

Final Report

Clean Drinking Water Research 2012



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1 Introduction

In the view of many Western and non-Western critics, traditional development aid is not effective enough and too slow to have a significant impact. For this reason, many organizations are trying to develop other solutions to help the local people in Cameroon. However, they do not see it only as development work; they made a business model out of it. Setting up this business opportunity takes time, money and a lot of effort. This is where we come in; EFR-Involve. In this project we investigated how a social enterprise can be set up.

With the help of the Boston Consulting Group a research structure for the project has been consolidated. The group was divided into 4 teams each studying a mutually exclusive part of the overall research question:

'Can we set up a business that provides people living at 'the Bottom of the Pyramid' with clean drinking water?'

First a desk research was performed in the Netherlands. By means of articles, interviews with experts and immigrated Cameroonians a first draft of the research could be produced. Most of the information, however, was gathered during the field research in Cameroon (27 July – 21 August).

In the following report the findings of both the desk research and the field research are combined and presented from all the teams.

Furthermore the teams were all able to draw their own conclusions and write a recommendation. The teams managed to have cohering conclusions and recommendations; which has been concluded in an overall conclusion.

2. Social Team – Methodology

After the structure was set in place by the Boston Consulting group, each team was appointed their own exclusive field to get dug into. For the Social Team this consisted of the following aspects: people, price and product. In this report it is investigated whether it is possible to offer an added value product for which people at the Bottom-of-the-Pyramid in the South-West Region are willing to pay. For each element sub-questions and hypotheses have been distracted. Moreover, a hypothesis-tree (Appendix I) visualises these statements.

In the first week in Cameroon the Social Team visited Buea and the surrounding villages Mile 16 (Bolifamba), Mile 14 (Dibanda) and Great Soppo. The second week was spent in the area of Limbe where the villages Mile 4, Lower Bwuando and Wovia were the subjects of research. In the last week the Social Team went to surrounding villages of Kumba; Kake II, Kwa Kwa and Small Ekombe. During these weeks many semi-structured interviews were conducted with a wide range of people (village chiefs/students/mothers/farmers/etc.), summaries of these interviews can be found in Appendix II. Besides that, professionals were spoken to and water catchments and current water systems in villages were studied.

3. Product

3.1 Product

The product we want to offer is the good and/or service clean drinking water via a community tap. There should also be the possibility to connect an in-house tap to the water system for inhabitants who can afford this. There is a large population in the South-West Region of Cameroon that does not have access to clean drinking water up to this day, mainly because the region is neglected by CAMWATER. CAMWATER serves villages from 10.000 citizens and up, therefore, many villages are not even taken into consideration. Besides that, CAMWATER usually does not take care of repairs, and in some areas they ration the water supply (i.e. between certain times water is not available as it is located to other areas due to shortage). There are some local initiatives and NGO projects however there is a lot of room for extension.

Our envisioned product is different from the conventional way of water provision in Third World countries. This product gives rise to the awareness of local people; they are not victims, but customers. The aim should be to offer clean drinking water against an affordable price and in this report the feasibility of this goal is being researched. Besides that, an objective could be to offer easily accessible taps. Villages are of different shapes and outlines, and what we do conclude is that the maximum walking time from a house to a tap should not be more than 10 minutes, because water should be available not only for everyone but also at any time. These aspects could not be satisfied when the travelling time to the water tap exceeds 10 minutes.

Most people living at the Bottom-of-the-Pyramid will make use of the central tap. However, we can also serve higher-end customers by providing a home tap. Accessibility is extremely important to the Cameroonians. In the long-run the product needs to satisfy the whole community and the system should be maintained by the local people. The sustainable aspect is of major importance.

We will merely offer the service of clean drinking water via a central (or home) tap. We will not be involved with the provision of cans or bottles to carry drinking water in: this will remain the responsibility of the villagers. Self-responsibility and entrepreneurship are very important.

‘Affordable, sustainable and accessible’ are the keywords relating to our product.

3.2. Added value

3.2.1. What is the added value?

The added value could be seen through multiple angles. First of all, clean drinking water is a necessity in order to stay healthy. Where water from a river could bring diseases, clean drinking water is free of any of these threats. A positive consequence of drinking clean drinking water is the fact that people will stay healthy. This implies more days which could potentially be used to work. This results in an added financial value to the product. The product itself should be available close-by. This implies less travelling back and forth to acquire the water and consequently, this time could be spent in another way. When talking to people often the word ‘stress’ arises relating to the travelling time (Appendix II; Limbe Mile 4). Besides that, the product brings along potential labour opportunities. Since the local people should be involved and stay involved with the water project, there could be working opportunities for them. This in turn leads to more income for the villagers and thus, could lead

to more carrying capacity for the product. Lastly, sustainability is incredibly meaningful to the local people: many water projects have failed after some time. Customer trust should be gained by a trustworthy and dependable product. Extremely important about this aspect is again the local involvement; the villagers should be able to maintain the system, even when the partner has left the area.

3.2.2. How can we show the added value?

It is very important to make sure the customers will see the added value. Education is in this case a major instrument to reach our goal. Chapter 6 elaborates on this aspect. The added value could/should be shown through the financial aspect of it. People will tend to dislike the product since they have to pay money for it and elsewhere they can get the (according to them) same product for free. However, the added values summed up in the previous paragraph can directly contribute not only to a better health but also to more income, maybe even more than spent on the product itself.

In addition to this, when talking to Mrs. Patricia Nollens and Mr. Charles, who are originally from Cameroon and have been living in the Netherlands for quite some time, they clearly stated that clean drinking water in Cameroon is perceived as necessary, but people should trust the ones who are supplying this (example: CAMWATER had major problems with dealing with trust issues, since a cholera epidemic had its roots in their water). Therefore, promises that we make to the local communities should be turned into reality. This also implies that we should have a clear idea about the needs and wants of the local community *before* we can explicitly mention the added value of our product. In many villages/communities a chief is head of the community and thus governs everything. In order to make villagers aware of the benefits of (our) clean drinking water, the chief has to support a project. Intense cooperation with these chiefs is required. When one can convince the chiefs that the water projects make his people better off, we have a big stepping stone to success. Thus, the added value should be shown to the major influencers in the village, as we can reach a large group through them. They can then set in motion water education programmes.

4 Place

This research is focused on the South-West Region of Cameroon, since we have done our field research in this area. We have seen that this region is quite different from other regions. Therefore, more research is needed to gain information about other regions. We have done our field research in the southern part of the South-West Region. We have to be careful with drawing general conclusions about the whole region, since we have seen that there are extensive differences between different parts of a region.

In our desk research, we have focused on the rural areas of the South-West Region. However, it is hard to decide when an area will be called a rural area. And when is it semi-rural, or urban? It depends on how you state the concept of rural, semi-rural and urban.

Often, cities are divided into villages. You can call some of the villages' rural areas, while others can be called urban. To give an example: Buea is a city, so you can call this urban. Mile 16 is part of Buea, however, this is a poor village located quite near the city centre of Buea, and could be called rural.

Therefore, we will not continue with the concept 'rural area' in the report, but we will call it 'a poor village'. This could either be a poor village by itself, or a poor village which is part of a city.

When is a village a poor village? We first thought about serving the people who live at the Bottom-of-the-Pyramid. But as we will explain in the part 'People', it is not easy to only serve these people when more wealthy people are living in the same village. We want to serve the poorest people of the South-West Region, but we cannot exclude other people who are living in the same village. When making a choice for a village, we want to serve the poorest villages, but this does not mean that only poor people are living in this village. We will also serve the richer people of this same village.

It is hard to decide when a village can be called a poor village, since there is not much information about the income of habitants and their costs. In our opinion, a poor village is a village where most habitants must work hard to be able to get their primary necessities in life, like water, food, gas and education. In these places, people have a struggle in paying their bills, most adults must work hard to take care of their families, and only few people have the money to pay for an in-house tap. These are the villages that will benefit most from our project, since wealthier villages have a greater ability to pay for a good water system and have fewer problems with getting enough clean drinking water.

Another condition that must hold is that a village desires our system and that it is affordable to build a water system in that village. Villages that are close to a spring (i.e. a natural source where water flows to the surface of the earth from underground)¹, need a lower investment to make sure that water will flow from the spring to the taps. Fewer pipes are needed and a cheaper system could be used. Villages downhill will be more interesting than villages up hill, since the cheapest system, the gravity-based water system, will be easier to place in these areas.

We must perform feasibility studies to see if a village could be called a poor village and if a water system will be desirable and affordable to install. This is normal practice in Cameroon.

¹ U.S. Department of the Interior; <http://ga.water.usgs.gov/edu/watercyclesprings.html>

However, often feasibility studies are expensive and not always very reliable. Therefore, we should make sure that our feasibility studies are of high quality and are not too expensive. If we cannot assure this, a feasibility study will have no other effect than making unnecessary costs.

We will take an active role in deciding about which villages will be considered for our project. Villages must be visited, meetings with chiefs must be organised and we have to talk to local people to get more information about these villages. If we think a village will be considered for our project, we can decide to start feasibility studies in this village. Of course, it will also be possible for villages to approach us. If the chief is interested in our project, he can take the initiative to come into contact with us. We can then start with a meeting with him and talk to local people to receive more information. Thus we will have an active role in visiting villages, but villages themselves could also contact us if they are interested.

If we are interested in a village and that village is also interested in us, we can start the project. Here, we expect an active participation of the whole village. This will be both the chief and the habitants themselves. The project will only be successful if everyone is enthusiastic about it and is willing to put in effort. If this enthusiasm is not present from either the side of the chief or the villagers, we will stop taking this village into consideration. We have seen that a project will not be a success if it does not have full support.

5 People

The people we want to serve with water will be the whole community of a village. Everybody needs clean drinking water and everybody makes use of water. Clean drinking water must be available for every person, no matter what their income is. Besides that, it is not feasible to merely make clean drinking water available for the poorest people in a village, as all people will have access to the public taps.

If we provide a water system for a village, we would like to serve every person within that village. If people are willing to pay for an in-house tap, they can let it be installed in their house. If people do not have enough money for an in-house tap, they will make use of the public tap. The product must be available for every single villager of the village where we set up our project.

However, there are some risks involved. In a lot of villages, the number of inhabitants is unknown. Therefore it will not be easy to make forecasts about how many public taps are needed to make the distance to the tap no further than a 10 minute walking distance, how many people will make use of an in-house tap and what will be the total costs of starting a project in that village. If a chief will be asked about the number of inhabitants of his village, this number is not necessarily reliable as people are often not registered. Thus, a more thorough (field) research should be conducted.

It is also hard to find other information about these villagers. The average income and thus the willingness to pay are hard to estimate as this information is unavailable. The lack of data makes it hard to create accurate forecasts and estimations and makes it a time-consuming task.

6 Price

6.1 Willingness to pay

During our desk research we had an interview with Mrs. Patricia Nollens, a Cameroon expert. She told us that people in Cameroon, South-West Region, are willing to pay for clean drinking water. She stated that it surely depends on the product one could be offering. We also asked a local Western NGO worker if he knows how much the target group is willing to pay for clean drinking water. He couldn't give us an answer.

According to the study 'Market-based solutions to poverty in Africa, Monitor Group 2011' and the article of JP Morgan, 'Impact Investing' we stated that the very broad range for a 20L jerry can will be between \$0,005-\$0,13.

The relationship between pricing and use in the water sector seems strong, and a difference of even \$0.01/jerry can appear to drive significant differences in adoption rates.

If we are going to set a price for clean drinking water than we need to be very cautious, since water has a very elastic demand and we have to make sure to have enough demand at the start of our project. Later on, one can always increase the price if demand allows so. During our field research we tried to determine the willingness to pay for clean drinking water.

During our field research we have been to several villages. All these villages had one or more community tap(s). The people who collect their water from these community taps do not have to pay for the usage of water in these villages. During our research we have noticed that there are exemptions. For example, if a villager wants to build a house in Wovia, a village near Limbe, he needs water to mix it with the necessary materials. The water consumption will be enormous and this will affect the water supply of the community tap assuming he is collecting this water from the community tap. As a consequence, a villager needs to go to the chief and buy water for 500CFA per drum (250-280L). However, the water is not used for drinking.

Another exemption is that in Great Soppo (Buea) people buy water from other villagers with an in-house tap. The price is 50CFA per 20 Litre. The reason that people buy water from other villagers is that the community taps are far from their homes (approximately 1 km). Another reason is that the community taps are rationed in this village. Thus, only on specific times the villagers can collect water from the community tap.² Therefore, in times of scarcity people can buy drinking water from their 'rich' neighbours.

In Mile 16, people pay monthly for the usage of water from the public tap. Minimum amount is 1000CFA for 500 Litre and the maximum amount is 1500CFA for 2000 Litre. These are the prices during the wet season. During dry season the prices increase with 50% per cent.

Based on the interviews we have conducted during the field research we conclude that in general people are not willing to pay for clean drinking water from a community tap.

However, we also interviewed households with an in-house tap. If CAMWATER facilitates this water system than the price the households need to pay for water is 364CFA for 200 cubic meters.

If the community facilitates the water system then a household with an in-house tap needs to pay for his own connection, but he also needs to pay an amount of at least 5000CFA for the maintenance of the community tap since the water comes from the same source.

Maintenance

² Between 05.00-08.00 (only wet season) and 15.00-19.00 (both seasons)

Based on our interviews we know that people are willing to pay for the maintenance of water taps. There are various ways to pay for this maintenance.

Some villages use a system where the chief decides how much money every household needs to contribute to the maintenance of the community taps. Usually this is a fixed amount.

In other villages the water committee is collecting the money from the people when needed. Then local technicians are asked to fix the tap when it breaks down.

In Mile 4, for example, households with an in-house tap who can afford it will pay for the maintenance costs because otherwise they also have a lack of water since it is connected to the community tap system.

The main risk is that people are not willing to pay for water. We saw that in general people are not willing to pay for water. But people are willing to pay for maintenance. The social control needs to be very strong to ensure that every household contributes to the maintenance of the community taps. The people who are in charge of the collected money for the maintenance costs need to be very keen with the money. They should not be allowed to pay for beer or dinners during the water committee meetings with that money.

Another important risk is that people will not always be truthful in interviews with western people. Therefore, prices used in this rapport could be biased.

6.2 Income of target group

There is hardly any information about income or expenditure in Cameroon. A research of 2001 has shown that in Itaka (a village in South-West Cameroon) people spend on average 0.30 euro/month on water. (200 CFA).³

From the interviews no reliable estimation of income can be stated. An important risk of asking income related questions are that people will not tell the truth and the results could be very biased.

³ Annabel Davis, 2001, Transport versus service provision: a sustainable livelihoods profile of Cameroon.

7 Education

One of the most important aspects of water supply is the education about the usage of water. Multiple villages have been visited and the results we obtained from these visits are striking. By comparing Great Soppo with Buea for example, big differences are noticeable. In Buea a lot of instruments are used to make people aware of the dangers behind dirty water. Examples of these instruments are posters throughout the whole city, textbooks for children in which tools are described to clean your water with and the basic literature provided by primary and secondary schools. By contrast, in Great Soppo people still drink rainwater, even though an American researcher recently discovered and presented the fact that rainwater is not healthy to drink. One important side note, which should be made here, is the fact that sometimes people just do not have an alternative; it is either drinking rainwater or drinking nothing.

A big step is taken by introducing health related courses at primary and secondary schools but there is still a large group that is not fully aware of the dangers caused by dirty water. This group is mainly formed by older people, who have been drinking this dirty water throughout their entire life and thus argue that it cannot be the water which causes diseases. They are still alive after all.

Another important aspect is witchcraft. In some villages people believe everything is God's will and therefore many diseases or other externalities caused by dirty water are not judged as they should. To get the attention from these people, an intense educational program should be established.

Also, hierarchy can play a vital role in adopting hygiene standards. Higher ranked people such as the chief, medics, professors and teachers should form a leading group by educating the people through the 'watch and follow principle'.

This should go together with educating the caretakers of the water installations. Since they will be held responsible for the water supply, educating them is the first step. They should be the authority when it comes to clean drinking water, they should know what causes could have led to dirty water and they should also be able to solve these problems. An ideal situation in this would be to install the pump, educate a group of people (preferably the top of the hierarchy as described above) and let them educate the rest of the community. If needed, Western parties could always guide this progress but try to leave it up to the locals as much as possible.

8 Conclusion

With the results presented above we can make several conclusions concerning our research question. Firstly, selling water does not seem to be realisable. People are not used to this construction and we also got several remarks about this. Quote: 'People in Africa should not pay for their water, people in the West should' (Kaliste, Mile 4).

What people are used to do is pay for the maintenance of their water installations. This system should be adopted to generate money to keep the system working. The amounts and ways to collect the money vary per village, recommendations about these systems can be found under recommendations.

Secondly, the geographic place for water taps is a really hard question to tackle, especially since most villages have different shapes, sources of water and infrastructure. However, what we do conclude is that the maximum walking time from a house to a tap should not be more than 10 minutes. This because water should be easily reachable, should be available for everyone and should be available at any time. These points could not be satisfied when the travelling time to the water pump exceeds 10 minutes. Taking this factor into account, several taps should be installed per community to fulfil this requirement.

Thirdly, serving water solely to the people living at the Bottom of the Pyramid is not a realistic target. Since every community has richer and poorer inhabitants, the focus should be to supply a whole community and consequently supplying the poorest people as well. Because of the fact that public taps are mostly used it is easier to reach the mass rather than focus on individuals or smaller groups.

Fourthly, we would like to highlight the importance of education. Most primary and secondary schools use school materials to teach the children the importance of clean water, but older people sometimes lack this knowledge. Therefore, when supplying water, the caretakers of the water pumps should be well educated about water safety and the usage of water. Furthermore, to make the people aware of the dangers of dirty water, people who are higher in hierarchy should be taught to inform the people about the advantages of clean drinking water. These people should include the chief, teachers, priests and richer people in communities. Since hierarchy is a very important factor in communities these people should attract the attention of the 'lower' class and could so be an ally in the mission to bring clean water to all people in the South-West Region. One underlying assumption in this should be that everyone has access to clean drinking water. Without this, people will still return to less safe sources of water.

