lessons learned in phase 5 are used as additions to the rural approach. The questions addressed in this phase are: Does the design meet the requirements and how does it score on the criteria?

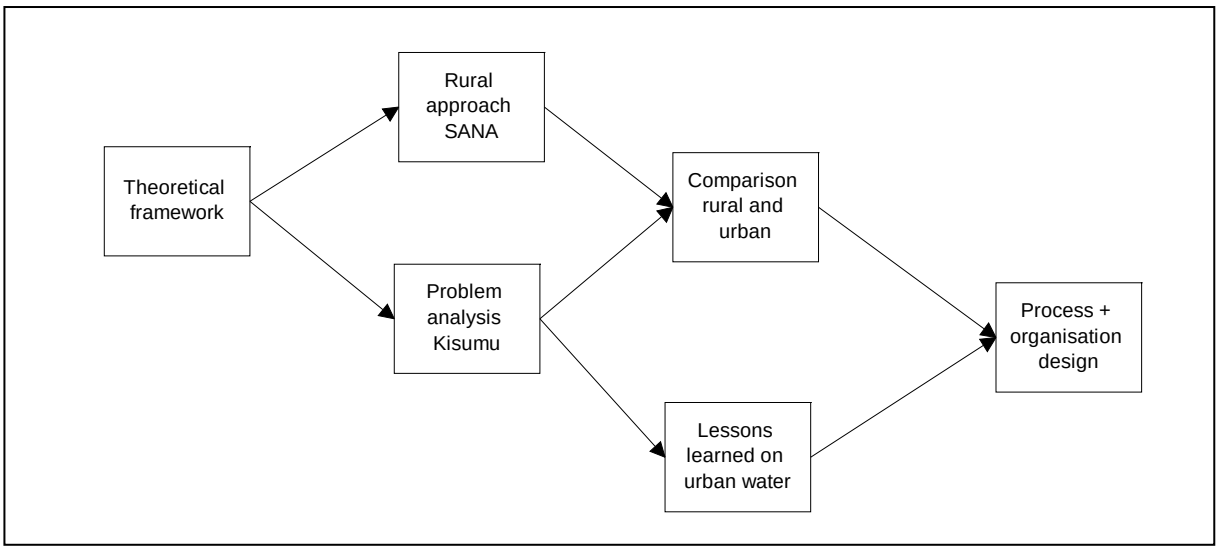


Figure 1.1. Research structure

1.3.3 Data collection

This research makes use of several types of data; a description is given below.

The first phase of the research is the development of the theoretical framework. In this phase, I used sociological, economical and technical literature on water supply systems as well as on community-based development.

The second phase is meant to practically describe how SANA is doing the projects in the rural areas and to determine whether this method was successful. In order to do so I have interviewed people in the villages where SANA implemented a water system. I have interviewed water users, members of the water and sanitation committee and employees of SANA. Some finished projects were evaluated, so I could use the evaluations and recommendations that were made by several institutions. In order to verify the evaluations I visited a number of projects and observed the situation and interviewed the beneficiaries. In the three months that I was with SANA I attended the weekly project management team meetings, which made obvious the difficulties in implementation. Together we could discuss how things could be improved. Annex 5 shows a list of projects that I visited and the interview questions.

In the third phase I have described the water-related problems in Kisumu and the various perceptions of the actors. First, I have read the research documents that were made by the international development institutions [SIDA, 2002; JICA, 2001]. After that I visited the slums and talked to the inhabitants. I also visited Kiwasco, the water supply company and interviewed a number of employees. Furthermore I interviewed one employee of the Kisumu Municipal Council.

After the above-mentioned steps, I could thoroughly analyse the issues in Kisumu and find solutions. First I described the differences between the rural and urban situation in order to determine the applicability of the rural approach of SANA in Kisumu. While reasoning in a theoretical way it appeared to be possible to establish a successful community based urban water supply system, but as additional proof I wanted to analyse comparable models in practice. In order to find comparable management models I visited a community based urban water supply system in Migori and I have read several case studies about urban water management in other countries like Tanzania and Mauritania.

1.4 Structure of the report

Chapter 2 describes the theoretical framework that is used in the analysis of the rural and urban situation. Chapter 3 describes the rural approach of SANA. Chapter 4 describes the problems related to water in the slums of Kisumu. Chapter 5 analyses the problems and explores different aspects of the solution. Chapter 6 presents the design of the water user association and it's extensions for further development. Chapter 7 gives the conclusions and recommendations.

2. Water supply systems and community-based development

This chapter develops a theoretical framework, meant to analyse rural and urban water supply systems. In order to do so, the first section of this chapter describes general characteristics of water supply systems. This results in a framework that shows the different roles in the initial and operational phase of the water supply system, which can be performed by different actors. The second section gives barriers for implementation of a water system and barriers for its sustainable and equitable operation. The third section describes the relations between the different roles in a water system with the concept of accountability. As was explained in the previous chapter the role of the community is important in the approach of SANA, so that is why the last sections focus on the community and their role in development.

2.1 Criteria and roles

The objective of a drinking water system is to supply the users with water. The alternative the users have is to get the water by walking or using carts or trucks. Where necessary the system is used to treat the water, to make it safe for consumption. An alternative for central treatment is local treatment, which means the filtration, chlorinating or boiling is done on a decentrale location before consumption.

In the book The Best of Two Worlds [Wijk, 2001] is described which aspects contribute to a good water system. The two main criteria are the available quantity and quality of water. For water quantity is said that water users decide on the capacity of the water system. In water quality the water should be safe for consumption and the water is tested on a regular basis so the water users can trust the system. Another criterion Van Wijk mentions is that nobody should be excluded from using the water system, which means that people with less money and power than others need help to get their daily need for water. The management of the water system can develop mechanisms to ensure that nobody is excluded.
The quantity and quality of water supplied by the system depends on the source. For sustainability the water in the source should not be polluted and the water extraction should not exceed recharge of the source. Besides that a good distribution system is needed, which is designed, build, operated and maintained properly. This requires solid financial management.
Criteria for the sustainable and equitable operation of a water supply system are:

- Reliable water quantity, the system supplies as much as was agreed with the citizens.
- Reliable water quality, users know that the water is safe for consumption.
- Equity for the poor, so they can use the water for an affordable price.
- Source protection: qualitative and quantitative.
- Financing of the operation.

The book Between Rural and Urban [Moriarty, 2002] describes aspects that are important when a water supply system is implemented. The authors state that there is an existing water system that should be taken into account in order to be able to improve the water system. This regards the natural or technical situation as well as the people who use it. The actors involved in the water system should support the process of improvement. If the water users or operators of the existing system do not see the need for improvement, or do not want it for any reason they will not initiate any action. Another aspect concerning the initiation of the implementation or improvement of a water supply system is that it should be possible to finance the investments. The last criterion is the duration until implementation.

Criteria for the initiation of implementation or improvement of a water supply system are:

- Support of the actors.
- Financing of the investments.
- Duration until implementation.

Several roles can be seen in a water system. In order to establish a water system and to keep it running, a number of roles can be distinguished [World Bank, 2004]:

- Initiator or facilitator organises the implementation process.
- Investor has paid for the implementation.
- Constructor builds the water system.
- Owner, responsible for the infrastructure after implementation.
- Service provider; is responsible for the daily technical and financial management and organises maintenance to prevent or fix technical problems.
- Water users, need water for consumption or commercial activities.
- Supervisor, checks things like water quality, water tariffs and equity.

These roles can be performed by different groups of actors, namely the government, water users, private companies and non-profit organisations as can be seen in figure 2.1. The table will be used in the next chapters to compare different alternative allocations of the roles.

Roles ▼ Actors ►	Citizens	Government	Private companies	Non-profit org.
Initiator				
Investor				
Constructor				
Owner				
Service provider				
Water users				
Supervisor				

Figure 2.1. Roles allocation table

For individual citizens it is very difficult to implement a water supply system. The alternative for a water supply system is that everybody goes to the source to get water, for example to the river or use groundwater. The advantage of a water system is that the drawing point is much closer to the houses and that people do not have to walk that far to collect it. In order to establish a water system, the individual citizens should cooperate so they can share the investment costs for implementation. In many countries the government fulfils this role, but in other countries the government is not able or willing to invest in a water supply system. In that case the citizens can form an organisation to arrange the implementation by themselves. The third group of actors that could implement a water supply system are the private companies, but like the government and citizens they can have some barriers that keep them from the investment in a water system.

2.2 Barriers for water supply

In order to establish a water supply system, an initiating actor is necessary that organises the implementation process. Several aspects can impede the initiation, which is explained in the first sub-section. When the system is implemented it is important that it is managed in a sustainable and equitable way. The second sub-section describes what barriers can affect sustainability and equitability during the operation. Please be aware of the distinction between the initial and operational stage, as shown in figure 2.2.

Barriers for initiation

For implementation of a water supply system it is important that one of the actors initiates. In many cases the government is doing this, but also the citizens or private companies can do so. This section describes possible causes for a situation in which none of the actors is able to implement a water system. The criteria that were introduced in section 2.1 that deal with the initiation of a water supply system are:

- Financing of the investments; it should be possible to finance the implementation.
- Duration until implementation; it should not take too long until the users are supplied with water.
- Support of other actors, when influential actors do not support the implementation process, they can hinder the progress.

The criteria are mentioned here once again, because they are used later on to compare the different options the actors have to initiate the implementation of a water supply system. It is not possible to select a suitable actor, as this depends on the local situation, but some theoretical considerations are given that can be expected.

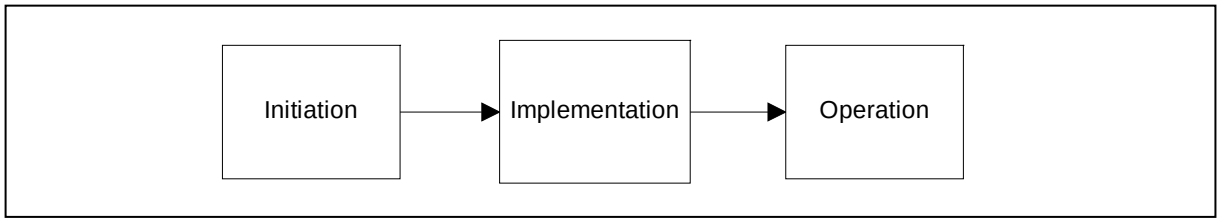


Figure 2.2. Stages in a water supply system

Initiation of the establishment of a water system is in many countries done by the government. When there is no water system, this can be because the government is not able to do the implementation, or because they do not want to. If the government is not able to perform the implementation this is usually caused by underfunding. In some countries water is very scarce and this requires expensive supplying technologies. It is also possible that there is no universally accepted government, or that the government officials do not have the required skills [Evans, 2002].

Another barrier for initiation by the government is their willingness. The government can perceive other problems as more important than improvement of the water supply for the poor people. A common situation is that the government focuses their efforts on the rich and more influential people who help the politicians to get votes during the elections. The implications for the poor people are not important for them, so they are ignored [World Bank, 2004]. Another reason could be that there is some water available and most people are alright with that; they do not need a higher service level [UN-Habitat, 2003].

Citizens that need water but do not get it, have two options: They can either try to stimulate the government to implement a water system for them, or they can do it themselves with or without donor assistance. In both situations it is important for the citizens to be organised in an organisation to aim at their interests together. Together they have more power and a stronger voice [Dongier, 2003]. However, in some cases they do not come together in an organisation, or they are organised, but do not achieve the implementation of a water system. This can have several reasons, which are described by Wasserman (2001). In the first place it could be because they do not know that it is possible to achieve improvement, or they do not know the way in which to do it. Another reason is often that the community does not consist of a harmonious interest group. The last reason she mentions is that it is possible that some of the community members do not desire change.

Private companies can be investors from the same or other countries. For them the main motive is having a large revenue and profit. They can invest in a water system and start supplying water to the users. Furthermore they need permission from the government. Besides that, the firm's operations should be profitable. That means that if the users do not have money to pay for the water, or if the investment costs are very high, the companies will not invest. Additionally, there should not be unacceptable threats for the profit, like the risk that the source runs dry, or that a (civil) war breaks out, or that users do not want to pay for the water, or sabotage the system in such a way that the investor is powerless to do something about it.

Non-profit organisations are another group of potential initiating actors. They can behave in the same way as a private company (without having the need to make profit), by implementing a system themselves. They could also support the government in a financial or organisational way in case the government is willing, but not able to do it. Non-profit organisations can also help the citizens to get organised to push the government to do something, or to implement it with financial support.

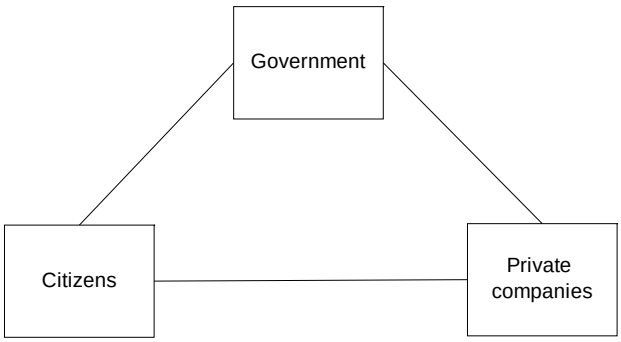


Figure 2.2. Potential initiators

Figure 2.2 shows the parties that have various possibilities to initiate the implementation process of a water supply system. Sometimes these are in balance, but in other cases the power distribution is not equal and one actor has most power. Examples of aspects that contribute to a powerful position are money and political support. The non-profit organisations are not included in the figure, as they can act as or through one of the mentioned actor groups.

Barriers for equitable and sustainable operation

This sub-section describes reasons why a water system could not be sustainable or equitable. In order to do so, the criteria from section 2.1, which deal with the sustainability and equitability of the water system, are mentioned to discuss the alternative role allocations in an operational water supply system:

- Reliable water quantity, the system supplies as much as was agreed with the citizens.
- Reliable water quality, users know that the water is safe for consumption.
- Equity for the poor, so they can use the water at an affordable price.
- Source protection: qualitative and quantitative. For sustainability the water in the source should not be polluted and the water extraction should not exceed recharge of the source.
- Financing of operation and maintenance.

Especially when private companies run the water system there is a risk that they are only focussed on making money, without taking into account the long-term sustainability. They could extract too much groundwater, so after a few years it is not possible anymore to get water. Another example concerns the position of the poor people, who could be excluded from water by a private company, because they cannot afford the high prices. That is why in many countries the government acts as a supervisor and guarantees a universal supply of service. Unfortunately, some individual politicians think they have the right to make a lot of money without bearing in mind the undesirable effects. In that case they have so much power that other actors are not able to change the situation, even if the victims are aware of the risks.

The water users do need a sustainable system, which supplies good quality at an affordable price. Then the question is how they can make sure that the system is managed properly. If the government is functioning well they can achieve this by using their electoral power and by lobbying with action groups. They also have the possibility to participate in a supervisory role, but then the government should not try to hinder them. Figure 2.3 shows the different roles in an operational system that could be performed by the citizens, government, private companies and non-profit organisations [World Bank 2004].

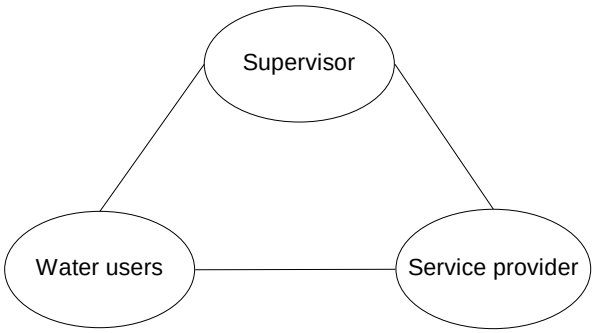


Figure 2.3. Roles a in an operational water supply system

In order to avoid confusion with figure 2.2 it is important to know that 2.2 represents the power distribution during the initial stage, whereas 2.3 is meant to show the most relevant roles during the operational stage.
The previous section mentioned eight different roles, but figure 2.3 only shows three of them. The reason for that will be discussed here. The initiator or facilitator organises the implementation process, so the role of the initiator during is finished in the operational stage. The same applies to the investor who has paid for the implementation process, but in some cases the investor becomes the service provider to get his money back. This depends on whether the investor considers it as a donation to the government or water users or not. The water users or service provider can be the owner, but a water board, or the government could fulfil this same function. The owner of the system can use his ownership as tool to gain power for the supervision on the system; potential actors for the ownership are a water user association, the local government, a private company, or a water board with representatives of different stakeholders. This water board can also do the supervision, another option is that the government fulfils this task [Valfrey, 2003].

Dealing with the barriers

The previous sub-sections have enumerated most barriers for initiation of the implementation and for successful operation of a water supply system. It was explained that the water users are the main stakeholders who benefit from a good water system. In many countries the government tries to arrange water supply for all citizens they represent, but in other countries the government is not able or willing to do so. In that case the water users themselves have to do something to establish a water system, for example pushing the government, or doing it by themselves.

The private companies can also try to establish a water system, but there are three barriers. The first is that private might have no incentive at all to invest in establishing water supply system in low value areas such as Kenya. The second is that they need permission to do so. The third is that the private companies might harm the sustainability, by extracting too much water from the source. In case the government is not able to enforce this sustainability it would be nice if the water users could do this, because it harms them the most if the water source is misused.

Despite the big interests they have, the water users can also harm the sustainability of the water system. An important reason for this is the lack of knowledge about the implications of poor management of the water source. The water users can also harm the equity, as rich and influential people could exclude the poor from the water system [Wasserman, 2001]. In the design of a management structure this should be borne in mind.

As a conclusion of this overview it can be said that the community and government can both fulfil the supervisory role in a water supply system. The following chapters will describe how this is arranged in the projects of SANA and whether this way of supervision is also applicable in the slums in Kisumu. The next section gives more details about the supervisory task.

2.3 Investigation of the barriers

The World Development Report 2004 [World Bank] states that successful services for poor people emerge from institutional relationships in which the actors are accountable to each other. The World Bank has developed a framework to analyse how well the actors in service delivery are able to keep each other accountable. This framework will be used later on in the problem analysis for Kisumu.

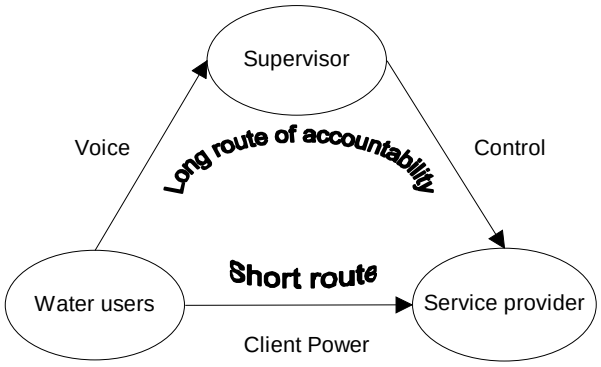


Figure 2.4. Framework of accountability in operational infrastructure services[1]

"Accountability implies on the one hand *answerability* (the right to receive relevant information and explanation for actions), and on the other hand *enforceability* (the right to impose sanctions if the information or rationale is thought to be inappropriate). For the water sector this means that clients who receive water from a provider have means to enforce good services, such as a reliable supply and water quality at a fair price." Figure 2.4 shows the framework of accountability, which is an extension of figure 2.3 in this chapter.

The short route of accountability is a direct relation between the water user and service provider. In the long route this relation is via the supervisor. All roles can be performed by public, private or community organisations. In this report the most suitable role allocation for Kisumu will be determined in order to be able to keep the service provider accountable for the operation of the water system.

Short route of accountability

"In a simple market transaction, the buyer keeps the seller accountable for the product bought, rewards the seller by repeating business, or penalises the seller by choosing another provider. This accountability is "short" because the water users can keep the provider directly accountable, without any intermediaries. Small, independent providers in water and sanitation and their clients are usually in such a market relationship.

Service and market conditions that automatically give *client power*, through choice, ease of monitoring, and market enforceability, are not always present for infrastructure services. The reason for this are the big investment costs required to establish the infrastructure, which results in a natural monopoly. The route of accountability has to be long unless the water users can organise themselves in such a way that they are able to enforce sustainable market conditions. In that case the supervisor is not represented by the government, but by another institution in which the water users have a strong voice."

Long route of accountability

"Governments world-wide deem it their responsibility to provide, finance, regulate, and in other ways influence infrastructure services. They do it for two good reasons: market failures and equity concerns. First, networked infrastructure services exhibit economies of scale, or network externalities that could, in very specific cases, make it technically more efficient to have a single distributor of the service; in this case the infrastructure can be seen as a natural monopoly. Also free-rider problems, where one person's behaviour hurts others with impunity, as in the case of runoff from open defecation in many parts of Africa, require community or government intervention. In the case of water supply, a free-rider problem could consist of user receiving water for which they have not paid. Second, societies care about equity, and governments often redistribute resources, such as a lifeline water subsidy, to ensure the minimum equitable service access that competitive markets are less likely to supply.

Network externalities and collective action problems thus provide powerful reasons for the government to be involved. The arrangements then are no longer primarily between the water users and the service provider, and new accountability relationships become important. The first of these arrangements is *voice*, citizens delegating to supervisors the responsibility to ensure the quality of services they want. The second is through the *control* of supervisors on providers, to design the service delivery framework, and ensure that it meets the water users' expectations. Voice and control together become the "long route" of accountability [World Bank, 2004]."

In order to be able to understand the accountability framework I will give two examples as alternatives for the allocation of roles to different actors: community and governmental management. In a community managed water supply system the system is small, so the citizens do not need many skills. An elected committee is doing the operational management and in case the water users are not satisfied with the service they go to the committee to ask for change. This means that the water users are supervisors at the same time, which is possible, because the accountability in a small community is very good. The second example is a governmental managed water system in which the operational management is done by the water department of a municipality. In case the water users have problems they can complain to the councillors who are elected (*voice*) and the councillors can ask the water department to improve the service (*control*). The long route of accountability is only successful if both voice and control are in order.

An important question about urban water supply is about privatisation and the implications for accountability. The main reason for privatisation is that a private company is more efficient then the government and receives more financial incentives that will lead to lower prices, more innovation and better services. Another reason to privatise the utilities is because of the need for investments in infrastructures, which could be available through international companies. In some cities the privatisation goals were not achieved and some other issues arose, such as rising tariffs and exclusion of people who could not pay their bills. The World Bank used to be the main supporter of privatisation, but is now trying to find other approaches, as there are problems with the accountability. The involvement of the communities in their utilities seems to lead to good solutions [Muskens, 2003]. The reason for this is that some municipalities are not able or willing to enforce the private operator to provide good services. In that case it would be better if the water users had more power to keep the private operator accountable. How this can be achieved is described in the next sections.

2.4 Community-based development as remedy

As was stated in section 2.2, the barriers for initiation and for sustainable and equitable operation of a water system are most harmful for the citizens who need the water for consumption. If private companies or the government do not initiate the implementation of a water system, or do not manage it well, the citizens can do something about it. Community-based development is meant to give citizens more power to improve their living conditions, which is explained into detail in the next section.

In community-based development citizens form organisations to be able to improve their living conditions, for example the establishment of a water supply system. These organisations often work in partnership with local governments, the private sector, NGOs, and central government agencies. Community-based development is a way to provide social and infrastructure services, organise economic activity and resource management, empower poor people, improve governance, and enhance security of the poorest [Dongier, 2003].

Support to community-based development usually includes:

- Formation or strengthening and financing accountable and inclusive community groups or community-based organisations.
- Facilitating community access to information through a variety of media, and increasingly through information technology.
- Forging functional links between community-based organisations and formal institutions and creating an enabling environment through appropriate policy and institutional reform, often including decentralisation reform, promotion of a conducive legal and regulatory framework, development of sound sector policies, and fostering of responsive sector institutions and private service providers.

In the Sourcebook for World Bank Poverty Reduction Strategy Papers [Dongier, 2003], community-based development is said to be relevant across many sectors. "The potential for community-based development is greatest for goods and services that are small in scale and are not complex. Furthermore these goods or services require local cooperation, such as common pool goods (for example, management of common pasture and surface water irrigation systems), public goods (for example local road maintenance), and civil goods (for example, public advocacy and social monitoring). But not all goods and services are best managed through collective action at the community level. Public goods that span many communities or that require large, complex systems are often better provided by local or central government. Similarly, private goods are often better provided using a market-based approach, relying more on individual enterprises than on collective action.

Community-based development can fill gaps where markets are missing or imperfect, or where public institutions or local governments fail to fulfil their mandates. The market alone cannot provide all essential services and goods for poverty reduction. It often provides insufficient public goods while over-harvesting common pool goods. Although national government programs focused on investing in human and physical capital they have the potential to redress some of these imbalances. Accumulated experience has shown that central government programs are often slow to deliver basic services and are often ineffective in reaching poor people."

The Dutch ministry of International Cooperation confirms Dongier's statement in a policy document about civil society and poverty alleviation [Lammers, 2002] by saying that a well-developed society has a balance between state, market and civil society. "An important cause of poverty is the lack of self-reliance of the poor. They do not have rights, lack opportunities to learn

and do not have access to resources. This can be changed by (self-)organisation, power clustering for social action and the organisation of countervailing power. Community-based development establishes structures and systems that aim at empowerment form together the civil society. Poverty alleviation requires a good civil society." Ribot (2002) says that civil society should be viewed as a complement, rather than alternative, to representative government.

