Sustainability of Rural Water Supply Systems:

Assessment of gravity water systems implemented by Plan Cameroon in the Northwest Province of Cameroon

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University of Twente
The Netherlands

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Bachelor thesis
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Final version

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Frontpage pictures (from left above clockwise): Unusable standpipe at the fon's palace in Bamali; storage tank in Mbemi; standpipe in Upper Mbemi (Nyen); Sedimentation tank in Bamali.

Acknowledgement

About one year ago I started looking for an organization where I could do an internship for three months within the framework of the completion of my Bachelor degree Civil Engineering. After months of trying I was very happy that Plan Cameroon invited me to execute this practical training at their Northwest Program Unit. This appeared to be an excellent choice not only because English is the official language in this part of Cameroon, but also because of pleasant climate, atmosphere and surroundings of Bamenda. In the first case, the Northwest Province didn't seem to be the most useful place to do research on the sustainability of rural water supply systems. The sustainability of gravity water systems, the most common technology in this province, was not seen as a pressing problem. But they welcomed a fresh view on this and especially on the adaptation of the PHAST-methodology.

This has led to a report that compares both the implemented systems as well as the used project approach with a high standard. At the first site this literature-based standard seem to lead to discouraging results, but I hope that it will encourage Plan to keep on learning and improving. When I came to Cameroon I had never been in Africa before. When I came to Plan I had no experience in doing research, not to mention a research with many social-scientific elements. When I started my research I never had seen a gravity water system before. I have learned a lot during the last three months and I want to thank Plan Cameroon for this chance that was a great challenge. I really hope that the results of this report will be just as challenging for Plan Cameroon as the creation has been for me!

I would like to thank Prem Shukla, Tah Massa Shadrack, Kevin Ndemera and Leticia Soriano for their support from the moment of my request until now. I also would like to thank Lucas Ganye and Vincent Dohvoma for sharing their knowledge with me. Further I want to thank all my colleagues in the Northwest Program Unit for being part of them. I would like to thank especially Emmanuela and Denis for making arrangements in the field. Also thanks a lot to Mercy and Julliette for taking me up in your office and being mates! The last colleague I am really grateful to is Bernadette who shared her house with me during this period and was always ready to advise me. From the University of Twente I would like to thank Annet and Ellen of the Mobility Centre for their support especially during the preparations. I am also very grateful for the support given by my supervisor Martijn Booij for the very useful and fast feedback and always being available. And of course I wouldn't have made it without the support of Bernd!

Joanne de Kruijf
Bamenda, August 2005

Executive summary

Plan Cameroon is part of Plan International, an international, humanitarian, child-focused development organization. Since 1996, Plan International is also active in Cameroon trying to make long lasting improvements in the life of Cameroonian children and their families by the implementation of several programmes. Since many families in Cameroon don't have access to safe drinking water, the implementation of rural water supply facilities is one of the elements of these programmes.

The purpose of this research is to assess whether rural water systems implemented by Plan Cameroon are sustainable. This involves both the current capacity of the system to deliver and continue to deliver safe and adequate water for all beneficiaries as well as the efforts Plan has made and is making to implement a sustainable system.

The focus of this report is on the sustainability of gravity water systems; the main used technology in the Northwest Province of Cameroon. This technology taps and channels water from mountainous sources towards communities using pipes and stand pumps. Part of every project is the implementation of infrastructure and building of capacities inside the community to manage and use their system after project completion. A recent development is that Plan is shifting towards community-managed projects, which requires capacity building that enables the community to be in control during all phases of the project. One of the advantages of this shift is that it will ensure sustainability of the projects.

For the purpose of this research a rural water supply system is supposed to be sustainable if the facilities are operational and benefiting all users, maintained and managed and have the capacity to continue this in the future. It is assumed that a facilitator can provide a foundation for a sustainable system by using a project approach that enhances sustainability. For a community-managed water supply common accepted project requirements for sustainability are the use of an appropriate technology, participation from the community members and training of water management committee (WMC) members and households. Besides these three, more recent aspects have also been studied. This is in the first place the degree to which the project is driven by the demand expressed by households. Secondly the extent to which the facilitator and the community are jointly planning and practicing a strategy that recovers all the costs related to a rural water supply system. The last aspect is the ongoing support towards operation and maintenance (O&M) by providing materials, assistance, coaching etcetera.