As a last conclusion, we recommend starting up projects in villages where local people are willing to join in the project and where a water committee can be installed which keeps an eye on the water projects. By making the local people responsible, it will be easier to set up multiple projects and thus reach more people.

9 Recommendation

An ever-returning observation is that the villages differ substantially. Thus, the choice of the villages is important. We think that there are two approaches one could adopt; an idealistic or a practical approach. Do you want to help the poorest villages that are in desperate need of clean drinking water? Or do you want to help out villages that need water, but where the need is less urgent, however, where people want to contribute for the maintenance costs. In these villages it is easier to implement a successful water system.

Our recommendation is that there should be a focus on villages where it is less hard to implement new water systems. First provide the 'easy' villages with clean drinking water and later move on to the (mountain) villages where there is a real need for clean drinking water. Besides that, we recommend focusing on two core aspects: involving the local people and education. In our opinion especially the involvement of the village chief has an important role in the success or failure of a water project.

10 Technical Team – Methodology

After the structure was set in place by the Boston Consulting group, each team was appointed their own exclusive field to get dug into. For the Technical Team this consisted of the following aspects: types of water sources, cleanness and cleaning systems, payment methods, maintenance efforts and the planning process that precedes the construction of a water system.

The main question the Technical team is focussing on is how to get the clean drinking water from the sources to the consumer. It should be noted that the question falls apart into three different aspects: the source that is used, the cleanness of the water that is eventually provided to the consumer, as well as the transportation system that is used to get it there. For each element sub-questions and hypotheses have been distracted.

In the first week in Cameroon the Technical Team visited Kumba and the surrounding villages. The second week was spent in the area of Buea In the last week the Technical Team went to surrounding villages of Bamenda. During these weeks many semi-structured interviews were conducted with a wide range of people (village chiefs/students/mothers/farmers/etc.), summaries of these interviews can be found in Appendix II. Besides that, professionals were spoken to and water catchments and current water systems in villages were studied.

11 Water sources

For this part we came up with the question; what kinds of water sources are available and feasible? As far as the water sources are concerned we have four options. First of all spring water, the most feasible option. Second of all, groundwater, a more expensive but also a very good method. Then we have stream or surface water and rainwater, so called alternatives that are not good options to use for drinking water.

11.1. Spring water

Springs can mainly be found in mountainous areas. Springs are the favored source of drinking water as it is normally of high quality.

Springs normally are identified through the knowledge of local people, these being local workers and farmers. They generally have the best knowledge about the location. Although not applicable to Cameroon, springs can also be recognized by finding green vegetation in dry areas. The problem is that the groundwater level is not determined beforehand. The village usually does not measure the flow rate or the amount of people the spring is able to supply.

Spring water is generally of high quality. However, communities living in the recharge / catchment area might contaminate groundwater through waste dumping. With groundwater it is important that the layer of soil between the surface and groundwater level is thick enough to filter possible contamination. If this layer is thin, any human activity in the catchment area should be prevented. At all times, water quality should be tested in a laboratory as part of the feasibility study.

Since spring water is a natural source that usually does not need to be pumped up it is also a very cheap option to supply water. For further details about this see the distribution and transportation section where we will further elaborate on the problems and advantages of using springs and water by gravity systems.

11.2. Groundwater

Groundwater is another preferred source of drinking water, due to the fact that closed wells provide clean drinking water that is free of most contaminants. A good well can fulfill the drinking water needs of a small village or town without running dry. The groundwater source requires the vertical pumping of water and can be connected to virtually all existing filtering systems, storage tanks and distribution systems. The problem with this type is, however, that the costs of a pump are usually too high to carry by a rural (poor) community. This makes it a less preferable source of water seeing as it needs a good feasibility study to look at the question whether the community is able to support the system in the long term.

Open wells are a lot cheaper. This is just a deep hole in the ground where one can take water from with a bucket hanging from a rope. The big problem with this water however is contamination. Open wells need to be covered with a lid but if the lid is not on or an animal manages to get into the well, people can become very ill by drinking this water as it is contaminated. Villagers with a well in their front yard (or close to their home) acknowledge that fact that they should take matters in their own hands to clean the water, making it safe to drink, for instance by boiling the water. However this often does not happen. Either because cleansing the water, to make it safe for drinking, takes too much time or the villagers simply do not have the means to boil the water due to lack of fuel. Fuel can only be used once, either for boiling water, making food or heating the house.

Before the start of drilling the well for groundwater, ideally hydrological research should be conducted to verify that the water is not contaminated by soil-borne chemicals (such as arsenic) and that there is no chance of pollution by chemical waste seeping into the soil in nearby locations (waste dumps, chemical plants, etc.). Generally, the groundwater quality in Cameroon is considered to be of excellent quality.

Another problem with ground water is that usually villagers dig until they run into the water. However they do not dig deeper and by doing so will never exploit the full potential of the source.

11. 3. Stream water

Of all available sources of water, surface water is the least preferable. The water that is used from these sources is virtually always infected with microorganisms that need to be filtered out before the water is safely drinkable. This infection tends to be even worse in non-moving surface water such as lakes and ponds. Moreover, surface water is often clouded by sand or other particles, which make a pre-treatment step necessary, in order to prevent clotting of subsequent filtering steps. Examples of such pre-treatment steps are sedimentation systems and gravel filters. Once most of the particles are cleaned out, the pre-treated surface water can be processed with all other filtration systems that would be used for anaerobic groundwater as well.

Luckily Cameroonians are somewhat smart in their usage of stream water. The water they drink they take from the upstream part of the river and they'll wash themselves and their clothes more downstream. This minimizes the chance of water born diseases given the situation.

11. 4. Rainwater

Rainwater is another alternative that is available. This alternative is somewhat clean, but really dependable on how it is collected. It is not feasible because we need a surface that is big enough to catch enough water. However, for individual households as an alternative to a working or broken water system it is very feasible.

Cameroonians use rainwater for washing themselves and their clothes throughout the year. Mostly in villages where the public tap is some distance away from their house. The public tap is mainly used for drinking water.

The last alternative is to use a system that works in a neighboring village. The downside of this is that it takes a lot of effort to get a small amount of water to your house. This imposes a huge workload on the woman and kids of the family.

11. 5. Feasibility studies

The proper source of the water is determined through a feasibility study. For feasibility studies it is important to determine the quantity and quality of the water and to assess the environmental impact. Again, local people can be of great help for this.

One should determine the risks of landslides, erosion, or contamination of the source. The environmental assessment includes investigating the flow direction of surface run-off above the spring; human activities and water uses in the catchment area, i.e. habitation, farming, grazing, etc.; and the type of plants growing in the catchment or recharge area. Moreover it is very important that the characteristics of a certain village are taken into account. One has to realize that every village is different.

Social economic studies are very if not the most important. Is the population willing and able to maintain a water system and more specifically the system that is planned there. This study is probably more important than the technical analysis, since the system itself is normally not the problem, but the maintenance and the ability of the population to work with the system. Also the sustainability should be taken into account. It should be possible for the locals to maintain and build the system themselves.

The initiative for a feasibility study could be initiated by either the village (community or chief) or by NGO's. There's a bigger chance for success if initiated by the community, since commitment is showed (minimally a higher chance of commitment).

The topic of feasibility studies will be discussed in more detail in chapter 16.

The most important thing is that the catchment is well protected. If the catchment is open and the water is already contaminated there it is hard to make sure the water will get to the villagers clean. A clean catchment area also involves the vegetation around the catchment as well. No farmers should be allowed to farm around the catchment. Their pesticides contaminate the water through the soil.

Also the maintenance of the catchment is a big concern. In general in Cameroon we get the feeling that something is built and then nothing is done to maintain it in the next x-years. This also counts for the catchments. We have seen catchments that are on the verge of breaking. This can be avoided by good maintenance. Even though a system is built to last at least for 30 years with good maintenance this could be prolonged.

12 Water treatments

For this part we came up with the question; how is the water treated to make it drinkable? Since even springs are usually contaminated (either by not protecting the catchment enough or other contaminants in the soil) there is a need to filter the water in virtually every situation.

12. 1. Roughing filter

Roughing filters are used as pretreatment for filters that require low turbidity water like slow sand filters. A roughing filter uses the same principle as the slow sand filtering system (see below); except for the fact that the grains it uses are much more coarse. A roughing filter is often installed between the direct source of unfiltered water and the slow sand filter. Its main purpose is to filter out fine dust or iron oxide precipitations that result from the aeration of anaerobe water, as the presence of such particles could clog the filters.

Roughing filters can be applied in the same way as slow sand filters (gravity-based, allowing the water to flow from top to bottom) or could use pressure to pump the water from bottom to top. In either case a level of gravel washes out particles from the water. Roughing filters need to be rinsed occasionally, depending on the level of contamination and the flow rate, as a gravel filter that is saturated with dust particles loses much of its effectiveness. The filter removes sand and silt (settle able solids).

12. 2. Sedimentation Tank

Sedimentation tanks are coarse systems that are meant to make sure that the coarsest particles that get sucked up with some sources of water do not enter into subsequent filtering steps, where they could be clogging the system.

The main principle of a sedimentation tank is to pump the water into a reservoir, where the water is held still enough to allow any heavy particles to sink to the bottom of the tank. Typically the water gets pumped out from higher areas of the water tank. The sediments at the bottom of the tank need to be washed out continuously, or could alternatively be removed manually from time to time.

As the function of a settling tank is generic and the only requirements are that it should be able to contain the water in an aseptic manner, its costs are marginal. Any closed concrete, metal or plastic container could in effect serve the purpose and should cost between €50 and €500, depending on requirements and materials.

12. 3. Slow-Sand Filter

Slow-sand filters are a preferred use of filtering contaminated water in developing countries and are already being used in many water projects. The relatively low costs, natural materials and natural processes make it an ideal way of filtering medium to low turbidity water. The sand and the tiny bio film layer on top of the sand clean the water while dripping through the filter.

Slow sand filters are relatively easy to build and mainly consist of concrete, sand, piping, and, if necessary, a storage tank. The size of the filter itself depends on the desired capacity. Slow-sand filters provide a steady flow of water, where the flow rate depends on the size of the filter. The average flow rate is 100 - 300 liters per square meter per hour. It is important for proper functioning that water keeps flowing through the filter at all time and that the water level is above the sand level. A typical filter has a depth of 1 - 2 meters and is filled with different types of sand varying in size of the grains.

Depending on the source, slow-sand filters can be sufficient to function as the sole filtering system in between a source and the consumer. For proper functioning it is essential that water turbidity is not too high, preferably lower than 10 NTU. Higher values will cause malfunctioning (read: less filtering capacity) much faster and maintenance costs will rise. In this case pretreatment of the water is necessary, one can think of a gravel filter.

Slow-sand filtering is also not suitable if water quality faces severe and sudden changes and if it contains industrial and toxic waste.

12. 4. Chlorine

Chlorine is often not used correctly due to lack of knowledge about it. There are units and openings designed to put it in the system but the knowledge of villagers how to add it and in what amounts is limited. Although especially the villages around Kumba often add eau de javel or pure chlorine to the water, they are often not sure why they put in that certain amount, but just guess that it shall be correct. To summarize you can say that chlorine is either not used or used without knowing exactly how much to put in at what times and why.

In practice filters are hardly used. Especially in the mountainous areas around Limbe, Kumba, Buea and Bamenda people are used to just building a system without a filter. The opinions whether this is necessary differ widely. In the Northwest they seem more educated about the fact that if the water looks clean it might not be clean. The villages in the Southwest seem to have more trouble realizing this. If filters are used it are slow-sand filters and sometimes sedimentation tanks. It should also be noted that water from an essentially clean source of drinking water, such as a mountain spring, can and will be contaminated if the distribution system is not clean and closed off. We have often witnessed clean drinking water getting polluted because of broken pipes along the way to the village.

13 Distribution systems

For this part we came up with the question; what kind of distribution systems do we use? As stated in a previous chapter, we identify four water sources that are available for villagers in the rural areas of Cameroon; ground water, spring water, stream water and rain water. Distribution systems that can be connected to these sources are explained in the following paragraphs. We will explain which systems can be connected to which source. In the subsequent paragraph we will discuss the most used system in Cameroon: Water-by-gravity. Afterwards we will discuss water-by-gravity with a pump, and manual distribution. At the end of this chapter we will conclude which distribution system we prefer.

13. 1. Water-by-gravity

The distribution system preferred by virtually all the NGO's and villages we visited in Cameroon is "water by gravity". This means that water is being caught at the spring by a catchment, either filtered or not at that spot, then being led to the village via pipes where the water comes out at several public or in-house taps. The water pressure comes from gravity. Not surprisingly, this means that the source has to be on higher ground than the village using the water. There has to be a 5-meter difference in height from the catchment to tap in order for the pressure to be high enough.

Sources those are appropriate for this distribution system:

- Spring
- Stream/lake

The advantages of this system are clear:

- There is no way to contaminate the water, since the system is fully closed from catchment to tap.
- There are no mechanical moving parts in this system, so it is less likely to break down than the next system we will cover.
- There is no need for electricity to power any kind of pump. This reduces costs.
- Piping can be led to every house, so it is possible to install convenient in-house taps.

The disadvantages of this system are:

- The clearest biggest disadvantage of this system is that the source needs to be on higher ground than the village itself. If the source is not higher, this whole system does not work. So you are very dependent on your environment.
- The investment for this system can be high.

13. 2. Water-by-gravity with a pump

What we have also encountered in our field research is water-by-gravity with a pump. This means that if your catchment or source is on lower ground than your tap, you will have to use electricity powered pumps to pump up the water from a source to a reservoir that is on higher ground. Please note that this difference only has to be 5 meters. From this reservoir on out, the system works the same as the water-by-gravity system.

Sources those are appropriate for this distribution system:

- Spring
- Stream/lake
- Ground water/borehole

The advantages of this system are:

- You can use a source that is on lower ground than the taps.
- You can use more sources than the water-by-gravity system.
- No contamination
- Availability of in house taps.

The disadvantages are severe:

- The pump requires energy; this causes costs to rise disproportionately. If your aim is to start a business and sell affordable water, this is a big disadvantage.
- The pump itself is expensive to make and maintain.
- The pump can break down and eventually will. Fixing it needs skilled labour, which might not be available in the rural areas. This means that if the pump breaks the villagers will not have water.
- The investment for this system can be high.

13. 3. Manual distribution

The most basic and widely used way to distribute water is by hand. Children or women go to the source with their containers in hand and fill it up with water. Then they walk back to their homes to use it.

Sources those are appropriate for this distribution system:

- Spring
- Groundwater
- Stream/lake
- Rainwater

Please take into account that this “system” can be used by hand powered pumps as well, as described in the previous chapter.

The advantages of this system are:

- You can use it with every source
- It can be used everywhere
- There are no parts that can break down
- No investment is needed

The disadvantages of this system are:

- It is not really a system
- Containers tend to get contaminated

- It is not convenient; villagers sometimes have to walk miles to the source.
- There is no possibility for water filtering

In the desk research we suggested different distribution systems. During the field research we found out that one issue is most important: simplicity. The system should be simple to build, maintain, understand and repair. You cannot expect villagers with no educational background to be able to repair a complicated system.

The other issue is that it has to be affordable. Villagers expect water to be free, but are willing to pay for maintenance of the system. Also, they do not have the means to pay large amounts of money throughout the year. This means that a system with an energy driven pump is not very preferable, since it would cost the community a substantial contribution each month.

Taking everything into account, the water-by-gravity system is our preferred system. It is the cheapest (apart from manual distribution), cleanest and easiest to maintain. This also means that if the community does not have a spring or stream that is on higher ground than the taps, you cannot help them. The established NGOs that we interviewed all prefer to work with the water-by-gravity system. So you help the village or community that best fits your requirements.

14 Payment systems

For this part we came up with the question; how does the consumer pay for the service? The payment systems are dependent on the location of the points where the water reaches the end customer. There are two different options. Firstly, there is the option of one centralized point of sale where customers have to go to get their water. Secondly, a certain distribution system can make sure to deliver water to every household on its own.

A single central point of sale has certain advantages. Firstly, in this way, the water supply system is better to control. However, it needs to be investigated whether people have to walk for more than 10 minutes, as some NGOs set it as one of their goals to offer water close by. Also, it has to be determined whether a central place is a sustainable solution.

It is argued that electronic payments are a sustainable solution when determining an appropriate payment system. In the article: “Communications specialists, better than cash alliance”, it is said that: electronic payment technologies offer a more effective, efficient, transparent and often safer means of disbursing payments while also promoting financial inclusion and advancing aid effectiveness.⁴ However, it needs to be recognized that the population in Cameroon is not yet familiar with any electronic payment system. For that reason, we do not see this as an appropriate solution in this point of time. From our research it can be determined that people in rural areas do not have a bank account. This means that we cannot make use of electronic payments. For that reason we would like to investigate the following possibilities:

- Cash payments
- Mobile phone payments
- Prepaid card/ Rechargeable cards

14. 1. Cash Payments

The most feasible option seems to be cash payments as Cameroonian people do not seem to trust other types of payment systems. For example, they do not trust the mobile phone telecommunication companies as somehow their phone numbers can be traced everywhere. Also, the delegates of the South West Community recommended us to use a payment system based on cash. They also questioned the use of pump attendants. Though we do not have enough information to fully eliminate this option, it means that we can narrow down our ideas to the following solutions:

- A system that can receive coins and give water (liters) in return.
- A system giving the people access to the water (payment based on a monthly or yearly contribution).