According to the *Voices of the Poor* study (Narayan and others 2000), based on interviews with 60,000 poor people in 60 countries, poor people demand a development process based on their communities. "When the poor were asked to indicate what might make the greatest difference in their lives, they responded:

- Organisations of their own so they can negotiate with government, traders, and NGOs in order to improve the economical situation and governmental functioning.
- Direct assistance through community-based programs so they can shape their own futures.
- Local ownership of funds, so they can end corruption. They want NGOs and governments to be accountable to them".

In the research 'Evaluating Community-Based and Community-Based Development: A critical Review of the Evidence' [Mansuri, 2003] is stated that they have not been able to find a research in which is proven that community-based development leads to better results then when it would have been done by the government. Many evaluations do not use a good methodology to prove the relationship between community-based development and sustainability. However, they have found some evidence that community-based development projects create effective infrastructure and improve welfare. In case the government is not able or willing to improve the living conditions of the poor, community-based development is an opportunity for the citizens to improve their situation.

Concluding from the quoted studies it can be said that community-based development seems to be a good way to keep the government accountable for its attitude towards poor water users. If the government is not willing to establish a water supply system, the water users can use their increased power to enforce better governance. They can get assistance from the non-governmental organisations that have more knowledge and experience in such cases.

2.5 Water user associations

The establishment of a water user association will empower the citizens in a few ways. In section 2.2 two stages were distinguished: initiation and operation. In the initiation stage the citizens are empowered towards the government. In other words, they have a stronger voice to stress their right to be supplied with drinking water. Besides that, they are organised so they can establish their own water supply system with help of e.g. development agency.

In the operational stage a water user association will be able to monitor the sustainability and equitability of the water system. They can use the long or short route of accountability to improve the services. In the short route of accountability, the client power is bigger when water users come together in an organisation. One of the advantages is that they can monitor the water quality together. In the long route of accountability a water user association can empower the citizens towards the government, which could mean that the association informs its members about the water quality. This creates a strong incentive for politicians to strive for better water, which leads to more political support.
The World Development Report 2004 [World Bank] distinguishes different institutional arrangements for the management of water supply. To determine the type of organisation the

report gives an important guideline: if the government of a country is not pro-poor it is important for clients of water providers to get enough power to make them perform well. A government is not pro-poor when they are not willing to provide the poor with good services, because it does not favour their individual benefits. An indicator for this is patronage, in which politicians give powerful actors cheap services, so they get support during the elections. This used to be the case in Kenya for a long time, but the new national government is expected to break with this behaviour [Kane, 2003]. However it is difficult to determine whether they are really pro-poor and whether they will maintain this attitude.

The users' role will depend on the attitude of the government. In the best case the government asks the users preference, but in the worst case the users have to establish and manage their own water system. For both situations it is good to have a water user association, which also appears from figure 2.5.

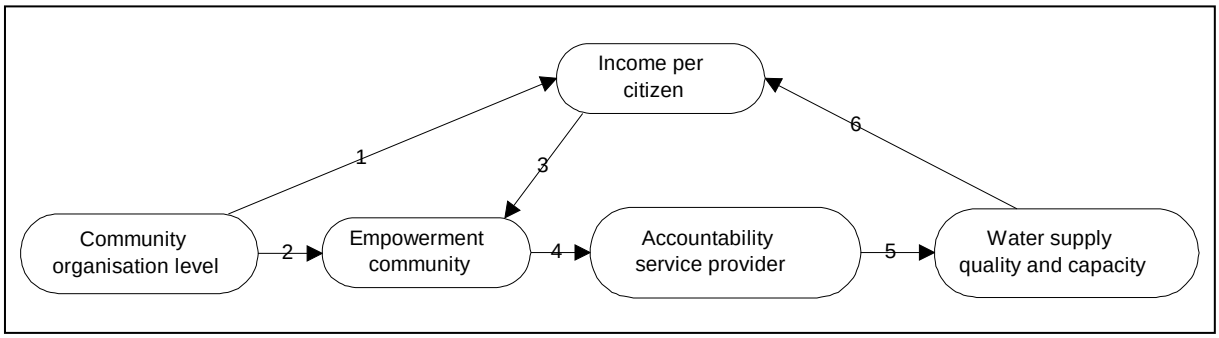


Figure 2.5. Causal relations in community organisation

The relations are simplified and there are more factors that influence the displayed factors. However, the literature that was discussed in the previous sections justifies the assumption that these relations exist. The relations in figure 2.5 are numbered and every relation is explained below.

1. A higher community organisation level can result in more local economic activities, so this increases the income per citizen. The citizens can cooperate to gain market power and work more efficiently. They could also ask an NGO for additional training.
2. When individuals come together in an organisation to increase their power, they have a stronger voice towards the government, so they can ask for better regulations or lobby for corruption reduction. They also increase their client power towards a service provider.
3. When the citizens have more money, they will have more power towards the government or service providers. This applies for both the initial and operational stage. For the initiation the empowered community can ask a potential service provider to implement a water system and during the operation the empowerment of the community makes it easier for them to enforce better services.
4+5. When the community is empowered they have a stronger voice towards the government, so they can force the service provider to improve the service (enforceability). The community can also collect more information about the service, for example the water quality. And they are able to find out who is responsible for the poor functioning. They have the power to ask for more transparency (answerability).
6. Water supply improves the water quality. This infects less people, so they will not get ill and have more time for labour. It will also take less time to collect water and the water can be used for economic activities, so this contributes to a higher income per citizen.

Also in figure 2.5 it is important to make a distinction between the initial and operational phase. In the initial phase the citizens who need water can establish a water user association to increase the 'community organisation level'. Then they will have more power to keep the government accountable for their lack of water. The government can implement a water supply system, or give the water user association permission to build the water supply system. The financing of the implementation could be a problem for the user association, but it is possible to ask international donors or private companies for financial assistance.
For the operational phase the empowered water users can keep the service provider accountable. In case the government is the service provider they can send representatives for lobbying for better services. Together the water users have a stronger voice and they can even use their electoral power to enforce good governance. In case the service provider is a private company, the water users can establish an information system to monitor the functioning of the water supply system. If there are problems they can keep the private company accountable. In practice this means they can ask the government for assistance or establish an alternative water supply system that meets their standards.

In the next chapters will be determined whether it is possible to establish a community-based organisation in Kisumu. The relations in figure 2.5, which lead to an improved water supply system can be considered as theoretically supported assumptions that justify the establishment of a community-based organisation.

2.6 Conclusion

From the theoretical notions in this chapter it appears to be necessary to establish a water user association in order to establish and manage the water supply system in a good way. The roles of the water user association depend on the attitude of the government and the private companies. Water users have the biggest interests in a good water system, so their involvement in the water supply increases the chance that the water system is established and managed in a good way. How this should be done will be determined in the following chapters.

The accountability framework, which was introduced in figure 2.4 will be used in the next chapters to analyse the water systems in the rural areas, and to make an institutional design for improvement of the water system in Kisumu. In chapter 4 the actual situation in Kisumu will be analysed. After that it becomes possible to determine what roles the water user association should fulfil. These roles will also determine whether the rural approach of SANA, which is described in the next chapter, is applicable in the slums of Kisumu and what adaptations need to be made to make it successful. In the last chapter of this report the criteria that are mentioned in this chapter will be used to evaluate the design of the implementation process of the water supply system and its management structure.

3. The Rural Approach of SANA

This chapter describes the experiences that SANA has with community-based development. The first section describes the background of the organisation, afterwards one of their projects is described. Some aspects of this approach are widely accepted, but others are innovative and will be explained with practical experiences. Where improvements can be made, this is mentioned in the text as a recommendation. The total description will be used later in the research to determine what aspects of the rural approach are suitable to apply in an urban setting.

The information in this chapter is collected during a three months internship at SANA. In this period I interviewed employees and board members of SANA, I visited project villages to see the project and interview members of the community and water and sanitation committees. Some of the projects were under construction and some were finished already. Furthermore I used evaluations of the projects that were implemented by SANA and I was involved in the discussions about project management, so I could see what problems arise during implementation and ask whether my ideas were useful or not.

3.1 Background of SANA

Sustainable Aid in Africa International (SANA) is a non-governmental organisation (NGO) that acts as a facilitator of water and sanitation projects in order to improve the living conditions of rural communities. Before SANA started in 2000, the bilateral Rural Domestic Water Supply and Sanitation Programme between The Netherlands and Kenya (RDWSSP) did the projects. Since 2000 donors from Europe and Kenya have financed the projects. As some of the employees of the RDWSSP are still working for SANA, the operational principles and methodologies operate along the lines of those of RDWSSP. They aim at ensuring long-term sustained water and sanitation delivery by establishing partnerships with local communities. This means that they help the beneficiary communities to organise and monitor their own projects. Besides the own SANA staff, external experts are regularly hired from government departments for several tasks, like technical design, community-training and participatory monitoring. SANA has an office in Kisumu in the Nyanza Province. Kisumu is the third-largest city of Kenya with about 400,000 inhabitants.

SANA is working in the rural areas of the Nyanza province, where many farmers live with their families in small villages. Because of the irregular rainfall the women (men are not involved in domestic tasks) have to walk for long distances to get water from rivers or springs. They do not have money to invest in a reliable water supply system. Furthermore the health situation is bad, because of the poor water quality and lack of proper sanitation. SANA and other NGOs try to improve the living conditions by the implementation of a water supply system, building of latrines, construction of drainage or training on income generating activities. In 2003 SANA also started doing projects in the urban areas in Kisumu and the lessons learned from these projects will also be mentioned.

By implementing the projects, SANA aims to have the following effects in the communities:

- To make water more easily available. This reduces the burden of women and children for carrying water over long distances. This leads to the fact that they have more time for other income generating activities.
- To improve the health status and well being of the community due to the improvements in hygiene (for example the use of environmental sanitation).
- To organise the community. This results in sustained operation of facilities and should stimulate improvement in areas other then water.

3.2 Projects

This section describes an example project that SANA did in Nawa that will give a good overview of the approach. The main goal of the project was to implement a water supply system in this village, because the existing sources were not reliable. The community uses a small river to fetch water, but because of pollution from the upstream communities the water quality is not reliable. Besides that, the river dries up after the rain periods, so that the women have to walk for 2 kilometres to get water from the lake. The community was not able to increase the availability of water by themselves for a number of reasons:

- The community did not have enough money to do the investments;
- Besides that other problems were more important in this community, like income generation as many people did not have a job;
- The government, represented by the district development office did some projects in the rural areas, but they do not have enough resources to provide all people with water.

SANA has drilled a borehole to reach an underground aquifer. A footpump is installed to pump the water from a depth of 50 metres into an elevated tank. From the tank the water is distributed by gravity through underground pipes to the school and the village. Here, two standposts are installed to be able to fill jerry cans for domestic use. Besides the water system, pit latrines are built during the project, because this will contribute to the health of the community.

A water and sanitation committee is responsible for the management of the water system after implementation. The committee consists of elected inhabitants of the village and one of their tasks is to collect money from the water users. This money is used to repair the pump or other parts of the water system in case of break down. During implementation the committee organises the contributions of the community to the project. In Nawa, they had to provide labour and local materials for the installation of the distribution pipes and pit latrines.

The project started with a leadership meeting in the community to inform them about the project. The meeting was attended by the district water officer, the chief and the headmaster of the primary school. After that SANA did a participatory rural appraisal (PRA) with the community members to identify the main problems in the village and to discuss the solutions. The PRA was also meant to inform the community about the project and to explain the advantages it will have for their health to have good water and sanitation. In the Nawa primary school, the students, teachers and parents form a school health club. The members of the club are trained by SANA on hygiene issues, like washing hands after going to the toilet and boiling water for disinfecting. The members of the club train the other students and they have to clean the latrines of the school.

3.3 Accepted knowledge

The approach of SANA is based on experience derived from their own projects and from other organisations. This section will give an overview of the main characteristics of their approach that are accepted by most rural water development experts. This information will be illustrated by some experiences from the SANA projects.

Participation

PRA and participatory monitoring and evaluation are meant as tools for external organisations to involve the community in the process to improve their living conditions. The communities know their problems, possible solutions and important conditions which need to be considered to enforce sustainable improvements. They are the main stakeholders in the project, so that is why they have to maintain it after implementation.

Participatory methods are also used to mobilise the community members by creating awareness as they often do not know the causes of their illnesses. Participatory monitoring and evaluation will assure that the indicators will be quantified in the right way. When the community is aware of the fact that their project outcome is not satisfactory they will keep their leaders accountable for the results [World Bank, 2004].

Wijk (2001) concludes that projects are more sustainable with a demand-responsive approach. This means that the community participates in local planning choices, not only on type of technology and service levels and the location of the facilities, but also on local maintenance, management, and local financial arrangements.

Capacity building

Another important aspect of the rural approach is capacity building, which involves organisation, empowerment and training of communities. Elections are used to select people for a management committee. These people are trained in management of the water facilities. They are empowered, so they can initiate new projects and are accountable for their own development. An important aspect in the projects of SANA is the establishment of a Water and Sanitation Committee, that has to collect money by selling water. This money can be used to finance the maintenance of the pump and other parts of the water system.

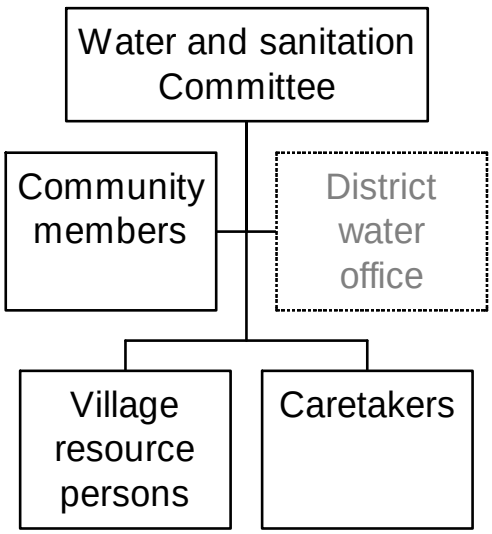


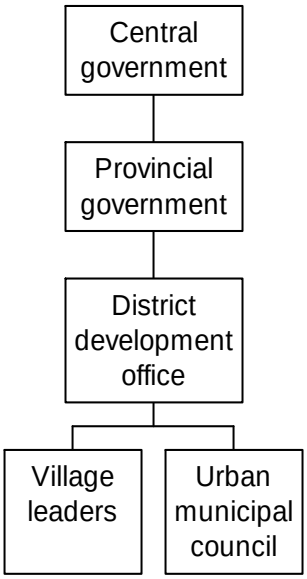
Figure 3.1. Community management structure

The operational tasks such as water sales and pump maintenance are done by the caretakers, who are trained in these skills. Sometimes local repairmen take up this task as it complements their daily activities as bicycle repairmen or carpenter. Another operational task is hygiene training and monitoring, which is done by village resource persons. They check the hygiene of the water and sanitation facilities and try to motivate community members to improve their hygiene behaviour. Both caretakers and village resource persons can be members of the water and sanitation committee. In case the community is not able to fix a problem themselves, they can ask the governmental district water office for assistance.

Several evaluations done by different people and organisations explain that this way of organising the community contributes substantially to the sustainability of the implemented water supply systems [Asamba, 2001; Netwas, 2000; RDWSSP, 1996].

Where possible it is helpful to involve and make use of existing organisational structures [Lammers, 2002]. Sometimes it can be risky to ignore them, because they want to be involved in the project. In the projects of SANA, the communities have a chief and a village elder who can inform the community about the intended project. Schools can be beneficiaries of projects and act as a communication channel to many families. Existing self-help groups can come together in a project where their organisational experience can be useful for the project.

Box 3.1 Institutional levels in Kenya



The government in Kenya is divided into several layers. The central government of Kenya is working from Nairobi. The country is divided in 20 provinces. One of them is the Nyanza province and the provincial headquarter is in Kisumu. All ministries have provincial sub-offices in the Nyanza province. SANA works with employees of different ministries: Health, Agriculture and Water. The Nyanza province is divided in 12 districts, which all have a district development office. This office facilitates the development in the districts as a platform for all development activities. SANA joined the district water development committee to discuss their activities with other NGOs. The district development office provides information about previous projects and it has maps and other information.
In the district are several cities and locations (villages) with their own leaders. The villages have a traditional chief, but he is paid by the government and has legal power to enforce his regulations. The cities, like Kisumu, have a mayor and councillors [GoK, 1995 and 1998].

Figure 3.2. Government structure Kenya

Demand-driven and ownership

The project is demand-driven when a community expresses their need for the project. This is an important condition for the sustainability of the project, because if the community does not need the project, they will not try to maintain the implemented facilities. Furthermore the demand should be large enough in order for the project to be sustainable. SANA checks whether the community wants the project during the PRA. When the community does not want to attend the PRA meetings, they probably do not see the need for the project.

Another indicator is the willingness to contribute during the implementation process. SANA wants the community to provide local materials and labour for the construction of the water supply system and the pit latrines. Only the people who really want a pit latrine will dig the pit and construct the superstructure. This also stimulates the feeling of ownership, which means that they will invest in maintenance when they already invested in the construction. In order to increase the sense of urgency to participate in the project, SANA uses a health and hygiene training to create awareness about the link between illnesses and hygiene. This training is meant to enable the citizens to make an informed decision.

A water supply study [Sara and Katz, 1997] of 1,875 households in rural communities in six countries (Benin, Bolivia, Honduras, Indonesia, Pakistan, and Uganda) suggests that water system sustainability is significantly higher when communities control key investment decisions and when they pay part of the investment costs, ensuring that they get what they want and are willing to pay for it. For NGOs it is a challenge to inform the community about the options in such a way that they can make a sound decision.

Gender

It is important to involve women in the project, because women are responsible for water supply in their household. They know the requirements for the water system. Another reason is that women have a long-term perspective as they look after their children. In practice men often live by the day and do not save money or food for the future. In the committees it is recommended to have equal representation of men and women. In case the men are excluded completely they will not support the project and use their power to stop it [Hannan, 2000].

Financial incentives and equity

Water is a resource that needs to be protected for depletion. A source can only yield a certain amount of water. A good way to limit the water use is by variable pricing of the water, so the more water someone uses the higher is the price per litre [Evans, 2002]. In the SANA projects the decision of financing is left to the water and sanitation committees and they often decide to have a fixed price per month, as this is easier to control financially. Especially in a system where households have an individual connection, this can cause problems because of the increasing use of water.

A risk of pricing the water is that poor people cannot afford the water and use cheaper sources of water with unreliable quality. The water and sanitation committee should assure that the poor people are able to use the water [Wasserman, 2001]. This equity is not monitored by SANA or any other independent organisation, so there is a chance that some members of the community ignore the needs of powerless people.

3.4 New insights

The previous section describes typical development issues that are widely accepted, because they proved to be useful in many projects. This section describes some opportunities to increase the sustainability of projects that I formulated after my observations in Kisumu, during my internship with SANA in Kisumu.

Governmental involvement

In the first place the provision of water services is the task of the government. When they are not able or willing to do so a NGO can do it. In the rural areas the government has implemented some water systems, but they have not been able to serve all citizens. If SANA wants to do a project they need permission of the government, and the officials can be involved to do the monitoring when the project is finished. Besides that the project can be used to improve the capacity of the government, because if the government does not receive help it will be difficult for them to do it alone. SANA could arrange support from a donor, so the government officials can monitor the project for some years after implementation.

The relationship between SANA and the government seems to be quite good. SANA itself has only 8 employees, but many government employees are working for SANA. The district water office is doing the design. The ministry of health is doing hygiene training and monitors the implementation of the latrines. The ministry of agriculture gives training on irrigation. And the ministry of water is doing geo surveys to locate underground aquifers for a borehole. When the project is finished the community can go to the district water office to ask for assistance in case of problems they cannot solve alone.

The regional coordination of all development activities is performed by WESCOORD, a networking platform for NGOs and government institutions in a certain area. In this platform the different actors discuss their plans to avoid duplication of activities in a community.

Continue monitoring

After implementation, most external organisations leave the community with their project, as they are expected to maintain it. The community is trained to deal with the small problems and in case of bigger problems they know where to ask for assistance. Sometimes the community does not ask for help, so this can mean the project is not sustained. To prevent this situation the external organisation can visit the community regularly to see whether the community misses any skills. This regular monitoring and training could continue for about 2 years, after that the community should be able to sustain the services. It is important to explain the community that in the first place it is them who are responsible for the sustainability of the project. The monitoring activities should become embedded so that they are part of the development process [Shordt, 2000].

The SANA project management knows that it would be better to continue monitoring the communities. This monitoring should be paid for by the donors, but they usually only want to pay for the implementation. At the moment this attitude is changing as the donors realised that the sustainability of the projects will be higher if the implementing NGO checks the projects regularly.

Wider function

In the current situation the projects of SANA are focussed on water and sanitation. Besides that the community has many other problems that they could solve together, but for some reason they do not initiate any other activities. The community is organised, so the committee could try to continue the development process. If they need support they can ask the government or other organisations for help. SANA can stimulate this continuation in two ways: they can train the community on their wider development function, instead of only on water and sanitation and they can organise a meeting after completion of the water and sanitation facilities to plan the way forward, to make them aware of the other opportunities.

Two pilot projects have been done by SANA to give the water and sanitation projects a wider function. The first one rehabilitated the drainage canals, to avoid flooding of the village. The second one established tree nurseries, to be able to sell the trees and to protect the water catchment of different springs by afforestiation.

The drainage canals were rehabilitated in a village called Bandani. Now the maintenance is done by the water and sanitation committee, which means the dredging of the sludge and waste out of the canals. All inhabitants of the village benefit from these activities and to be sure that they all contribute to the maintenance, it is paid for with the water revenues. This is one of the advantages to develop several aspects in one village, because the different aspects support each other.

The second pilot project with tree nurseries in Nyakach was not so successful in the start, because the water tanks were not ready, when the trees were already planted. In the dry periods the villagers did not have enough water for the trees, so the trees dried out. An important lesson from this project was that the implementation sequence should be planned properly to maximise the effectiveness of the project.

3.5 Role allocation

This section uses the conceptual models of chapter 2 to summarise the rural approach of SANA. First the initiation of the water projects is described and after that the operational phase.

Chapter 2 states that the initiation of the implementation of the water supply system can be done by the government, citizens and private companies. In the rural areas the government implements water systems in some villages, but they do not have enough money to serve all villages. For private companies it is not attractive to implement a commercial water system, because the citizens do not have money to pay for the water and they are small in number. The citizens do not have money to do big investments. Usually the citizens ask SANA for financial and organisational assistance to implement a water system. SANA gets the money from Kenyan or foreign donors.

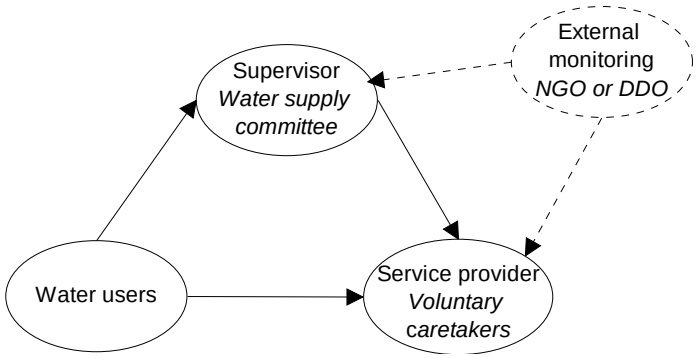


Figure 3.3. Roles in a rural system

Chapter 2 also states that in the operation of a water supply system three roles are important: water users, service provider and supervisor. When a project is finished, SANA hands over the water system to the community. The community elects a water and sanitation committee to supervise the operation of the system. The operation is performed by voluntary caretakers, who are water users trained by SANA. Operation involves the collection of water payments and maintenance of the system. The water and sanitation committee consists of water users who are member of the community. All water users can be seen as supervisors, because if the water quality appears to be too low, they can go to the water and sanitation committee. Because it is a small community, it becomes easy for the water users to keep the caretakers and water and sanitation committee accountable.

In order to secure long-term sustainability, my recommendation would be to monitor on a regular basis, for example every three months. This can be done by an NGO, or by officials of the district development office. Monitoring can involve more technical water quality tests, but also to check equity, as powerful people could exclude some people from the water services. The external monitoring empowers the water users in their role as supervisors towards the water and sanitation committee.

Roles ▼ Actors ►	Citizens	Government	Private companies	SANA
Initiator	X			X
Investor	X	Future?		X
Constructor	X	X	X	
Instructor		X		X
Owner	X			
Service provider	X			
Water users	X			
Supervisor	X			
Facilitator		Future?		Future?

Figure 3.4. Rural role allocation table

The role allocation table is used to give an overview of the projects of SANA. The government is currently only active during construction by providing their experts for executional tasks, but they could become investors if their financial position improves. In future they could also become monitoring supervisors together with SANA and other NGOs. Small local private companies are hired by SANA to do the skilled construction work. The citizens do the unskilled tasks, so they can also be seen as investors and constructors. Two roles are added to the table that was presented in section 2.1. The instructor and facilitator role, which show that the SANA people and attached government staff is training the community on management and hygiene. In future they are probably facilitating the involvement of the community in other aspects of development and do post-implementation monitoring.