The assessment of sustainability has been carried out for two case studies in the Northwest Province. The first case study is Mbemi: a small community where Plan has been using their traditional project approach. The second one is the first phase of the Bamali water project where Plan has been using a community managed project (CMP) approach. To assess the sustainability of these projects two sets of indicators have been defined, one for the current performance of facilities and one for the used project approach. Performance indicators are the operation, management and maintenance of the facilities. For the project approach six indicators are defined: technology, participation, training, demand-driven approach, cost-recovery and support O&M. For both frameworks the indicators are divided into sub-indicators, which are again divided in sub-sub-indicators. Scores will be attributed to sub-sub-indicators based on information obtained from interviews inside the two communities with households and committee members, from project files, reports and information obtained from Plan employees. From the scores of the sub-sub-indicators, averages will be drawn to obtain an overall impression of the indicator concerned.

Comparing the performance of the systems in Bamali and Mbemi with the indicators of sustainability shows that both systems are not really sustainable. Though most of the facilities are still operational, except from one standpipe in Bamali, both communities are not prepared for the future. This is mainly due to poor financial management. Both communities lack appropriate financial planning and budgeting and an appropriate system for user fee collection. In Bamali there are no clear agreements at all available about the recovery of operation and maintenance costs. In Mbemi agreements have been made, but these are incomplete and people are not really acting upon. Further the efficiency of collection appeared to be very low and the committee members are not really acting upon non-payment. This results in both cases in a lot of problems with the available money for maintenance, which is generally insufficient to buy appropriate tools or sometimes even not to do repairs. Users are generally quite satisfied about the system, maybe because they are all recognizing the improvement of their health. However sanitary inspections show that still a lot can be done to deliver water of better quality.

Concerning the used project approach it appeared that Plan is paying a lot of attention towards participation. In theory the score on participation should be especially high in the case of community-managed projects, but this is not the case. Comparison of both case studies shows that the participation in Mbemi has a higher overall score than Bamali. Comparing both case studies with the objectives of the CMP-approach shows that even the objectives of the CMP-approach were not worked out better in Bamali. The case study of Bamali showed that capacity building is mainly focused to empower some community members, which might even lead to inequality and doesn't ensure sustainability.

Further it appears that the used project approaches had a low attention for O&M. Costs of maintenance, minimization of contamination risks and availability of spare parts didn't really play a role in the design. And though it has been very clear towards the community that they will be responsible for O&M, they are not aware at all about the implications. Training on O&M is also weak both at community and committee level. It is also not part of Plan's policy to support O&M by providing an approach for monitoring of their facilities, planning of maintenance activities, providence of spare parts, tools or materials to inform community members about hygienic use of water. Monitoring and assistance from Plan after completion is mainly done in an ad hoc way and monitoring of sustainability of water systems is not really part of their policy.

Considering the results it is assumed that Plan can still improve the sustainability a lot by changes of their project approach. Paying more attention towards O&M aspects in particular can really strengthen the sustainability of projects. Attention for O&M should already appear from the presence of O&M aspects in design and feasibility studies. Further there should be provided more information about the implications from O&M and the project in the beginning. The Participatory Hygiene and Sanitation Transformation (PHAST) methodology might be an appropriate methodology to facilitate this, if conducted before the starting of a water project instead of after. Monitoring should be improved at community and Plan Cameroon level and be based on aspects related to sustainability. Furthermore, committee members should receive more coaching instead of only a short theoretical training on financial and technical planning and monitoring. Plan should ensure that spare parts and tools for O&M are available in the community after project completion.