14. 2. Criteria for a payment system

14.2.1. Desk Research

From desk research we can determine that the criteria for a payment system are the following:⁵

⁴ <http://www.nextbillion.net/jobpost.aspx?jid=1718>

⁵ <http://web.mit.edu/urbanupgrading/waterandsanitation/funding/setup-pay-sys.html>

1. A payment system should provide accurate information on consumption (e.g. through improved metering) and a breaking down of charges,
2. Introduce volumetric charges/ tariffs and ensure that progressive tariff or other regimes that have social objectives reach intended targets, and take into account possible negative impacts on community services, multifamily units, domestic vending etc.
3. Introduce frequent and timely billing or cash systems to accommodate both low income consumers and informal service providers who may have irregular incomes.
4. Prepayment systems should be introduced to improve revenue collection and address issues of security for house connections where there is no title. Installment plans will help with large bills.
5. Payment sites more convenient to customers reduce inconvenience and increase security for consumers and informal service providers.

14. 2. 2. Field research

Current situation – villages that have a payment system

At this moment, in some villages, people pay for the consumption of the water. This is usually done per household, regardless of the differences in size of the households. In general, people do not see this as unfair. The reason for that could be that all families are relatively large or that people did not think about it before we asked them.

In some villages, the water itself is provided for free. However, there is a difference in payment for installation of private taps and public taps. If a household decides that they want to have a private tap, the household has to pay for the installation of it. This means that they have to acquire the needed materials to accommodate the connection. Once the connection has been established, the household does not have to contribute more than the people that pay for the public tap. However, if there is a breakage in a private connection tap, the household has to repair it themselves. Hence, this is not the responsibility of the community.

In general, households pay a yearly contribution. The amount differs from 500 francs to 5000 francs. The amount is being determined by the water committee. The amount depends on the number of households in a village, the amount they want to save for maintaining the system, etc. In most cases, the water committee determines when the contribution is collected. A good time of the year seems to be the month of September as in this period; the farmers receive the revenues from their harvest. We have seen some cases where the villagers have to go to a local office of the water committee to pay their bill. In another village, every member of the water committee got a particular part of the village assigned where they had to collect the money. There were also some cases where the members of the water committee randomly went to the different households to collect the money.

We have been to villages where the households are being punished if they do not pay their contribution. In some cases, the people were taken to court. However, in most instances, this procedure is too expensive. In general, households that do not pay their contribution are punished with a fine. This fine can be a goat, pig, salt or soil.

Current situation – villages that do not have a payment system

During our field research we also encountered some villages where the people do not pay for the consumption of the water. In the case of a breakage in the system, the water committee collects money to repair the parts. However, in the days between the breakdown and the repair, the people return to their initial source of water which contains contaminated water. We also observed that some people pay for the repair and some people do not which meant that in the end, the tap does not get repaired. Sometimes, the people believe that the government or the council is responsible for financing the repairs.

A very important aspect of the payment system should be the provision of receipts. The households have to receive a receipt in order to show at a later point in time that they have already paid. It might also happen that other people that do not belong to the water committee come to the village to collect money. In this way, the people can show that they have already paid. Transparency of the payment system is the key to keep the community involved. The people should know that at any time they can show proof of payment, to whom they need to show their proof of payment, how often, the amount they pay and why. These are all factors that will make the chance of corruption as small as possible and in the long run even obsolete.

How does the customer pay for the service?

Customers will pay by cash at a local office or members of the water management committee will come to collect the money at every household. No other option is possible at this point in time, as Cameroon is not yet developed enough to implement other types of payment systems.

15 Maintaining the system

For this part we came up with the question; how do we maintain the system? Good maintenance is the key to the sustainable existence of a water system over many years. This falls apart into an initial component (the quality of the design of the system), as well as the efforts that are taken to keep the system in good working order. In this section, we will discuss some aspects that we believe are essential to the proper maintenance of a water system.

15. 1. Community involvement

The involvement of the community that is served by the water system is required, given that there is no other party that takes care of the maintenance of the system. If the maintenance is taken care of by an external party, the community will have a reduced sense of ownership and responsibility for the system. This will lead to the rapid decay of the system as soon as the external party decides to stop maintaining the system for whatever reason. However, the option of an external maintenance servicer should not be discredited right away. As long as the maintenance can be provided reliably for a good number of years, contracting an external party is an option worth considering.

Very similarly, if a community itself takes care of maintenance work, any efforts to sustain the system are futile if not undertaken regularly. Any organizational structures should be designed accordingly, as to take into account aspects of responsibility. It is of the utmost importance that a sense of responsibility is to be built into the community: this could involve an entire community, a designated water committee or one person that makes a living by taking (good) care of the system, but if no one feels responsible, the system will dilapidate much faster than is necessary. Thought should be given to the proper incentives and rewards of these people, preferably before the water system is constructed.

15. 2. Incentives and motivation

To our mind, the best way to induce behavior that makes for optimal sustenance of the system is to involve the community itself and to make sure that through their involvement a sense of responsibility for the system results. We have acknowledged in our visits to many villages that maintenance that is performed by the community at large is often irregular and insufficient, even if there is a water committee in place. Some of the best maintenance was witnessed in villages where one individual took it as his personal duty to maintain the system. In one instance this was a retired economist and businessman who was self-trained as a technician. In another instance this was an orphan who learned how to repair simple breakages by following the technicians around when they were installing the system. Both of them worked for pride, the benefit of the community and perhaps the lack of another job. Neither of them got paid for their efforts.

15. 3. Preventive maintenance

In many of the other villages that we visited, external plumbers would perform repair tasks. We have not seen any examples of water systems that were repaired or maintained by the parties that constructed the systems in the first place. The procedure that would be followed in such instances is that someone calls for a plumber that arrives later and quotes a price for the repair work. The village only then collects the required amount of money, calls for the plumber again and then has their system repaired.

What struck us as remarkable is that none of the villages seemed to be doing any structural maintenance work, nor did they plan on performing any in the future. Maintenance work would only go as far as cleaning catchments and tanks, sometimes adding chlorine to the water, but no repairs or preventive enforcements were made to the structural parts of the system. In many instances, concrete water tanks were already cracking, without anyone planning on enforcing or plugging the walls. In terms of preventive action, we witnessed that none of the villages that we visited were doing any replacement of parts (such as faucets) before they would break. As mentioned before, action would only be taken whenever something would break. In effect, no spare parts are kept and most of the time there were not even sufficient financial buffers to purchase even the simplest of parts. One reason given for this way of working is that amassing repair funds could lead to the embezzlement of money by water committee members.

We recommend that the water committees in future water projects should be trained as to see water supply not only as a service to the community, but also as a bare necessity. As people cannot live without water for even a day, they will resort to other (polluted) sources whenever their source of clean water is impaired for too long a time. We do therefore recommend that water committees should be doing their utmost to make sure that the flow of clean drinking water is warranted and that any interruptions should be limited to a matter of hours at most. With spare parts and technical expertise at hand, there is no reason why most common breakages should impair the water supply for longer than that. However, the people involved should not only be incentivized, but also be held responsible for the quality of the service that they provide.

16 Planning process

For this part we came up with the question; how does the planning process work? An extensive planning process is needed for a water project to succeed. Many factors have to be taken account to assess technical feasibility. But this is not everything; community commitment might be the most important factor for success. We have seen that most people are not aware of the dangers of polluted water. Education prior to the installation is vital for proper functioning of the system.

The process normally starts with the selection of a certain village. This normally happens with a village, either the water committee or the chief, applying to an NGO or a specialized organization.

Application and initiative from the community will increase the success rate as commitment is shown through contacting organizations for help. Applying certain criteria, an NGO selects a village for a feasibility study. We have seen that future costs, and thereby the ease of helping the community, are important factors in their decision for the selection of a certain village. That means that villages that need more complicated systems due to their position in the landscape, or villages with a low population resulting in higher relative costs, are often left behind.

After the selection a feasibility study is being executed. The costs for this study are estimated at about 3 million CFA (4600EUR) and takes about 3 – 6 weeks (FAHP). Accuracy reported by FAHP is about 80 to 90% with respect to predicted costs in their feasibility studies. Funding for this comes from NGO's as most villages apply because they are not able to set up a water system themselves.

As all villages are different, every feasibility study is unique. These differences are not only visible in the type of water system suitable for foremost in the social economic situation, said to be the most important part of the study as the system itself is normally not the problem for sustainability (source: FAHP Water Engineer). The social economic study looks into the ability and willingness of the community to maintain a water system, so to use it in the correct way and be willing to make contributions for repairs.

16. 1. Technical analysis

The technical analysis is done with basic knowledge and electronic devices. As knowledge is limited, difficult issues are being sent to the US and Europe for further investigation (FAHP).

The villagers usually already know the different water sources in their area. It is up to the research team to determine which one is best. Criteria for determining the most suitable source are distance to village, height differences for the use of gravity systems, capacity and water quality. Good water quality will prevent the use of filters, which will make the system cheaper, but also easier to maintain.

16.1.1. Capacity

The flow rate (amount of water the source provides within a certain time frame) is meant by capacity. The capacity determines if the source provides enough water for all prospective clients.

One should first look at the total water demand of the village. An average villager uses about 20 liters of water per day. Apart from looking at the current population and demand, one

should adjust the capacity calculations for fertility, mortality, immigration and emigration rates during the expected lifespan of the project. As fertility rate is high (4.5, UNICEF 2010), a higher capacity is needed to guarantee sustainability of the project.

It is advised to study the capacity for at least one year as the seasons (rain & dry season) highly impact the capacity of sources. Wrong or inaccurate measurements could severely impact sustainability as we have seen with one of the SHUMAS projects where the system did not provide enough water during dry seasons and villagers were forced to get water from other (maybe contaminated) sources.

16.1.2. Water quality

Water quality tests determine the further design of the water system and possible use of filtering systems. Testing usually takes about 14 – 21 days (FAHP). Filtering systems are only necessary if water quality is not sufficient. As for the whole system, the preferred filter is cheap and easy to build and maintain. Filters using chemicals (chlorine for example) and electricity are usually too expensive, too vulnerable and / or need specific knowledge that is not available.

16.1.3. Distribution system

The most expensive part of the water system is the distributional system, mainly piping. This part of the feasibility study determines how to get the water from the source to the consumer. GPS systems are used to determine distances and height differences. As “water by gravity” systems are often used, a height difference of 5 meters between the highest and lowest point is necessary to make sure there’s enough pressure on the taps. Another point of attention is air bubbles within the distributional system. These bubbles increase friction and decrease the velocity of water. Valves should be attached to the pipes to release the air.

The material of the pipes should also be planned and accounted for beforehand. Usually PVC pipes are used, but these happen to be not as strong as galvanized pipes. Galvanized pipes are more expensive and stronger and are used on places where piping is exposed.

16.1.4. Protection

Planning of the protection of the water system, and especially the catchment is essential to ensure water quality. It often happens that both cattle and other animals, and humans drink from the same catchment. Fences should be planned around to prevent this. Furthermore, tapping points should be protected from playing children. We have seen several villages where taps were broken because children were playing with the system. Simple solutions like fences and locks can prevent this.

16. 2. Financial planning

The community often applies for the help of an NGO or other organization because it is not able to afford their own water system. As costs could be borne by the community partly, some NGO’s choose to ask for a contribution from the village. This is not only for covering the costs, but also for the village to show their commitment. We have seen that people willing to have private taps often have to pay for materials and / or labor for construction themselves.

16. 3. Environmental assessment

Taking away water from the environment could have a great impact on the ecosystem around. The feasibility study has to pay attention to this. Apart from this, the use of the environment within the catchment area has to be researched. The use of pesticides for example could

negatively affect water quality. Within an area of 100 meters around the catchment, no pesticides should be used. Trees around the catchment could also influence capacity. We have seen catchment areas with eucalyptus trees around that draw tremendous amounts of water from the soil. One should make sure those type of trees are removed and replaced with ones using less water as empty areas will cause erosion.

16. 4. Social-economic assessment

The most important part of the feasibility study is the social economic.

Commitment of the community is essential to ensure sustainability by regular maintenance and cleaning. NGO's like SHUMAS, FAHP, SIRDEP and SNV all plan community meetings at the beginning of the process and all have educational programs to make people aware of all aspects around. The importance of this cannot be underestimated, as 40% of all water systems in the Northwest area are not working properly anymore (SNV survey). The community should understand the necessity of clean water, should be aware of the economic needs, should be willing to give input and should be willing to contribute financially for the maintenance of the water system. Special attention should be put on women and children, as they are the ones getting the water and using the most of it. Ideally community meeting and education take about one week, but due to resource constraints this is often limited to one day (SHUMAS).

During this week the water committee and maintenance staff should also be trained. The water committee should be legalized to manage the systems and funds and functions as the link between the community and the NGO.

17 Conclusion

The main question we want to answer is how to get the clean drinking water from the source to the customer. To start with the source, we found that there are only two workable sources, namely spring water and ground water. Spring water is preferred as it is normally of high quality. One of the requirements for the source is that water should be clean and the water should be kept clean through the process of catchment, transportation and distribution.

Even springs can be contaminated. This means that all water will need to be filtered before drinking, unless the cleanness of the water can be absolutely guaranteed between source and tap. The water can be cleaned by making use of a roughing filter in combination with a slow sand filter, a sedimentation tank or chlorine. The most preferred approach is to make use of a slow sand filter, as these systems normally have low costs and are made of natural materials and natural processes.

The distribution system that is most preferred is the water-by-gravity system. The reasons for this are that there is no way to contaminate the water as the system is fully closed, there are no mechanical moving parts and there is no electricity necessary to power any pump. Also, a water-by-gravity system is in most situations, the cheapest option. Other types of distribution that we have encountered during our field research are water-by-gravity systems with a pump and manual distribution using a spring, a stream, a lake or rainwater as a source.

The ways of payment can be kept very basic. Customers will pay by cash at a local office or the water committee members will collect the contribution. As Cameroonians do not trust other ways of paying or are not familiar with it, this is the only option that can be implemented.

Maintaining the system is one of the most important factors in setting up a sustainable water project. In order to be able to accomplish this, the community should be actively involved and feel a sense of responsibility. The water committee has to focus on preventive maintenance and repairs of structural parts of the systems.

One of the most common types of failures during the process of setting up a water project is the planning process. The planning process consists of a technical analysis, a financial planning, an environmental assessment and a social-economic assessment. All factors should be taken into account and the community has to be prepared for any deviations from the feasibility study.

18 Recommendation

The least complicated system is a catchment at a mountain source where water is filtered through a slow sand filter and then distributed through force of gravity. The water system and especially the catchment should be protected from cattle, farming, playing children etc. as this is too often forgotten. Any water system to be built should be constructed as simple as possible: maintenance, repair and cleaning should be uncomplicated for uneducated end users. This also means that funds, spare parts and (basic) technical expertise should be available at any given time, to make sure that breakages can be repaired within a day's time.

Before the actual realization of the water system, the initiators have to take into account the following factors. Firstly, community buy-in is essential for the initiation of a water system. A sense of responsibility needs to be built in with some or all of the villagers by giving them an incentive to keep the service working, but also to suffer the consequences if the service is disrupted. During the process, education is necessary to engrain people with the idea that maintenance and preventive repairs are essential for the sustenance of the water system.

The feasibility study should be executed with caution. Socio-economic factors are the most sensitive part of a feasibility study. As the financial feasibility of the project depends on it, proper attention should be devoted to study these parameters very well. Capacity calculations should take into account fertility, mortality, immigration and emigration rates during the expected lifespan of the project. This should include the magnet effect of a village that suddenly has clean drinking water.

19 Financial Team - Methodology

After the structure was set in place by the Boston Consulting group, each team was appointed their own exclusive field to get dug into. For the Financial Team this consisted of the following aspects: how to set up a company in Cameroon, tax issues, difference in NGO and commercial company and most important the financing.

In the first week in Cameroon the Financial Team visited Douala. During this week they visited a lot of major banks and microcredit organisations. They also went to PwC and a notary. Part of the first and second week was spent in the area of Kumba and the surrounding villages. The last part of the second week was spent in Limbe where they most importantly visited the Chamber of Commerce. In the last week the financial team went to Buea and the surrounding villages. During these weeks many semi-structured interviews were conducted with a wide range of people (village chiefs/students/mothers/farmers/etc.), summaries of these interviews can be found in Appendix II. Besides that, professionals were spoken to and water catchments and current water systems in villages were studied.

20 Setting up a company

This chapter explains the steps that have to be taken to set up a company in Cameroon. Furthermore the associated costs are provided.

The legal forms are similar to the French legal forms. It is possible to have both subsidiaries and branches. The current business law in Cameroon is the OHADA law, which is the cooperation between different African countries to stimulate economic development in the region. To set up a company in Cameroon, it is necessary to register at two different institutions; 1) the courts (Legal), and 2) Tax institution (for paying the necessary taxes). The legal registration is important for the proof of the ability to pay salaries and social contributions as an employer. Tax registration is important because you get a registration number. The courts provide a certificate of registration. When you have the certificate of registration, you need to announce the establishment of a new company in an official newspaper. The registration at the tax office is free. The official documents of the courts and the tax institution are then stored and administered by one institution. This institution should make the administration and documentation of new companies more convenient. Hiring local staff is no problem (legally; education is a different story). For expatriates there are certain formalities. The conditions are; a contract that states that you are employed in Cameroon, work permit, long stay visa (not only a business visa, but a long stay visa, to avoid possible problems). If you want to invest in Cameroon as a foreign business, you have to register at the Ministry of Finance. There are no fees; it is only an official registration of the investment. Setting up a company takes approximately 1-2 weeks. The registration at the tax institution can take a bit longer (1-3 months).