3.6 Conclusion

This section provides an overview of the guidelines that were mentioned in this chapter, which make the rural approach successful. In chapter 5 the applicability of these guidelines in the urban setting will be discussed. The success of the rural approach is measured in the first sub-section by using the criteria that were identified before.

Criteria

The criteria mentioned in chapter 2 will be used to show the success of the rural approach and the relevance of the recommendations I make. Criteria for the initiation of the implementation process are the support of other actors, financing and duration. The actors in the rural projects are the community, district development office, schools and chief. Most of the time they support the idea of an improved water supply and if the community is not aware of the need for it they get a training to be sure that they make a well informed decision. Financing is done with money of a donor, which is sometimes difficult to get. This delays the process, but the community does not have an alternative way to improve the water system, so they have to wait.

Criteria dealing with the operational phase are reliable water quality and quantity. This mainly depends on the source. That is why source protection is important, so the community is trained to avoid pollution of the water in the source and during transport or storage. Besides that a pump is installed, so the source is protected. Equity and financing are two other criteria that are the responsibility of the water and sanitation committee. Not all committees protected poor people for exclusion or collected enough money for maintenance of the system. But most of the committees were doing a good job. In order to increase the sustainability of the projects it would be good if the committees were monitored after implementation by SANA or the district development office. Then they can get additional advice or training where necessary.

Guidelines derived from the rural approach of SANA

The analysis of the rural approach of SANA results in a number of guidelines that contribute substantially to the sustainability of the implemented water systems. In chapter 5 will be determined whether it could be expected that these guidelines are also valid in the urban setting. The guidelines are neither strict regulations that must be followed, nor a prescription for success. They are meant as advice that should be followed as good as possible to increase the chance that the project is sustainable. Figure 3.6 shows the relations between the guidelines and the criteria.

The guidelines that could help to make the approach sustainable are:

1. The community is organised in a water and sanitation committee. The committee is trained to do the supervision. Caretakers should receive a salary for doing the provision of operational services like pump attendance.
2. Involve and make use of existing organisations, like governmental offices, schools and traditional community leaders.
3. Participation of the community in the design and monitoring.
4. Education on hygiene to create awareness about causes of water-related diseases.
5. Community contributions to the implementation ensure ownership.
6. Equal representation of women and men in the management.
7. Volumetric pricing of water to stimulate saving water.
8. Make sure that equity is maintained, so poor and less powerful people are not excluded.
9. Experts should continue monitoring the committee on a regular basis after implementation.
10. The water and sanitation committee can develop other aspects than water, like drainage or income generating activities. However, a water and sanitation project is a good starting point to organise the community and after that other development aspects can be improved.

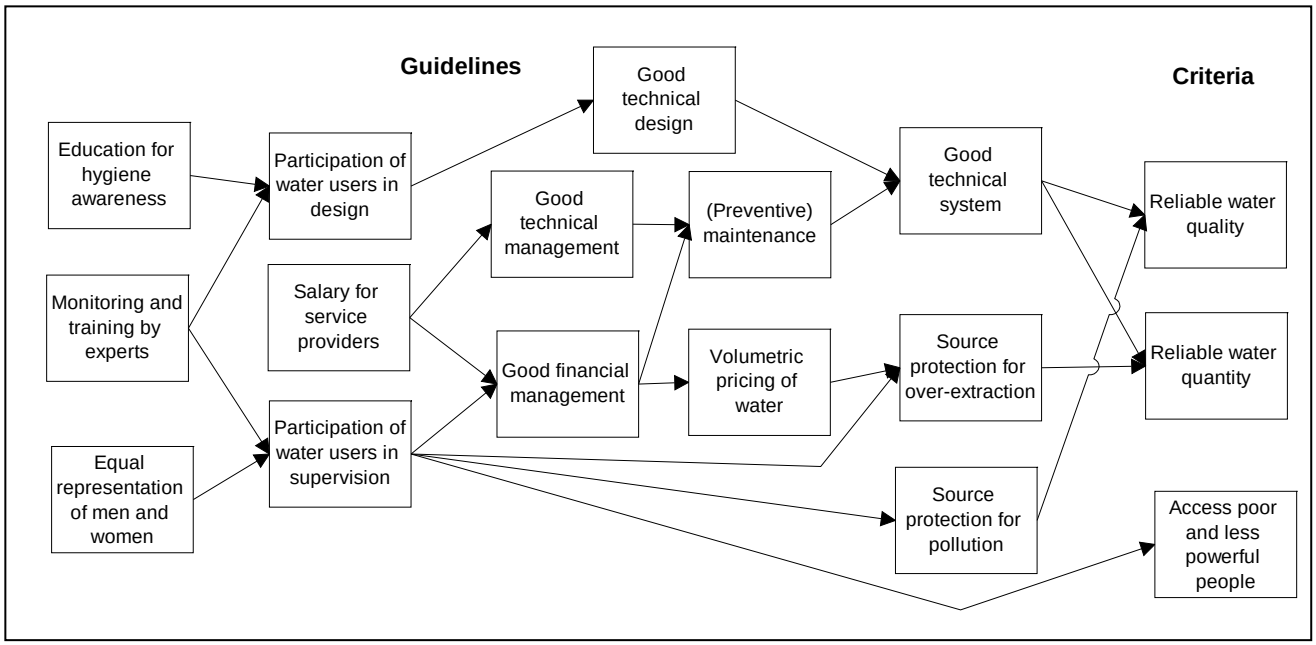


Figure 3.5. Influence of guidelines on criteria for a water system

The guidelines are meant to increase the sustainability of the water supply system, which can be measured by the criteria. Some guidelines are related to other guidelines, because they have an indirect impact on the criteria. An example is the monitoring and training by experts, which means that SANA monitors the performance of the water system and supports the community and committee to achieve a reliable water quality and quantity. Another example is that education for hygiene awareness contributes to the participation of water users in the design, because it increases their sense of urgency. Furthermore they will only be able to understand the implications of a certain choice if they are informed. This way the participation of the water users will improve the quality of the design and have a positive impact on the criteria.

4. Drinking water in Kisumu: problem analysis

This chapter describes the problems in the water sector in Kisumu. In order to do so, several actors have been analysed and interviewed, for example the slum inhabitants, the Kisumu Municipal Council, the Kisumu Water and Sewerage Company, and some NGOs that do development projects in Kisumu.

4.1 Existing water system

The slums of Kisumu do not have enough drinking water. In order to understand the reasons for this situation the existing water system is described. The water system supplies the inhabitants with water from Lake Victoria, after it has been treated. However, it is not functioning properly, because not all areas are connected to the system, and sometimes even the connected areas do not get water.

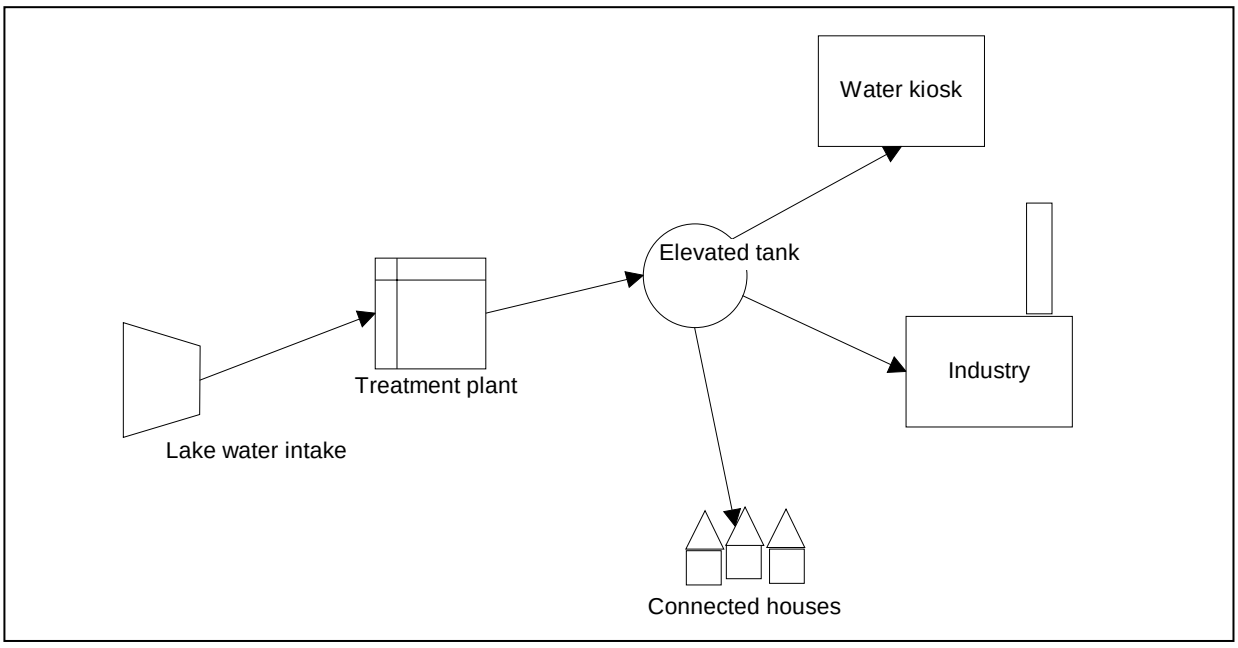


Figure 4.1. Overview existing water supply system in Kisumu

Figure 4.1 shows that the water is taken from the lake (see also figure 4.1). Then it is pumped to a treatment plant where it is filtered and chlorinated. Then it is pumped to an elevated tank on a hill in the middle of the city. From this tank it is distributed by gravity pipes to the houses and industries with a private connection and to the public water kiosks in the slums. In the water kiosks the water is sold to citizens directly, but also to water vendors. The water vendors use handcarts to transport the water to the unconnected peri-urban settlements, where they sell the water. Detailed information about the various water systems in Kisumu can be found in section 4.6.

The slums are situated around the town centre and have a small number of water kiosks, which are unreliably supplied by the central system. The peri-urban settlements are about 2 kilometres from the town centre and do not have connections to the central water system. The rich people live in and around the town centre; this is about 20 % of the population. 50 % of the population lives in the slums and the rest lives in middle-class houses.

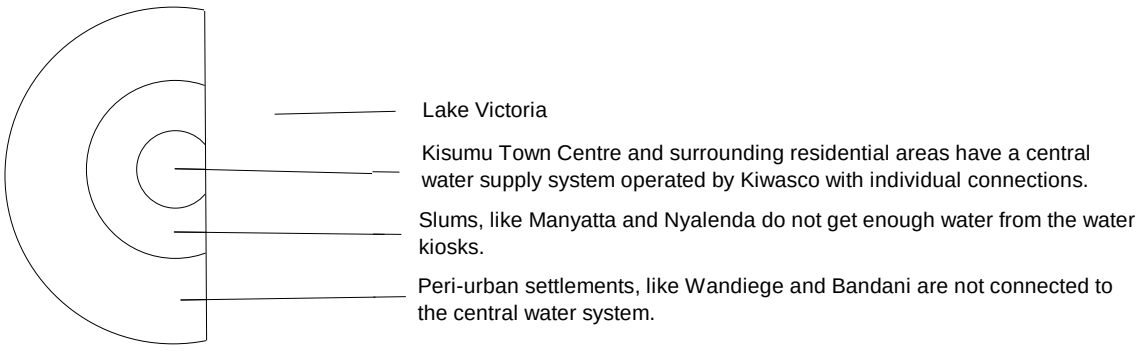


Figure 4.2. Water supply zones in Kisumu

A study carried out with funding from Japan indicated that less than 40% of the population has access to a safe water supply [JICA, 2001]. Currently there is no comprehensive municipal plan including the slums and peri-urban settlements, which addresses the problems of water supply, sanitation, waste management and drainage in Kisumu. The problems are severe but there are very few actions taken to improve the situation from either the government or donors. There are only a few NGO interventions within the municipality as majority of them are concentrated in the rural areas [BGA, 2002].

Many people therefore suffer from insufficient, poor quality water at very high costs. The current network is limited and management of taps is restricted. Poor maintenance and management, leakages and illegal connections cause low water pressure and resulting rationing (fixed quantity per person) combined with preference being given to urban areas and business premises, results into frequent dry taps in the slums and peri-urban settlements. The price in the urban areas is 1 Shilling for 20 litres, but in the slums this amount costs 2 Shilling and in the dry periods it can rise to 10 Shilling. This is a considerable part of a families' income as can be seen in box 4.1.

There is also lack of well-maintained pit latrines. High water table causes problems with construction and emptying of latrines. Faecal pollution is thus high especially during rainy seasons. Inefficient waste management, poor drainage and flooding cause further problems such as contamination of ground water and unhealthy living conditions. There is also lack of awareness on sanitation, waste and water handling.

Box 4.1 Background information about Kisumu

Kisumu is a city in the west of Kenya bordering Lake Victoria. It accommodates about 400,000 people. The unemployment rate is about 40%, but many people have an informal job that is not registered. Important economic activities are fishing, taxi driving, hawking, retailer branch and garages. The average income per capita of the inhabitants of the slums is about 1 dollar per day, which is about 75 Kenyan Shilling. Despite the poor economical situation people from the surrounding rural areas come to the city to find a job, which causes an annual population growth of 5% [BGA, 2002]. More economical and demographical information about Kenya can be found in annex 7.

In order to be able to understand the implications of water shortage for the residents I describe the situation in Manyatta-B, a slum in Kisumu, where the water problems are representative for other slums and peri-urban settlements. Increased urbanisation, high population density and unplanned settlement in Manyatta-B, has led to a shortage of water supply [Wasonga, 2001]. The main sources of water are the piped water supply and some informal arrangements like private wells and boreholes. Hawkers sell the water in water kiosks or on a door-to-door basis.

The reliability of supply and quality of the piped water is poor due to lack of maintenance of the network and insufficient production capacity of the water treatment plant. Numerous shallow wells dug in the area are always contaminated due to poor protection and the presence of latrines near to them owing to the high population density. During the dry periods most of the wells within the settlement dry up and leave the residents with several difficult choices. One is to purchase drinking water from vendors. Transport in handcarts, water is obtained from the piped water supply in Manyatta-A and Arina estates. This is an expensive option, beyond the financial reach of the average inhabitants. The second option is to walk to the Upper or Lower Kanyawar area, queue, and pay for water. A third choice is a 4-km walk to river Nyamasaria. Many are seen choosing this option that requires them to transport the water long distances home on their heads, but the time taken is preferred to paying the Ksh.5 required for a twenty litre jerry-can from the water vendors. Even for those who do pay for the water from the vendors, there is no assurance on the quality of the water as they sometimes sell river water because the taps are dry [Wasonga, 2001].

Currently the water vendors have an important task, as they arrange transportation of the water to the slums. They are able to supply people who live in areas that are not connected to the water supply system, and who have little money. In order to protect their market they are said to have damaged some new pipes to unsupplied areas. By bribing the authorities they could prevent that the water department fixed the pipes, so they did not loose their customers.

4.2 Kisumu Municipal Council and Kiwasco

The responsible actor for the water supply system is the Kisumu Municipal Council. Their water and sewerage department used to be responsible for the provision of water in town, but in August 2003 this department was privatised and Kiwasco was formed, this stands for Kisumu Water and Sewerage Company. In this section I will describe the previous and current situation to find conditions for a sustainable design.

Before the privatisation the municipality used the water revenues to increase their budget, so the investments in the water system were neglected. The maintenance of the system is very poor, pipes are leaking, pumps are not working so the supply of water and the water quality are not reliable. That is also the reason why the network could not be extended to supply the slum areas and to increase the production capacity. Another aspect of the situation is that some councillors owned water kiosks, so they earned a lot of money by selling water to the inhabitants of the slums. They were in the position to protect their own monopoly, as they were also the ones who gave licenses to other water suppliers who wanted to start a water supply system. Even non-profit organisations like NGOs could not supply water, because they did not get a license or experienced other difficulties.

Since December 2002, when the new government took over the leading role of the old regime that had been there for 25 years, things have changed:

- The Water Act prescribes the privatisation of local water supply organisations.

- Corruption is no longer tolerated, because a national enquiry is done to improve the reliability of the governmental officials.
- The financial situation of the municipality is better because a representative from this area lobbied successfully in the central government for a bigger budget for Kisumu.

The impact of these developments on the slums can be noticed in different ways:

- The water and sewerage department is privatised to form Kiwasco.
- NGOs have been given permission to do water projects in the slum areas.
- The municipality started a project in which self-help groups of slum inhabitants are stimulated and supported to improve their living conditions.

At the moment the privatised water and sewerage company, Kiwasco, is still paying about 10% of their water revenues to the municipality, but this is not as much as it used to be. In order to be able to rehabilitate the existing system they receive financial support from a French donor, but this is not meant for investments to provide the slums with water. This means that it will take at least 3 years until the network and production capacity will be extended to serve the slums. In the meantime SANA can look for a donor to arrange funding to build a small-scale water supply system.

Another cause of the problems in the Kisumu Municipal Council is their human resource management. Usually they are hired by relatives or friends who want to do them a favour, instead of looking for the right skills. When the government officials are not doing a good job it is difficult to fire them, because they protect each other. People are afraid to loose their job, as the unemployment rate is about 70%. This makes the operation of the municipality very inefficient, so that is why they needed so much money from the water revenues to pay for the salaries, but the output is very low. Especially the poor people suffer from this situation, as they do not have a voice to ask for their rights.

The low salaries of the government officials who are hired cause an extra problem: stealing. This is observed in three ways. In the first place the government officials use their position to increase their income by forcing people to pay bribes to make them work faster, for example if you need a passport. Second, they use the resources of the government for their family, e.g. their relatives do not have to pay their water bill. Third, they do other things during or after their job, e.g. they pretend to be working for the government, but they do another job in this time or especially doctors are seen to run their own private clinics in the evenings.

4.3 Slum inhabitants

Because of the poor functioning of the government it could be expected that the citizens have tried to improve the water situation by themselves. This section summarises the most important political, social and cultural reasons why the efforts of the citizens were not successful.

In the first place the political system was not functioning properly, as described in the previous section. The councillors of the Kisumu Municipal Council should know the problems in the neighbourhood in which they are responsible and do their best to improve the situation. They are the communication channels from the citizens to the government, who were elected for this position. Slum inhabitants who asked the councillors to do something for them did not succeed. In the end the inhabitants did not ask anything, as this appeared to be waste of time.

The second option the slum inhabitants had to improve the water situation was to cooperate, for example by establishing an organisation. This organisation could collect money for joint investments. Some reasons why this was not possible:

- Poverty: people do not have money to invest, but on the other hand, they were able to buy water for 5 sh per jerrycan, which could be reduced to 1 sh with a better system.
- Trust: people do not trust each other when it comes to money, and because they do not have enough money they do not take any risk.
- Awareness: people do not know the advantages and possibilities of working together. They do not know what activities they can undertake together.
- Gender: getting water is a problem for women, who have to queue and collect money for their family. Men have more power to make improvements, but they have other priorities.
- Heterogeneity: the inhabitants of the slums come from different areas of the country and belong to different tribes, which have very different cultural traditions.
- Pride: in some tribes cooperation is a sign of weakness, because you are not able to do it alone.
- Mobility: 50 % of the inhabitants of the slums are tenants, so they are not staying in the same place for a long time: when they loose their job they go to another place.
- Ownership: people do not want to invest in a rented house, because they perceive this to be the task of the landlord, who owns the house. However, the landlords do not invest that much, because they also lack financial resources.

There are some self-help groups in the slums, but for the previous mentioned reasons they were not very successful. They usually have no more then 20 members and do not have much money. Their main activity is investment in small-scale income-generating activities such as livestock keeping. Another important social organisation is the church or mosque. Most people are member of a religion. They have made joint investments in buildings to come together and they have the same ideas about life and development, which could result in successful community-based projects. One of the reasons why this does not happen is because that the members do not realise that this is an opportunity for development.

The efforts of the slum inhabitants were for a substantial part constrained by the poverty that hinders their opportunities of investment. This is caused by the economical situation, AIDS and the attitude of the majority of the inhabitants. An important cultural aspect in Kisumu is that families and friends help each other where necessary. This means that if someone gets ill and needs money for the hospital, or when he loses his job and cannot feed his family, he receives financial support from his social network. Due to the bad national economic situation many people have lost their jobs, so a bigger number of unemployed people needs support of a decreasing number of people with a salary. This means that there is no money left for investment in things like a water supply system. Background information about the national economy can be found in box 4.2.

The last reason why the citizens were not successful in improving the living conditions in the slums was because of their own attitude. I am not completely sure about this statement, but I think this is a contributing factor that could be relevant in the search for solutions. The majority of the men in the Kisumu are not trying very hard to improve their living conditions. On the one hand this is caused by lack of knowledge and money for change, on the other hand they do not want to change their traditional profession of fishing. This situation is made worse because they drink a lot of alcohol to forget their problems. Besides that population growth and AIDS are giving families financial problems. Family members are supposed to take care of orphans or

widows, but men do not change their attitude towards AIDS prevention. Population growth is caused by the cultural fact that the number of children represents the salaries, so people have many children, but no money to feed them. This is an important aspect in the local male attitude that should change to make development easier, which is shown in figure 4.3.

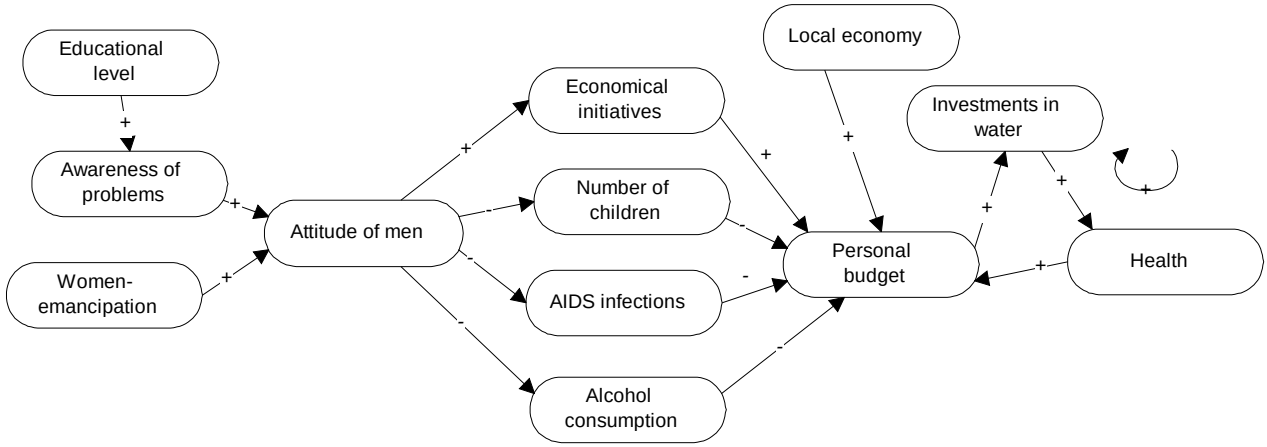


Figure 4.3. Economy at family level

The figure provides an overview of the important factors at family levels and their causal relations. The relations can be positive (+) or negative (-); a positive relation means that if a factor increases the influenced factor also increases; a negative relation means that an increase causes a decrease.
The figure shows some solutions that could improve the situation. Education can increase the awareness of problems, so men understand why they should change their attitude and behaviour. Women emancipation will also help to reduce the mentioned problems, because women have a better long-term feeling. Another influencing factor is the local economy, which can be stimulated on local level, but also depends highly on the functioning of the national economy. In chapter 5 will be discussed how these input factors can be used in order to increase the personal budget and investments in water.

Overview

Several reasons can be found why the citizens have not been able to improve their water supply:

- The local politicians ignored the interests of the inhabitants of the slums. The inhabitants should be empowered in order to keep the politicians accountable for their living conditions. The citizens do not have enough money, so they had other priorities then improvement of the water supply.

- The cohesiveness of the community is not very high, however, some community organisations are active, which offers opportunities for more activities.

- The attitude of the citizens and especially men has worsened the situation, instead of improved. The NGOs should bear in mind they importance of awareness and empowerment of men in order to make their participation effective.

Box 4.2 National economy and corruption

The bad economic situation is said to be caused particularly by the corruption of the previous national government, which has stolen money from the treasury and committed fraud with import taxes [Daily nation, 2003]. The money in the treasury could have been used in necessary things like infrastructure. This lack of investments is an important reason for the decreasing national income as a lot of people could have been employed in the construction of national investments. Another aspect of corruption was the fraud with import taxes. Kenya had protected its national market by import barriers, but the responsible officials and politicians made private deals with foreign traders to sell products on their markets. This lowered the market price, so the local farms and factories could not make enough money and went bankrupt. This was possible because other countries were able to produce more efficient [Pomfret, 2000].