List of abbreviations

BMRD	Baka and Mboro Rights and Dignity
BRRM	Building Relationships and Resource Mobilization
CBO	Community Based Organization
CDF	Community Development Facilitator
CDO	Community Development Outline
C.f.u.	Colony Forming Unit
C.m.	Community member(s)
CMP	Community Managed Project
CPO	Country Program Outline
CSED	Child Survival and Early Development
CSP	Country Strategic Plan
D.U.	Development Union
FCFA	Franc Comminaute Financiere Africaine (1000 FCFA ≈ € 1,52)
F.s.	Feasibility Study
Govt	Government
ICD	Integrated Childhood Development
IEC	Information Education and communication
M.c.	Management or maintenance committee (synonym for WMC)
NGO	Non Governmental Organization
O&M	Operation and Maintenance
P.c.	Project Committee
PECUDA	Peuchop Cultural and Development Association
PHAST	Participatory Hygiene and Sanitation Transformation
P.U.	Program Unit
RIE	Rural Infrastructure Engineer
RMP	Resource Mobilization Source
SRL	Sustainable Rural Livelihoods
TPA	Towards a Productive Adulthood
WMC	Water Management Committee (Synonym for m.c.)

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1 Introduction

This report is written in the context of Cameroon and Plan Cameroon; since this might not be familiar to every reader this context will firstly be discussed in §1.1. The second paragraph introduces the research itself.

1.1 Context of research

Plan Cameroon is the part of Plan International that is carrying out development activities in Cameroon. This paragraph will successively give an introduction towards Cameroon, Plan International and Plan Cameroon. Further explanation on Cameroon is written down in Annex A.

1.1.1 Cameroon

Cameroon is a country located at the West coast of Africa. The country has a colonial background of French, English and German dominance. In 1961, one year after Cameroon became independent, the former British and former French part merged to the present country of Cameroon. Cameroon is officially a bilingual country, with French and English as official languages, but besides this about 275 tribes are also having their own languages.

The landscape is just as the rest of Cameroon quite diverse. It consists of rain forest in the south, savannah in the North, almost Sahara in the highest North and green hills in the Northwest. The Northwest Province belongs to the Anglophone part of Cameroon. Because of the rich volcanic soils, it has a higher rural population density than elsewhere in the country.

Cameroon once belonged to the richest countries of Africa. Unfortunately the country has been in deep economic crises from 1985 until 1995. Currently the country is recovering, but has still to deal with a bad reputation on corruption, which led also for instance to the retirement of the Dutch embassy and the cutting off of development support from the Dutch government. Last February the Dutch government however decided to reopen the Embassy in Cameroon. There are working a lot of NGO's in Cameroon who are fighting against malnutrition, HIV-Aids, illiteracy, low access to safe drinking water etcetera.

1.1.2 Plan International

Plan Cameroon is part of Plan International, an international, humanitarian, child-focused development organization. It has no religious, political or governmental affiliation. Plan International carries out activities in developing countries around the world, but informing people and gathering money in donor countries are also important activities.

The mission of Plan International is 'working for lasting improvements in the quality of life of deprived children in developing countries, through a process that unites people across cultures and adds meaning and value to their lives'. This mission is guided by the vision 'of a world in which all children realise their full potential in societies that respect people's rights and dignity'.

Plan International has six strategic directions to achieve their mission and vision. The first and most leading strategy is being a child centred development organisation. The second is making long-term commitment to children living in poverty and is strongly related to sustainability. The reason for sustainability is also given in the third strategy 'assisting as many children as possible'.

The last three ones are building partnerships; working in partnerships and alliances and being a recognised voice.

1.1.3 Plan Cameroon

Plan operates in Cameroon since 1996. Currently Plan carries out activities in the East, the Centre and the Northwest Province of Cameroon. Every Province has one Program Unit (PU) with departments in finance and administration, sponsorship and programme implementation. Sponsorship is responsible for the enrolment of children in Plan Communities and pass on information about the children to Plan donors and sponsors. So far this activity has also been the basic foundation of the organisation. Community Development Facilitators (CDFs) are the executers of programme implementation. Every CDF has a zone consisting of several communities, where they facilitate and monitor the developing process of the community.

Plan Cameroon also has a country office to support these activities. Important activities in the Country Office are the formulation, monitoring and evaluation of strategies, programmes and policies. In the country office are about 25 people working as fixed Plan Staff, whereas in totally there are about 80 people working as fixed Plan Staff in whole Cameroon. Besides these employees there are also working a lot of consultants and people working on a temporary base.