The notary provided all the fees that have to be paid when setting up a company. At the foundation of the company, the following documents are required:

- Identification of the shareholders
- Objective of the company
- Shareholder capital (paid-up capital)+ proof (both the notary and the bank can provide the proof, depending on where you deposit the money)

For foreigners;

- Certificate of non-conviction in Cameroon and the home country

For Cameroonians;

- Certificate of non-conviction in Cameroon

20. 1. Cost overview for setting up a company

| What | Fee |
|---------------------------------|---------------------|
| Registration at the courts | CFA 31.500 (fixed) |
| Registration board of directors | CFA 4000 |
| Stamp of company statutes | CFA 1000 (per page) |
| Registration at tax office | Free |

20. 2. Overview notary costs (fixed in Cameroon):

| Size of share capital | Fee |
|-----------------------------|-------|
| 1.000.000 – 3.000.000 CFA | 2% |
| 3.000.000 – 10.000.000 CFA | 1,5% |
| 10.000.000 – 25.000.000 CFA | 1% |
| 25.000.000 – 50.000.000 CFA | 0,5% |
| > 50.000.000 CFA | 0,25% |

If you want to set up a business as a foreigner, at least 51% of the shares need to be owned by Cameroonians. The chamber of commerce is there to stimulate the business climate and provides seminars on for instance entrepreneurship. The chamber of commerce has no administrative purpose, like in the Netherlands.

Sources;

- Chamber of Commerce Limbé (mr. Erik Andrew Kombem)
- PriceWaterHouseCoopers Douala (Isodore Ndzana, assistant manager)
- Notary in Douala (Me. Liliane Bopda, Etudes Me. Yanze NoNo)

21 Taxes

For personal income taxes in Cameroon, there is a 183-day rule. This rule states that if you are in Cameroon for more than 183 days, you are subject to income taxes in Cameroon. For personal income taxes, there is a social contribution scheme that is paid by the employer. This is only relevant for permanently employed people. Permanent employees are paid monthly. For temporary workers there are no taxes or social contributions that have to be paid. If the temporary worker is employed for more than three months (by the same employer), the employer has to pay taxes and social contributions. Most temporary workers are paid per week. According to chief Motase, it is required that a company has at least 10 permanent employees. This requirement did not come up during other conversations. Personal income taxes are as follows:

| Scale | Personal income tax | Income tax including community contribution (10%) |
|--------------|---------------------|---|
| First scale | 10% | 11% |
| Second scale | 25% | 27,5% |
| Third scale | 35% | 38,5% |

Next to personal income tax, the employer is obliged to pay social contributions for his employees. There are two types of social contributions: (1) Industrial accident, and (2) Old age pension. The industrial accident can be seen as insurance, whereby risky jobs have a higher rate. Jobs are divided in three categories, based on their riskiness. The employer pays

the industrial accident contribution. Both employee and employer contribute to the old age pension. The social contribution rates are as follows:

| Industrial accident | | Old age pension | |
|----------------------------|-------|------------------------|------------------|
| Group 1 | 1,75% | Employee pays: | 2,8% |
| Group 2 | 2,5% | Employer pays: | 4,2% |
| Group 3 | 5% | Family allowance | 7% (by employer) |

For company taxes, the tax rate on profits is 35% with a fixed minimum amount. In case of losses the company is obliged to pay 10% taxes on the total losses. According to chief Motase, this is to prevent tax evasion. Therefore, losses cannot be compensated by profits in the future (like in the Netherlands).

There is a tax on money that is leaving the country (for instance dividends paid to foreigners).

Sources;

- PriceWaterHouseCoopers Douala (Isodore Ndzana, assistant manager)
- Hon. Chief Motase Ngoh David (MSC Motase & Sons Company LTD)

22 How to set up a NGO

This chapter provides the framework on how to set up a NGO in Cameroon. The first condition is government approval. This procedure can take quite some time (up to one year), but gives certain benefits, for instance tax-benefits. Officially, the time for setting up an association is 60 days (by law). Setting up the other forms requires 90 days. If the procedure takes longer, you can already start before the NGO status is granted. It is likely that foreign NGO's are observed more closely by the government than local NGO's, and may therefore require more diplomacy from the foreign NGO. There are four types of NGO's;

- Cooperative society (COOP)
- Common initiative group (CIG)
- Economic interest group (EIG)
- Association

22.1. COOP

Administration and registration is done at the ministry of agriculture. It is the most common form for NGO's. The COOP can benefit more than only its own members. This is the main difference between de COOP and the CIG.

How to establish one?

- At least seven members with a common economic interest. The president must be a Cameroonian.
- Make a groundwork of cooperative;
 - Prepare a draft the articles of association
 - Hold an initial general meeting or constituent meeting to be attended by at least seven members; these members become the founding members of the COOP.
- Adopt the articles of association, elect the administrators (chairman, vice-chairman and supervisory committee of three till five persons which are chose for a term of three years) and appoint a third party auditor and send three copies of all papers to the ministry of agriculture.
- At the ministry of agriculture and development a certificate of recognition should be issued. To get such a certificate of recognition one needs to hand in:
 - An application letter which has a stamp of the fiscal office,
 - Minutes of the general meeting or constituent meeting (three copies)
 - The adopted articles of association (three copies)
 - Photo copies of the ID's of the elected officials, and
 - A location plan

Three months after the general meeting or constituent meeting the certificate of recognition should be completed and approved.

The COOP is exonerated from company tax but obliged to declare results.

22.2 CIG

The CIG is very similar to a COOP, and registering such a legal form takes the same procedure as that of the COOP. The main difference between the CIG and the COOP is that the CIG can only benefit its own members, where the COOP can benefit also non-members.

The CIG is therefore mostly used for few people working together for purchasing and using a farming machine for instance.

Another big difference is that one doesn't need a large Board of Directors and supervisory committee. Only a meeting of members and a delegate are necessary. This makes sense because often only few people are involved in the CIG.

The third difference is that no third party auditor is needed. The CIG is exonerated from company tax but obliged to declare results.

22.3. EIG

This group is treated as a company and should be registered in court, because it is a profit seeking collaboration between businesses. See the previous chapter on the registration of a company in court. No third party auditor is needed.

The EIG is exonerated from company tax but obliged to declare the distribution of revenue to members. The members will be most likely obliged to pay PIT/CIT.

22.4 Association

In contrast to the economic collaboration above the association is a social collaboration between different persons. The registration of an association is done by the senior divisional officer and should be finished in 60 days.

Registering an association takes the same procedure as that of the COOP. One major difference is that the association doesn't need a large Board of Directors and supervisory committee. The structure of management is open.

The association is exonerated from company tax.

The association is forbidden to receive gifts, legacies and subventions. Excepted are associations which are recognized by the presidential decree as serving "public purposes".

22.5 Unions and Federations

CIG's and COOP's are able to work together with other CIG's or COOP's (mix is possible) in a union. Practically the CIG's and COOP's are establishing a new CIG or COOP, which should be registered with the same procedure.

22.6 Table with differences

| Criteria | Coop | CIG | EIG | Associations |
|---------------------------------------|---|--|---------------------------------|---------------------------------|
| Legal framework | Law nr 92/006 of 14/08/92 and decree nr 92/455/PM of 23/11/92 | (same as the cooperative) | Unknown | Law nr 90/53 of 19/12/1990 |
| Minimum founding members | Seven | Five | Two | Two |
| Share capital | Required | Not required | Not required | Does not exist |
| Type of members | Individuals or corporate bodies | Individuals, possibility of offering | Individuals or corporate bodies | Individuals or corporate bodies |
| Users outside the organization | Yes, but percentages are defined in the articles of association | Paid services to outsiders, same as coop | Yes | Yes |

| | | | | |
|---|---|--------------------------------|---|--|
| Documents required for registration | Stamped application Minutes of CGM Articles of association | | Stamped application Group agreement Registration fees | Declaration Two copies of articles of association |
| Territory | Open, but determined in the articles of association | (same as the cooperative) | Open | Open |
| Main activity | Economic Thrift and loan for thrift and loan cooperative societies (TLCS) | Economic | Economic | Social |
| Place of registration | Provincial register of COOP/CIG (prov. Del. Of agriculture) | (Same as the cooperative) | Commerce register (Registry of Court of first instance) | Divisional office, open |
| Compulsory organizational bodies | General meeting Board of Directors Supervisory committee Loan committee(TLCS) President Vice-president | Meeting of members Delegate | General meeting Administrators | Open |
| Voting system | One person one vote | Open | Open | |
| Compulsory meetings | At least one general meeting per year and Board of Directors meeting at least quarterly | Open | Open | Open |
| Quorum | Determined for each type of meeting | Open | Open | Open |
| Decision-making (majority required) | Determined for each type of meeting | Open | Open | Open |
| Accounting system | Most conform to accounting norms in Cameroon | Simple system at minimum | Open | Open |
| Auditing | Annual, by private third party | Open | Open | Open |
| Company tax | Exonerated, but obliged to report results | (same as the cooperative) | Exonerated, but obliged to declare the distribution of revenue to members | Exonerated |
| Reception of gifts, legacies and subventions | Permitted | Permitted | Permitted | Forbidden (except for associations recognized by presidential decree as serving "public purposes") |
| Membership | Open subject to the | (same as the | Open or closed | Open subject to |

| | | | | |
|---|--|---|--|---|
| | articles of association | cooperative) | according to the agreement of the group | the articles of association |
| Expulsion | Determined by the articles of association but 2 months notice is required | Determined by the articles of association | Determined by the agreement of the group | Determined by the articles of association |
| Liability of a member with regard to the debts of the organization | Minimum = 1 time the number of shares subscribed (5 times for TLCS) Maximum = 10 times the shares subscribed for. (it goes on for 2 years after expulsion/resignation) | Defined by the articles of association | Unlimited | Defined by the articles of association |
| Required reporting | Annual submission to the Provincial Register of: Balance sheet Income statement Auditing reports Some resolutions Declaration of income to the govt. Tax Office | Periodic submission (1 to 2 years) to the Provincial Register: Financial report Some resolutions Declaration of income to the govt. Tax Office | Submission of names of appointed administrators to the registry of the Court of First Instance | Submission of resolutions on the change of title, object, headquarters, or officials to the Division Office |
| State intervention in activities | The state can carry out an investigation where there is an alleged offence and communicate the results to the Courts | (Same as the cooperative) | State cannot intervene in its activity | Where there is a problem the Ministry of territorial Administration can intervene |
| Creating Unions, Federations and Confederations | Possibility exists according to the law | (Same as the cooperative) | Not normally provides for | Not provided for |
| Forms of dissolution | Voluntary by the members Legal by the Courts where there is an offence Automatic by the competent ministry when the law is not respected | (Same as the cooperative) | Voluntary by the members | Voluntary Legal Automatic by the Min. of Territorial Admin. When its objective is not respected or when public order is disturbed |
| Liquidation procedure | Priority order: Liquidation costs Debtors Return of donations Reimbursement of share capital Distribution of | (Same as the cooperative) | Remaining sums distributed according to agreements | Left to the discretion of members (Articles of association) |

remaining sums
according to the
articles of association

Sources;

- PriceWaterHouseCoopers Douala (Isodore Ndzana, assistant manager)
- Ministry of Agriculture and Development Buea
- Chamber of Commerce Limbé (mr. Erik Andrew Kombem)
- Eyole Lambe - CED

23 Financing

This section will elaborate on the insights we got from talks with different banks, microcredit organisations and local entrepreneurs. The main objectives are to find out how the banking and microcredit system works, and to investigate the opportunities to get financing for water projects and communities in general. This chapter is divided in three sections; banks, microcredit organisations and local entrepreneurs. The first two sections focus both on how the system works and the opportunities to receive financing, while the last chapter solely focuses on financing community water projects.

23.1 Banks

Consumers are able to open both a checking and savings account. There are certain conditions. The most important condition is that salaries have to be paid on that account. Since a few years a new law is in place that states that having a bank account (as consumer) is free of fixed costs. There are fees for wire transfers, but there is no fee for having an account. Debit cards for consumers are available, but are not very useful. Banks provide different payment systems for shops because of different type of debt cards. This makes the use of debt cards very inconvenient for both shops and consumers. Payment by mobile phone is in the early stages. Payment by phone is a business between the carrier and the bank, and started approximately one year ago. The carrier opens a bank account with a certain bank, and takes care of the payments. Mobile payment systems are used to pay the rent, other bills and even a beer in a bar. It is still in the early stages, and therefore not widely adopted.

Aside from consumer accounts, it is also possible to open a company account. Depending on the legal form of the company (limited/unlimited liability) there are certain documents required. For foreign companies it is also possible to open a company account. The fees for having an account differ depending on the size of the company. For small and medium enterprises the fee is 2500 CFA per month. For large companies the fee is 7500 CFA per month. This is the standard fee, excluding additional fees for wire transfers etcetera. The interest rate on loans is 15%, but this is negotiable depending on the credit history of the customer. Most banks have a credit committee that analyses the loan request of a customer.

23.2 Microcredit organizations

As stated in the previous part, bank financing focuses mainly on (large) companies in the urban area. Since we are interested in the possibility to get financing in rural areas, we also visited some micro finance institutions. Micro finance organisations provide small loans to customers, and if all goes well, the total loans may get bigger over time. For customers it is possible to pay back the loans during times that they have the money (for example the harvesting season). Basically, the loans are staged and the payback fits is tailored to the specific customer. There are two categories of micro credit institutions; category 1 and category 2. Category 1 is a cooperation that gives loans only to its own members. How to become a member depends on the institution, but involves buying shares or membership. Category 2 is also a cooperation, but is open to non-members to get a loan or account. Micro finance organisations have a “normal” bank account, so that they can also make wire transfers for their customers and keep the money in a relatively safe place. The payments to the customers are in cash most of the time, especially in rural areas. According to one micro finance institution, financing a company with micro credit is very expensive, but should be possible for small companies. It is not possible for start-ups, a company is supposed to be in business for at least one year. Non-profits are not able to receive financing. The maximum loan you can get is about five times the profit of the organisation. The interest is approximately 1,5% - 3% per month. This interest rate is non-negotiable. When opening an

account, the costs of the consult are 5% of the loan, with a minimum amount of 15000 CFA. Furthermore, there are certain costs associated with opening an account and insurance.

At Advans Cameroun (another micro finance organisation), most loans are provided in the urban areas. Due to company policy, it should be possible for villages within a one-hour drive of the office to receive micro finance support. In practice this has never happened. About 90% of the customers are traders. Clients are able to receive a loan between 100.000 and 15 million CFA, depending on the ability to pay back the money. It is also possible to receive a group loan, for five people at most. The group is responsible for the payback of each other. The total loan is the sum of the maximum loan that each person can get. There is no added leverage in this case. Currently Advans is trying a new type of loan, the so-called rural loan. This is a loan tailor made for agricultural activities. The payback is customized for the harvesting season. All the loans are paid out monthly. For water projects most of the response is that it would be very hard to get financing, and that it has not happened before. The main issue is that loans are not provided to a whole community, and that the collateral needs to be very large. Collateral appears to be the main motivation for not providing loans to rural communities, and also the distance to the office location, because the further away a village is, the harder it is to retrieve the loan in case of default or late payments. Another problem with collateral for community financing is that it is unsure which person provides what part of the collateral, and who is responsible in the end. For a micro finance institution this means it is not sure where the loan can be retrieved in case of default.

The last microcredit organisation we spoke to is Nkong. The organisation has an NGO part, which provides loans to people that normally would not be able to get a loan, because of lack of knowledge and collateral. The NGO part of this microcredit organisation works as follows;

- Meet people on the field (tribe meeting) and tell them about the company to sell your plans. Perform a feasibility study;
- Teach the villagers how to use and save money;
- Deal with villagers as a group;
- Fix all paperwork before the money is transferred;
- Repayment is done in cash weekly or monthly (interest rate of this organisation is 3%);
- The president/leader of the group is responsible for the payments and is managing the group.

The women most often get the loans, because they have more experience in managing the money (men tend to buy beer if money is available). The loans this organisation provides are between 50.000 CFA till 250.000 CFA. If someone is able to manage a loan of 250.000 CFA, the person should be able to open a bank account herself. Loans are provided every ten months, and if someone has learned more about managing the money, the amount of the loan can be increased. The two main risks faced by the microcredit organisation are default and theft. Furthermore, the microcredit organisation get's regular visits from the government to check if the organisation sticks to the core business.

23.3 Local entrepreneurs

The local entrepreneurs we spoke to, acknowledge that it is very hard to receive financing as a community, especially for water projects. They would never invest in these projects, because of the high uncertainty of retrieving the investment and the laziness of people in Cameroon.

Trust and ability to payback are the most important reasons why local entrepreneurs are not willing to invest in community projects.

Furthermore we spoke to a local entrepreneur in Kumba, who is a construction contractor. He told us that he once constructed a waterproject, but that it had failed, because there was no money anymore at a certain point. The construction of every project is done in steps, and each step has to be paid in advance. This is where most projects fail, because the money runs out and the project is stopped. He also emphasized that he would not construct community projects or invest in communities. The reason is that there is a lot of uncertainty about getting your money back. All payments are in cash, also salary payments. The customer pays prices per unit to the contractor. For the construction of a house, you pay per cement block for instance. Payments to make a part of the house are not common; it is all paid per unit. Maintenance of the new build construction is possible, if you agree to a specific maintenance contract (for which you pay an additional amount). In practice this never happens. The entrepreneur does guarantees that the construction is properly build for a short period after the construction is finished. But the precise definition for this guarantee is vague.

Sources;

- Banque Atlantique Douala (Laure Towa – Responsible for client services)
- SGCB Douala (Jean Pierre Mathias Bell Bell – Responsible adjoint PME/PRO)
- SCB Bank Douala

24 Opinions

During the field research, we spoke to a lot of people, both highly educated or in key positions within communities, with their own opinions about various subjects. These different opinions, not all about water projects, but also on employment and political issues in Cameroon, seemed too valuable to neglect in the final research report. In this chapter, we want to bundle these different opinions, and provide the reader with an insight in Cameroon as a country.

Hon. Chief Motase Ngoh David

This chief has a construction company in Kumba, and is therefore, besides chief of a village, also entrepreneur. The chief emphasized that the banking system is not properly working, especially for small and medium sized enterprises. Financing is available for large companies, but for small and medium sized companies it is very hard to grow due to the inability to receive bank financing. Furthermore the chief talked about the importance of making projects community based. Community based projects do not have to be handed over to the government, whereas private initiatives need to be handed over to the government. If you take for instance water projects; a community based water projects will stay the property of the community. If it is a private initiative, the government will set a timeline in which you can earn back the investment plus some profits, but after that the water project is government property.