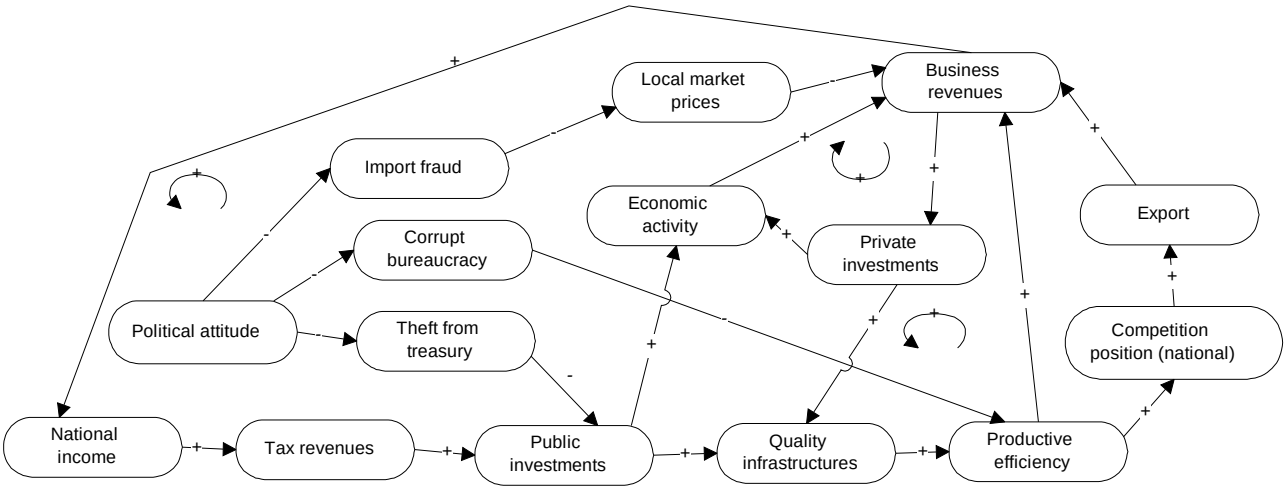


Figure 4.4. National economic situation

The new government has tried to reduce import fraud, corrupt bureaucracy and theft from the treasury, so it is expected that the national economy will improve. For the local situation in Kisumu, this results in an increase of the number of jobs and more financial support for the municipality. There is a risk that the national or local government abuses its power again. The citizens in the slums should be empowered to prevent this situation. Together with other actors in the civil society, like private companies, NGOs and other organisations they should get sufficient power to be able to counterbalance and check the government or other powerful actors.

4.4 Development organisations

Development organisations could make a significant contribution to the improvement of the water supply and empowerment of the citizens. The Kisumu Municipal Council seems to be willing to cooperate with the development organisations such as international donors and local NGOs. This section describes what problems the development organisations experienced in the period that the municipality was not that cooperative and how these problems could be avoided in future.

Interventions of development organisations addressing the lack of water in Kisumu are limited. Only a few projects have been carried out, which is mainly due to the uncooperative attitude of the Kisumu Municipal Council. There is a Kisumu Well Owners Association, which together with an NGO, Osienala, works on improving the water from the shallow wells. CARE Kenya who as

yet is only involved in the rural areas, has supported the development of a chemical for treatment of unsafe drinking water. It is locally produced in Kenya and being sold at local markets for 45 Shilling per bottle. In general interventions are very limited and needs are much bigger.

In a study funded by SIDA on Development of Slums and Peri-Urban Settlements in Kisumu [BGA, 2002] it is stated that many of the interventions simply address the symptoms of poverty without necessarily committing substantial investments towards improvement. Experience has shown that the willingness of communities to support and sustain development activities depend on the approaches adopted right from project inception through project implementation. Many of the initiatives that have been implemented in the slums have not been sustained for a long time. They have been implemented using the supply driven approach as opposed to demand driven approach. For any initiative to have meaningful impact within the target community, it must address the needs as prioritised by the communities. Community participation is key to project sustainability. Many of the development agents in the settlements have been accused of working in the community but not with the community. As a result, new facilities have often been referred to as belonging to the donor or the NGO who financed it and as such, there is lack of ownership to use and maintain it among community members. Many initiatives have therefore collapsed soon after finalisation [BGA, 2002].

Other problems in Kisumu are related to culture and tradition to use and maintain new latrines. Many people are used to bushes if available. It is also common that communities don't use the latrines unless there is a cholera epidemic. Latrines have been built when cholera is rife and people have referred to them as a temporary solution for the disease and will therefore not use them when the disease is under control. Besides the implementation of sanitation facilities, the community must be trained on hygiene to learn about the effects.

Initiatives that clearly define the target group are likely to achieve support and backing of community members in the settlements. In Kisumu's slums the majority of the residents are tenants (person who rents). The structure owners are absentee landlords who come to collect rent at the end of the month. Where the landlords reside in the settlements, these are very few in number. Development initiatives that have been implemented in the slums have ended up generating controversy and not meeting the planned objectives. Where the objective of the project is to improve the standards of living of the poor tenants, the landlords who are the owners of the land have ended up hijacking the initiatives to a point of stalling. They were in the position to do so, because the landlords often have strong ties with the councillors of the municipality. There is therefore a need to involve the landlords in any development activity in the slums and make them understand the whole aim of the initiative right from the beginning.

Some NGOs and donors tried to improve the situation and offered help to the Kisumu Municipal Council. Also international donors like JICA and SIDA did research on possibilities to address the problems, but nothing happened because of the uncooperative attitude of the municipality. Thanks to the new central government of Kenya this attitude has improved, so the councillors could not block development anymore to safeguard their personal gains.

The international donors are expected to come back to Kisumu soon, because the stable situation seems to be maintained by the government. The municipality is working on a project to improve the living conditions in the slums and to protect Lake Victoria from more pollution. The municipality does not have enough money to do the projects, so they try to get funds from international donors or from the central government. The financial position of the central government has improved because they are back in favour of the World Bank. An important reason for this is the establishment of the national Water Act, which enables the privatisation of the water supply systems.

Kiwasco, the water and sewerage company needs money to invest in their system. The French donors investigated the situation in Kisumu and concluded that they are going to pay for rehabilitation of the existing system in January 2004. They do not want to extend the piped network to the slums, because this requires a big investment and corruption is still an important risk. When the cooperation is working without problems they are planning to fund more investments. In the French plan for the slums is pleaded for the use of the existing system of water kiosks in more locations. The main difference with the current situation is that the water kiosks are not owned by individuals, but managed by the community. Another advantage is that Kiwasco does not become the only supplier of water.

4.5 Overview: causal relationships

In the previous sections the problems concerning drinking water are described. This section determines in a schematical way what causes of the water problems can be addressed by the citizens themselves. Many factors appeared to be related to the problem, so these relations between the factors are visualised in causal relationship diagrams. The first diagram shows all relevant factors at micro level in the families in figure 4.3. From that diagram can be understood why the citizens are not able to invest in improvement of their own water supply: their 'personal budget' is not sufficient. The second diagram shows all relevant factors in the national economy in figure 4.4. From that diagram can be understood why the 'national financial support' and 'employment' are not very high, which has consequences for the local economy in Kisumu. Figure 4.5 shows the local situation in Kisumu with a focus on the availability of water. This figure is at meso level, between the macro (national) and micro (family) level.

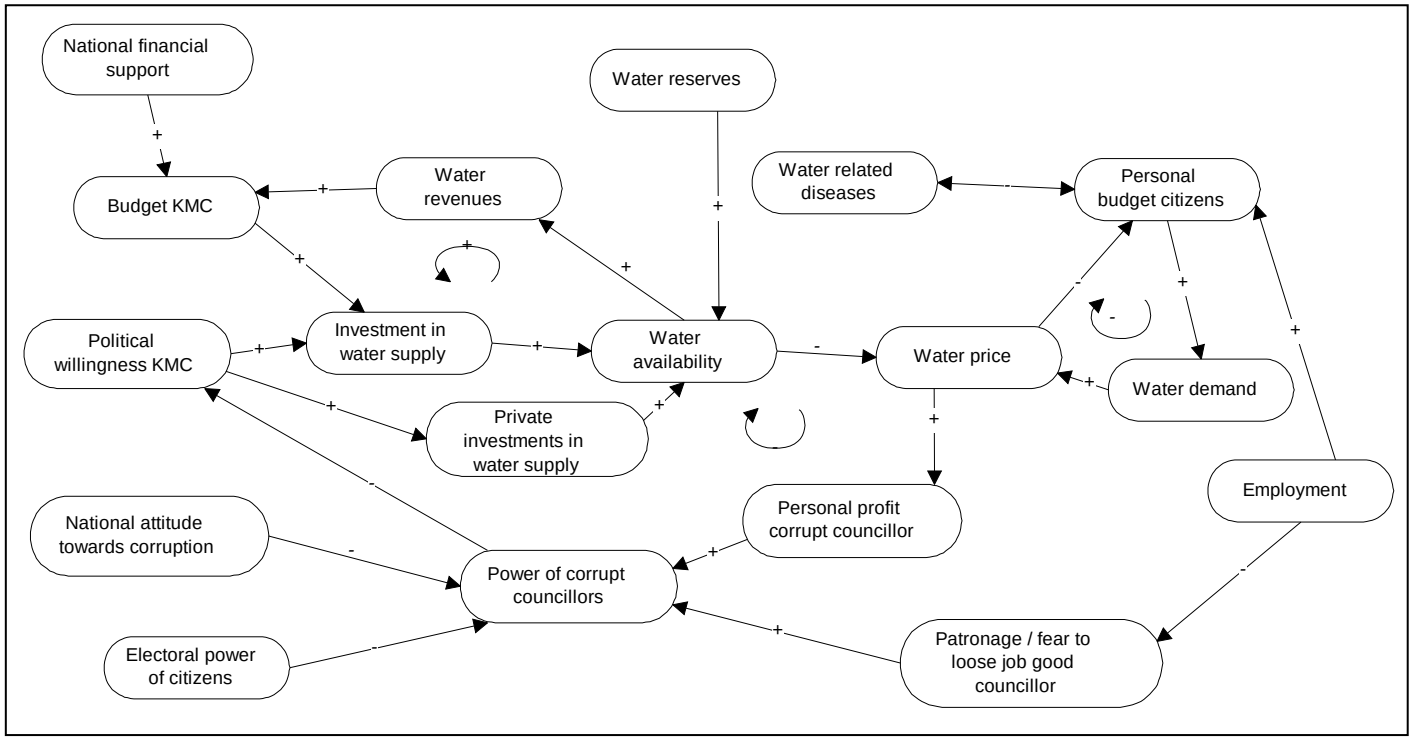


Figure 4.5. Urban water market

The figure provides an overview of the important factors and their causal relations. The relations can be positive (+) or negative (-); a positive relation means that if a factor increases the influenced factor also increases; a negative relation means that an increase causes a decrease.
The main factors in the diagram are the 'water availability' and 'power of corrupt councillors'. This diagram is an explanation for the low availability of water in Kisumu, which used to be the case before the national elections. At the moment the water supply system is privatised, but the old situation gives a good impression of the causes of the problems.

The two curved arrows represent a positive and a negative feedback loop. The first one is positive, which means that if one factor increases all factors will increase, except when external things stop this. The loop deals with the existing water system of Kisumu that supplies water. The users pay for the water, so the operator, the municipality gets the revenues. These revenues goes to their budget, so they can invest more in the water system, supply more water and make more money. The question is why this did not happen and the answer is in the second feedback loop.

The second feedback loop shows that if the water availability is low, the price will be high. This increases the personal profit of corrupt councillors, so they are not willing to allow more investments in the water supply by the municipality, or by external investors like private companies or non-profit organisations.

Since the national elections the situation has changed and the corrupt councillors have not been able to maintain their powerful position. The water supply department is privatised and the national government is trying to stop corruption. However, there is still a risk that the councillors or other people misuse their power and ignore the bad living conditions of the poor people. That is why the citizens need more power to ensure their interests. The electoral power of the citizens is enlarged if they establish a water user association. Together with the improved national government the empowered community should be able to increase the availability of water.

In the figure the 'water reserves' are not influenced by the use of water, because I assume the water reserves to be much bigger than the current water use. The lake and ground water aquifers seem to be sufficient to supply all inhabitants of Kisumu with drinking water, and the main reason why they do not have water is because of the corrupt councillors. However, it is important to remember that the water reserves are not infinite and should be protected from depletion. More about the alternative water sources is written in section 5.4. More about incentives to stimulate saving water by consumers is written in section 6.2.

The 'water demand' is not constant as there is raw water for washing and treated water for consumption. The sources of the raw water are the river and shallow wells. In the dry periods the yield of these sources is lower, so the demand for treated water increases. This results in a significant higher price, which is sometimes ten times more than the normal price. The same situation arises when some parts of the town are not supplied with water because of problems in the water treatment plant. Then the water vendors have to transport the water further, so the consumers pay more.

The attitude of the Kisumu Municipal Council was not the only reason for the water problems, so in the design of a solution the other causes should also be borne in mind. The water availability is related to economy and poverty. That is why the factors concerning the national economy and at family level are presented in separate figures (4.2 and 4.3). The attitude of men should be changed to reduce problems with population growth, AIDS and other diseases and to stimulate the local economy by initiation of small-scale enterprises. On the national level the previous government caused damaged the national economy, which affected the local economy and budget of the Kisumu Municipal Council. The inhabitants of Kisumu should be able to address the problems related to water, together with the new national government and the Kisumu Municipal Council. Empowerment of the citizens enables them to improve the situation and prevent it from worsening after some time.

The main lessons from the causal relation analysis are that the water problems are caused by the poor functioning of the government, the bad economy and the lack of awareness of the citizens. Implementation of a water system can only be successful if the underlying causes are addressed.

4.6 Analysis of initiation and operation

In chapter 2 the distinction is made between the initiation of the implementation of a water supply system and the operation of the system. The first sub-section describes why none of the actors initiated a water system in the slums of Kisumu. This shows options and constraints for SANA to initiate the implementation. The second sub-section describes the operational situation of the different water supply mechanisms in Kisumu. For the design of a new management structure the existing situation should be used as a starting point and lessons can be derived from this situation.

4.6.1 Barriers to initiation

The first section of this chapter explained that the availability of drinking water is not very high in the slums of Kisumu. This sub-section describes the actors who could have improved the availability and reasons why they did not succeed. The actors are the Kisumu Municipal Council, the national government, the citizens, the private companies and the NGOs.

The Kisumu Municipal Council was responsible for the central water system. They could have used the water revenues from the water delivered to the rich people, to invest in enlargement of the treatment capacity and network for the poor. However, their priority was to satisfy the rich people and middle-class and they ignored the poor. Besides that some councillors had personal interests to create water scarcity in the slums, so their water kiosks would give them a lot of money.

The national government in Nairobi did not care about Kisumu, because the inhabitants supported other politicians. They used the tax revenues and international aid to support other parts of Kenya, where their investments would maintain their electoral power.

The inhabitants of the slums did not have enough water, but they were not able to improve the situation. Several individuals asked the municipality for help, they heard promises, but nothing happened. Lack of awareness and knowledge about the opportunities of group management for development caused that they did not come together to have a stronger voice and more financial power to improve the situation. Money is considered as an important constraint and because there is cheap low quality water and expensive high quality water available, they did not invest in improvement of the water availability.

Private companies in Kisumu could have invested in a water supply system. The water is scarce and the price high, which makes an investment profitable. For establishment of a water system permission is necessary from the municipality, who protected their monopoly. That is the main reason why private companies did not invest. One company succeeded in getting a license. He drilled a borehole and sells water in a water kiosk to water vendors with water trucks and hand carts. This individual is said to have strong ties with the municipality.

The last group of actors that could have done an investment to increase the availability of drinking water are the NGOs. They have tried to help the municipality to improve the existing central system and made several studies. They also helped the inhabitants with simple solutions, like water improvement of the shallow wells. In the villages around Kisumu they established several water systems, but in the slums they were not allowed to do so.

In December 2002, the national government is changed and its attitude towards Kisumu has improved, which implies more financial support. The national government actively discourages corruption by several public investigations. SANA has been given permission to establish a community-based water supply system in two peri-urban settlements of Kisumu: Bandani and

Wandiege. And a French donor helps the privatised water company, Kiwasco, to improve its existing water system. The municipality is now actively involved in the improvement of the living conditions in the slums. The next chapter describes an approach for SANA to seize this opportunity.

Lessons learned about initiation

There is a risk that the national or local government abuses its power again. The citizens in the slums should be empowered to prevent this situation. Together with other actors in the civil society, like private companies, NGOs and other organisations they should get sufficient power to be able to counterbalance and check the government or other powerful actors.
SANA can have an important role in the initiation process, but they should cooperate with the municipality and citizens to have enough support for their plans.

4.6.2 Existing operational water supply systems

This sub-section describes the operation of the current water supply systems in Kisumu, which will give some causes of problems that have arisen. Besides that the current situation will be used as starting point for the design of management models for new water systems. Three water systems will be analysed: the central water supply system operated by Kiwasco, the informal water supply in the slums by the water vendors and the water system SANA established in the peri-urban settlements of Wandiege and Bandani.

Central water supply system

The central water supply system, as shown in figure 4.1, is currently operated by Kiwasco, the Kisumu Water and Sewerage Company, but before August 2003 it was operated by the Kisumu Municipal Council. This change in roles is visualised in figure 4.6.

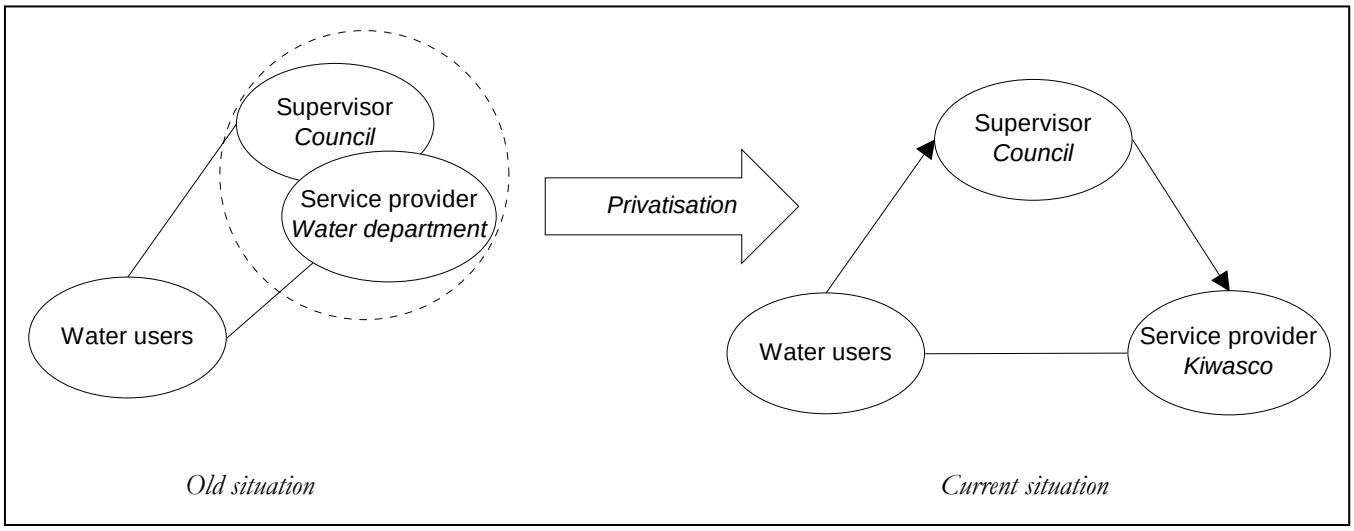


Figure 4.6. Changes in operational roles and power distribution

Figure 4.6 shows the situation before and after the privatisation. Before the privatisation, the service provider was within the same organisation as the supervisor, so the supervisor was checking itself. This is possible if there is a good separation of the political and the administrative branch of the Kisumu Municipal Council. But the money from the water department was used to pay other things, for example the salaries of the political arm. This harmed their objectivity and willingness to invest in the water supply system for the poor, as was explained in section 4.2. After the privatisation (current situation) the long route of accountability is strengthened, because if the water users complain about the service provider (Kiwasco) in the current situation, the supervisor (Kisumu Municipal Council) can decide who is right. This is an improvement compared to the old

situation. However, still a substantial part of the water revenues of Kiwasco is transferred to the municipal budget, so success of this arrangement is not guaranteed.

Another improvement compared to the old situation is that several financial incentives are stimulating the efficient operation of a private service provider, which stimulates them to maintain the network and treatment plant, improve the metering and billing system and extend the network to unconnected areas. The municipal water department management did not get a higher salary if they made profit in the old situation, but in the current situation the management of Kiwasco does.

Individual water vendors

The second water system in Kisumu is operated by individual water vendors. They have handcarts with jerrycans or water trucks to take water to their customers. Their customers live in slums that are not connected to the water supply system, or where the water system is not reliable. The water vendors buy water in water kiosks, which are supplied by the central water system operated by Kiwasco (visualised in figure 4.8). At some days, the water kiosks and do not have water, because the central treatment plant is down. Then the vendors go to lower areas in town to buy water, so the transport distance increases, which results in a higher price. Other clients are middle-class houses that do not get water from their individual tap, due to lack of pressure in the central system, which is caused by the low capacity of the treatment plant.

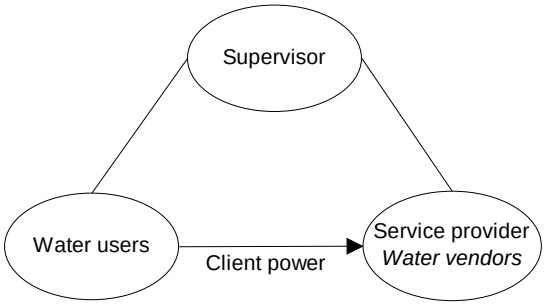


Figure 4.7. Roles in the informal system

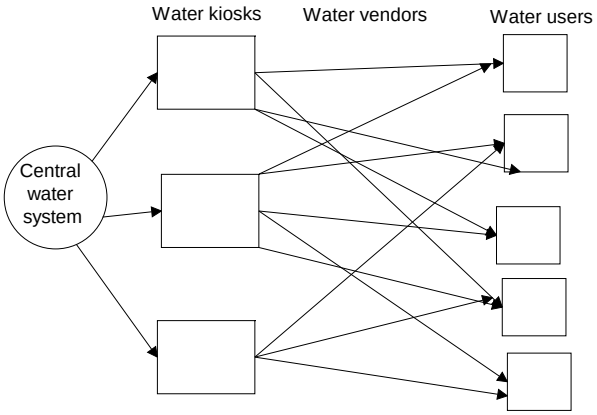


Figure 4.8. Informal water supply system

The water vendors supply directly to the water users. Their trade is not formalised, so there is no supervisor in this system as can be seen in figure 4.7. Most conditions for a market with perfect competition exist: there are many buyers and sellers, no entry barriers and homogeneous product, the only draw back to this model is information, as the seller knows more about the water quality then the buyer. The only entry barrier for the sellers is to buy a hand cart, which appears to be possible, as there are many water vendors in Kisumu. The big number of water vendors gives the water users client power, because they can switch to another supplier if the price is too high, or quality too low. This keeps the profit margins low for the water vendors, and it forces them to supply good services to maintain their customers. Another advantage of the water vendors is their flexibility, because when the shallow wells in Kisumu are giving water, they can use their handcart for other jobs, or they go to their rural home in the rain periods to work on the farm of their family. In case a water user cannot pay for the water a certain week, they can agree to pay later, which is much more difficult in a big water company where the client would be disconnected

immediately [Collignon, 2000]. This informal water market also gives many people a job, so this should be borne in mind when thinking about improvements of the water availability.

Local community-managed system

The third type of water system in Kisumu is established by SANA in the slums, or peri-urban settlements, at about 3 kilometres from the town centre. A community-based management committee, called water supply committee, is elected by the water users to supervise the operation of the water system. The operational tasks are done on a voluntary basis by caretakers, who are water users who are trained by SANA, see also figure 4.8. This is the same type of management model as SANA establishes for the management of the water systems in the rural areas which is described into detail in chapter 3. In Bandani the water system consists of several springs and hand-dug wells with a handpump. Women come with their jerrycan to buy water at the source, where a voluntary attendant collects the money. In Wandiege SANA has drilled a borehole, from which the water is pumped to an elevated tank, so it can flow by gravity through the pipes to the water kiosks as is shown in figure 4.10.

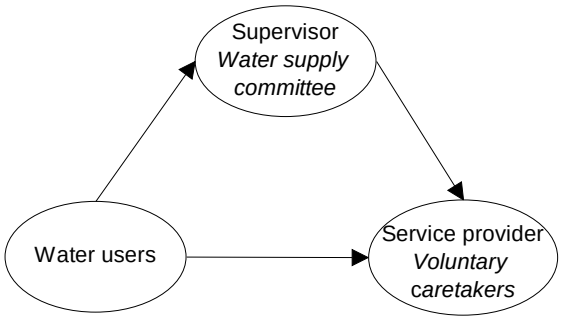


Figure 4.9. Roles in the local system

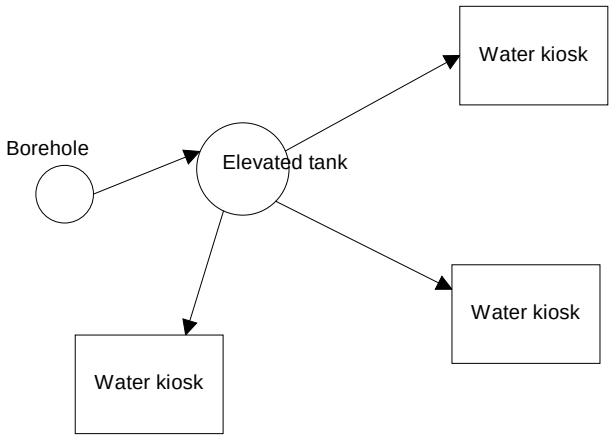


Figure 4.10.Local water supply system

It is not possible to say whether this rural management model is successful in the urban areas, because the water systems are implemented less then a year ago. That is why some other urban community-managed systems are analysed in section 5.3 to determine whether this management system should be applied in more slums in Kisumu.