The programmes of Plan Cameroon are based on the strategic directions from Plan International, but also on the specific strategic directions and themes for Africa, the current situation in Cameroon and Plan Cameroon and international processes like the millennium development goals.

1.2 Introduction of research

This paragraph introduces the research by giving subsequently the occasion, objectives, strategy, scope and limitations and relevance. The outline of the report is determined by the research questions and is also given in §1.2.2 with the objectives.

1.2.1 Occasion

Although yearly a considerable part of Plan Cameroon's budget is spent on the implementation of rural water supply systems and the providence of safe and adequate water is an important objective - especially in the domain of health - until now Plan Cameroon didn't execute a specific evaluation on the effectiveness of their water projects. Of course more general evaluations about the effectiveness of programs have been executed, but the budget spent on water projects and the place in the programs justifies also a more specific evaluation of these projects.

It is understandable that Plan Cameroon has been given priority to implementation of projects instead of evaluation. Plan is still a young organization and wants to 'assist as many children as possible'. However, for assistance of as many children as possible, improvements need to be long lasting. To verify whether improvements are indeed long lasting, censorious evaluation is indispensable. This report provides this evaluation by using sustainability as a measuring rod, since only the implementation of sustainable systems will support the goals 'long lasting improvements' in the lives of 'as many children as possible'.

1.2.2 Objectives

The objective of this research is '*How sustainable are rural water supply systems implemented by Plan Cameroon and how can this be strengthened in the future?*' To answer this objective the following research questions will be answered:

1. How is Plan Cameroon implementing rural water supply systems (in theory)?
2. How can sustainability be defined and strengthened based on literature?
3. How can sustainability of projects implemented by Plan be identified and measured in practice?
4. How sustainable is the performance and approach of a project that is executed following the traditional project approach?
5. How sustainable is the performance and approach of a project that is executed as a community-managed project?
6. How do the different project approaches from Plan Cameroon and their outcomes correspond to literature?

The answers on these questions are answered subsequently in chapter 2 until 7. A summary of this answer can be found in the last paragraph of each chapter. Chapter 8 summarizes all these answers and draws conclusions and recommendations on the general objective of this research. Annex A until G are giving more clarification and are also part of this report.

1.2.3 Strategy

Theoretically a system is sustainable if it 'continues to function over a prolonged period of time' (Brikké, 2002. In: Cardona and Fonseca, 2003) or has 'capacity for continuance' (Parkin 2000a,b. In: Sohail et al, 2005). From empirical research it appeared that a sustainable water supply requires operational facilities that are benefiting all users, maintained and managed (Brikké, 2002. In: Cardona and Fonseca, 2003).

To draw conclusions on the sustainability of projects implemented by Plan, sustainability in theory will be compared with the performance of two implemented systems in two case studies. This comparison will be done through a framework of 'performance indicators'. These indicators don't provide enough information to indicate how Plan can strengthen the sustainability of water systems in the future. That's why a second framework with 'project approach indicators' is designed that enables a comparison of a project approach that is said to enhance sustainability with two project approaches used in the two case studies. Comparison of theory with the reality of two case studies and the current method of approach finally leads to conclusions and recommendations about sustainability. Figure 1 reflects the comparisons between theory and practice and the relation between project approach and performance.