Mr. Eric Andrew Kombem (Chamber of Commerce Limbe)

Mr. Kombem acknowledges the financing problems for businesses. He believes micro financing provides a better solution to Cameroon, due to the small payments that have to be paid back before getting a new payment. Furthermore there has long been a gap between education and employment. Most studies had no job perspective. Needed are technically educated people, who can actually apply their knowledge in practice. Therefore the Chamber of Commerce has different programs to teach people real skills (skill based education) that they can apply in available jobs. It does take time to resolve this issue.

Jaba and Eyole Lambe (Local NGO partners)

Most villagers never learned to work and pay for water, because the general mindset is that the government should provide water. Furthermore they lack the knowledge to set up and maintain a water system for a village. To summarize; there is no culture of planning, the mindset of villagers needs to be changed and the people lack relevant knowledge.

Regarding financing Jaba and Eyole stated that it would be impossible for a community to get a bank loan, mostly due to the required collateral.

It is also possible to collect funds from the villagers in a community. The chief is often responsible. However, it would be illegal for the chief to just start collecting money. The chief needs to establish a legal institution. Another option is to establish a legal entity for the water committee approved by the council, which can collect the money. If people should pay for maintenance, it has to be clear beforehand that the villagers have to pay for maintenance of the system.

Villagers lack the knowledge on how to create and maintain a water system. It is therefore important to create a water committee and train the members on finance, water, management

and administration. This can take 4-5 years. During the training period it is important to check the project frequently and guide the villagers, so that they get used to using their new skills.

Setting up a company that will construct water projects is not advisable, according to Eyole. Existing local water companies would see it as competition, and will use the government to put an end to the company. The best way is to make the water projects community based. The government cannot influence community based projects, and it is certain that all facilities will be owned by the community in the future. The main reason is that “you give back the water to the people”. This makes it community based and it is the reason why the government will not interfere.

The general structure Jaba and Eyole use for new water projects is as follows. Generally, there is a supervisory board, and a board of directors. The business exists of three parts; water committee (technical), business (finance/non-profit), and marketing (education). They try to retrieve the investment while the project is running. However, they only install home taps, because it is hard to make people pay for the public taps. Poor people in the community therefore still have no clean water provision; even when this new waterproject is constructed. First the investment in the water system has to be paid back, and then the public taps will open. The main reason for this is the assumption that people will not pay for public taps.

Another point Jaba and Eyole made is the importance of local Cameroonians who are part of - or partners of the organisation. For foreigners it is harder to get to know the real issues in villagers. This may be easier when a local Cameroonian is willing to help you or get into a partnership.

24 Conclusion

The aim of the research was to find out if a water company in Cameroon can be founded to provide clean drinking water to the people of Cameroon for an affordable price, which is high enough to pay back the price of the initial investment and perform maintenance of the system.

Like stated before, it is very difficult to get a loan in Cameroon, especially for small enterprises and communities. The reason is that the risk is too high for the lender and the lender has little faith in the success of a community. In case one wants to start a company, it should be considered that taking a loan in Cameroon is both expensive and difficult to get.

Another obstacle in establishing a water company is the government. If the water is sold, even if this happens at cost price, the company will be assumed to sell water and compete with governmental water companies. The result would be that the government and existing water companies that are government owned turn down the company.

What is highly recommended, and therefore happening on a larger scale, is establishing water projects in a community based way. This means that one or several communities establish a water project to provide their own people with clean drinking water. In this way no competition will be assumed and the government won't appropriate the system, but it will remain property of the community.

When a community-based system is established, a legal entity must be registered. A cooperation or an association could be used for this purpose. The legal entity would be authorized to collect money from the community. A water committee or chief is not allowed to collect money from the community, because they are not a legal entity.

Furthermore if such a project is started all the village's specific aspects should be studied. A conflict in the village, which splits up the community, could be a potential danger for the water project and the collection of water. Also the mindset of people is important; are people really willing to put energy, time and money in a water project?

We also think that repayment of the initial investment to the investor is possible under strict conditions.

- The kind of village is very important. Traders are likely to have more money than farmers and have therefore more possibilities to pay for their water,
- The willingness to pay differs per village, which depends strongly on the existing knowledge about clean water,

Rural areas are poorer than semi-rural areas, and therefore we expect that the people in rural areas can only afford to pay for the maintenance of the system. In contradiction the semi-rural areas have more possibilities to pay and therefore the initial investment might get paid back on the long term.

Moreover, education is key. People lack all kinds of knowledge, but have a base understanding about what clean water is and what dirty water does to people. The things people should get educated in are:

- Why should we do maintenance, and why should you pay for that?
- How do you manage a whole project?
- How do I make a long term planning and how do I stick to that?
- Technical skills should be developed.

The people working for the water project should be paid for their work. It stimulates them to do fast repairs and pay good attention to their work.

If one wants to establish a water project as described above, partnerships with Cameroonians are very important. If Cameroonians talk to Cameroonians they are more likely to speak the truth. Furthermore a local partner can faster detect village specific aspects.

We also realized that people do not value the things they receive for free in many places. It is important, especially in rural areas where people won't pay back the money invested in the project, to detect the mindset of the people. If people don't understand the value of a free water installation, the chance they want to pay for maintenance is small. If you want to let people pay for maintenance, you should make sure they value the installation and the clean water.

Summarizing: under very strict conditions the initial investment of the water project can be paid back to the investors. If people have a base knowledge about clean water it will be easy asking a small amount of money for the maintenance of the project.

25 Recommendation

As stated above in the previous chapter there are a lot of possibilities in Cameroon. We would recommend water projects become community based projects. This way the entire community is responsible for their own water provision and they understand and appreciate the amount of work that went into obtaining the water system.

The government in Cameroon is responsible for making sure everyone is provided with clean drinking water. For this they have the government owned company CAMWATER. By only setting up community based projects you would not be competing with the government and you will not be seen as a threat. This will also make sure that the water system will not be handed over to the government and the community can stay in control of their water supply.

We also think that repayment of the initial investment to the investor is possible under strict conditions and recommend the villagers do so when possible. This all depends on the mindset of the villagers. The villagers need to be willing to repay their initial investment and understand why they do so. That is why we recommend that a great part of the community based water project also entails educating the villagers. If the villagers do not know what they are paying for or why the chances of providing poor communities of clean drink water are very slim.

26 Economic Team – Methodology

After the structure was set in place by the Boston Consulting group, each team was appointed their own exclusive field to get dug into. For the Economic Team this consisted of the following aspects: the business structure, human resources and legal issues. For each element sub-questions and hypotheses have been distracted. Moreover, a hypothesis-tree (appendix) visualises these statements.

In the first week in Cameroon the Economic Team visited Bamenda and the surrounding villages. The second week was spent in the area of Buea where they visited the University of Buea and spoke with a lot of students. In the last week the Economic Team went to Douala. During these weeks many semi-structured interviews were conducted with a wide range of people (village chiefs/students/mothers/farmers/etc.), summaries of these interviews can be found in Appendix II. Besides that, professionals were spoken to and water catchments and current water systems in villages were studied.

27 Business Structure

In this paragraph, the business structure will be discussed. Two Scenarios will be detailed and a thorough discussion on how water provision in Cameroon is organized will follow.

27. 1. How should a financially sustainable water company in Cameroon be optimally structured?

Based on our findings in Cameroon, we came up with two broad ways in which a water business could be structured. In one scenario, a collective tax is levied per project, while in the other a system of pay per usage is introduced.

27.1.1. Scenario 1: Collective tax per project

Collective tax payment (for maintenance) is being used in Santa and Tubah both located in the North-West region. These payments differ between public stand taps and private taps. Tax payments in Santa are collected annually (out of community taxes which differ for both sexes). Private tap users pay an additional tax of 12,500 CFA on an annual basis. Tax payments in Tubah (CFA 1,000 for each individual in the community, except for private tap users who pay CFA 5,000) are collected annually. Private tap users pay a connection fee (50,000 CFA or more, dependent on hours of community service) before first usage. These amounts only apply to households. Private tap owners are themselves responsible for the delivery of pipes, which results in various diameters and differences in the level of quality/durability. Companies and institutions, such as the newly built University of Bamenda, pay based on an estimated usage of their buildings.

The tax payment is seen purely as payment for maintenance works, as water (is by some believed to be given by God and therefore) should be free of charge. The tax payment for maintenance ensures the following services: materials for public stand taps (except for tap heads), committee members'/care takers'/maintenance crews' allowances (the heights of which are still unclear to us), R&D of new sources, and other related expenses. A balance deficit is however rampant, as predicted costs are frequently largely exceeded by actual costs. In Tubah, the tax revenues only cover half of the total expenses. The budget of the Bambui Water Authority shows an enormous difference between the budgeted amounts and the amounts actually spend.

The maintenance levies and taxes do not cover the costs of the water project. Therefore, the council and committee are looking for other sources of income, such as donors, NGO's and "Other Sources", which were not specified further.

The projects in Santa and Tubah showed a great local commitment, experience and knowledge. Committee members are elected by the community and the committee has to explain their work, problems and progress to the community at the annual water congress. The council is supervising and checking the water committee, in order to check whether the committee uses the community money well.

One of the most important current issues the projects in Santa and Tubah have to deal with is the Eucalyptus trees surrounding the water sources. These trees consume around 200 litres of water per day each. This extracts a lot of water from the sources, which has a detrimental effect on the water provision. The committees are currently cutting down these trees and replanting the riverbanks and catchments areas with water friendly vegetation. If there would be no replantation, farmers would come in and use the freed up land as farmland. They would use the water for their crops and livestock, which puts additional strain on the quantity of water for the village. Regarding the quality, farmers use chemical solutions for their crops,

which are washed away and enter the village water source. The committee has been struggling to educate and persuade the farmers to relocate.

Payment occurs annually and has to be paid in cash at the Water Authority. A receipt is given as proof of payment. The project in Tubah has even computerized their payment administration. In Tubah, 70% of the public stand tap users pay the fee, which the head of the committee was very proud of. Non-payers are not cut off from the water project in Tubah, because that would also hurt children, a policy the community doesn't want to pursue. Public stand taps are cut off if the committee observes abuse (e.g. leaving the tap running all day). When a quarter of people surrounding a stand tap in Tubah is rich enough to afford private taps, the public tap is also disconnected in order to force people to install private taps. In Santa, non-payers with a private connection are cut-off directly and are only reconnected when the bill is paid plus a reconnection fee.

27.1.2. Scenario 2: Pay per usage

The water committees have expressed their desire to install meters in the private water provision in the near future, believing they raise more income (especially from the large users, such as companies and organisations). The delay in the installation of such meters is caused by a lack of funds. The project in Tubah has run a pilot with meters. After three months, however, the display of the meters became unreadable, probably because of mould or dirt in combination with water. The problem originates from the fact that the meters are placed outside. After comparing a broken meter with a new one, we suspect that the meter has been forced open by the users, as the seal attached to the meter was broken off. This could indicate sabotage.

The members of the water committee also perceived paying by usage to be the fairest way of paying. This came from the following idea. People who use more water are responsible for more wear and tear to the system and should therefore pay more for its upkeep.

Former government water company SNEC asks payment according to usage. The business case of former SNEC will now be discussed thoroughly.

27.1.3. Privatization of SNEC

The company SNEC, which was a state enterprise responsible for water provision in Cameroon, was divided in two: public CAMWATER and private Camerounaise des Eaux (CDE). The privatization has gone about in the following way. Of the 2000 employees, one hundred people were transferred to CAMWATER. 1900 people, lock stock were transferred to CDE, which is founded by a Moroccan syndicate who won the tender offer. They thus received the water concessions for free, but CDE has to pay a fee to the state based on the amount of water consumed. In turn CAMWATER fulfils her duties as network manager and investor. CAMWATER and CDE have a contract d'affrimage, in which the responsibilities of the two parties are written down. CDE is responsible for small maintenance, distribution, payment, etc. Large maintenance, new investments and replacements are the responsibility of CAMWATER. Thus CAMWATER has most of the resources and CDE's activities are more of an exploitative character.

Of the about 460 CFA that CDE receives per cubic metre of water, it has to pay 200 CFA to CAMWATER. In contrast to what was expected beforehand, there is too little left for CDE to pay all their expenses, this mainly has to do with the inefficiency of having 1900 former government employees as its staff.

Communication between CAMWATER and CDE is only happening at the highest levels. In case of problems, the ministry intercedes and mediates between the two parties. The important decisions are being made in Yaounde (headquarters of CAMWATER) and Douala (headquarters of CDE). The fact that both headquarters are in different cities doesn't help the communication issue.

An interesting fact is that the regional director of the South West (located in Limbe), as well as the Chefs de Ville of Bueia and Limbe all speak French, and very little to no English, which seems very odd in an Anglophone region.

Another noteworthy fact is that CDE had a start-up capital of 5 billion CFA.

27.1.4. CDE (Camerounaise des Eaux)

CDE is responsible for the water provision in villages with more than 10,000 inhabitants. In total, 103 villages are provided with water. All villages with less than 10,000 inhabitants are direct responsibility of the ministry of water and energy (MINEE). Due to a multitude of problems, a lot of the villages are actually not reached by the ministry. In the 4 years since SNEC has been privatized, only 2 villages have been added by new projects arranged by CAMWATER.

Between 1997 and 2012, there was hardly any maintenance to the water provision facilities of Cameroon. This might have to do with the upcoming privatizations. In contrast to SONEL, which has a concessive; CDE has an agreement and is also not expected to invest in the water catchments and systems themselves. The investments in water systems are done by CAMWATER who carries over a project to CDE after completion. However, no investments have been made, despite the great increase of population. This concerns CDE a lot. CDE doesn't have the money and the responsibility to do so, but CAMWATER –for unknown reasons- won't do it either. As a result, the maximum capacity has been reached, especially in the large cities, and shortages are of regular occurrence.

CDE is structured as follows. In the top there is a central layer. This layer has a supportive character and deals with the contact with CAMWATER. Next are different regional directives. These cover the whole of Cameroon, which is divided into eight regional directives and two metropolitan directives. Regional directives are responsible for quality, maintenance, supportive activities and partly commercial activities. One layer down is the chef de Ville. The Chef de Ville is responsible for collecting the payments and contacts with customers. A lot of customers have a hard time with the height of the fees and the recurring interruptions of water supply. This last problem seems to originate from the high fee of 200 CFA per m³ which needs to be paid to CAMWATER. A private company or a village project will readily be a lot cheaper because of the lack of that payment.

The public is unaware of the privatization of SNEC and the division into CAMWATER and CDE. This is only explained when necessary.

27.2. Will a central management structure be trusted?

The projects in Santa and Tubah were both approached by CAMWATER to be taken over and incorporated into the national systems. Although they were offered a large sum of money, they refused in order to keep their independence. The population was very reluctant to be provided by CAMWATER, as they believe that the price would increase and the payment would occur per month, instead of per year. Most people prefer to pay per year and the monthly payment was the main reason for not allowing CAMWATER to operate the water projects.

A local entrepreneur in Buea indicated that the service offered by CAMWATER/CDE is very poor, because of rationing, system defaults and bad customer service. Being without water for three days is of regular occurrence. According to him foreign companies are often more reliable and trustworthy than domestic companies such as CAMWATER.

27.2.1. Opinion of students about water provision in Cameroon

We talked to a group of five economic students from a student association similar to the EFR. They agreed that Cameroon is very rich in terms of natural resources. Especially water sources are abundant. The problem, however, is that those water sources are not connected to a piping and cleaning system. Villagers thus need to travel to get clean water from a spring source, which they often not do because of time issues. As a solution, they get water from a river nearby. This water is not clean and therefore a source of disease. According to the students, most people know that water needs to be boiled to kill harmful germs. The government is doing quite a few things to sensitise the population on this subject, for instance through television, radio and door-to-door visits. Nonetheless, not all people act accordingly, as boiling water costs fuel, which then cannot be used for cooking and such.

The students were sure that every person in Cameroon would love to have clean water nearby, as well in their house as from a public stand tap. From their experience, paying for maintenance is accepted; paying for the water itself would however be a bigger challenge. They thought it would be possible if you could educate the people about how their money is spent. They were convinced that education is the first basic step into acceptance and implementation of a water system. Without education, it is impossible to start any kind of enterprise in water.

The students were very interested in the concept of starting a business in water. They thought it would work. Especially because they believed that private companies have to serve their customers better and the fact that the population knows that fact. This makes private companies more reliable than for instance a CAMWATER/CDE. Moreover, they thought that a private company could substantially reduce the price of water. Especially in the cities, where water is always scarce and rationed, they saw great potential for this. They thought it was idiotic that they didn't have a constant water supply at university.

28. Human Resources

In this paragraph, the labour market in Cameroon is discussed. It will especially focus on student's aspirations and views on the job market and on entrepreneurship in Cameroon.

28.1. Studying

In Cameroon there is a trend towards more job oriented studies. Studying is mostly seen as a way of obtaining a (good) job. Students as well as the student councillor and the head of the department of economics from the University of Buéa emphasized on this concrete goal of studying. Studies are more and more professionalized, which means that they focus more on practice aspect as opposed to pure theory, as taught for instance in Universities in Europe. Therefore, internships are either obligated or highly recommended. The main objective of internships is obtaining practical skills. The general opinion seemed to be that without those practical skills, you would end up unemployed. They were very surprised to hear about the attitude of Dutch employers, who employ people from the university and teach them practical skills while already paying them. It sounded completely absurd to them. Why would you hire someone who is not yet productive? This reaction shows the competitiveness of the Cameroonian job market.

The people we spoke to at Buéa University all talked about the importance of good management, as they see that Cameroon is lacking in that respect. At the University of Buéa, 3000 students per year are starting in the field of Economics and Management.