The three described operational water supply systems in Kisumu are the starting point in thinking about improvement of the availability of drinking water in the slums of Kisumu. In the next chapter the described systems are analysed into detail.

4.7 Conclusion

The inhabitants of the slums in Kisumu do not have enough water, especially in the dry periods. Currently this situation is changing, particularly because of the new national policy. This gives SANA the opportunity to start water projects in the slums, because Kiwasco notified that they will not have enough financial resources to extend the network and treatment capacity to supply all slums with water. SANA can discuss with them what slums need their help the most.

The position and attitude of the municipality is not clear at the moment. Before the national elections of December 2002, they were not very cooperative, but probably this has changed by now. SANA will have to communicate with them to determine whether the municipality wants to participate in the development process or is able to facilitate it. In this discussions it is nice to

know that several international donors would like to contribute to improvement of the living conditions in Kisumu.

The existing community-based organisations can be useful if SANA does a community-based project. The same applies for the water hawkers, who should not be seen as a threat for the new water system, but as an opportunity. They have a lot of knowledge about the water users in Kisumu and they are ready to work on improvement on a commercial basis. If there is more water available they do not have to queue as long as they do now, so for them one should look for advantages.

The lack of water is not the only problem in the slums. They have other problems like flooding, waste accumulation, diseases and poverty. All problems should be addressed, as they all contribute to the water scarcity. Two important factors that could contribute to this goal are that the Kisumu Municipal Council has a better attitude towards the poor and the economical situation of the country is expected to improve. There is a risk that the national or local government abuses its power again. The citizens in the slums should be empowered to prevent this situation. Together with other actors in the civil society, like private companies, NGOs and other organisations they should get sufficient power to be able to counterbalance and check the government or other powerful actors.

5. Exploration of solutions

This chapter is meant to integrate the previous chapters. The problem analysis in chapter 4 is used to determine whether the rural approach of SANA, as described in chapter 3, can be used to improve the water supply system in the slums of Kisumu. In the first section the rural and urban situation are compared to determine whether the rural guidelines are applicable in the urban setting. In the second section the design of the implementation process and design of the management structure are determined with the comparison in mind. The third section describes some other cities with a similar role allocation as proposed here. This is done for two reasons. In the first place to see whether it is possible for a community to act as a supervisor and in the second place to derive lessons learned and inspiration for the specification of the institutional design. Before the design is made some other questions need to be answered about the technical, legal and financial possibilities that need to be taken into account in the design. The last section provides an overview of all information that was provided in this chapter.

5.1 Comparison of the rural and urban situation

In this section the urban and rural situations are compared to see what adaptations need to be made to make the approach of SANA successful in the urban setting. Chapter 3 concluded with a list of guidelines that make the rural approach sustainable, so this list is discussed here for the urban applicability.

5.1.1 Rural and urban communities

An important aspect of the communities of the rural areas is that they know each other much better than in the urban areas. People live their whole life in the rural areas and they know each other and are often in some way family members. They check each other socially and want to help each other. Some of the urban inhabitants live there their whole life, but most of them came to town to make money. That's why they have different backgrounds and tribes. In case they loose their job, they sometimes move to another town.

For the approach this means that people do not trust each other that much in the keeping of agreements. If you break an agreement in town you can get away with it, but if this happens in your home area your whole family will be accused. A second and related aspect is that people in the rural areas stay longer in the same place, so they are willing to invest in their house and living conditions.

"Legal recognition of tenure is often a prerequisite for the investment of resources in basic infrastructure services for both the residents and the municipal authorities. The residents will not spend their money on infrastructure if they are not sure they can stay in the settlement. Municipal authorities are often not allowed to provide services in areas that are considered illegal" [Wegelin, 2000]. In the slums of Kisumu many people rent a house. The tenants perceive the provision of water and sanitation as a task of the owner of the house. The owner usually lives in the same compound and has built the rental houses near his own house, so in case the tenants want something to be done he can easy be found. The slums and peri-urban settlements in Kisumu are legally admitted areas, so there is no risk that the government will demolish them. Both aspects contribute to the willingness of the inhabitants to invest in their own property.
In figure 5.1 some interesting differences appear. An important aspect is the difference in income. One of my recommendations in chapter 3 was to start a commercial water system in the rural projects of SANA. An important constraint for this is the low income of rural families. The urban people seem to have more money, as they have to pay for the water in the current situation, so this means a professional operator can be hired to manage the water system.

	Rural	Urban
Community composition	Homogeneous	Heterogeneity
Income distribution	Low	Medium
Income	Low	Medium
Mobility	Low	High
Awareness of hygiene	Low	Medium
Population density	Low	High
Literacy	Low	Medium

Figure 5.1. Comparison communities

In the rural situation the sustainability of the water system depends on the dedication and voluntary contributions of the water and sanitation committee. If the system is commercial the operator gets financial incentives to continue. A risk for the water user association is that it falls apart, which can be prevented by enough awareness among the users and monitoring of the group dynamics by the external professionals like the NGO employees.

Urban inhabitants live closer to schools, so they are usually better educated. They know about the importance of hygiene and they can read. Informing them about certain decisions and intentions regarding the project is much easier if they can read.

A necessary condition for the establishment of a community-based organisation is that the inhabitants are willing to work together [Wasserman, 2001]. In some slums different tribes live together and some people have more money than others. Despite these differences people seem to accept those differences and do not make a problem of it. A good example is the water and sanitation committee in Bandani, where SANA did a project. This committee consists of muslims and christians, men and women. The training on awareness (PHAST and PRA) that SANA is doing to create a sense of urgency appears to be suitable to overcome the social and cultural differences. However, the diversity or heterogeneity should be a continuous point of attention during the operation as this might cause problems, for example when a committee tends to ignore several people because they lack power to do something about it.

Concluding from this community analysis can be said that the urban inhabitants do not form a real community. They do not have strong relations, which means the social cohesiveness of a community-based organisation in the slums will not be very good. Voluntary labour for the community by individuals during implementation and operation will be less easy to organise than in rural areas. That is why it would be better to use more market incentives, as in a commercial system. The urban people have more money, so they can afford it to pay for the water. The skilled level of the paid employees will be higher, which results in a better system and better management. However, the involvement of the water users is very important, as they can monitor the service provision. They are the main stakeholders who will keep the service provider accountable for his job.

Section 5.2 will discuss how this commercialisation is arranged and how the water users will be able to keep the service provider accountable. The next sub-section continues the comparison of the rural and urban situation by describing the differences in actor networks.

5.1.2 Rural and urban actors

In the rural projects of SANA the number of actors involved is very small. The village is one community, which usually consists of a number of families, they have a chief and usually there is a school. The government involvement is low, because the District Development Office covers a large area and does not have that much employees. SANA usually gets permission if the chief supports the project.

In the slums of Kisumu much more actors are involved in water affairs. The Kisumu Municipal Council gives licenses for implementation of water services. Kiwasco already supplies water in other parts of the city and might see the water system of SANA as a competitor. The same applies for the numerous water vendors who work in the slums. The inhabitants have different types of businesses and there are schools and small community organisations. Some NGOs do projects in the slums for AIDS prevention and help orphans and street children.

The Kisumu Municipal Council and Kiwasco indicated that they will supply water in the slums close to the existing network, but the slums further away will not be supplied in the near future. That is why they agreed with SANA's proposal to build water systems in Wandiege and Bandani, two slums in the outskirts of Kisumu. Then the same situation was created as in the rural projects of SANA: the government is not able to establish a water supply system, but they also don't try to prevent it and the community is willing to participate. That's why the same approach can be used as in the rural areas, which will be specified in the next sections. There will be explained what is a good way to deal with the private actors, like Kiwasco and the water vendors.

5.1.3 Urban applicability of rural guidelines

In chapter 3, a number of guidelines were formulated that contribute to the sustainability of the rural projects of SANA. The guidelines are neither strict regulations that must be followed, nor a prescription for success. They are meant as advice that should be followed as good as possible to increase the chance that the project is sustainable. The guidelines will be mentioned here again and I will make some remarks about the applicability of these guidelines in the urban setting.

1. *Rural communities elect representatives who form a Water Supply Committee. The committee is trained to do the management of the implementation and operation.*

An important reason why the inhabitants of the slums do not have a water supply system is that there is no organisational structure that advocates the need for water of the poor people. The water users can establish a Water User Association and the members can organise elections to form a Water Supply Committee. This committee asks the Kisumu Municipal Council for the implementation of a water system, or implements it by themselves with assistance of SANA. The water supply committee should be trained in group management and financial and technical monitoring. The operational management could also be done by experts who are hired and paid with the water revenues. This arrangement is discussed into detail in section 6.1)

2. *Involve and make use of existing organisations, like governmental offices, schools and traditional community leaders.*

The main stakeholders are the Kisumu Municipal Council and Kiwasco, who will have to be involved in the initiation process and operational phase. Every slum has a chief and several schools which can also be involved in the project, like it is done in the rural areas. Another important group is the water vendors, who should send representatives to take their interests into account. The process of initiation and allocation of operational roles is explained in section 5.2.

3. *Participation of the community in the design and monitoring.*

When the water system is managed in a commercial way, the participation of all citizens in the design is not necessary. The water user association can be involved in the design by participation of the water supply committee in the negotiations. The monitoring in the operational phase will mainly be done by the water supply committee, but all technical and financial information can also be viewed by the members of the water user association. More about the participatory monitoring system can be read in section 6.2.

4. *Education on hygiene to create awareness about causes of water-related diseases.*

Education on hygiene is necessary, but most people have already learnt something about it, so before the training starts it is important to determine what they know already. Another option is to integrate the information in the existing school syllabus, which is also done in the rural projects by establishing school health clubs and training of teachers.

5. *Community contributions to the implementation ensure ownership.*

This seems to be not necessary, because the water system is commercial. In that case there are enough financial incentives for a viable system.

6. *Equal representation of women and men in the management.*

The involvement and empowerment of women is also in the urban setting very important. In section 4.3 was explained that the attitude of men contributes to the bad local economy and bad health situation. Empowerment of women and education are both ways to reduce the causes of these problems.

7. *Volumetric pricing of water to stimulate saving water.*

The availability of water is not infinite, so it is good to have a volumetric pricing system. The population density is very high, and people might want to use the water for production and irrigation. The water supply committee should decide whether this is allowed or not. They can also decide what is a good pricing system. More information to make this decision can be found in section 6.1.

8. *Make sure that equity is maintained, so poor and less powerful people are not excluded.*

There is a risk that the water supply committee that is elected excludes the people with less money or power. In order to be sure that even those people benefit from the water system an external organisation should check on equity. Furthermore that the discriminated people should be able to complain somewhere. Complaints could be sent to SANA or another institution. The support and monitoring of external agencies is described in section 6.1.

9. *Experts continue monitoring the Water Supply Committee on a regular basis after implementation.*

The water supply committee can make mistakes, or abuse its dominant position. Examples are technical by forgetting some maintenance, financial by corruption, or social by harming equity. The same institution as in guideline 8 can fulfil this role.

10. *The Water Supply Committee can develop other aspects than water, like drainage or income generating activities. However, a water project is a good starting point to organise the community and after that other development aspects can be improved.*

Chapter 4 already explained that in the urban areas water is not the only problem. In section 6.4 is explained more about how the new association could address the other problems. A water supply system is not for all slums a good starting point, because some slums have other problems that are more important. It is important to address a relevant problem, because otherwise the community is not supporting the project.

The remarks above imply that the water users should establish a water user association for the operation of the water supply system that is implemented by SANA. They can perform the operational tasks by themselves as volunteers or hire employees. However, there are some alternatives to this approach for initiation and operation that will be discussed in the next chapter.

Generally speaking, most aspects of the rural approach can be used in the urban setting. During the initiation SANA takes a leading and facilitating role. Then the community is trained and the water system is handed over to the community. In the rural projects the community contributes to the implementation by providing labour. In the urban areas this is more difficult, as the community is not clearly defined. It would be better if people contribute to the implementation afterwards, if the implementation costs are calculated in the water price. In the urban areas the involvement of the water users is also very important, as they are the main stakeholders. The same way of accountability can be applied as in the rural areas, where elections are organised to select a water supply committee, which is responsible for the water system. The reduced cohesiveness is compensated by the commercialisation of the system, which will make the operation less dependent on voluntary labour. Financial incentives will stimulate the operator to sustain the service. Another way to secure the sustainability of the water system is that the committee is assisted by external professional facilitators. These facilitators are an extra check to avoid problems caused by the weak cohesiveness.

Another difference is that in the rural projects SANA also implements sanitation facilities. This is not done in the urban situation, because this is done later, when the community recognizes the need for good sanitation. Post-implementation monitoring is something that is not happening in the rural projects, because the donors do not provide funding for it. In both rural and urban projects it would contribute to the sustainability of the project. This also applies for the operational tasks like pump attendance, which are done on a voluntary basis in the rural projects. It would be better if those tasks are paid, as this stimulates people to do the job and other users can keep them accountable because it is not a voluntary gesture anymore.

5.2 Alternatives in initiation and operation

This section provides an overview of the alternatives for initiation and operation of a water supply system in Kisumu.

5.2.1 Initiation

Four groups of actors could initiate the implementation of a water supply system in the slums of Kisumu: Kisumu Municipal Council, a NGO, a private company and the citizens. Chapter 4 explained the Kisumu Municipal Council does not have enough money and skilled employees to implement a water system. It is not clear whether they are willing to supply the slum inhabitants with water. The second group of actors are the citizens, who are not organised and cannot establish a water system without external financial assistance. The NGOs and private companies have money for implementation of a water system, but they need permission of the municipality to extract ground or surface water for commercial activities. The NGOs like SANA can work together with the other groups of actors in order to encourage initiation.

The first alternative that SANA has is to do nothing and focus its activities on the rural areas. In that case the inhabitants of the slums would have to wait for the expansion of the central network which is operated by Kiwasco. In the meantime they can use the water from their shallow wells and buy water of the water vendors, or walk to the water kiosks in other slums. The problem description in chapter 4 explains that it would be better if SANA or another actor helps to increase the water availability.

The second alternative that SANA has is to consult the municipality and Kiwasco to ask them for their plans to supply water in a certain slum. If there are no plans SANA can suggest to implement the water supply system and ask the municipality and Kiwasco for permission. SANA also consults the other NGOs in Kisumu, to see what their plans are concerning water. For a good coordination of all development activities the municipality, District Development Office and NGOs in Kisumu have established a platform called WESCOORD. This is a good institution to determine in which slums SANA can establish a water supply system. Private companies should also be involved in the process to see what their contribution could be in the implementation and operation.

After the selection of the slum, the inhabitants can form a water user association and elect a water supply committee. Together with the water supply committee SANA determines where the water kiosks can be situated. They should also ask the water vendors, schools, chief and other institutions to see what their wishes are concerning the location. The reason for this is that local women and men have knowledge of local conditions and processes that external professionals miss [Chambers, 1997].

There is a chance that the municipality or Kiwasco do not give permission to implement a water supply system in a slum. In that case SANA can help the inhabitants to establish a water user association that tries to arrange their water supply, for example by asking donors for assistance, or by lobbying at the municipality and Kiwasco for a more cooperative attitude. At the moment the municipality seems to be willing to help the water users in the slums, but if this attitude changes it is good if the water users are organised in a water user association, so they have more power then as individuals.

5.2.2 Operation

Chapter 2 describes the roles in an operational water supply system: service provider and supervisor. In the rural projects of SANA all tasks are performed by the water and sanitation committee, which was elected by the community.

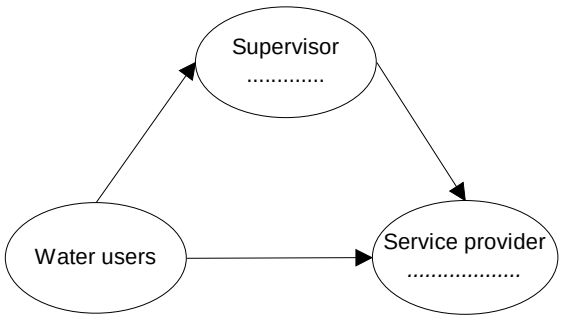


Figure 5.2. Role allocation table for a water system

The role of the supervisor is the most complicated. It consists of several tasks, which ensure sustainability of the project. The supervisor monitors the water quality, financing and equity. In case a water user has a problem with the service provider he can go to the supervisor to complain about the situation. The role of service provider involves the pumping of water to the standposts, selling the water in water kiosks, line patrol to check for pipe leakages and illegal connections, arrange the maintenance, and dealing with incomes of the water sales and expenditures to keep the system running, like salaries for employees and energy for the pump. Some things can be done by both the supervisor or service provider, depending on the agreement they have. These tasks are extension of the network, determination of water prices and protection of the source for pollution and depletion.

Four actors could perform the operational tasks in a water supply system in the slums of Kisumu: the Kisumu Municipal Council, a water user association, an NGO and a private company. The ownership of the water supply system is an essential aspect, as it contributes to the power of the supervisor. Two situations are described with two owners and the implications for the sustainability: water user association and a private company.

Water user association as owner

In most rural projects of SANA the operational tasks are done by the water users on a voluntary basis. The people are trained to learn the skills that are necessary. The analysis of the rural projects shows that it would be better to have a commercial management, who receive financial incentives for their activities, so that is why the role of service provider should be done by a private company which can also be individuals who are hired by the supervisor. The supervisory role, with tasks as summarised in the previous paragraph, can be done by the municipality, like it is the case with the central water system of Kiwasco. The water user association can also perform the supervisory role, which increases the accountability. The water users benefit directly from a well functioning water system. Later, when the skills, capacity and financial situation of the municipality appear to be improved the supervisory role can be handed over to them. The water supply committee of the water user association is trained to do the supervision. Besides that they get professional assistance from NGOs like SANA or from the municipality.

This external professional assistance involves giving advice about technical or financial issues, but besides that the professional representatives of NGOs or the government can act as facilitators. They can monitor the activities of the water user association and its committee to check on equity, corruption and sustainability. How this is done will be discussed in section 5.3.

The relationship between service provider and supervisor, in other words private company and water user association is a legal agreement. When the water supply system is implemented SANA hands the ownership over to the water user association, so they have the power to hire a service provider and to send him away if the services are not good enough. For this enforcement it is important that the legal system is working. If the water user association is registered in the ministry of social services they are a legal entity that can go to a judge in case of serious problems with a private company. There are several options for the agreement: the water user association can hire employees, like a manager, water kiosk attendants and technicians, but the water user association can also give a concession to a company who arranges everything. In the next section an overview is given of institutional arrangements between supervisor and operator, derived from other cities.

Private company as owner

Most inhabitants of the slums do not have an individual connection. They buy water in a water kiosk, or from water vendors, or use an alternative source like shallow wells and the river. This means the water users have client power: in case a supplier does not satisfy them, they can go to another one that provides better services. Theoretically it would be possible to allow a private company to drill a borehole in order to sell water in a water kiosk. The question is whether this harms the sustainability and equity of the water supply.

The municipality could give one or more private companies permission to implement a small decentral water system as is shown in figure 4.9. Then a free market is created, in which different actors supply the water users with water. The new water providers compete with the existing water companies, which results in a bigger supplied quantity and a lower price. The water users can choose the best service provider, depending on price, quality and distance from their house.

This type of market has a few risks that need to be addressed:

- *Water users do not know the quality of the water.*

Currently the water users have an informal system to monitor the water quality. If a water vendor supplies bad water, the neighbours will inform each other. An organisation could monitor the water quality and disseminate information or impose sanctions on suppliers of bad water. This monitoring organisation could be paid with water revenues of the water suppliers. This could be a condition to acquire a license for commercial water extraction.

- *Prices could be too high for poor people.*

The price of water will be determined by supply and demand. The increase of supply will reduce the price, but the suppliers can decide to sell water to factories or other companies, instead of consumers. Another aspect that could increase the price is that water suppliers in a certain area can make agreements about the tariffs and try to prevent new suppliers to enter the market. Poor people who cannot afford to buy water would be forced to use polluted water. This can be prevented by a lifeline subsidy, which enables them to buy a minimum amount of water. An organisation could collect a part of the water revenues of the suppliers and distribute it among the poor people.

- *Over-extraction of water from the source.*

The last risk discussed here is that too much water is extracted from the surface water or groundwater. The water suppliers get a license from the municipality to extract water. This license should also specify the maximum extraction.

The three mentioned risks can be minimised or avoided by a well-functioning and powerful regulator of the market, which is not available in Kisumu.The government is not able to act that powerful at the moment, because they miss the required skills. A possibility is to train the officials of the municipality to fulfill those tasks, but they need to be willing to do so. Currently it is not clear whether the municipality is willing to stand for the poor inhabitants of the slums. That is why it would be better if the water user association owns the borehole and water kiosks. Then the water users have more power to keep the service provider accountable for his service level.

5.2.3 Overview

Chapter 2 explained that the poor people could improve their living conditions when they work together in an organisation. Together they have a stronger voice towards the municipality, they can do joint investments, and keep service providers accountable by using their client power. This theoretical relation seems to apply for the situation in Kisumu, as the community analysis in section 5.1.1 learned that the slum inhabitants could come together in an organisation.

In the proposed process, the water users have the leading role during implementation and operation, because they have the biggest interests in a good water system. They are assisted by representatives of NGOs and the municipality. The municipality seems to be willing to help the poor, so if the water users are convinced that the municipality is able to perform the leading roles they can hand it over. In this stage I prefer a community-based approach. Based on the approach that SANA is using in their rural projects, the urban approach is designed. The role allocation in an operational urban water supply system is shown in figure 5.3.

The first step in the process is that SANA helps the water users to establish a water user association. The water users are informed about the project in a participatory urban appraisal, which is also meant to determine whether they need / want a water system. The members of the water user association elect representatives who form a water supply committee that is involved in

the initial phase of the system and responsible for the system as soon as it is operational. Because the water users elect the committee, they have a strong voice in the supervision. The water supply committee can hire employees to do the operational tasks in the water supply system, like pump attendance and maintenance. Another option is to organise a tender to contract out all operational tasks to a private company, more about this arrangement and implications for the control can be read in section 6.1. Individual water users have client power, because they do not have an individual connection, but they buy water in a water kiosk. In case the price or quality supplied by the service provider is not giving satisfaction, they can go to another water kiosk, or buy water from water vendors. For the contract between supervisor and service provider it is important to have financial incentives that stimulate the service provider to satisfy the water users.

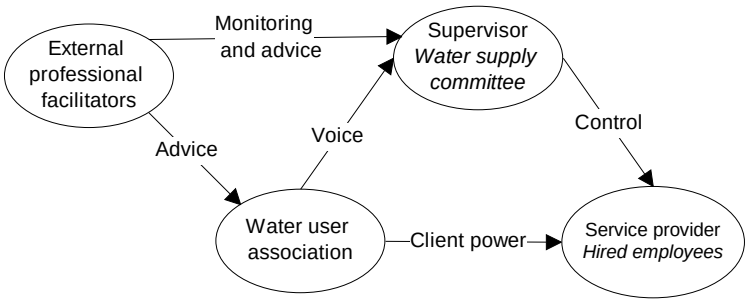


Figure 5.3. Roles in the proposed operational water supply system

The external professional facilitators are representatives of NGOs like SANA and the Kisumu Municipal Council who monitor the activities of the water supply committee and advise them on complex issues. The facilitators do not have power to force the committee to do something, so in case the facilitators notice problems in the functioning of the committee, they can advise the water users to address these issues during the annual general meeting. In this general meeting the committee has to justify itself to be able to be elected for the following year. More details about the design of the management structure can be found in chapter 6.

Three questions arose in this section that need to be answered in the following sections:

- Who should perform the tasks like extension of the network, determination of water prices and protection of the source for pollution and depletion?
- How is the relationship between supervisor and service provider organised, in other words between the water user association and the private company?
- What is the role of the external professional facilitators that monitor the water user association on equity, corruption and sustainability?

In order to answer these questions the management models of water supply systems in other cities are analysed to learn from their experiences.

5.3 Community involvement in water in other cities

SANA wants to build more water supply projects in the slums of Kisumu, managed by a water user association that hires a private company or employees for the operational tasks, as this appeared to be the best arrangement in the current situation. This section describes community managed water supply systems in other areas for two reasons. In the first place to see whether it is possible for a community to manage an urban water system and in the second place to derive lessons learned from the experiences in other places to specify the institutional design. The cases come from three countries: Tanzania, Mauritania and Kenya.

5.3.1 Water supply companies in Morogoro region in Tanzania

The first case is studied by the IRC in the Netherlands [Smet, 2002]. It describes communities who hire employees for the management of their water supply system. Besides that the communities from different small towns formed a federation together to share their experiences.

Structure

"Water users in Morogoro have established 21 legally registered water supply companies. A water supply company covers 1 to 6 small towns and serves a population ranging from 1000 to 18000. All the companies have elected water user group committees at domestic water points. A committee is composed of six members including a chairman, a secretary and a treasurer. Such committees must include women. Each committee elects a representative. The maximum number of representatives is 50. The representatives elect a board of 8 to 10 members. The board elects an executive committee led by a chairman. The executive committee includes a secretary and a treasurer. The executive committee is responsible for the day-to-day management of the company. In few companies, those serving a larger population, a management team comprised of a manager, a water supply technician and an accountant has been put in place.