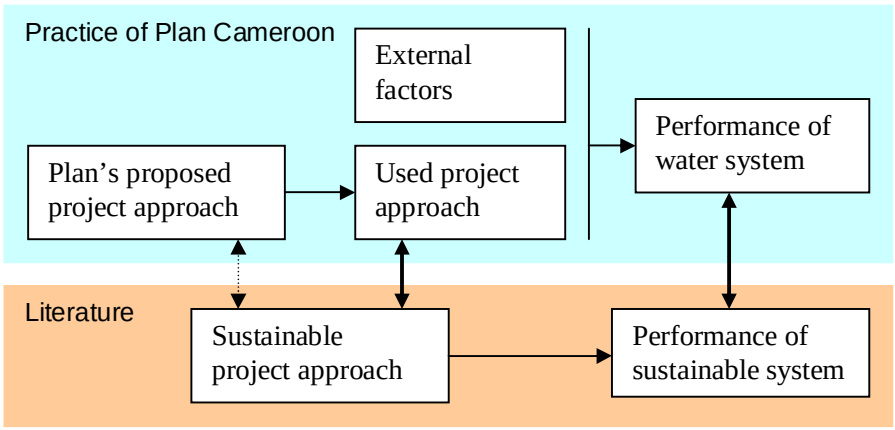

Figure 1 - Relation between project approach, performance, theory and practice.

1.2.4 Scope and limitations

This research is a qualitative research with some quantitative aspects on gravity water systems in the Northwest Province of Cameroon. This scope of type of research, technology and area was necessary since the time-schedule was only three months. This time-schedule limited also the number of case studies to two, each with eleven respondents. Considering this small-scale it is not possible to draw any definite conclusions on the sustainability of gravity water systems or on the use of the examined project approaches. In the second place it is not possible to draw absolute conclusions about the situation in the two villages, based on interviews with 11 respondents and documents. Furthermore it has to be taken in mind that the interview results might be unreliable, since a white person did them. This might have especially influenced the response on questions about finances. This cultural bias has been minimised by interviewing respondents with different interests and by trying to discover facts from minutes and accounting books. The focus of this research asks also for carefulness in applying the results to other areas and technologies.

Considering the type of research it is not possible to prove interrelations between project approach and sustainability. The main reason for this is that external factors cannot be excluded in this type and scale of research (see also Figure 1). Still assessment of the project approach is one of the main objectives of this research, but it will be restricted to a comparison between what Plan is currently doing and recommended approaches by authors. Based on these results and the performance of the project some tentative recommendations can be done towards Plan.

1.2.5 Relevance

One of the Millennium Development goals formulated by the United Nations and signed by many countries is to 'halve the proportion of people who are unable to reach or afford safe drinking water' (UN, 2000). This target should be realised by 2015, which seems to be very ambitious, since still one billion people over the world lack access to safe drinking water. But during the 1990s nearly one billion people gained already access to safe drinking water. (UNDP, 2000) Low access to safe drinking water is also the case in Cameroon. In Cameroon only about 60% of the people have access to safe drinking water (Worldbank, 2003). In the rural communities where Plan is working this rate is even lower, for instance in the Northwest Province only 29% of the families are currently having access to safe drinking water. The objective of Plan Cameroon is to enlarge this percentage in whole Cameroon to 50% in the year 2010.

Since so many people are not having access to safe drinking water, sustainability becomes more and more important. Only when sustainable water systems are implemented it will provide lasting change in the lives of these people, which makes it possible to go further to support other communities. This contributes to the mission and strategy of Cameroon to provide long lasting improvements, assist as many children as possible and their commitment towards the millennium development goals. Besides this, other arguments like efficient use of resources are relevant when talking about sustainability.

2 Implementation of rural water supply

This chapter introduces rural water supply in general, with a focus on the implementation of gravity water systems by Plan Cameroon. It gives an answer on *'How is Plan Cameroon implementing rural water supply systems?*' The first paragraph discusses the different options of facilities, the project organization and the project cycle of a water project implemented by Plan Cameroon in general. The second paragraph describes the way Plan is working inside communities in general and explain two recently adopted methodologies of approach. The answer of the research question will be summarised in the last paragraph.

2.1 Rural water supply projects

This paragraph firstly goes into the infrastructure of a rural water supply project. Subsequently the used project organization and activities of gravity water systems will be discussed. Annex B provides more technical information about gravity water systems and implementation guidelines from Plan for infrastructure and training.

2.1.1 Infrastructure

Depending on local conditions and the preferences of beneficiaries and facilitators a choice for a certain level of service and technology can be made. To give an idea of the different options, some common varieties of technology and level of service are written down in Table 1.