28.2. Students on the Labor market

The opinion about students' goals and dreams is very slowly shifting from becoming an employee to becoming an employer. Traditionally, government jobs were always the most wanted jobs around. Being employed by the government means you have a secure, stable and well paid job. Moreover, the government doesn't check its employees as well as they should. This means that employees have a lot of freedom in spending their time. It makes being a civil servant one of the easiest jobs around. Students are still interested in those jobs, for very clear reasons. The hiring policy of the government is however highly unclear. Last year, the government hired 15.000 students in one go, just to bring down youth unemployment figures. The students told us that becoming a government worker is a case of having contacts.

Being an employee in the private sector means working at a higher pace. Getting one is difficult, as there are not that many private employers. As a new employee, you are expected to perform immediately. There is hardly any time for on the job training. Moreover, if a company decides to train an employee, they are usually training them for the next (better paid) job. As soon as a person receives those extra skills, he or she can earn more in another place. This job-hopping is one of the main issues in the Cameroonian Job market. The concept of loyalty to a business is not well developed. Mainly because every extra CFA earned is a welcome one in sustaining life.

Traditionally, the biggest obstacle in starting a new business is obtaining funds. It is virtually impossible to get a loan from an institutional bank, as they ask for a certain amount of collateral and own starting capital from the entrepreneur-to-be. Students with good ideas therefore need to work for an employer first, in order to be able to save the amount needed for starting their own business. A lot of good ideas are therefore wasted.

Some students do not acquire a job on their own level after they graduate. They become taxi drivers or shoe salesman or get some other uneducated job, just because there are not enough jobs available on their own level and the before mentioned problems with founding a new company. This causes a lot of frustration among those ex-students. The reason that those

frustrations don't get out of hand is that beer is always readily available. According to the student councillor, this makes them calmer: 'asja' they say, which means 'too bad'.

28.3. What kind of people are needed?

The structure that we propose is dependent on several different functions. We propose a central management layer where different responsibilities are represented. These include: financial, commercial, marketing and communications, technical (up to the extent that monitoring and hiring can be done sufficiently) and managerial. On a second level we need regional managers whose main responsibility is supporting communities and keeping in touch with these communities. Apart from this, engineers are needed throughout the companies with different levels of specificity of skill.

Eyole suggested first hiring a lot of flex workers, so that when time goes by and the project develops, you will obtain a better understanding of the amount of employees needed, and the ones who perform best get selected.

28.4. How are these people recruited?

Employees are recruited through personal networks and newspapers. Internet is not yet developed fully as a means of recruitment, as most people do not have access to it. Labour is abundant. Recruiting students through the universities also occurs. This cradle-snatching happens to the brightest and best who are handpicked by career officers and such and who are placed with befriended companies/government offices. Furthermore many students are recruited after successfully completing an internship. These internships have either been arranged by themselves, or by universities.

An interesting way of recruiting would be to go through channels that are normal in the Netherlands, i.e. student organisations and guest lectures and such. Raven Green finance is known to recruit interns in this way.

28.5. How does payroll occur?

Partly cash, partly by bank depending on the preference of the committee. Payment occurs monthly. Only the higher paid employees and larger companies own bank accounts. Cameroon is mostly still a cash based economy.

28.6. How much are they paid?

The minimum amount paid is the amount a person can earn in another function. As a person will readily leave for a better-paid job, commitment to a certain company is not very high. People work to survive and to get better jobs in order to climb the social ladder.

The minimum wage that should be offered is an average of what you could live on to get by. This means that while this might be sufficient if you live in rural Cameroon and have very few basic needs, it is not nearly enough if you live in more urban areas.

28.7. What kind of contract is best fitted for each kind of job (flex, part-time, fulltime)?

This would have to be looked at on a case by case basis. Cameroon labour law is consistent with ILO recommendations and should not cause too many problems. This is also based on what Eyole has told us.

A clear distinction should however be made between people that we need on a regular basis and people who we would only use occasionally. An example of this difference is between

someone who can replace a tap head of a community tap, etc. which can occur regularly and someone who can renew the sand in the filter (a few times a year)

28.9. What is the turnover of personnel?

A local entrepreneur in Buéa said that the problem with hiring management talent is that there is a shortage of such people with practical experience. New graduates have to be trained for three months to be up to standards. After their training, they often leave for a better paid job. Experienced managers will need to be paid a lot more. This problem was also seen by Human Resource advisor in Africa confirmed that the lack of (management) experience is an Africa wide problem. In Tubah, however, this problem did not occur, as the manager is paid well compared to what he could be earning elsewhere.

28.10. Maintenance

What now follows are the discussions of the findings related to the maintenance crew.

28. 11. How large does the project staff need to be?

In Tubah, there were three technicians for a population of 20.000 people. The village of Tubah is divided in 50 compounds with a population between 500 and 700 people. Every compound has 7 'responsibles', who contact technicians, caretakers and the committee in case of malfunction.

As Eyole and Jabba argued, it is best to just employ two technicians and see how the workload develops. It is always possible to hire more technicians if necessary.

28. 12. What is the maximum distance that can be travelled per day and how should this be arranged?

This question is very hard (if not impossible) to answer in a way that would be useful to the project. It should be mentioned that in case it is decided that every village gets its own maintenance team, traveling over long distances does not play a role.

29. Legal

What follows, is a discussion of the findings related to the legal side of setting up a business in Cameroon.

29.1. How does ‘law in the books’ compare with ‘law in practice’?

Cameroon has a well-developed system of business laws. These differ very little from European laws on important points and therefore it is not necessary to go into too much detail.

What is important is that we have heard some mention, i.e. from Otto, that a little dash goes a long way. It is not always possible to get government employees to do what they are required to do without using a certain amount of persuasion

29.2. How are contracts for employees set up and what are the underlying characteristics and conditions?

We believe this is more important for a later stage than for now. As much is still either unclear or is being, or has been researched by Jabba and Eyole.

29.3. How are pensions schemes arranged?

Employers are obliged by law to pay social security benefits. However, this is not always done with great precision.

29.4. What role do insurance issues play?

During our field research, we did not get a clear understanding of the way in which assurance issues play a role. We do expect, however, that the insurance market is less well developed when compared with the Western World.

29.5. How is it ensured that the company doesn’t go bankrupt in case one of the projects fails?

During the field research, we did not find an answer to this question.

30. Education from an Economic perspective

During the field research, every single person mentioned education as the first and most important parameter of success. It is vital to educate people before the start of a water project, so they feel as if the project is theirs and understand its workings and its importance. The people should know what is and isn't done with their money. Only after receiving that information, people might be willing to pay. This adagio goes for payments for maintenance, which are more common, and for repayments of investments in the system. In short: sensitisation is key.

Communication about the importance of clean drinking water and hygiene is present to some extent. Firstly, it is taught mandatory once every six months at every primary school. Secondly, it is discussed in special programmes and sketches on national tv, national radio and regional radio. For instance, a programme with tips on hygiene and avoiding diseases is broadcasted on Saturdays from 7 to 9 am. Thirdly, there is local radio in Pidgin or the local dialect/language. Finally, the government does some Door-to-Door sensitisation, which is the most effective but also the most costly form of education. Most people know thus to some extent that drinking clean water is important. Acting accordingly, however, is harder due to for instance financial and practical restraints.

A group of ten students of Journalism and Mass Communication at Buea University argued about the effectiveness of these media in sensitizing the people about health and water. TV is very important as 'seeing is believing'. Not everyone owns a TV however, and the people who do don't always watch the 'good' programmes. Local radio in local dialect is understandable for everyone, which is not the case with TV or national radio. Different mediums reach different people within the society, so diversification will serve its goal best. It could be very helpful to incorporate the idea that 'clean drinking water is not free' into these programmes.

Furthermore if feasibility studies are carried out into the possibility of starting a new project, this could be combined with sensitisation.

31 Conclusion

During the field research we came across a lot of projects which were in essence well developed, and driven by a will to succeed, but still encountered problems. These were mainly related to the financial side, i.e. the revenues did not meet costs, but also problems originating from a lack of knowledge or too little management. We therefore think that there certainly are fruitful opportunities to be exploited.

Also, the way the main water provision system of Cameroon, i.e. what was previously known as SNEC, is organized, provides reason to envision a more efficient and reliable water provision system. In this respect, the before mentioned conditions under which CDE has received the right to exploit water provision in Cameroon, are at the core of this. A business that does not need to transfer a substantial amount per unit water sold, while there is little to nothing that is offered in return, and does not have to employ 1900 employees which are largely superfluous, could provide the people of Cameroon with a far more efficient and reliable source of water.

For these reasons, we see opportunities for a sustainable water business in Cameroon. In order to ‘flow under the radar’ and have as little as possible to do with corruption, and reduce chances government will perceive us a competitor and therefore a threat, we advise to start as an NGO.

To ensure involvement from the local population, we deem a mixed management structure to be optimal. This entails a central management layer which includes both people elected by the facilitating NGO, as well as local people which could for example be elected by the people of the village.

In order to be able to attract sufficient funds, a construction in which this newly set-up NGO borrows funds from an NGO-led investment fund at a reasonable interest rate, seems to be a fruitful option. The investment company could both attract ‘conventional investors’ who require a positive return on their investments, and investors who want to invest funds as a way of charity and as a result aim at getting their money back, without hoping for a positive return.

33 General recommendation

If we start with answering our main question: *'Can we set up a business that provides people living at 'the Bottom of the Pyramid' with clean drinking water?'*

Ask yourself the following before starting a water project in Cameroon. There are two possible approaches one can adopt; an idealistic or a practical approach. Do you want to help the poorest villages that are in desperate need of clean drinking water? Or do you want to help out villages that need water, but where the need is less urgent. The latter villages being ones that would not only be able to pay a fee for maintenance but in the long run could perhaps pay back the entire investment made for the water system. In fact, there are also possibilities that lie between the approaches above. For example a partly subsidized investment or discount on maintenance costs. The problem here is that you cannot build as many water projects as you could have done if the villagers would repay their investments. So less people are served. The possible ideological problem here is that you don't treat every village, and so every person, in the same way.

Starting a profitable business in Cameroon seems to be almost impossible because momentarily there is no return on investment is possible within a reasonable business timeframe. From a business point of view this would make it difficult to attract investors. To attract suitable investors for providing water to bottom of the pyramid communities an NGO approach would be advised. This way you would attract investors that would accept a longer timeframe for the return on the investment perhaps even a lower percentage.

Thinking about the legal form a water organisation could or should adopt. We can start with discussing the possibilities of an NGO. In this case the organisation would be operating under a legal form in Cameroon and no longer under the radar. Operating as a legal form in Cameroon can have its advantages and disadvantages. Advantages being it would be easier to build a network, for example with other interesting NGO's and you can benefit from certain tax reliefs especially set up by the government for NGO's. Another advantage that could also be seen as a disadvantage is that an NGO needs to be owned for 51% by a Cameroonian. Cameroonians tend to lie to 'white people' and therefore a partnership with a Cameroonian would be an advantage to obtain the most reliable answers. A disadvantage of this partnership is that you are not the majority of the NGO is not in your possession. It will be time consuming to find an appropriate partner. Operating as a legal form in Cameroon means that the government will be aware of your presence, seeing as you will be benefiting from certain tax reductions. What you have to be aware of is that providing a water service in Cameroon is seen as a service that should actually be provided (for free) by the government. If the government or anyone else feels threatened by the NGO that was set up, the government could intervene and they might prove to make it very difficult for the NGO in Cameroon. Therefore working to some extent under the radar might prove to be the most effective.

Selling water as a product seems to be almost impossible. People do not see water as a product and cannot seem to comprehend the fact that you would have to pay for such a thing. Paying for water is something that people in the west do and therefore should also do so for the Cameroonians. The Cameroonians believe this is a neo-colonialism right. Furthermore people do not seem to view things in the long term. The Cameroonians do not see that by paying for water as a product you are actually investing in a sustainable water system. They only see it as a way that the 'white people' would make money of them and again that would bring back the issue of neo-colonialism. However what could be accomplished is that villages become self sufficient in providing clean drinking water and pay a maintenance fee. How to collect this maintenance fee is of course a touchy subject. Some villages might be able to set

up a monthly payment system while in other villages it would be advised to have a yearly contribution. This all depend on the fact that some villages only reap the rewards of their harvests at one moment of the year. It has been proved that not a lot of Cameroonians are aware of financial planning and therefore it would be advised to collect the contributions in times you are assured the villagers are able to pay and have an income.

Villages could become self sufficient by receiving a water system as a loan which they will pay off. The villages are then in control of their water system and are responsible for keeping it in working order. Furthermore by paying a maintenance fee the water system will become sustainable because when it breaks down there will be money to get the water system fixed. This could be for a mere tap that is broken or perhaps even a more severe problem like a burst pipe under the ground. For some villages it might even be possible to have villagers that take care of the maintenance. The villagers that are responsible for the maintenance of the water system would receive a financial compensation for their work. If the maintenance would be voluntary the problem would arise that the maintenance would not be done. Why would you leave your means of survival to do something else? Very important in self sufficient villages is that the chief is onboard and that a water committee has been appointed. If you do not have a water committee, people once again would not feel responsible for the water system as they lack the knowledge and the know-how.

To summarize starting up a social enterprise that sells water by the litre would be almost impossible. However educating communities and helping them to become self-sufficient is a possibility we believe to have a high success rate. Hereby we recommend that the communities repay (part of) the investment.

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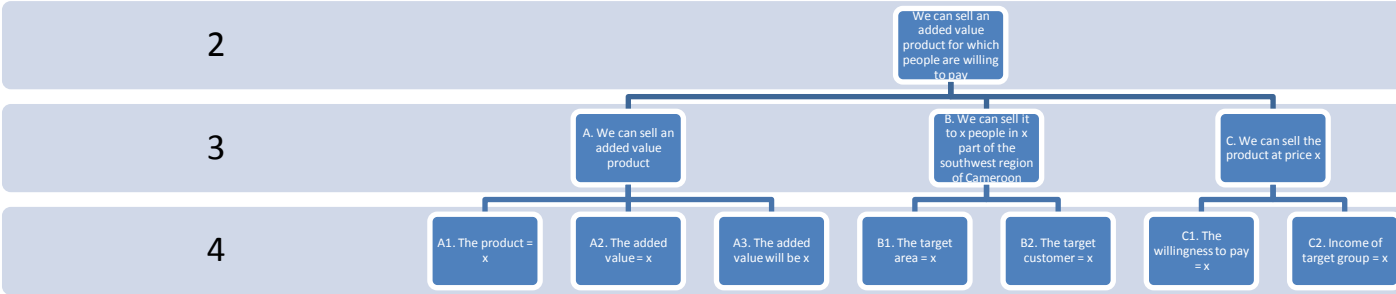
Eyole Lambe – CED

Banque Atlantique Douala (Laure Towa – Responsible for client services)

SGCB Douala (Jean Pierre Mathias Bell Bell – Responsible adjoint PME/PRO)

SCB Bank Douala

Appendix I – Hypothesis tree



Appendix II - Information villages

1. Buea area

1.1 Buea (city)

People spoken to

- Cedric (student, 25 years old)
- Delphine (hotel cleaner, 28 years old)
- Thomas (student, 25 years old)
- Eyole (NGO, 40-50 years old)
- Jaba Woshe (FAHP, 34 years old)

No. of inhabitants

Unknown

Type of system

In Buea CamWater supplies most households with water, both by in-house taps and public stand taps. They use water from Mount Cameroon. A catchment is located near the mountain to fetch the clean mountain water. The pumping system is quite new; there is no rust in the water (contrary to Douala water).

Year of placement

Unknown.

No. of in-house taps

Most houses near the main road are equipped with an in-house tap, the actual number is unknown.

No. of public taps

Unknown

Water system in use? (incl. elaboration)

The water system is in use. However, Buea suffers from frequent water cut downs. CamWater rations the water, as the current water supply is not sufficient for the amount of people in the region. Rationing means that between fixed times a day running water is not available. The timeslot is known, but differs per area (usually allocation between quarters is used). Some hotels/households make up for the rationing by using reservoirs.

Presence water committee (incl. elaboration)

The water supply in Buea is the responsibility of the government (CamWater).

Payment for maintenance

The households with an in-house tap pay for the amount of water they use.

Willingness to pay

Most people living in Buea City are willing to pay for water, they are aware of the fact that water cannot be free. This is different in the surrounding villages.

Water education/perception of water/use of rainwater)

On average the citizens of Buea City are educated about the dangers of unclean drinking water. Posters about the necessity of clean drinking water can be found all around the city.

Differences dry/wet season

Unknown.

General conclusion

In Buea City most households are served by CamWater, thus it would be very hard to compete. However, the rationing of water is quite a big problem. Even though it is usually known when water will not be available, every now and then there are unexpected water cut downs. The unreliability of the CamWater supply is detested by the citizens of Buea City.

1.2 Mile 14 (Dibanda)

People spoken to

- Chief Samuel (everyday managing transferred to son)
- Son of Chief Samuel
- Worker CDC
- Worker government
- pastor Full Gospel (50 – 60 years old)

No. of inhabitants

Unknown.

Type of system

The system is a water-by-gravity based system. Mile 14 collaborates with three other villages: Mutengene, Ikande and (...). Near Ikande there is a higher located lake; this water is transported to a catchment and treated. Thereafter, a pipeline goes to the four consecutive villages to supply their inhabitants with water.

Year of placement

More than 50 years ago the system has been placed. It was an initiative of the counsels of the four villages.

No. of inhouse taps

Unknown.

No. of public taps

Appr. 10 taps (in total 6 caretakers for these 10 taps)

Water system in use? (incl. elaboration)

Yes, the system works well. There are enough public taps for the people who cannot afford an in-house system; the walking distance is max. 300 m. and there is hardly any waiting time. However, due to a growing community probably extra pipelines and new public taps are needed. The mayor already invested in new pipes, when the need is there he will also pay for the construction of the new water connection.

Presence water committee (incl. elaboration)

The Water Committee is located in an office in Mutengene. The committee controls the maintenance fees and the maintenance itself. The Committee is responsible for the bank account and pay for the maintenance costs of the four villages. The Office is not really transparent, the amount of the bank account and salary of Water Committee members are unknown. The caretakers of every village (the quarter heads) have to report to the Committee when they need assistance in repair. Time span to repair a public tap is between a day and a week; the office hires plumbers for the repairs.