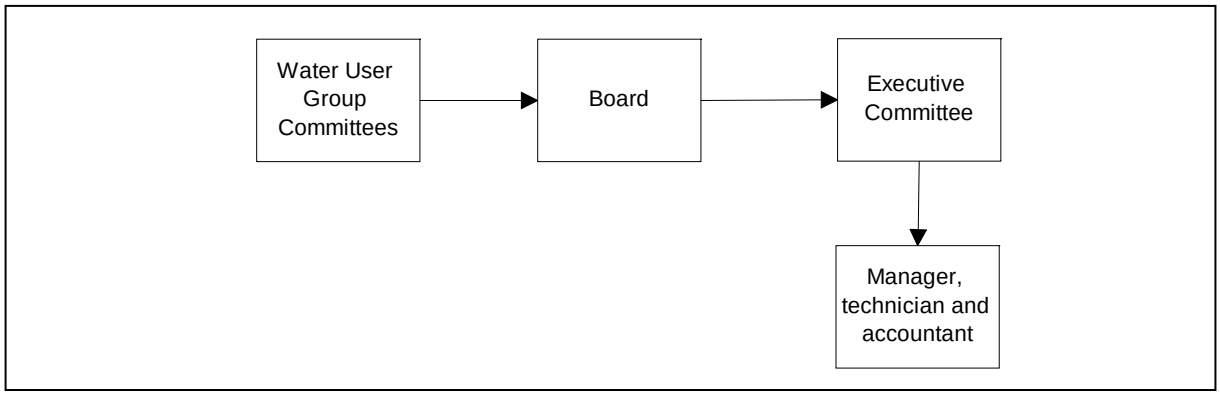


Figure 5.4. Organisation structure of the community-based water supply company

Smaller, uneconomical water supply companies face problems to sustain the water service provision, particularly as their revenue is low and the unprofessional approach to their services. Management by contracting private companies is not an option because of lack of profit. The option to pool management staff (including manager, accountant and technicians) and other resources among a group of small and uneconomical water supply companies is being examined. Other possible options could be considered including mergers to establish a few large (district) water supply companies.

The companies' final decision making institution is the annual general meeting of users' representatives. In a water supply company there are three types of users: domestic water users, house connection users, and institution users such as schools, dispensaries, churches, mosques and guest houses. The role of water users is to protect the water supply infrastructure, to clean the surroundings of the water points and to pay a monthly water fee. Each category of users has its maintenance cost as well as the depreciation of assets. The treasurer prepares a monthly report on income and expenditure and an external auditor prepares an audit report every year.

Successes of the water supply companies

Successes recorded (period 1999 – 2000) by the water supply companies in Morogoro:

- Users have established their organisations to run their water supply schemes.
- Users participated in construction, rehabilitation and maintenance.
- Users have a sense of ownership of their schemes, elect democratically their leaders, and manage the schemes.
- Users clean the surroundings of the water points.
- Users pay water fee and hold regular meetings to solve water supply problems.

Problems of the water supply companies

Problems recorded by the water supply companies in Morogoro:

- Poor relation with the Village Government and the water supply company board.
- Low collection of fee (20 to 50 %) in most companies.
- Insufficient funds for major rehabilitation and expansion of schemes.
- Insufficient management skills.
- Weak networking and not enough cooperation with other actors.

Federation of water supply companies

In order to address the problems and secure the sustainability of the water supply companies a Federation of water supply companies was established. This is a platform for the different community-based water supply companies to share their experiences, so the strong companies can support the weak ones. Besides that the federation is meant for communication with the Government of Tanzania (GoT), external support agencies and other actors as can be seen in figure 5.5.

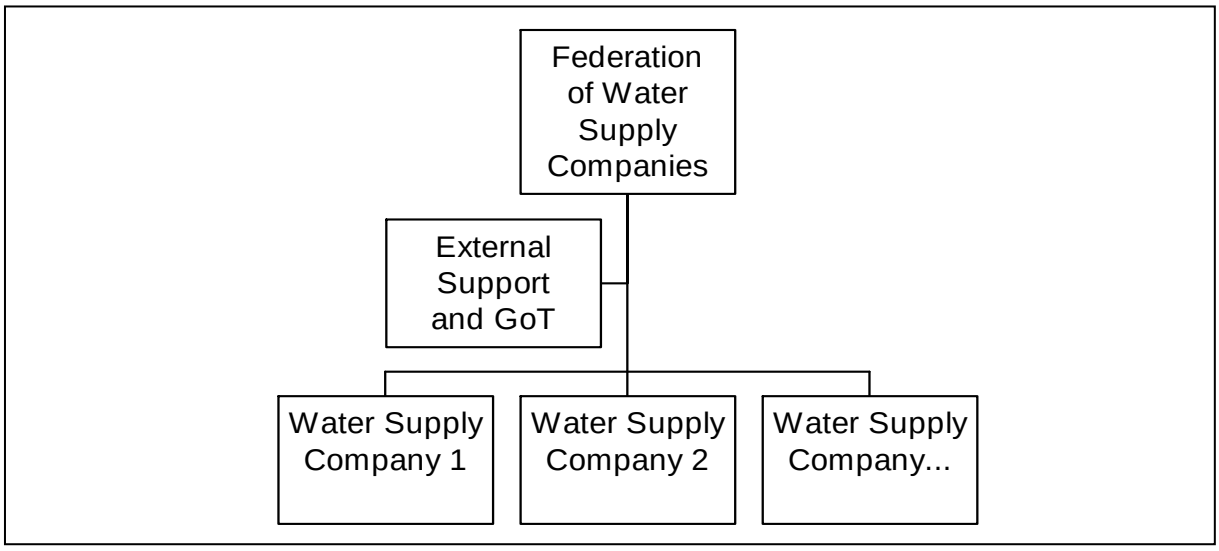


Figure 5.5. Structure of the Federation of water supply companies

The federation is an umbrella organisation of 21 autonomous water supply companies. The federation has a board of directors composed of 6 members. Four members represent the water supply companies, one from each district of Morogoro region and two directors are women purposely elected to ensure women involvement in the management of the Federation. The board of directors elects a chairman and a secretary.

Successes resulting from the existence of the federation

- Awareness among consumers on ownership on the water system has increased.
- Transparency of the financial management in the water supply companies has enhanced.

Problems

- Continuing interference by village government in water supply affairs.
- No strong financial basis for staff at management and technical staff.
- Lack of supporting organisations, like government, NGOs and private sector.

Lessons learned

- For a community it is possible to delegate the management of the water supply system to a private company. They can manage their own water system, but need external support.
- Small decentral water supply systems can be operated together by one service provider.
- The relationship with the government and other existing organisations are important to avoid problems.
- An umbrella organisation is a good way to support each other and cooperate with actors like banks, government, private sector and NGOs."

5.3.2 Urban water supply in Mauritania

The second case is studied by Hydroconseil from Mauritania [Hydroconseil, 2001]. This management model is a cooperation between the government, private companies and the community.

In the south-west of Mauritania the water supply systems in small towns are managed by 'concessionaires'. This 'concessionaires' are private operators, who have a contract to manage the system. Private operators can be companies, but this role can also be performed by individuals. This management system was developed in 1993, because the municipalities appeared to be poor managers of the services. The service rapidly declined and the financial deficit grew. Then the national government developed a strategy of water service delegation in small towns. The private operator is selected by the users. After that the private operator signs a one year contract with the Water Directorate (a regional government office that owns the network). In case the water users have problems with the services, they will try to find another private operator. The Water Directorate decides whether the reason of the community is valid, to determine whether the current contract is extended. Currently this model functions adequately, as most operators, communities and delegating authorities are satisfied. One of the aspects that contributes to the success is the fact that the contract will be extended as long as the private operator provides a good service. This is controlled directly by the community, rather than by the town or a sector regulatory body.

Lessons learned

- In this arrangement there is a balance between community, government and private sector.
- The government has no resources to do monitoring, so this task is done by the community.

5.3.3 Migori, urban water supply committee

The third case was studied by SANA and I also visited the city to do some interviews. It is about Migori in Kenya where the community is managing its own water supply system. Migori is a small town in the south of Kenya, about 200 kilometres from Kisumu as can be seen in annex 6. SANA is assisting the inhabitants of the town to solve technical and organisational problems they experience.

The water of Migori is coming from a spring in the hills about ten kilometres away. A pipeline leads the water by gravity to a watertank. From the tank it is distributed by pipes to various standposts in the neighbourhoods. It was implemented with donor funds and operated by a manager and some other employees for billing and technical tasks. The supervision was done by an elected committee of representatives from different supplied areas. The problem in Migori was that the committee did not organise new elections, so they could maintain their powerful position. The committee did not re-invest the water revenues, so the water system was not maintained or extended to other areas. Besides that the supervisors and operators are said to have stolen money from the system. The water users did not have the power to improve the situation and neither access to legal assistance.

An important lesson from this case is that even a committee of community representatives is able to misuse the money of the water users. It is important to try to prevent this from happening in Kisumu. The team of external professional supervisors can fulfil this requirement, as they will do something to change the situation if the committee is not favouring the water users. The institutions of the government are very important for this enforcement, because in such cases the water users or facilitators might need the police or a judge.

5.3.4 Applicability of models in Kisumu

The models prove that it is possible for a community to manage a water system, without help of the government. However, the described projects also have some problems. The model of Mauritania is a good example of cooperation between the government and community, which could be applied in Kisumu. The water users of the central water system managed by Kiwasco can help the municipality in monitoring, so then a similar model is created as in Mauritania. If that appears to be possible, the local water system in the slums can also be handed over to the municipality, so they perform the supervisory task. The problems in the cases also learn that a community needs help of experts during operation to prevent or solve social, technical and financial problems. Without help only the very devoted communities will sustain their water supply system.

An umbrella organisation, such as the federation in Tanzania can also be established in Kisumu, as this appears to have some advantages that contribute to the sustainability. Communities can exchange experiences in the management, and together the communities could negotiate with other actors, like the government or commercial banks. Another lesson learned from this case is that SANA must involve the municipality and Kiwasco in the initial and operational phase to avoid resistance.

5.4 Legal aspects

The legal basis in the arrangements of the water user association in Kisumu consists of several existing laws and regulations, especially because Kenya is facing a decentralisation process, where the government is progressively transferring its responsibilities to local governments and user associations.

- The National Policy on water resources and development recommends involving stakeholders and beneficiary communities to participate in the implementation, financing, operation and maintenance of water resources and supply facilities [Ochieng, 2003].
  Furthermore it forces the local government to privatise the water supply system.

The related Water Act also says that every water resource belongs to the state, which means that the Kisumu Municipal Council needs to give permission to sell water within its boundaries and it can levy a water tax on every litre.

- The Local Government Act transfers the responsibility of services delivery from the central government to the local authorities. This seems to be contradicting the National Water Act, but even in a privatised water system, the local authorities are responsible for the services. A new law is under construction that delegates the full management to an independent entity, like an association, private operator or an individual.
- The Association Act provides a legal status for the water user association. It enables the association to own some assets, to open a bank account, to contract a loan and to sue someone in case of mismanagement. Also the water and sanitation committees that SANA establishes in the rural areas are subscribed in the Ministry of Social Services.

The responsibilities can be clarified by direct contracts between the main stakeholders [Valfrey, 2003], namely:

- The Memorandum of understanding or performance contract between all participants in the initial phase: Kisumu Municipal Council, District Development Office, Water Users, private operator, SANA, and other NGOs. This document details the share of responsibilities between the different members and the extent of the public service mandate which is delegated to the water supply committee.
- The delegation contract between the water user association and the private operator in which the private operator commits himself to the provision of water for a certain period.

Concluding it be said that there are no legal objections to the establishment of an urban water supply association. The only barrier is that permission to extract water is needed from the Kisumu Municipal Council.
For the enforcement of the delegation contract it might be necessary to go to a judge. It is not clear to me whether this system functions properly in Kenya. The chance that it will come to a conflict that a judge is needed as an arbiter is not very large as most problems can be in a cooperative fashion; especially when external professionals facilitate the discussion.

5.5 Technical possibilities

This section gives an overview of the water sources and water systems that could be implemented in the slums of Kisumu. The different alternatives are compared, and this information can be used by the water user association to select a suitable system in cooperation with other actors like Kiwasco. For me it is not possible to make this selection as I do not have all information about the possibilities.

5.5.1 Water sources

Kisumu has several sources of water available, which will be discussed to see what source is best to be used to supply the slums.

The city is bordering Lake Victoria. The rich suburbs and town centre are close to the waterside. However, the poor slums are further away from the lake, because the remaining areas along the lake are lower then the suburbs (see also figure 4.1 for a map). The distance from the lake to the slums is between 1 and 5 kilometres. The quality of the lake water is very poor, due to pollution of several factories. The sewage water of Kisumu flows into the lake as well, without treatment.

It rains regularly in Kisumu. The average annual rainfall is 1500 mm. There are dry periods in January and October, but even then it rains at times as can be seen in figure 5.6. Rainwater catchment tanks are an option, however they are expensive and the tanks require space that is not always available.

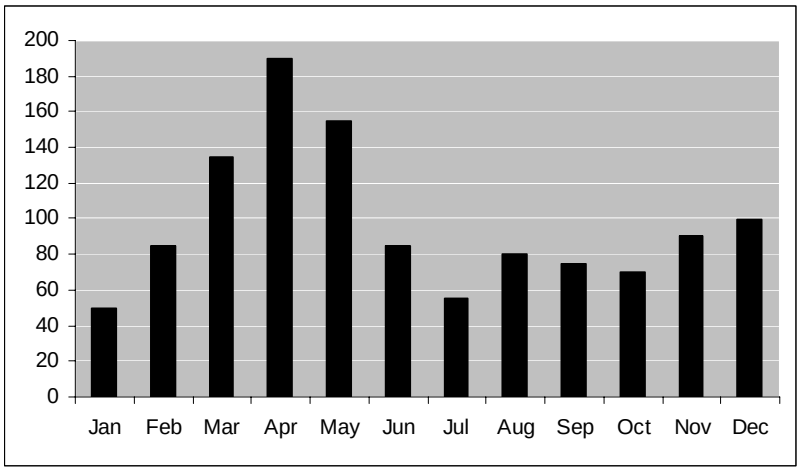


Figure 5.6. Monthly rainfall in Kisumu[3] (mm)

The groundwater level in the slums is quite high, which means that digging a shallow well of 2 metres is enough to reach water. In the dry periods the water level drops, so then the water is not available in most places. Many compounds have their own shallow wells, but the water is not clean. Pit latrines are within a radius of 10 metres, which means that the water is polluted. Some wells are lined with concrete blocks to avoid the pit to collapse. The water is fetched with a rope and bucket. Chlorine is for sale on the market to disinfect the water.

Two rivers flow into the lake near Kisumu, so some slums are along the river. The water is polluted by sewage water. The rivers are almost dry during the dry periods.

Twenty to fifty metres below the surface are underground aquifers that can supply safe drinking water. A pump is needed to get the water. For the pump there are different alternatives. A footpump is cheap, but has a low capacity. An electrical or diesel pump is more expensive in operation, but it can pump more water per hour.

5.5.2 Water distribution systems

For the transportation and distribution of the water from the source to the community there are different water systems. This section gives an overview of the existing options.

The first option is the central water supply system that is operated by Kiwasco. It is described in section 4.1. The system pumps water from the lake to a treatment plant, where the water is filtered and chlorinated. Then it is pumped to an elevated tank, from where it is distributed to the individual connections and water kiosks.

The second option is a decentral water supply system as it has been built by SANA in some villages around Kisumu (see also figure 4.9). The water system extracts the water from of a borehole from an underground aquifer. A footpump is used to pump the water into an elevated tank. From the tank it is distributed by gravity pipes to the water kiosks where it is sold to the water users who come with their jerrycans. The water could also be drawn from surface water like a river or the lake, but in that case the water needs central or local treatment, which involves extra costs.

[3] Source: Lonely Planet Kenya

The main differences between the central and local water system are the source and scale. The water from the lake is polluted by untreated urban sewage water and industrial waste. That is why the central system needs a water treatment plant to improve the quality of the water. Groundwater is safe for human consumption, because it is collected at 20 to 60 metres depth and it is tested in a governmental laboratory for any harmful material. The size of the system depends on the yield of the borehole and the size of the community. Some boreholes have a long recharge time, which means that it is not possible to extract high volumes. In rural areas this usually does not give problems because the population density is not that high that the water yield is insufficient. In urban areas this can be a problem, especially because the water infiltrated far away and to be sustainable the extraction should not exceed the recharge. A related subject is afforestiation, which stimulates infiltration. This is not only relevant near the borehole, but also further away, as the water flows for long distances to reach these depths [Dijk, 2001].

For the situation in Kisumu it would be possible to increase the capacity of the existing centralised water system, but as described in the previous chapter this costs a lot of money and is not expected to happen in the near future. That is why I suggest to drill one or more boreholes in the slum areas to supply the community with water. Another possibility is to build rain water tanks to collect rain of the roofs, but this is less attractive for several reasons: it is more expensive per family, it requires more maintenance, it is less reliable because sometimes it does not rain for long periods and it requires more space to build many tanks.
In July 2003 SANA has drilled a borehole in Wandiege, a peri-urban area near Kisumu. This borehole gave a very high yield to serve 4000 persons with 40 litres per person per day[4]. Some tests done by some provincial officials show that it can be expected that boreholes in other places in Kisumu can offer such a high yield. Probably it is not possible to serve 100,000 people with water without exceeding the groundwater recharge capacity, so it is important to minimise the water use. It is good to bear in mind that the average water use per person per day in the Netherlands is 135 litres. As long as the slum inhabitants do not have an individual connection they won't use that amount, but it is good to consider some alternative solutions as the need might exceed the supply.

In the first place the water use can be limited by pricing. If people have to pay more if they use more water that is an incentive to save water [Moriarty, 2002]. In the second place alternative sources can be an option. Currently many people have shallow wells near their house, or go to the river or lake. This water can still be used for washing, so ground water is only used for consumption. In the third place it is good to know that this can be a short term solution, and if further research shows that using ground water is not sustainable for many years it is possible to switch to another source. Then the small water systems can be linked to one or more water treatment plants that extract water from the river or lake. Most of the implemented water system can still function as this water comes to the elevated tank and does not require a new distribution network.

All alternative sources and water systems are summarised and compared in a multi-criteria table. The criteria are implementation costs to build the water system, operational costs to get the water in and through the system, water yield of the source which is combined with the reliability as the source might not supply the same amount of water the whole year. The last criterion is the quality of the water, which relates to the operational costs, as the water needs to be treated if the quality is not good enough for consumption.

[4] More information can be found in Annex 4

Source	Implementation costs	Operational costs	Water yield + reliability	Water quality
Lake water	High	High	High	Depends on system
Bulk of Kiwasco	Low	Low	Low	Depends
Rain	Average	Low	Average	Depends
Ground water	Low	Average	Low	Average
River water	High	High	Low	Depends
Aquifer water	Average	Average	High	High

Figure 5.7. Multi criteria table with water sources

The alternatives to provide water in the slums are to build a treatment and transportation system to extract water from the lake. This costs a lot of money for implementation. Operation is also expensive. A positive aspect is that the water is always available even in the dry periods. The water quality depends on the treatment. The owner of the system can decide to supply bad quality water which is cheap, so then the water users have to treat it before consumption. Another way to get water from the lake is by extension of the existing network to the slums and peri-urban areas. Kiwasco is asked to arrange this extension and increase the treatment capacity, but they are not able to do so in the near future, which means it will take at least two years. A common arrangement in Southern Africa (e.g. South Africa, Namibia) is that a Private or Municipal Water Authority sells bulk water to communities and towns. In the town/community, a Local Water Committee (the Water Service Provider) is responsible for distribution, routine operation and maintenance and billing [Smet, 2003]. It is worth consideration of the possibility to work together with Kiwasco in the areas close to the existing network especially for the slums that are situated close to the town centre.

The next alternative source is rain water catchment which requires a roof with gutters and a water tank. This is quite expensive compared to the other alternatives because every house has its own tank. Besides that it requires a certain surface to build the tank, which is not always available in the densely populated areas.

The use of groundwater is good for things like washing and bathing and it can be chlorinated to make it safe for consumption, which is not very expensive. The problem is the reliability in the dry periods as the shallow wells are dry when the groundwater table drops. Another problem is that if everybody starts using the ground water the water table will also be low in the rest of the year.

River water availability is reduced in the dry periods and it is quite polluted, which involves extra costs for treatment.

The water of underground aquifers can only be reached by drilling a borehole, which is quite expensive. The water yield depends on the place, but the yield is constant over the year and the water quality is good, so it does not require treatment. The last aspect that makes this source quite attractive is that the transportation distance is relatively short as the borehole is drilled close to the water users. This option seems to be the most attractive for the peri-urban settlements that are not that close to the central water supply network of Kiwasco.

5.5.3 Management of the water reserves

The quantity of water available for consumption around Kisumu seems to be infinite. Lake Victoria is very large, the rivers have a large capacity and the underground aquifers seem to be able to produce a lot of water. However, it is important to bear in mind that natural resources are not infinite. It is important to protect the water resources from depletion and pollution. Lake Victoria supplies water to other countries like Uganda and Tanzania and the Nile river takes the water through Sudan to Egypt. It is important to restrict extraction, so the other countries also have enough water. The same applies for the underground aquifers. The water infiltrates at a certain quantity, so if the extraction exceeds the replenishment the source will be dry after several years.

The Kisumu Municipal Council gives licenses for commercial extraction of ground or surface water. Water companies like Kiwasco pay a fee for every litre they extract. The revenues should be used by the municipality to protect the source, for example by planting trees. I don't know whether a maximum quota has been determined, but the water user association should recognise the importance of such a system.

An effective instrument to limit the use of water is volumetric pricing, which means that users pay for the water per litre. This stimulates them to save water. More about pricing can be found in section 6.2.

Water quality is another aspect that needs attention. Currently the water sources are being polluted by human activities. Sewerage water flows into the lake without treatment, industries dump their waste water and rain takes air pollution into the water. This will cause serious problems in the near future, but poverty and poor functioning of the government make it difficult to change the situation. People who can hardly afford their food, do not care about the environment and besides that they are not aware of the fact they should care. Members of the water user association should discuss this problem to come to action for making the water system sustainable.

Conclusion

The multi-criteria table is not meant to select one source, as it is also possible to combine two or more sources. The table can be used by the water user association that is established to determine what source is the best for their situation. Because of economies of scale it would be the best to have a centralised system, from economical point of view. But a small local system is easier to manage by a water user association and it is easier to keep the operator accountable for the service.

5.6 Financial options

Before SANA was created, a bilateral programme between the Netherlands and Kenya funded the projects. In 2000 this funding from the Netherlands was stopped, so SANA had to look for alternative funding. Now they write proposals to different donors to be provided with money. This is a time-consuming activity, so it is interesting to look for alternative ways of collecting money to reduce this dependency of donors.

An innovative way of funding that can be used in the slums is by giving the community a loan. The urban residents have more money than the people in the rural areas and currently they pay for the water they buy from water hawkers. They can invest in water facilities and pay for the water they use. These water revenues can be used to finance maintenance and refund the loan, so SANA can use the money for another project. In annex 4 this possibility is analysed financially. The rough estimation shows that it takes between 2 and 12 years to pay back the loan, which mainly depends on the drilling costs and the yield of the borehole which are both difficult to predict in advance. The price is an instrument to reduce the time of paying back. In this calculation a price was used of 1 Kenyan Shilling. This is much lower than the price the water users pay at the moment, which varies between 2 and 10 Kenyan Shillings.

Commercial banks in Kenya do not provide loans to communities as they only accept real estate as security grant to be sure that they will get their money back. The loan will have to come from a charity organisation who trusts SANA because of positive experiences in previous projects. The private sector of Kenya or from abroad could also invest in development of water facilities. Currently they are not allowed to start their own water supply companies, but they can provide the community with a loan. The national water act has privatised the market, but it has not been liberalised yet. This makes it impossible for private companies to get a license for water supply, but SANA has been given permission to do water projects, because they use a community-based approach.

Another way of private investment is public private partnership, in which the private sector works together with the government or community to do investments. This approach is used by another NGO in Kisumu, Africa Now, who use different ways to link communities with companies. Examples are Honeycare for bee keeping and Kentank that provides the schools with cheaper tanks to enter the market. Another possibility is that the drilling companies provide loans for the boreholes. Public private partnership only works if both the private company as well as the government benefit from it [Evans, 2002]. The benefits for the drilling company is that the investment barrier will be lower, which generates more demand for their services.

The government of Kenya used to lack financial resources to invest in water facilities for the poor people. This situation is expected to improve, due to the reduction of corruption and increased availability of international support. The communities can ask the government for money to implement their water facilities, or the government can implement the facilities.

A big advantage of gifts above loans is that the community can use the water revenues for other investments, for example drainage or health facilities. The fact that they can afford it to pay for the water does not mean that they do not have financial problems. On the other hand the available donor money is not infinite. That is why an external consultant advises SANA to start a revolving fund, which means that SANA implements a project in a village or slum and asks the beneficiaries to pay the loan back in some years, so SANA can use this money to do another project [Murage, 2003].