Table 1 - Common options in rural water supply systems. (*Sara and Katz, 1998, p. 6, table 1)*

Technology options	*Level of service*
• Point sources per hand dug well • Hand dug or drilled well with hand-, solar- or electric pump • Rain water catchment or storage tank • Distribution systems • Spring or river with gravity flow • Deep well with pump and storage	• Number of users per distribution pump • Individual house connection or water point • Public facilities • Public and individual in same community

Though Plan allows communities to extend their system to a higher level of service, Plan only provides public facilities preferably at schools, markets, the Fon's palace and densely populated areas. Plan has also developed a policy concerning the technologies they are implementing. In the East and Centre Provinces of Cameroon the main types of water facilities, provided by Plan, are open wells with a pulley and improved springs. Plan discourages communities to install closed wells with hand pumps, since these systems proved to be unsustainable due to the unavailability of spare parts. If the community insists to have a closed well with a hand pump, they have to contribute one third of the costs of the pump. Whether a well is drilled or hand dug depends on the community's ability to contribute. An improved spring is made up of a catchment from where the water is continually flowing through two pipes.

Because of the hilly landscape and the presence of springs in the hills gravity water systems have become the widely used in the Northwest Province, though wells are also used for the supply of water. Water is intercepted at a spring and is led by pipes or directly to one or more catchments. From the catchment pipes lead the water to a reservoir. From the reservoir it's lead to the tap(s) for the community. The reservoir fills at night to provide enough water during the day. For the providence of water during the dry season special trees retaining water are planted at the

catchment area. An advantage of this system is that the force of gravity provides the needed energy to lead the water from the hills to the community. This has a major influence on the costs and efforts of the operation and maintenance of the system.

2.1.2 Project organization

In projects carried out by Plan at least two parties are involved: Plan and the community. Besides this in water projects the government is also involved most of the time. Plan has an agreement with the government that they can request for their involvement in supervision, monitoring, research and protection of the environment. Plan Cameroon further involves other NGO's to conduct training.

The persons from Plan mostly involved in water projects are the CDF and the engineer. Every CDF is responsible for development projects supported by Plan in communities in their zone. They will also monitor the water facilities as long as they are working in the community by keeping an eye on the facilities and informing about the management of the project. The engineer supports the CDFs technically in every project concerning infrastructure like schools, water systems and latrines.

Every community has to appoint some representatives to enable communication towards Plan. Most of the communities in Cameroon already have a Development Union to express their needs and represent themselves. This is an association of which all community members are member, but it has also an executive that organises and coordinates all development activities. This might be through the formulation of a strategic development plan, mobilization of people or networking. The executives of this Union sometimes also act as the project committee, but most of the time a specific project committee is elected. Depending on what's agreed this committee can be responsible for the management of project funds, planning, monitoring, coordination, evaluation and reporting. When the construction is completed the community becomes responsible for the operation and maintenance of the facilities. For this purpose they have to appoint a water management committee, who will be responsible for the operation, maintenance and management of the system. This responsibility is generally laid down in an agreement that obliges the community to keep the system functional for at least 10 year and involves the collection of water user fees, the appointment of a caretaker etcetera. In some cases the government is also involved in this agreement and is obliged to monitor whether the committee is fulfilling their part of the agreement.

Plan expects every community to conduct a feasibility study before they are requesting technical and financial assistance. Further every community is supposed to contribute at least 30% of the total project costs. This can be in cash, materials, labour or time. Plan enhances the community to provide as much skilled labour (a foreman, masons, plumbers) as possible. This will keep money in the community and will also enlarge the capacity to maintain the system.

2.1.3 Project cycle

Ideally a project is always initiated on request of the community, after conduction of a feasibility study. Before Plan decides to support a project an engineer will first make a brief appraisal about the geographical situation, the number of people, and the facilities etcetera. If Plan Cameroon decides to support the project, a thorough study and appropriate design must be available. This study contains all kind of project aspects, like the quantity and quality of water, costs, sustainability, sources, distribution system, utilities, level of service and costs of maintenance. The design is based on needs and wishes of the community and geographical data and contains a hydraulic profile, the course of the pipes and the construction drawings of the different facilities.