Payment for maintenance

The in-house tap maintenance costs are 7000 CFA per year (needs to be paid in persons in the Office in Mutengene). The installation costs are 205.000 CFA, paid to the office, which will then make sure a plumber installs the system. When you do not pay they will cut off your in-house tap water supply. The contribution of a household for the public tap maintenance is 1000 CFA per year.

Willingness to pay

The villagers are willing to pay for the maintenance, the fees are 'normal' to them. Sometimes they raise or lower the fees, this is decided by the village counsels.

Water education/perception of water/rainwater

When a public tap is out of order, the villagers will go to the nearest other tap. When the system is down, they might go to the nearby stream. However, they are aware of the fact that the water is not good for drinking and thus boil it first. This is also the reason why they don't use rain water; there is enough clean drinking water. People with an in-house tap do not sell the water to others.

There is education in primary schools about water and the threats of unclean water.

Differences dry/wet season

Mile 14 has a constant flow of water. However, Mutengene and Bawando are further from the source and thus have to ration their water in the dry season. Therefore, a future system is being organised by the Water Committee: a new pipeline will be constructed directly to Mutengene. The old pipe network will be used for the other three villages.

General conclusion

Currently, the water supply in Mile 14 is pretty well organised. Even though the Water Office does not have a transparent money policy, they make sure the water quality is good and the water taps working. In the future there could be a need for expansion.

1.3 Mile 16 (Bolifamba)

People spoken to

- Contractor (47 years old)
- Four women (25–45 years old)
- Mother (35-40)
- Banana seller (40-50 years old)
- Student/worker drycleaner (26 years old)

No. of inhabitants

Unknown (unreliable information, 1.000.000+ habitants).

Type of system

In Mile 16 a water-by-gravity system is used. The source is a spring further up the road. This water is transferred by pipelines to both public taps and in-house taps.

Year of placement

Unknown.

No. of in-house taps

Unknown.

No. of public taps

Unknown, but most are placed in the central part of Mile 16.

Water system in use? (incl. elaboration)

Yes, the water system is in use. The community makes sure the public taps are cleaned, every week someone else cleans the tap in their area. There is strong social control to do so.

Presence water committee (incl. elaboration)

In Mile 16 the community has been responsible for the installation of the water system. However, it is not clear whether there is an actual Water Committee.

Payment for maintenance

People pay a monthly/yearly fee for the maintenance. The villagers think this is a good system. The height of this fee depends on the amount of consumption.

Willingness to pay

The people are not really willing to pay for water: 'water should be free'. However, paying for maintenance is more accepted.

Water education/perception of water/use of rainwater)

Further down in Mile 16 tap water from the stream is used, people are aware that the water is not clean, but as it is accessible they use it after cooking it.

Differences dry/wet season

In the dry season, people have to pay more for the usage of water. The prices rise with 50%.

General conclusion

In the central part of the town water supply is sufficient. Further down the village there are less central taps and thus need for public taps with clean drinking water.

1.4 Great Soppo

People spoken to

- Eyole (appr. 45 years old)
- Jaba Woshe (34 years old)
- Counsellor, chairman Land and Organisation (51 years old)
- Quarterhead, President Water Committee (64 years old)

No. of inhabitants

Unknown.

Type of system

Currently, a water-by-gravity system is in place, a source up in the hills is used to provide the public taps with water. Both the in-house systems and the public taps are provided by CamWater. However, the pressure is low. Sometimes people tap water from the end of the CamWater in-house connections to their homes. This is of course illegal, but as CamWater does not supervise their systems it is not noticed.

Year of placement

Unknown.

No. of in-house taps

Unknown.

No. of public taps

There are two public taps. The distance for most people is approximately 1 kilometre.

Water system in use? (incl. elaboration)

Yes, the water system is working. The community tap is rationed: between 5:00 – 8:00 (during rainy season) and between 15:00 and 19:00 the public taps are providing water. During those timeslots queues of more than 200 people can emerge, which could cause people to go back without being able to get water.

Presence water committee (incl. elaboration)

The Water Committee consists of a group of village volunteers that take care of the maintenance of the current system and work on a new project to provide the village with enough clean drinking water. To raise money for a feasibility study 200 CFA per household was paid. However, the community cannot raise the money to actually execute the project, thus they need external funding. Besides that, their first feasibility study was not realistic. American volunteers proved that.

Payment for maintenance

For the in-house (CamWater) tap people pay 364 CFA per 200 Liters. For the maintenance of public taps the Water Committee collects money when needed. Local technicians are asked to fix the current tap when it breaks down.

Willingness to pay

The community is willing to pay for (the maintenance of) water, they however do not have the ability to gather money for the construction of the system. Some people sell water from their homestead for 50 CFA per 20 Liters. The community values clean drinking water and needs it; therefore, they are willing to pay (a reasonable amount) for water.

Water education/perception of water/use of rainwater)

An American researcher discovered that the rainwater is not healthy to drink. Some people who have had more education know this, however, most people don't. They say that the water does not affect them, however, in the long run it will. Besides the lack of knowledge, there is hardly an alternative. When the current system breaks down people go to the stream for water.

Differences dry/wet season

In the dry season the rationing of the water is even more severe; only during a short period in the afternoon water is provided. Sometimes people can be without water for three days.

General conclusion

The current system is unable to serve all villagers. Therefore, the plans and committee are there to execute a plan to build a bigger catchment to supply more people with water. Eyole thinks it would be best to connect Great Soppo, Wakoko and Molyko to one gravity based water system and thinks this is a feasible action.

2. Limbe

2.2 Mile 4

People spoken to

Kaliste (student, 19 years old)

No. of inhabitants

Unknown

Type of system

The water system is gravity based. This will sometimes be a problem, since Mile 4 is located on higher ground. The water comes from a river. Near the source there is a tank, where the water will be filtered. Pipes will bring the water from the tank to the tap. The system is 12 years old and is owned by the community.

There are multiple community taps. It is possible to get an own inhouse tap, on own initiative.

Year of placement:

2000.

No. of inhouse taps

Unknown. Not many people take an inhouse tap, because the village is located on higher ground and the water system is gravity based.

No. of public taps

Many.

Water system in use? (incl. elaboration)

Yes.

Every first Wednesday of the month, the water system will be closed for maintenance. The maintenance will be between 9.00-12.00, the system will be opened again at 13.00.

A well will be in use for 2-5 months before the next damage will be present. It will take 2 to 3 weeks to repair the well. This depends on how big the damage is. Money will be collected directly when there is damage.

There are no significant differences in water stock between dry and wet season, the system is always running (except for the maintenance closure).

Presence water committee (incl. elaboration)

No, the water system is owned by the community.

Payment for maintenance

Each year, every household has to pay at least 5000 CFA for maintenance. The real amount depends on the size of the household and on if you can afford it to pay such an amount. The chief decides how much you have to pay. He is also the one who collects the money.

Also the people who have an inhouse tap have to pay 5000 CFA for maintenance each year. The people say: you make use of the same source, so you also have to pay.

Willingness to pay

People do not want to pay for the water, but they do want to pay for maintenance. The sister of Kaliste said: 'People in Africa have the right to get free water, the Western people have to pay for this, since they have enough money.'

Water education/perception of water

There is water education from primary school onwards. People see the importance of clean drinking water. Especially kids learn a lot about when water will be clean and when you cannot drink it.

Differences dry/wet season

There are no significant differences between dry and wet season.

General conclusion

In general, the water system is quite good in this village. There always is enough water, there is a willingness to pay for maintenance and there is education. Points for improvement are the long duration between damage of a well and its repair, and the fact that the system is gravity based while the village is placed on higher ground.

2.3 Lower Bwuando

People spoken to

- Prince (son of chief and chairman of water committee, 45 years old)
- Some people of water committee

No. of inhabitants

Only a few, approx. 50. Officially, it has 1000 inhabitants. But since there is no water system and no electricity, most people live in town.

Type of system

There is a current system, but Lower Bwuando is a village without a good system. The water committee is working on a new system, with more water availability, so that it will be more interesting to live in this village. The village has a lot of ground; Prince wants to move the village from higher ground to lower ground, which is located closer to the main roads.

Current system: gravity based. The water comes from a river. It will be stored in a tank of 2000L. This tank will be cleaned 4 times a year. There is one public tap in the village. The village is located on the top of a hill.

Future system: they are now working on a bigger system. A new tank will be built with a capacity of 55000 L. Furthermore, they want to move the villagers more downhill. This will result in the village being positioned closer to Limbe (or: main streets) and will be better for the gravity based system. Since the roads within the village are bad at the moment, the new system must connect the new, lower located, village place with the main roads more easily.

Year of placement

Current system: around 1985. They are now working on a new system, building a bigger tank. They are waiting for more money to finish the project.

No. of inhouse taps

0

No. of public taps

Current system: 1. New system: more (number is unknown).

Water system in use? (incl. elaboration)

It is in use, but only by the few inhabitants, since the tank only has a capacity of 2000 L. They are now working on the new system, which is not yet in use.

Presence water committee (incl. elaboration)

Yes, there is a water committee with 16 people in it. We will get the official document of this committee, where all important information is stated.

Payment for maintenance

Current system: one caretaker is responsible for the tap. He is not being paid. He will make sure that the tank will be cleaned 4 times a year. People do not pay for maintenance.

The initial investment was approximately 2 million CFA. 25 years ago the community collected the money from community elite to pay for this system.

Future system: people will pay yearly or half yearly for maintenance: this amount will be in a bank account and will be used when needed for repair or maintenance. See the official document for details and prices.

The initial investment of the future system is arranged by community elite. Now the village is waiting for foreign money to complete the project. The people are not able to pay for the completion of the project, therefore they depend on other money sources to help them out. The costs of the initial investment was 9.2 million CFA, a same amount of money is needed to finish the project.

Willingness to pay

In the current system, people do not need to pay. With the future system they do, but willingness is unknown.

Water education/perception of water

The villagers expect water seminars to be arranged by foreigners. Besides that, god's will is very present. God decides whether there will be money for the project, whether people will be ill, etc

Differences dry/wet season

During the wet season the river flows continuously, thus the tanks will be full. During the dry season people suffer. It happens that the water tank is very low on water because the river is as well. The future system will take care of the month's people struggle.

General conclusion

This village is changing its whole water system, to make sure there will always be enough water for the villagers and water is clean. We have seen that in theory the new plan is quite good. People have really thought about how to arrange the whole new system.

The main problem with getting the new system is getting enough money. The new water committee does not exert any effort in trying to get more money, since they do not know where this money must come from. They are waiting for an investment from Europe/America.

2.4 Wovia

People spoken to

- Wife of the chief (45 years old)
- Daughter of the chief (29 years old)

No. of inhabitants

Unknown

Type of system

In the past, there were a lot of taps. They were installed by CamWater. When they broke down, nobody repaired it. Both old taps and new tap are from Snec. Technicians are not from Snec, they only install, not repair. Now there is only one new tap, which everybody uses. The new tap is always working, but sometimes the water is rationed. The times of rationing are unknown, it is totally random. Sometimes the water is closed for 2-3 days. People go to the stream. People clean the river bank and the whole village; this is done by all the villagers. This is done twice a month. The cleaning company Zakan cleans all the taps.

Year of placement

Unknown, but the tap is relatively new.

No. of inhouse taps

Unknown, but not many since inhouse taps have monthly bills and high installation costs which most people cannot afford.

No. of public taps

One.

Water system in use? (incl. elaboration)

There is one pump which works and so the whole community makes use of it. Some people have in-house taps, but as already mentioned, the monthly bills and high installation costs are a hurdle for many to install these taps. The community makes sure the quality of the pump is guaranteed, since every month the community is obliged to clean the riverbanks, pumps and other water facilities.

Presence water committee (incl. elaboration)

There is not a real committee, the community as a whole makes sure the water system keeps on working. These monthly cleanings are supervised by the chief.

Payment for maintenance

Some people have inhouse taps. For the inhouse tap (Snec water), you pay per cubic meter. They pay a monthly amount to Snec. We have seen the bills. Water usage was not stated on it, only total amount you have to pay. Range 2100-8000 CFA for meter 1, meter 2 is range 2395 – 11000 CFA. For public tap you don't have to pay, also not for maintenance.

Willingness to pay

The water of the public tap is for free. Nobody has to pay for it. People who have an inhouse tap do not sell water to others. They give it for free, since they feel as friends. When people build a house, they go to the house of the chief. They pay 500 CFA per drum (250-280 L), this is water that will be used for building.

Water education/perception of water

Education is widely available. Examples: boil the water, filter it with cotton. However, there are still many diseases. People know where the diseases come from, but sometimes they do not have a choice. In the smaller villages, the knowledge of water is not as good as the bigger ones. Example: Snec water is brown, however people still drink it without filtering or boiling it.

Differences dry/wet season

Rationing is all year long. It is totally random. In the dry season, less time the tap is open. Then the problem is bigger, sometimes the water is cut off for 2-3 days. People can still use the stream.

In the dry season, people use more tap water since there is less rain water to fetch. Proved by higher water bills in December/January compared to April and August.

General conclusion

There is only one public tap for the whole village. This will make the villagers very dependent on that public tap. It is interesting to see that now there is a big community feeling, people make sure that that one pump always works and will quickly be repaired in case of damage. They do the cleaning with the whole community. This community feeling was not present when there were multiple public taps.

Furthermore, rationing is there all year long and it is done totally random. This means that also in the rainy season, when there is much water available, there will still be rationing. People never know when the rationing starts and ends.

3 Kumba

3.1 Ekombe

-

3.2 Kake 2

People spoken to

- chief

- villager

No. of inhabitants

Approximately 6000

Type of system

It is a gravity based water system

No. of inhouse taps

Unknown.

No. of public taps

Unknown.

Water system in use? (incl. elaboration)

The water comes from the river (stream) and from the spring (ground).

Taps are not near. Sometimes people have to walk 300 meters up hill to go to a tap. The road to the tap is very slippery, which makes it hard to bring big amounts of water at one time. The village needs more public pipes to bring the water closer. Then it can serve a good part of the population. The chief himself has an inhouse tap, but it is not connected yet. He is one of the few people who has an inhouse tap.

Presence water committee (incl. elaboration)

There are 25 people in the water committee. They are responsible for the maintenance. Technicians are hired by the committee to do the maintenance. They want to work together with a Dutch NGO, they have contact with them. Then, the NGO has to be responsible for the maintenance. Villagers then have to pay a small amount for the maintenance. The committee knows all costs, the chief will give us the document (statuten). The NGO will give assistance to 4 villages: Kake II, Marula I, Marula II and Smaller (...).

Payment for maintenance

We have to see the document (statuten) to be able to tell more about prices and paying system. What we know: initial investment comes from donors. External people facilitate the job of building, the chief guides the project.

Willingness to pay

Everybody has to pay for the water. If you do not pay your monthly or yearly costs, you are not allowed to live in the village anymore. There is a lot of social control in this, commitment between habitants.

A lot of people who work at the farm come from the north. Therefore, they are no locals. They only work at the village but they do not live there. This results in that these farmers are not willing to pay for the water or the maintenance.

Water education/perception of water

Water from spring is not clean for drinking, people get ill. Cholera, typhus. But people do not know that water is not clean. They think: if my father has drunk it his whole life and he is still alive, it will not be, it has higher bad for you.

Since the kids have to get the water, they will go to school at a later time at day. They are responsible for the water of the household which is a higher priority than going to school.

Differences dry/wet season

In the dry season, there is a long queue. The reason: there is less water in the stream, so the pressure is lower. Therefore, it takes longer to fill a bucket. This results in kids going later to school.

In the rainy season, the rain water will be fetched. Not in the dry season, since in the dry season a lot of micro organisms come into the water, which makes it unhealthy.

The usage between rainy and dry season is different. In the dry season, people need more water. Not only for drinking, also for washing clothes. Clothes will become dirty sooner, which makes that people change clothes more often, after every 2 hours!!! But problem: in dry season is less water available!!!

General conclusion

The main problem in Kake II is that there are no public taps close to the villagers. A Dutch NGO has already started up a project in this village to make a better system.

3.3 Kwa Kwa

People spoken to

- driver
- chief
- Martin
- watercommittee chair

No. of inhabitants

Unknown.

Type of system

Gravity based.

No. of inhouse taps

The man I was talking with had an inhouse tap, but it is expensive. Most people make use of one of the community taps.

No. of public taps

Unknown.

Water system in use? (incl. elaboration)

The water comes from the stream, then it will come into a big tank. In the tank, they put chemicals to purify the water. Therefore, the water will be clean. The system is gravity based.

Presence water committee (incl. elaboration)

No, there is no water committee. There is one responsible guy per public tap, he works for the government.

Payment for maintenance

Every public tap has its own caretaker. This person is standing at the tap and sells the water from the tap for 30 CFA/20L. This person is also responsible for the maintenance: if something breaks, he will call a technician. This will be done very quickly, dependent on what the damage is. This person works for the government (Snec).

People pay directly to the maintenance guy when they come to the tap to receive the water. It is not clear what this guy will do with the money. The guy gets a wage from the government and has to pay the technician in case of damage.

Willingness to pay

People do not want to pay for their water, but since it is the current system, they do not have an option. In the ideal situation, the water is free and the council must be responsible for the maintenance. They receive enough money, since people have to pay tax.

Water education/perception of water

The water will be used for everything, so also for drinking. The water comes from the stream, then it will come into a big tank. In the tank, they put chemicals to purify the water. Therefore, the water will be clean.

Differences dry/wet season

In the dry season, there is sometimes a shortage of water. Then, the water will be rationed. A few days before the rationing starts, people will get a message that the water will be rationed. So they are prepared. They call it rationing, but it could also mean that the tap will be totally closed for some (2 or 3) days.