Overview

The investigation in this section shows that it should be possible to arrange funding for a project to improve the water system in the slums of Kisumu. However, it will take some time and energy to convince the donors. It will help that SANA has already a good reputation with international donors. Besides that the donors probably like the innovative way of funding, in which the community get a loan which is reimbursed with the water revenues.

5.7 Conclusion

Concluding from the previous sections the table that was described in chapter 2 with the different roles in a water supply system are allocated in figure 5.8 for the situation in Kisumu.

	Water user association	SANA / donor	Municipality	Private companies
Initiator	X	X	X	
Investor		X		
Constructor				X
Instructor		X		
Owner	X			
Operator				X
Maintenance				X
Supervisor	X			
Facilitator		X	X	

Figure 5.8. Role allocation table for Kisumu

The first role is the initiation of the implementation of the water system. This can be done by SANA, members of the water user association and the municipality of Kisumu. SANA can contact the municipality and some other NGOs to select a slum and then organise the water users into an association. Together they can select a suitable source and water system and make the design. SANA can write a proposal to a donor who probably will be willing to support the investment as was explained in the previous section. For the construction local constructors can be hired. When the system is finished it is handed over to the water user association, so they are the owners. This gives the water users the power to keep the service provider accountable. SANA trains them, so they know how to monitor the service provision. For the operation a skilled manager is hired, or a concession is given to a private service provider who can use the established water supply system. This service provider is also responsible for the maintenance. The last role is the supervision, which is done by the water user association. They are assisted and monitored by the external professional facilitators, who are representatives of NGOs like SANA and the Kisumu Municipal Council. The normal judges will act as arbiter. For example, when a client complains about the water quality and the service provider does not agree, then they go to the water supply committee. If the water supply committee cannot solve the problem the actors go to the judge to let him decide who is right in view of the contract.

The proposed management arrangement appeared to be successful in other cities. Besides that no legal barriers appeared in the legal analysis. The technical analysis shows that a decentral system possible in the local environment; it is not very different from the current situation and possible to be managed by a community organisation. From the financial analysis can be concluded that funding could be arranged and that the donors should consider the possibility of providing a loan to implement the water system.

In the next chapter the institutional design will be specified, so there the questions will be answered that were formulated in this chapter:

- Who should perform the tasks such as extension of the network, determination of water prices and protection of the source for pollution and depletion?
- How is the relationship between supervisor and service provider organised, in other words between the water user association and the private company?
- What is the role of the external professional facilitators that monitor the water user association on equity, corruption and sustainability?

6. Institutional design

The previous chapter showed that it is possible to use the rural approach of SANA as starting point for the urban approach. In other words it is possible to establish a water user association in Kisumu for the management of a decentral water supply system. This chapter explains how the functions of the associations should be organised and how the relationships with the other actors should be arranged.

6.1 Organisational design: Water User Association

SANA assists the inhabitants of a slum in Kisumu to establish a Water User Association, to which members can subscribe, who live in a certain slum. They elect a Water Supply Committee for overseeing the implementation and management of the water supply system. The first task of the committee is to arrange a water supply system in the slum in cooperation with the Kisumu Municipal Council. In case the council has money to establish a water system, they can do it. Currently they do not have money for this investment, so the committee can ask a donor for financial assistance.

A suitable design for a water supply system in Kisumu consists of a borehole with a pump to get the water. The water is stored in an elevated tank and distributed by gravity to the water kiosks, where people can fill their jerrycans. The selection of this system is described in section 5.5. In the rural communities SANA builds the water supply system with financial support of a foreign donor. Afterwards it is handed over to the community, so the community becomes the owner of the system and is responsible for it. In the slums SANA can do the same and hand the system over to the water user association.

Contract between association and service provider

The type of management structure depends of the size of the system, but the main activities to run the system are: sell the water, run the pump, maintain the pipes and ensure security by line patrol. It is recommended that the committee asks a professional for the management of the water system. The system supplies 1000 to 5000 people with water, which brings too much work to be performed only on a voluntary basis. Furthermore the financial management will require a manager with financial skills.
A simple option is that the committee hires a manager and water kiosk attendant, technicians and security officers by themselves. A more complex option is to organise a tender to find a private company that can do the management for a certain period. Both arrangements are described in section 5.3. The role of the committee is to do the monitoring of financing, equity, and quality. If users of the water complain about the tariffs or quality of the water, then this committee has the power to make the operational management to improve the performance.

My recommendation is to choose a simple arrangement, where most decisions are made by the committee. The committee does not have experience in dealing with complex contracts. Later the committee can decide to give more responsibilities, such as network expansion to the private operator. The best incentive for the employees can be given by a performance-related salary [Evans, 2002]. Figure 6.1 shows the organisational structure of the association. The next sub-sections give more details about the association.

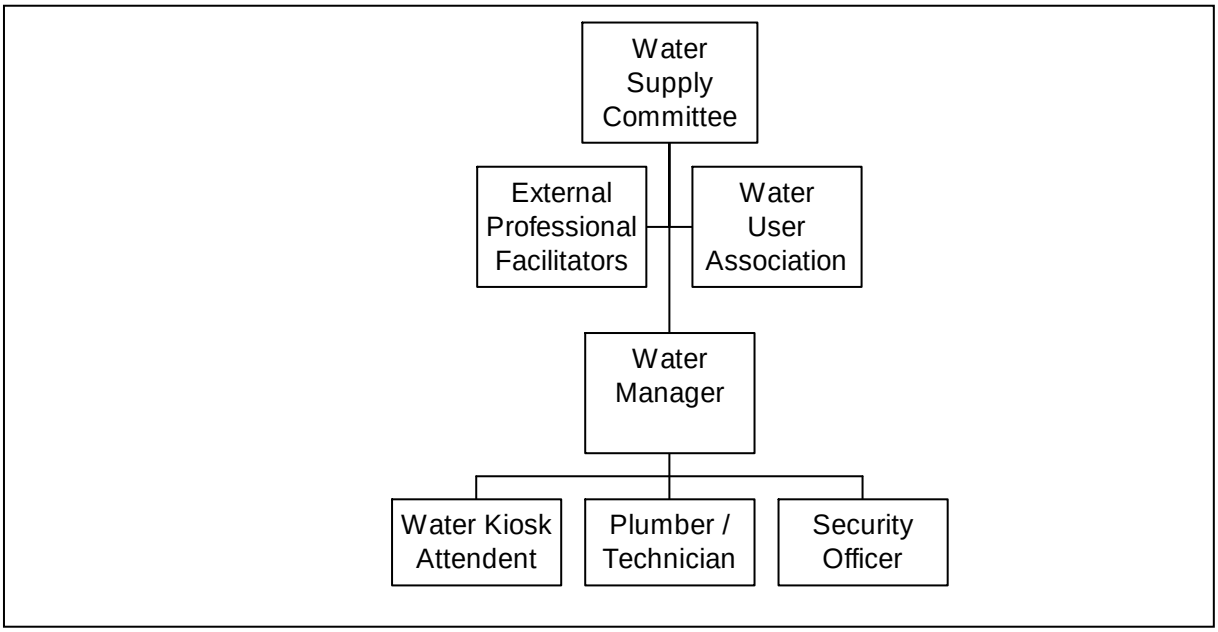


Figure 6.1. Organisation Structure of the Water User Association

Financing and Tariffs

In the previous chapters several remarks have been made about financing and tariffs. Two aspects can be distinguished: financing of implementation and of operation. Financing of implementation deals with the following questions: who is funding the investments and how do the water users contribute to the investments? Financing of operation deals with the following questions: what is a good tariff, concerning equity and sustainability? Financing is about the fixed costs, whereas tariffs are meant to recoup both the variable as well as a part of the fixed costs.

The different aspects of the decisions to be made about the tariffs are the following:

- *Funding of investment and reimbursement*

The implementation of rural projects done by SANA is usually funded by international donors. Section 5.6 describes the different options for funding. For the tariffs the main question is whether cost-recovery is necessary, which means that the water revenues are used to reimburse the loan that is given to the community where the water supply system is implemented. In annex 4 is calculated that it will take 5 to 10 years to collect the money for reimbursement. SANA, the association and the donor will have to decide about this. The tariffs should at least recoup the variable costs.

- *Membership of the association*

The water is sold in water kiosks, so the water users come from the slum where the water kiosk is built, but also from other slums. Some of them are members of the water user association, others are not. In the rural projects of SANA members pay a monthly fee and get reduction on the price of water. In the slums it is difficult to have a system of tariff differentiation, besides that it is not fair. Membership is needed for election of the water supply committee, so this can be done without membership. People in a certain area can vote for representatives in the water supply committee if they are above a certain age, for example 18 years old.

- *The tariffs should recoup the variable costs*

The operation of the water system should be self-sustaining, which means that the expenditures of energy and salaries for operation and maintenance should be paid by the water revenues. The same applies for network extension and individual connections. The water supply committee will have to decide about this, they can ask for advice from the external professional experts.

- *Water vendors and competitors*

Water vendors also buy water in the water kiosks, to serve people in other slums. In some cities they buy water at wholesale prices, because they serve poor people [UN-Habitat, 2003]. The price of the other suppliers in Kisumu should be considered. If the price is too low all people come to the new system. If the price is too high, all users will continue to use the old system.

- *Alternative pricing mechanisms*

In the report New Designs for Water and Sanitation Transactions [Evans, 2002] three instruments are described: uniform volumetric charge, increasing block tariff and lifeline subsidies. Uniform volumetric charge means that water users pay the same amount per litre, so there is a standard price for jerrycans of 1 shilling. Increasing block tariff means that the jerrycans someone buys in a month are counted, and the price per jerrycan increases, so number 1-10 are 1 Ksh. each, number 11-20 are 2 Ksh. each, 21-30 3 Ksh. etc. The advantage of this system is that nobody is excluded, as all users should be able to afford the low tariff for basic use and there is an incentive for big users to save water, because the prices are rising. The disadvantage of this system is that the number of jerrycans consumed in a month should be registered and this could cause corruption.
The third instrument is a lifeline subsidy in which all users pay the same price, but the poorest get a subsidy to be able to buy the water they need. Wealth ranking is a way to determine whether people are poor or not. However this method also involves extra administration and risks of corruption.

- *Selection of a pricing mechanism*

The selection of a tariff instrument should be done by the water user association, together with the determination of the price. The water supply committee makes a proposal, which is presented at the Annual General Meeting with all water users. They can ask the external professional facilitators for advice to make the choice. My recommendation is to have a uniform tariff in the water kiosks for all water users and water vendors, so every user pays the same per jerrycan. In order to avoid that poor people are excluded from the service they should consider the provision of subsidies for basic consumption.

External Professional Facilitators

The External Professional Facilitators form a committee that consists of representatives of NGOs, the government and other relevant organisations. Their role is to monitor the financing, equity and progress of the association. They can also give advisory support to the committees. There is a risk of misuse of the money of the association, as happened in the community based water system in Migori, see section 5.3.3. This risk can be reduced by ensuring sufficient checks of the financial status of the committees, which will be done by the members of the association, but also by the facilitators. They need to register in the ministry of social services, so they are a legal entity. The members of the water supply committee and the team of external professional facilitators sign a contract, so if the facilitators need legal power they can go to a judge. The facilitators can also guarantee that the association respects equity. The commercialisation of the water system could cause difficulties for the poor people and deny them from the service. That is why it is good to find ways to ensure that they can also use the services, for example by charging them lower tariffs. Another function of the facilitators is to monitor the progress. If the committee does not initiate new activities, or implements the ideas too slow, the facilitators can stimulate them to take more action. This is a pro-active form of advising the committee, but the committee can also ask them for advice.

For the success of the association it is important to involve all relevant stakeholders in the development process. Most neighbourhoods have a chief and are represented in the council by a councillor, so these people are all very welcome to participate in the committee of facilitators. The same applies for officials in the district development, who deal with development of the area around Kisumu. Development experts of NGOs like SANA, Africa Now and World Vision can use their experience to support the association as much as possible.

Salaries

Three types of staff can be distinguished in the water user association: employees for the operational tasks, members of the water supply committee and the external professional facilitators. The employees get a salary as this is their full time job. The members of the water supply committee do not spend that much time on the job and besides that it is an influential position, which attracts people. A salary is not necessary, but they can discuss whether an allowance for expenses can be given. The same applies for the external professional facilitators who are paid by their organisations. In case the work exceeds a certain limit another solution should be found, as NGOs like SANA do only have money for their own projects. Options are using the water revenues, or funding from donors or the government who could also pay for the implementation. This needs further investigation during the initial phase.

6.2 Participatory monitoring system

A participatory monitoring system is meant to give the members of the water user association information, which is an important aspect to achieve accountability. The monitoring is done by the water supply committee, but it should be checked by the members and external professional facilitators. This section mentions some important aspects that should be monitored and suggests how this can be integrated in the organisation.

In the book 'Action monitoring for effectiveness, Improving water, hygiene and environmental sanitation programmes' [Shordt, 2000] is stated that people should monitor who have real interest about an issue or problem. It is important to involve those people who can use the information, beginning with the local or lowest level, to improve a situation. This tends to shift control to user and community groups. The monitoring activities should become in-build so that they are part of the on-going programme, planned and carried out by staff, community members and other partners. Thus monitoring sometimes disappears as a separate activity.

The financial administration is the first thing that should be monitored in a participatory way. Corruption is an important phenomenon in the Kenyan society and it is not only in the government, but citizens also distrust each other when it comes to money [Kane, 2003]. Transparency is a good means to reduce corruption. The treasurer of the water supply committee is forced to account for all financial transactions towards the members and the team of external professional facilitators. The attendants of the water kiosks who sell the water deal with money and can give their family and friends water for free. One instrument to avoid this behaviour is by giving the attendant a good salary, so he or she is not forced to steal to have enough money. Besides that the open atmosphere can improve the social supervision in which members check each other and report offences.

The size of the water user association is also relevant. In a big association it is easier to cheat, because it is difficult to oversee the whole situation. In a small association people know each other and check each other automatically. People need to realise that they have to do something to make others stop cheating which harms the association. Another advantage of a small association is that the committee members represent their own area and will be held accountable if things go wrong. Their family benefits by a well-functioning water supply system, which motivates them to do their best.

Equity should also be monitored. Poor people are not assertive enough to ask for help and will suffer quietly. They go to the river or use other unsafe water sources, because they cannot afford it to buy water in the kiosks. The committee is responsible in the first place, but they can also create an environment that stimulates the members of the association to help their neighbours who have financial problems. The committee should be accessible for everybody who wants to report problems. Wasserman (2001) describes the risk of powerful people in a community that influence the others in 'democratic' elections. She also mentions the need for empowerment of women to participate in the decision making process. The external professional facilitators should be aware of this risk, so they can anticipate on this by helping the less powerful people.

Technical aspects that should be monitored are the quality of the water and the protection of the source for pollution and depletion. The members of the water supply committee do not have the skills to monitor water quality, so they can get training, or ask experts to do it for them. Besides that the water users can also report to the committee if they think the water quality is not satisfactory.
The committee is also responsible for the protection of the source. In the case of groundwater they have to avoid over-extraction of water, because the ground water table will drop and after some time the yield will reduce. They can also stimulate infiltration by planting trees around the catchment area [Brouwer, 2001]. On the other hand the water use should be limited. Volumetric pricing is a good way to do so and people need to be aware of the importance of saving water. The use of low quality water from other sources for washing is another method to save drinking water. The chance that the ground water will be polluted in the short term is not very big, because it takes a long time for the water and pollution to infiltrate to a depth of 20 metres. In the long term this can be a threat, so the committee should make people aware of the need for environmental protection. At the moment people use chemical products like pesticide and petrol without taking care of the environment, which will be very harmful in future.

6.3 Relationship with the Kisumu Municipal Council

The water user association is established, because the Kisumu Municipal Council is not able to build a good water supply system. At the moment Kenya is experiencing political changes which might result in an improvement of the abilities of the council. In order to give this possibility a chance it is important to keep in touch with the council. This section describes how the relationship with the Kisumu Municipal Council should be organised.

In the first place the citizens need permission of the council and the privatised company, Kiwasco, to implement a water system. In other places community-based organisations have developed their own water supply system in parallel to, or as extension of the official town supply system. These alternative supply systems are often seen as competing with urban distribution networks and can lead to conflicts [Moriarti, 2002]. SANA has been given permission to establish a water supply system in the slums, so this shows the goodwill of the council and cooperativeness of Kiwasco.
The citizens however do not respect the council yet, because their requests and problems have been ignored for a long time. That is why many people do not pay taxes. In order to improve the relationship between council and citizens the water user association can play an important role. The council can send a representative to the team of external professional facilitators and coordinate the distribution of development tasks between the association and the council. For example extension of the network to another area can be supported by different NGOs and with money from the council. When the council has information about all planned activities they can avoid duplication of facilities. The association can help the council to increase its accountability by providing information about the activities of the council and asking the citizens to pay their taxes.

The association needs the government when it comes to legal power. In case a water user does not want to pay for his water, or if water is stolen, the association needs the police, or even a judge. The same applies for the contracts with operational employees, who can be fired if they do not work according their contracts. And the committee can also misuse their position, so in that case the facilitators need the power to do something about it.

6.4 Neighbourhood Development Association

Lack of drinking water is not the only problem in the slums of Kisumu. The inhabitants suffer of many more problems that all need to be solved for good living conditions. Once united in a water user association the citizens can do much more then managing the water supply system. Lack of water is only a symptom of the underlying poverty problem, the causes identified in section 4.7, are the bad economy and the poor functioning of the government.

The water user association can be renamed as a Neighbourhood Development Association that tries to improve the local economy, lobbies towards the government and donors for assistance and implements other public services, like drainage, electricity and health in cooperation with the government.

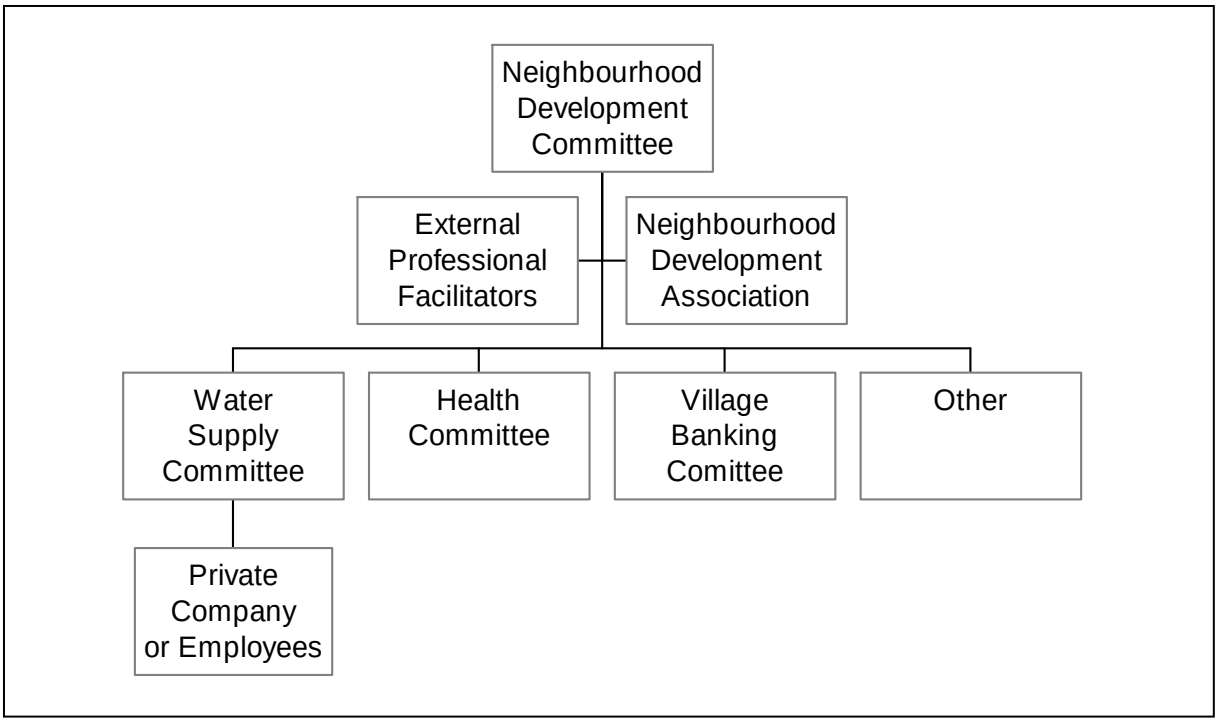


Figure 6.3. Organisation Structure of the Neighbourhood Development Association

The organisation structure of the water user association is transformed into a neighbourhood development association. The main difference is that the association has committees for other sectors than water, like health, village banking and other subjects. All sub-committees have representatives in the neighbourhood development committee that coordinates all activities. The members of the association can decide together what problems need to be addressed first using participatory tools that can be facilitated by the external professionals.

Sub-committees in other development aspects

When the water supply system is implemented the Neighbourhood Development Association can decide to address other problems, which can partly be financed with the water revenues.

Functions that can be fulfilled are related to drainage, waste, sanitation, health, income generation, banking and advocacy. The association can decide on what problem can be addressed first.

Flooding: the first problem that can be addressed is flooding. The Neighbourhood Development Association can implement or rehabilitate a drainage system and do the maintenance. This is related to waste collection as this usually blocks the drains.

Sanitation: the association can ask an NGO to train the members on the importance of sanitation for health. The NGO can provide funds for the improvement of the latrines, or the association can pay for it or give loans.

Health: the association can ask an NGO to do a health project. They can start a local pharmacy, train community health workers for voluntary home care, inform members about family planning and AIDS etc.

Income generation: the association can organise training on income generation, for example about agricultural opportunities or other businesses.

Banking: the association can ask for help to set up a local bank, in which members buy shares, so other people can get a loan and at a certain moment the available money is enough to be interesting for commercial banks to provide secure loans.

Advocacy: the association is now organised and can send letters or people to the government to ask for support. At the moment they are ignored, so their rights are not fulfilled. This empowerment can also be used to send proposals to donors.

Security: the association can hire watchmen who patrol during the night, to stop burglars and robbers.

These activities could be financed with the water revenues, but this needs further investigation about the pros and cons. This would mean that the water tariffs are higher than necessary. A separate financing system, like levy monthly taxes for joint investments, or a shareholder system for credit is another option. Water-related investments like a drainage system can be integrated in the water tariffs, because drainage is directly related to water consumption. However, this is more relevant when people have a fixed individual connection than in the initial situation where people carry the water to their house from the water kiosk.

All functions can be performed by the Kisumu Municipal Council or by the Neighbourhood Development Association. For every new activity it is recommended that the association discuss the intentions with the council to see whether the council is able or willing to do it. This depends on the success of the association and of the attitude of the council towards the poor people, which is expected to improve in the near future.

In the negotiations taxes will be a relevant topic. The members of the neighbourhood development association pay for the water, so the association has money for investments. However these investments can also be done by the council, so in that case the association can give money to the council, or ask their members to pay their taxes to the council. If the association arranges the implementation the council could also support them financially, because they probably receive money from the central government and other donors.

6.5 Scaling up

Kisumu consists of several slum neighbourhoods, which all can form their own Neighbourhood Development Associations. The first associations are already established in Wandiege and Bandani. If these associations have a positive impact on the living conditions of the inhabitants, the inhabitants in other slums should form their own association. This is called scaling up: a successful approach is used again in another place and the lessons learned can be used to improve the approach.

New associations and committees can learn of the older associations. They can organise exchange visits in which they can show each other the advantages of forming an association. This will make the task of the external professional facilitators easier, because the training is partly done by the existing associations, so the facilitators do not have to do everything. This does not imply that the facilitators are not necessary anymore. The facilitators can still stimulate progress by creating awareness in new neighbourhoods and by pushing them to undertake new activities.

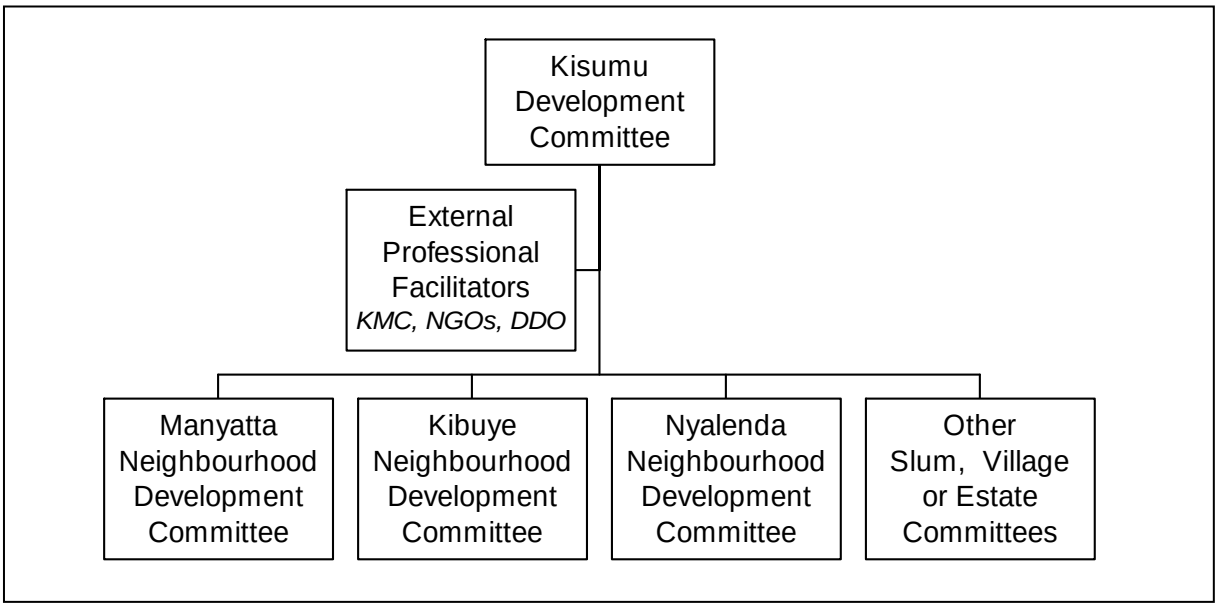


Figure 6.4. Organisational structure of Kisumu Development Committee

All Neighbourhood Development Committees can send one or two representatives to the central development committee of Kisumu. The meetings of the committee will also be attended by the facilitators. The same type of umbrella organisation is used in the Morogoro Region in Tanzania, but there the small water supply committees are from several villages, see also section 5.3. In Tanzania the results are quite promising [Smet, 2003], so it can be assumed that it will also be successful in Kisumu.

The establishment of a central committee has a few advantages. In the first place many activities of the neighbourhood development associations can be strengthened by cooperation, for example the implementation of rehabilitation of a drainage system is only possible when the water can go to lower areas and is not flowing too fast from upper areas.
Besides that the committees can inform each other about new activities, as they know each other's area, they can suggest what they assume to be necessary for development. If a committee in a certain area is not very motivated to undertake new activities they can be stimulated by other committees. The same applies for monitoring, which can also be done mutually.

As can be seen in figure 6.4, I do not suggest to merge all small associations into one big organisation. The power of the association is the small-scale, which makes it possible for the members to keep the committee accountable for the activities. Participation in activities will also be higher if the members are asked for assistance by their own committee. This way of organising makes it possible to benefit on the one hand of experiences from other neighbourhoods, but on the other hand the accountability is maintained which is expected to be the main reason for success.

Another option for the organisational structure was to make the Kisumu Municipal Council the top management, so the Neighbourhood Development Associations are sub-committees of the council. Then their position is more or less formalised as governmental bodies. In the beginning of the process I would prefer the council to participate as facilitator and not as top management. The relationship between the council and the slum inhabitants is not very good at the moment. Time is needed to create trust and this way the council has the possibility to cooperate, but their position is not critical, they even can quit if they want to. That seems to be the right position at the moment.

7. Conclusion

This chapter presents the conclusion and recommendations of the research. The main question in this research is:

To what extent is the rural approach of SANA useful for the improvement of the water availability in the slums of Kisumu?

In order to answer this question the rural approach of SANA has been analysed. After that the water problems in Kisumu have been analysed to see what were the reasons for the low availability of water in the slums. The project approach of SANA consists mainly of a process to learn the communities to manage their own water supply system. That is why the focus of the research was on the possibility to establish a community-based water supply system in the slums of Kisumu, but to be sure that there are no better alternatives the analysis also investigated the possibility of government-driven development.

The municipality is an important actor in Kisumu, which used to be the main supplier of water. In August 2003 the water department of the municipality was privatised and Kiwasco, Kisumu Water and Sewerage Company, is now managing the central water supply system. The management of Kiwasco said they will be able to supply some of the slums with water in the near future, but they do not have enough resources to supply all inhabitants of the slums with water. They gave SANA permission to implement a decentral water supply system in the remaining slums.

The main roles in an operational water supply system are the supervisor and service provider. The service provider is doing the operational tasks, like maintenance and water sales. The supervisor is responsible for the system and checks the water quality and reliability of the supply. Other tasks are the protection of the source for over-extraction or pollution and to avoid poor people to be excluded from the water system. The water users have a voice towards the supervisor, which means that they can complain about the service provider. The supervisor can use its' control to direct the service provider. The water users also have client power, towards the service provider, because they can go to another provider to buy the water. This is only possible if the water users do not have an individual connection.

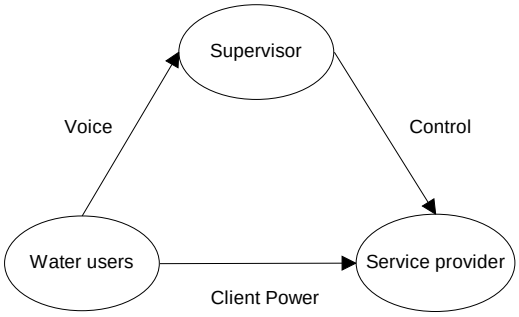


Figure 7.1. Roles in an operational water supply system

Role allocation in Kisumu

A powerful instrument of the supervisor could be the ownership of the water system. For the ownership SANA has two options: they can hand the water supply system over to the municipality, that also owns the central water system, or they can hand it over to the community. The main reason why I recommend to hand the system over to the community is because of several problems in the municipality. If they appear to have solved the problems with unskilled people and corruption, the community can decide to hand it over to the municipality. In the projects of SANA in the rural areas the communities are trained and form a management

committee to manage the system. Several evaluations show that this results in sustainable projects. The next question to be answered was whether the inhabitants of the slums are also able to manage a water system. After that is determined what adaptations should be made to the rural approach to enlarge the chance that it is sustainable in the urban setting.

There are several differences between the rural and urban communities. The cohesiveness of rural communities is much bigger, which is important for sustainable community-based development. This is compensated by the fact that in the urban setting the water system can be managed in a commercial way. The community in the slum owns the water supply system, but all operational tasks are performed by a private service provider who receives financial incentives to sustain the water service. The water users come together in a water user association and elect a water supply committee. The committee is trained to control the private service provider. Control involves that they check the water quality, equity of tariffs and financial management of the private service provider.

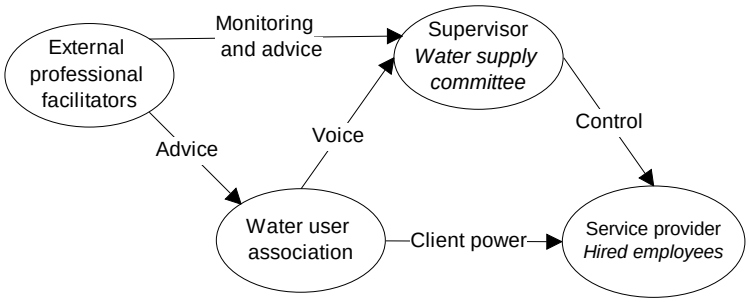


Figure 7.2. Structure of Water User Association and distribution of operational roles

The continuous involvement of external professional facilitators is another aspect that contributes to the sustainability and equity of the water supply system. The facilitators advise the water supply committee about certain aspects and they monitor the service provision and financial management. The facilitators are representatives of non-governmental organisations like SANA, or of the municipality. If a water user has a problem, for example because of bad water quality, he can complain at the service provider, if the complaint is not accepted, he can go to the water supply committee and eventually to the external professional facilitators.

The water user association could do the management of the water supply system, but this is not the main objective. The main objective of the association is to improve the availability of water in the slums of Kisumu, so alternative solutions are not excluded. An alternative is working together with the municipality to establish and operate an improved water supply system. Please bear in mind that the description of the water user association as supervisor is just an exploration of the possibility of self-provision. Due to the national elections in 2002, the attitude of the municipality is improving at the moment, but it is difficult to determine what implications this will have. In the initial phase of the project SANA will consult the municipality and Kiwasco to see whether they agree with the project and to determine in what slum the project will be done. Furthermore, the establishment of a water user association will be an extra incentive to the municipality to improve their attitude towards the poor, as the association can keep the municipality accountable for their bad living conditions.

Assessment of the design

Several criteria have been used to determine whether it is a good organisational design, in which a distinction is made between criteria for the initial and operational stage. For a successful initiation process it is important to have enough support of other actors to implement a water system, it should be possible to arrange funding and it should not take too much time. After the consultation with the municipality and Kiwasco, SANA can inform the inhabitants of the selected slum about the plans, to see whether they want to form a water user association. Together the water users form a water supply committee, and determine whether the proposed technical and organisational design is suitable for the local situation. The other actors like chiefs, schools and water vendors should also be consulted. The proposed water system consists of a borehole, from where the aquifer water is pumped to an elevated tank and then it is transported by gravity pipes to several water kiosks, where water users can fill their jerrycans and pay for the water. When all actors agree with the project, SANA tries to arrange funding from national or international donors. This funding can be a donation, but it appeared to be possible to use the water revenues to reimburse the funding, which will make it easier to get financial support.

The main criteria for an operational water supply system are the available water quantity and water quality in the water kiosks. The service provider that is hired by the water user association is in the first place responsible for the achievement of the criteria. The service provider is checked by the water users who report problems to the water supply committee. The available water quantity depends on the source, that should be protected for over-extraction. This can be done by creating financial incentives to save water, so the more water people use, the more they pay. The facilitators can also monitor this. On the other hand equity should be maintained, which means that poor people should not be excluded from the service. An option to overcome this risk is by provision of a subsidy to people who are very poor. The committee has to decide about this problem. The last criterion for a water supply system is financing of operation and maintenance. This can be done with the water revenues. The service provider is responsible and should work in a transparent way, so the committee and facilitators can check what he is doing.

Neighbourhood Development Association

Besides water the inhabitants of the slums have other problems like flooding, diseases, and insecurity because of criminals. The problems are symptoms of poverty, which is caused by the poor functioning of the government and the bad economical situation. The water user association should also address other problems and its causes, besides the water problems. A participatory urban appraisal could be organised to determine what problem is perceived to be the most important. The water user association can be transformed into a neighbourhood development association, which works together with non-governmental organisations and the municipality to address other problems. Examples are the improvement of the drainage system, sanitation and health facilities, but also stimulation of the local economy by provision of credit and training on small scale income generating activities.

Kisumu consists of several slums, which all can form their own Neighbourhood Development Associations. The first associations are already established in Wandiege and Bandani, two slums in Kisumu. If these associations have a positive impact on the living conditions of the inhabitants, the communities in other slums should form their own association. The different organisations can work together on several things. In the first place they can learn from each other, but also because some services, like the rehabilitation of the drainage system need coordination. This coordination could also be done by the Kisumu Municipal Council, but the relationship between the municipality and the slum inhabitants is not good enough at the moment. However, this situation is expected to improve soon, so by then the association and municipality can work together on improvement of the living conditions in Kisumu.

Recommendations

This sub-section summarizes the main findings of the study concerning the design of the implementation process and the operational management structure of the water user association. They could be used as guidelines in the implementation of the design in Kisumu. The issues I address are no strict regulations, but they should be used by the local actors to make an informed decision on the application.

Implementation process

- The inhabitants of the slums should form an association that is meant to improve their living conditions. A participatory urban appraisal should be organised to determine what the inhabitants perceive as a problem. The first step could be a water user association to address the water problems and after that it can be transformed into a neighbourhood development association that deals with other aspects of development, like drainage, health and income generation.

- The relationship with the Kisumu Municipal Council is important for an effective project. Where possible the water user association should work with the municipality.

- SANA can facilitate the formation of the water user association, alone or together with other non-governmental organisations and the municipality. After establishing the association these external professional facilitators can monitor the operation of the water system, train the community and the committee members and facilitate further development.

- In the initiation process of the establishment of a water supply system all actors should be consulted in order to address their interests when making the design. The actors are the chief, schools, water vendors, Kiwasco, churches and other community-based organisations and institutions.

- SANA can arrange the implementation of the water supply system, which is constructed by local contractors and funded with money from an international donor.

Operational management structure of the water supply system

- After implementation the water supply system is handed over to the water user association. A water supply committee is elected to do the supervisory tasks like monitoring of the water quality, financing and assuring equity. Equal representation of women and men is recommended.

- A commercial actor can do the operational tasks in the water supply system, like water sales and maintenance. This can be done by a private company who has a concession, but I recommend to hire employees for the management. They receive a performance-related salary.

- A system should be established to avoid that too much groundwater or lake water is extracted by the different water suppliers in Kisumu. The municipality has a licensing system, which should work properly.

- Water tariffs should be uniform, and volumetric. A subsidy can be given to the very poor people, to avoid that they are excluded from the service.

- The water revenues can be used to reimburse the investment funding and to do new investments, like in network extension, drainage or health. Only water related aspects should be funded with water revenues. For other investments an alternative financing or tax system should be established.

- The water user association decides about aspects like tariffs and contracts. They are assisted by the external professional facilitators. They should work in a transparent way in order to avoid corruption.

- An umbrella organisation should be established for coordination of projects between different associations in Kisumu. They can share lessons learned.

- Donors should consider the funding of the support to communities after implementation of the project as this contributes to the sustainability.

Epilogue

At the end of the writing process of my master thesis it is possible to reflect on the whole research by answering questions like what were the main difficulties and what would I do better if I could do it again. In chronological order I will describe the project to tell more about my experiences.

The initial phase of the research, which started in February 2003, was characterised by some important changes of the research subject. All the time it was about Kenya, but the rest of the content changed completely. My overall objective was to understand the difficulties in the development of Kenya and to find a way to contribute to the improvement of the living conditions of the poor. It appeared to be difficult to write a research proposal without having much information and understanding about the local situation. However the search for a good subject was a good way to learn more about development.

In Kenya it was good to see the rural projects of SANA. I was planning to analyse their approach in order to give recommendations for improvement. My preparation was mainly about participatory approaches and community management. The projects of SANA in the rural areas appeared to be quite sustainable, so my analysis would focus on participatory approaches. This requires some knowledge of sociology and I was afraid that it would not be useful for a master thesis in this faculty. Another reason to switch to another subject was my experience with the lack of water in the slums of Kisumu. That is why I decided to analyse the urban problems, to determine what SANA can do to improve the situation. SANA agreed with this change, because they had just started a project in a slum, so they wanted some fresh feedback on their approach.

After analysing and describing the rural projects, I have tried to get an overview of the complete situation in Kenya to be able to understand why there is no water in Kisumu. It appeared to be a complex problem with different levels: national economy and government, local government and water supply, and the attitude and skills of people at family level. In my study I have learned to get an overview like that, which is called the helicopter view. The causal relation diagrams in chapter 4 and 5 are an attempt to visualise the situation into orderly figures. There is always a trade off between going wide by considering many factors or going deep into a small number of factors. First I wanted to develop an approach to address all problems from water supply to income generation and corruption. Later I learned that it was better to focus on water and try to generalise the lessons learned about water to the other aspects of development.

The interviews in Kenya in the villages around and slums in Kisumu were a substantial part of my research. As a white Dutch person doing interviews in a culture I did not know might seem not very scientific, but despite some constraints or biases I expect the results to be very useful for my thesis. All information I collected was screened by SANA in numerous discussions I had with all staff members. Besides that I used some official studies done by professional organisations to check my findings. I experienced the difficulties that hinder development and learned that solutions are not easy to implement. Compared to the Netherlands there are some important differences, for example the awareness of people about hygiene, but also their inability to act due to their lack of skills and financial resources. Another lesson was about the role of the government. On the one hand I dislike corruption, but on the other hand I understand that officials try to find ways to supplement their low salaries to feed their families. A well-functioning government is a very important condition for development, which should be remembered by both politicians and citizens.

My study in TPM was mainly focused on the Netherlands, so it was a new field that I had to understand. Many aspects concerning community development and governance are related to fields like sociology and cultural anthropology, but that is not my background. I have tried to understand the situation without such theories and use other subjects like economics, water management and institutional design. For the analysis this perspective is used by many other experts, which is proven by the large amount of literature that is available on the websites and libraries of several research institutions. The accountability framework, developed by the World Bank, is one of the concepts I used to understand the situation in Kisumu and to make an institutional design for a water user association. Besides that I have used several reports that are meant to apply lessons learned, which means that experiences of other projects can be used in Kisumu.

The institutional design I made cannot be seen as a finished solution to better living conditions in the slums of Kisumu. It describes a process in which different actors can come together, and for several aspects I have given an overview about the options they have and risks they have to bear in mind. Local actors have to make the decisions, because I do not have enough information to do so. The last thing I did to validate my conclusions is asking Kenyan and Dutch experts for their opinion. The discussions indicated that my conclusions are right, so probably the research will contribute to an improvement of the living conditions in the slums of Kisumu.

If you would like to know more about the research, or if you would like to give feedback, do not hesitate to contact me on ErikSiepman@hotmail.com.

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Annex 2 Abbreviations

BTW	The Best of Two Worlds
DFID	Department for International Development of the United Kingdom
DWO	District Water Officer
GoK	Government of Kenya
GoT	Government of Tanzania
IRC	International Water and Sanitation Centre in Delft
JICA	Japanese International Cooperation Agency
Kiwasco	Kisumu water and sewerage company
KMC	Kisumu Municipal Council
MPA	Methodology for Participatory Assessment
NGO	Non Governmental Organisation
PRA	Participatory Rural Appraisal
RDWSSP	Rural Domestic Water Supply & Sanitation Programme
SANA	Sustainable Aid in Africa International in Kisumu
SIDA	Swedish International Development Agency

Annex 3 Definitions

Some definitions could be confusing as I varied the use of words, which have almost the same meaning. That is why they are listed here.

- Community, citizens, inhabitants, villagers.
- Service provider, private operator, individual operator, private company, investor, private sector.
- Slum, peri-urban settlements, outskirts.
- Government, local government, Kisumu Municipal Council, District Development Office
- Water and sanitation committee, water user association, community-based organisation, water board.
- Non-governmental organisation, non-profit organisation.

Annex 4 Water supply revenues

Objective: to supply water and to support development with the revenues.
Question: what is the estimated revenue of the water supply?

Investment: drill a borehole, install a tank and pipes.
Operation expenditures: salaries, electricity, maintenance.
Revenue: water sales.

The capacity of a borehole determines the size of the system and the revenues. That is why I make two different calculations. The maximum yield in High is 20 m3 per hour, and in Low it is 4 m3 per hour. These are my high and low yield values for further calculations.

The optimal extraction is between 60 and 80 %, so let's take 65%.
The pump can be operational for 24 hours a day, but then you need a big tank. Later I check what is a good size of the tank. That is not necessary for this estimation. I assume that the pump is operational for 15 hours a day (6.00 – 21.00h).

The available water can be calculated:

max. yield per hour x 65% x 15 hours a day x 30 days a month.

	High	Low
Max. yield per hour (m3)	20	4
Available water per month (m3)	5850	1170
Available water per day (litres)	195000	39000

The current price of water in the slums is between 1.5 and 7 shilling for 20 litres.
Our price for a jerrycan (jc) of 20 litres is Ksh. 1
1 m3 = 1000 litres, so Income per month = Available water x 1000 L/m3 / 20 L/jc x 1 sh per jc
Number of people that can be served = Available water per day / 40 litre per person per day.

	High	Low
Income per month in shillings	292500	58500
Number of people served	4875	975

Operational costs

To calculate the operational costs I calculate the number of waterpoints that can be served. I assume that it takes 1 minute to fill one jerrycan of 20 litres. And that all water is sold in jerrycans, so there are no individual connections.
It takes some time to change the jerrycan under the tap and sometimes there is nobody, sometimes it is busy. I assume that 30 jerrycans can be filled in an hour.

Number of water points = Available water per hour / (30 jerrycans x 20 litres per jerrycan)
Available water per hour = Max yield per hour x 65% x 1000 litres per m3

	High	Low
Available water per hour (litres)	13000	2600
Number of water points	22	4

The number of water kiosks depends of the number of water points. One water kiosk can have about five water points, so five people can fill their jerrycan there at the same moment .
The salary of an attendant of the water kiosks is 5000 sh per month. For 15 hours they can work in two shifts of 7.5hrs.

	High	Low
Number of water kiosks	4	1
Salaries attendants (month)	40000	10000

During the night one security officer can guard two water kiosks and he also earns ksh. 5000 per month.
The for maintenance a plumber is hired who is also doing line patrol and supervise the electrical pump. (2 High, 1 in Low) Salary is 10.000 per month.
A manager is hired to do the operational functions, like organizing maintenance and paying salaries and bills. (2 in High, 1 in Low) Salary is 15.000 per month.

	High	Low
Kiosk attendant	40000	10000
Security officer	10000	5000
Plumber	20000	10000
Manager	30000	15000
Total salaries (month)	100000	40000

Other operational costs

Electricity of the pump: I assume that this it costs 1 sh. to pump 1m3 from the borehole into the tank.
Other overhead costs, like renting of the office and water kiosks and electricity will cost about 1000 sh per water kiosk.
Maintenance like replacing of pipes and fixing the tank costs 1000 sh per water kiosk.

	High	Low
Electricity	5850	1170
Overhead	4000	1000
Maintenance	4000	1000
Total	13850	3170

Revenue

	High	Low
Income	292500	58500
Salaries	100000	40000
Other costs	13850	3170
Revenue per month	178650	15330

Investment costs

The investment consists of the drilling of the borehole, and buying and installing of the watertank, pipes and water kiosks with taps.
Installation of electricity will depend of the site in Manyatta.

A borehole can cost between 0.5 and 1 mln, depending on the depth and casing material. I use 1 mln
I assume that a water kiosk with five taps and 200m pipe from the central tank costs ksh. 85000
House is 10000, taps 1000 each, 1 m pipe is 350 sh. Including the installation.
The size of the tank depends of the yield of the well. The tank size is equal to one hour of pumping.
The employees need to be trained and the community must be informed: marketing. 10,000 per kiosk

	High	Low
Borehole	1000000	1000000
Pump	150000	150000
Electricity transformer	250000	250000
Electricity poles 10x35000	350000	350000
Watertank	300000	100000
Waterkiosks and pipes	340000	85000
Overhead (10% of total)	270000	160000
Training	40000	10000
Total investment	2700000	2105000

Refunding of the loan

The revenue can be used to pay back the loan for the investment.
For this estimation I did not include interest.

	High	Low
Number of months	15	137
Years	1,3	11,4

Annex 5 Respondents and interview questions

Respondents

Over a period of three months interviews were conducted in the following places:

1. In order to analyse the rural SANA projects I have interviewed 3-7 members of water and sanitation committees and inhabitants of the villages Mbaka Oromo, Nawa, Usoma, Karungu and Paga beach.
2. In order to analyse the urban SANA projects I went to the peri-urban settlements Bandani and Wandiege.
3. In order to analyse the urban water problems in the slums and peri-urban settlements I interviewed 10-15 inhabitants of Nyalenda and Manyatta.

Interview questions

The list of interview questions for the rural SANA projects:

- What used to be your water sources before the SANA project was implemented?
- What did you try to do to improve the situation?
- Are you satisfied with the approach of SANA?
- What could be improved?

The list of interview questions in the slums:

- Do you have enough water?
- What are the problems?
- What can be done to improve the situation? Who should do something?
- Did you try to improve the situation yourself?
- What are the constraints for the citizens?
- Why is the Kisumu Municipal Council not improving the situation?

Other people that I interviewed were:

- Employees of SANA
- Staff attached to SANA from the ministry of Health, of Agriculture and of Water
- Board members of SANA
- Employee of the Kisumu Municipal Council about community based projects and the water supply system.
- The technical and financial manager of Kiwasco, water supply company about the problems with the existing system and how they are planning to improve the water supply and whether they will supply the slums in the near future.
- Employees of the NGOs Africa Now and World Vision about their activities in the slums and activities other than water.
- General manager and board secretary of the urban community based water system in Migori to learn from their experiences.

In the Netherlands I have interviewed the following experts:

- Employee of Simavi, a Dutch donor for information about the possibility to continue financial support after implementation.
- Employee of IRC International Water and Sanitation Centre about water management models in other cities.
- Employee of Africa Study Centre about community based development in Nakuru.

Annex 6 Map of the research area

Annex 7 Kenya demographical and economical statistics

The following table provides some background information about Kenya[5], which is meant to achieve a higher level of understanding of the situation in Kisumu. The economical situation in Kisumu is below the average values in Kenya, which also influences the health indicators.

People	**2002**
Population (million)	31.3
Population growth (annual %)	1.8
Life expectancy (years)	45.5
Fertility rate (births per woman)	4.2
Infant mortality rate (per 1,000 live births)	78.0
Under 5 mortality rate (per 1,000 children)	122.0
Births attended by skilled health staff (% of total)	44.3
Child malnutrition, weight for age (% of under 5)	22.1
Child immunisation, measles (% of under 12)	76.0
Prevalence of HIV (%)	15.6
Illiteracy total (% age 15 and above)	15.7
Illiteracy female (% of age 15 and above)	21.5
Economy	
Gross Domestic Product (GDP) (billion $)	12.1
GDP growth (annual %)	1.8
Unemployment rate (%)	40
Value added in agriculture (% of GDP)	19.1
Value added in industry (% of GDP)	18.3
Value added in services (% of GDP)	62.6
Exports of goods and services (% of GDP)	25.5
Imports of goods and services (% of GDP)	31.6
Inflation rate (%)	1.9
Foreign direct investment (million $)	5.3
Present value of debt (billion $)	4.4
Aid per capita ($)	14.7
Technology and infrastructure	
Access to safe drinking water (%): Total	57
Urban	88
Rural	42
Personal computers (per 1,000 people)	5.6
Paved roads (% of total)	12

[5] Source: www.worldbank.org/ke and www.cia.gov/worldfactbook/ke