General conclusion

People have to pay for water. They pay it directly to the guy standing next to the tap, who is responsible for it. A positive point is that there is someone who is responsible for every well and takes actions in case of damage. A negative point is that people have to pay for water (which they do not want to) and it is not transparent what happens with the money that the people have to pay.

3.4 Banga Bakundu

People spoken to

- Chief
- Villagers

No. of inhabitants

10.000

Type of system

Water by gravity with a big reservoir, Camwater

Year of placement

Unknown

No. of public taps

20

No. of in house taps

0

Water system in use? (incl. elaboration)

The water system is broken, the village received a water system from Camwater. When the water system broke down, the chief wrote to Yaounde. Someone from Camwater came to fix the water system. Unfortunately the villagers were deceived and the generator to pump up the water to the reservoir was taken away. Again the chief wrote to Yaounde. The people from Camwater built a building containing a pump. However the villagers do not know anything about the system or what this building containing the pumps does and they are still left without water. The villagers feel deceived and do not have the expertise or the finances to obtain a working water system.

Presence water committee (incl. elaboration)

Not (yet) in place, however are willing to set up a water committee once they have a working water system.

Payment for maintenance

Not (yet) in place, however are willing to pay for the maintenance of the water system once they have a working water system. They would also be willing to train 2/3 boys to maintain the water system and pay their labor from the maintenance proceedings.

General conclusion

Villagers were deceived in the past and do not trust anyone anymore. If there would be a working water system which they can see with their own eyes they would be willing to make the water system sustainable by setting up a water committee, train a couple of guys to be able

to maintain the system and pay for maintenance. The village is very community based; the entire community comes together when something needs to be built. Once in a while they have a community day which entails that everyone comes together to build for instance a school. Everyone has their own task in making sure the school gets built. This shows that the community is very willing to work together for a better future. Unfortunately they do not always have the expertise to fulfill all of their necessities. For instance the chief and villagers know they need clean water and obtain their clean water from a spring although they do not know how to preserve this water.

3.5 Bombe Bakundu

People spoken to

- Chief
- Villagers

No. of inhabitants

8.000

Type of system

Water by gravity with a reservoir containing 6.000 liter

Year of placement

2000

No. of public taps

-

No. of in house taps

1, only the chief has his own taps including his own personal water reservoir.

Water system in use? (incl. elaboration)

The water system is in place but the biggest problem is that the pump does not have electricity to be able to pump up the water. They have the approval to hire a contractor to place the electricity. However they do not have the financial means to pay for the contractor. This will cost 2.000.000 CFA and they have only managed to acquire 450.000 CFA. They collected this money once in 2000, the men paid 3000 CFA and the women 2000 CFA.

Presence water committee (incl. elaboration)

Yes, they collected the money from every household and opened a community bank account.

Payment for maintenance

Yes, unfortunately they still do not have enough money to be able to set up the water system. They will be collecting money again soon in the hope they can collect the 2.000.000 CFA that is needed for the electricity.

General conclusion

The villagers are making use of a natural source that is ever flowing. They are in need of a properly working system which they will be able to have as soon as they acquire the 2.000.000 CFA. This village would perhaps benefit from a (micro-finance) loan. If the villagers are able to pay a reasonable amount in the harvesting months they would be able to pay back their loan.

3.6. Village along Kumba road

People spoken to

- Chief
- Villagers

No. of inhabitants

7.000 – 8.000

Type of system

Water by gravity from a river, the water is not filtered but they used chlorine once. Built by a Spanish company.

Year of placement

2011

No. of public taps

10

No. of in house taps

-

Water system in use? (incl. elaboration)

The water system is in use and working, the system has only been in place for a short period of time. Some of the taps are broken because the kids have been playing with the taps. These need to be fixed by a technician from Kumba.

Presence water committee (incl. elaboration)

Yes, the water community is to make sure that when something breaks down they fix it or they hire someone to fix the broken part(s).

Payment for maintenance

The community has money on a bank account for the maintenance. Every household paid 2.500 CFA for the maintenance. However they do not have a monthly or yearly payment system in place. As soon as the bank account is empty the chief and his counselors will need to get together to come up with a solution.

General conclusion

The chief of this village is young and dynamic and has a secretary and treasurer. The village is well organized with their water committee but the water system has only been in place for 9

months. We are not sure how sustainable the system is as it has not been there long enough to determine.

3.7. 8-8-2012 towards chief Motase's village

People spoken to

- Chief
- Villagers

No. of inhabitants

2.000

Type of system

Water by gravity

Year of placement

2012

No. of public taps

12

No. of in house taps

-

Water system in use? (incl. elaboration)

The water system is in use and working, some of the taps are broken at this moment in time but they still have sufficient working taps for the village.

Presence water committee (incl. elaboration)

-

Payment for maintenance

They tried to collect money for maintenance but only half of the villagers were willing to pay. This caused problems with collecting the money. The villagers that did not want to pay thought that if the water system was free the water should also be free.

General conclusion

The village had a young chief. The villagers were semi happy with the water system. The company that installed the water system was supposed to come back and train a couple of boys as technicians so they could fix the taps themselves, however they were never trained. After two years of placement the village is still waiting. They would still be willing to train a couple of the boys.

Appendix III – Interviews Technical team

Hans Angbor – 8th of August, Buea

Hans Angbor is a conservationist and a water engineer. We had a meeting with him about the technical aspects of water systems and the planning process. He is part of the Sustainable Management of Natural Resources Program.

According to him, the decision to perform a feasibility study is commonly initiated by either the water committee of a certain village or by organizations that see certain needs for a community. Secondly, a feasibility study can be executed with sufficient resources and a partnership with a specialized organization.

A feasibility study usually looks into eight aspects of water provision. It determines and looks into:

- Sources.
- Population (20L per person per day).
- Tapping points.
- Health issues.
- Community commitment.
- Training.
- Special structures needing water like schools and hospitals.
- Geological aspects. GPS devices determine the ideal location for piping.

There is a general preference for gravity based water systems due to their simple nature. No electricity is needed and systems can be built by locals with local materials. Pumps are only used if the source lies below the level of the community. Life-span, on the other hand, is reduced as pumps are complicated and can normally not be repaired by locals. Projects are designed to last as long possible and at least 30 years. In most feasibility studies it is advised to filter polluted water with natural filters instead of chlorine as communities normally lack knowledge about the chemical.

To make sure projects are sustainable, a water committee is set-up, legalized and recognized to manage the system. The committee also functions as the link between the village and the organizations that design and fund the project. Major faults like broken pumps and poorly constructed water catchments could be solved in cooperation. The most vulnerable parts in the system is community negligence, followed by tap hats and piping.

Livelihood – 15th of August, Bamenda

Monju Athanasius Tita Muwan - Executive Director of Livelihood

Livelihood is an NGO involved with catchment protection, making and distributing small scale slow-sand filters for household use, and educational projects regarding sanitation and water. It mainly focuses on the suburbs of Bamenda. They are currently looking into expanding into HIV prevention and into the agricultural sector to boost production.

The organization is built on three layers; the board of directors, 3 employed people and volunteers. Funding comes from members and private donors.

As said, one of their main activities is selling slow-sand filters. It started with a technician in Bamenda, trained by Canadians, who started making slow-sand filters. The current

organization, Livelihood, saw some problems with these filters and is now trying to improve weight and costs. The current filter, namely, is made with concrete that is more difficult to shape, more expensive and heavier than clay. Till now, a prototype of the new filter has not yet been made and expected costs are unknown. The old model has a cost of 40.000CFA and has to be paid for entirely by the households themselves. Catchment protection and educational projects are paid for by Livelihood and based on application by the community.

The filter has a surface of about 25 by 25 cm and a height of about 1 meter. The flow-rate is approximately 1 cup per 4 minutes. Please note that these numbers are estimations and expected to be not very accurate.

Livelihood also developed a bucket with a tap underneath to promote washing hands in houses and at schools. It is important to use flowing water for this. This bucket costs around 2500 CFA.

Livelihood also provides catchment protection (just a spring coming out of the ground, a stream), because farmers, animals and the community drink water coming from the same catchment. They step into other people's projects to separate drinking water provision for humans and animals. However, this means that sometimes there are conflicts between some parties. Where should the cattle drink?

The organization mainly focuses on education concerning water projects.

SIRDEP – 16th of August, Bamenda

Mdifor Patience – Coordinator

Nsai Kingsley – Natural resource management

Stephanie Oyebog – Natural resource management

SIRDEP started as a NGO in 1992. However, they received official recognition from the government in 1993. The organization started as an initiative from the Swiss government. The board of directors consists of 7 members, 4 women and 3 men. Their role is to supervise and control. It has a staff of 9 people and several volunteers. They have multiple focus areas. Their offices are located in Buea and Bamenda.

Agriculture and Environmental Protection

SIRDEP works very closely with the ministry of agriculture. They train farmers in how to use the inputs and to evaluate how the yields have improved. They also try to identify potential markets for the farmers. The government was giving soft credits to a farming group, at one point SIRDEP intervened in the process.

Environmental and natural resource management

SIRDEP is involved in water catchment protection in communities. One of the major issue that communities face is that the cattle is grazing in the catchment area. SIRDEP tries to provide alternatives for the farmers.

Within schools, SIRDEP teaches the children about climate change. The adults and elderly cut the trees and do not plant new ones.

Social development

The organization helps orphans to go back to school. Women are educated on the rights they have as rights of women were highly violated in rural areas. Once their husband dies, the brothers take everything. For this reason, women are educated on their rights, property and inheritance.

The organization does not focus on all aspects at the same time in a community. There is a network of organizations in the North West, North West Development Organizations (NWDO), where they work with.

SIRDEP puts a lot of emphasis on the training of caretakers in a water project. The reason for this is that by training water management caretakers, it is more likely that the project will succeed. They learn how the catchment and the water scheme need to be maintained. They guide the community to elect a board. The caretakers learn bookkeeping and water management in general. SIRDEP makes use of a standardized training. The training also deals with prevention of breakdowns. However, the reality is that they do not want to change all the parts before they breakdown.

SIRDEP makes use of an application process. Communities write requests or see them at forums to see what SIRDEP is doing and to apply for their help. The organization performs a stakeholder impact assessment in order to know their needs.

In 2010, SIRDEP identified the needs for water resources in 5 council areas. They have the information but not the financial means to start a project. Trees need to be planted and a fence has to be built around the catchment area. These surveys were conducted in collaboration with SNV. A request has been send out to First Peoples Worldwide to help the council get funds.

There are a couple of problems when it comes to water. Firstly, there is hardly water in the dry season. Secondly, an outbreak of cholera in Bafut killed a lot of people. Sometimes, the water contains harmful chemicals. Thirdly, the population is growing rapidly. Lastly, communities have to cope with conflicts on resources around the catchment.

In order to follow up on what can be done in a village, a team is set up at the community level. They monitor and report. At the level of the council, there is a water and sanitation team. The water management committee is monitored periodically.

90% of the projects that SIRDEP initiated work with a water by gravity system. Filters are not being used. However, the water is tested before the projects starts at the Camwater lab.

The organization strives for payment of maintenance. The households within the communities have to contribute a small amount every year. A tap at a compound costs 2000 or 5000 francs per year. The money is collected at the level of each quarter. A receipt needs to be given to keep the whole process transparent.

All villages have a strong feeling of unity. The people respect the chief and do what they are told to. If someone does not pay the yearly contribution, they get a fine. A fine could be a goat, a pig or salt or soil. Even people that leave the village to live in the bigger cities still contribute.

The representatives of SIRDEP emphasized the differences between the South West region and the North West region. They mentioned that some people in the South West are lazy and they do not want to contribute to the community. The people in the North West are more

willing to make community efforts. The costs of the projects in the South West are higher as they need to reserve an amount to give the people incentives to come to the meetings. For example, they buy food to make sure that the people in the village will come to the meeting.

Water committee – 16th of August, Bamenda

Lamnteh Joe Arthur - Technical advisor

Fundoh Katrine Nkwenti - Vice president

Lamnteh is the technical advisor of the water committee. He studied Business Administration. He has his own construction company called Arthur.

The water committee consists of 9 members, 4 women and 5 men. They are meeting every 15th and 30th of the month.

In the system, the water passes through 2 pots. In case there is any other impurity, it is clean and passes on, straight to the tank. The water is collected at the top of the tank, 30 cm above the floor of the tank. The tank has been cleaned 3 times. The system is operative for 7 months now. The whole system is being cleaned, including the floor. They do not make use of chemicals to clean. The walls are being scrubbed with brushes. There are valves to control the low and high pressures. In this way the water can be shut when it has to be cleaned.

The committee does not take preventive measures as there is no money for. They make use of very simple tools, made of solid materials. The committee applied for more funding from SHUMAS to build an additional tank to store water as there is no water in the dry season.

The committee realizes that water is very important. Women use the water the most. For this reason, there are also women in the water committee.

The committee wants to ask for a yearly contribution in the community. However, the project is just finished. For this reason, the committee will determine the amount at the beginning of September. A special price will be determined for villagers that use the water for industrial or commercial usage. The community has accepted this proposal. For example, for hostels, the landlord will be asked to pay a fixed fee for all hostels that he owns. In this way, the usage will be minimized. If, in the long run, the money that the committee receives is not enough, they will talk to the general assembly to increase the amount.

The private taps are ready for implementation. If a household can pay for it, they are free to install it. However, the water committee wants to get informed about it. The pipes are 150 meters extended on each side of the village. From September on, the villagers are free to install their private taps.

SHUMAS – 14th of August, Bamenda

Judith – Social affair program, manager rehabilitation center

Nicoline – Education program manager

Millian – Program coordinator

SHUMAS applies an integrated approach. They have 8 axes of intervention. Education is the most important one for SHUMAS. They construct and equip schools. However, people have to pay for their books and uniforms. Other points of interests for SHUMAS are the provision of potable water and micro financing for women.

SHUMAS understands the value of clean drinking water and good sanitation. They teach about the consequences of bad sanitation at schools. If the water cannot reach the school, they make a drum-system in order to provide the schoolchildren with the ability to wash their hands. Education is also a very important aspect. SHUMAS teaches about cholera, targeting the children and the women.

The school environmental program consists of several aspects. First, they try to raise income for the schools by selling the harvest from the students. Secondly, they teach the values of sustainable agriculture. SHUMAS wants the students to understand that using chemicals is not a sustainable way of doing agriculture as the chemicals can reach the water that is being used for drinking water via the ground.

Women program: after 15 years of working, they realized that women are the brain behind the development of a community. SHUMAS tries to make use of local materials and local labor. They give microcredits to women. After SHUMAS leaves, the project is fully transferred to the community. However, they still support the communities by providing seminars. Men are still involved in the projects, however SHUMAS realizes that women and children feel the pain of polluted water, as they are the ones who get the water every day.

SHUMAS get their finances from volunteers and individuals that donate money. For example, Martin Leech (British) pays for the scholarships that made 66 children be able to go to school. Also, SHUMAS receives funds from Rotary International.

SHUMAS works with an application process. Firstly, the needs of the community are being identified. Did the community try to solve the problem themselves? If they are unable to, SHUMAS tries to find funding to help the community. The need assessment takes about 1 day. In order to perform a better assessment, they would need to have at least a week for every community. However, due to the limited amount of resources, they shorted the need assessment to one day. After that a contract is signed with the community. At this moment, SHUMAS has a lot of applications coming in.

What often fails in projects performed by international organizations is the involvement of the local community. If the community is involved from the start, they know what to do and what can be expected from them. After the construction, the caretakers will do trainings and workshops to be prepared for the 'job'. With this approach, the communities feel as if they are stakeholders in the project. If any repair cannot be done by one of the caretakers, they contact SHUMAS. They will send their technical team. However, most often it is within their reach. How the community gets their money for the repairs is their own responsibility. Maintenance is not the responsibility of SHUMAS. The caretakers are not paid. According to SHUMAS they are proud to perform the job. They receive no cash but sometimes other people work for them at their farm.

The main obstacles that SHUMAS encounters are the willingness to contribute and the amount of applications. Some villages do not want to contribute their own quarter. Also, the locations of the projects are sometimes far away from each other. This makes monitoring difficult and costly.

SHUMAS performs the feasibility studies themselves and are for free for the community. In general, they make use of water by gravity systems. However, they also make use of solar pumps.

After the completion of a project, an impact assessment is performed. In the case of water projects, one of the major pitfalls is that the project did not take into account the growing population. This means that the community applies again to SHUMAS for another catchment.

SHUMAS does not want to ask the community to pay the whole amount of the project. If they could, they would not apply to SHUMAS in the first place. They think that the community needs to get education before this can be achieved. There are projects where the people pay for the water, this goes via the water committee. If they don't pay, they shut down the system.

SNV Cameroon – 14th of August, Bamenda

SNV is not investing in projects themselves, they work with project investors. They started in 2006. The head office is in Yaounde and they have 3 branches at other places, including one in Bamenda. They help the council and train the follow up committee. SNV gets funding from the African government bank. They do not build or pay the systems themselves.

Every council needs to deliver 2 persons for maintaining the system. Nowadays, more than 40% of the systems in rural areas is not working. By focusing on maintenance, it will be cheaper to develop these systems instead of waiting before they need to get repaired. The council needs to get training as well to be able to manage the water projects. They need to develop maps of which projects are working and which not, what the capacity is of the source, etc.

When they are looking for people in the community to train, they contact other NGOs. They help with developing a maintenance plan for the coming 2 or 3 years and help stabilize the financial means. SNV works with IDC, Livelihood, Aghi, Mindin. In total 15 organizations that concern clean water supply. Some are located near Bamenda, some in Yaounde and some only in foreign countries.

SNV works closely with the government. They help to achieve the millennium goals in Cameroon. They also create a platform for the councils to exchange experience. The platform comes from the regional delegates for water. Also Plan International is part of the platform.

SNV is funded by the ministry of foreign affairs from the Netherlands. However, some projects are funded by other parties, for example, the African Bank. By 2015, the funding will stop as the millennium goals will expire by then; this means that the program will terminate.