In the meantime the project committee has to mobilise the community to gather local materials like stones, sand and gravel. Other materials like pipelines, cement and iron parts are generally provided by Plan. Besides this the community is supposed to contribute in kind by digging channels for the pipes. Skilled labour will construct the different chambers, standpipes and lay pipelines. If all the standpipes are providing adequate and safe water the project will be handed over to the community. This is done through a ceremony that is accessible for the whole community.

Before handing-over of the project takes place, Plan will provide training for the WMC how to manage their system and at household level on hygiene and sanitation. From the beginning of July 2005 Plan also adopted the policy that local based technicians are supported, trained and supervised in conducting water quality control. This must support the objective to measure the water quality at least once.

If the system is well designed and constructed the main parts of the gravity water system can remain for more than 20 years. Activities to be undertaken are the cleaning of the reservoir, the area around the standpipes and the cleaning and maintenance of the fence around the catchment. Further the system has to be monitored to signalise leakages, unhygienic circumstances etcetera. Plan networks with local institutions for the supply of spare parts. Parts that might break down easily are the tap heads of the standpipes. It is important that these parts are locally available.

2.2 Project context

Implementation of a rural water supply system by Plan Cameroon is part of formulated programmes, the community development process and strategic choices and directions. This paragraph will describe the context of a rural water supply project by clarifying the programmes and the intervention process of Plan inside a community. The last two sub-paragraphs will go into two recently adopted approaches in Plan; these are the community-managed project approach (CMP) and the PHAST-methodology.

2.2.1 Programmes of Plan Cameroon

Every 10 years Plan Cameroon defines their strategic plan (CSP) for the country. This CSP is at the grassroots of the five-year programmes, which are presented in Country Programme Outlines (CPOs). The current CSP has been defined for the period 2000 until 2010. New CPOs are just presented in May 2005 and are:

- Child Survival and Early Development (CSED)
- Integrated Childhood Development (ICD)
- Towards a Productive Adulthood (TPA)
- Baka and Mboro (two marginalized communities) Rights and Dignity (BMRD),
- Sustainable Rural Livelihoods (SRL)
- Building Relationships and Resource Mobilization (BRRM)

Infrastructure needed to reach the objectives of these programmes is not a programme in itself. Infrastructure to provide access to adequate and safe drinking water all year round is especially an issue in the CSED and BMRD programmes. The objective is to enlarge this percentage in Cameroon to 50% in the year 2010.

Monitoring and evaluation of programmes is done based on defined outcome indicators. Concerning access to drinking water these are the number of families that have access to adequate and safe drinking water, the % of communities with water supply and a functioning gender balanced WMC, the % of water sources functioning all year round and the % of water supplies where the water quality has been tested at least once. Part of the strategy to reach these outcomes is the inventory of existing infrastructure, construction of infrastructure, support training of WMCs, support IEC on hygiene and sanitation by use of the PHAST methodology, capacity building through use of the CMP-approach, networking with local institutions, and support, train and supervise local technicians to conduct water quality control.

2.2.2 Intervention cycle

Before Plan starts to work in a community generally an exploratory study is carried out firstly. This study starts with the analysis of data from the Worldbank about level of poverty, education, and facilities etcetera. Based on these data Plan selects communities to be analysed specifically through a Baseline Survey. These surveys form also the base for strategic plans and country programme outlines. Depending on the results of this survey there might be a justification for Plan to introduce their organization in a community. This introduction consists of what Plan is and what they can do for that community.

After this introduction a community can decide to accept or refuse intervention from Plan in their community. If they accept intervention of Plan, the sponsorship department will start with the enrolment of children. The objective is to find a sponsor for one child per woman. If the community wants to improve their circumstances they have to organize their development needs in a Community Development Outline (CDO). During the accomplishment of the CDO an employee from Plan plays the role of facilitator in a development dialogue amongst communities and other stakeholders. During this process Plan will also promote and strengthen CBO's and organize trainings to enhance the capacity of the community. A CDO normally contains several projects, which will be gradually implemented during the years. Each year a community agrees with a CDF about the project that has the highest priority. When the community has been chosen a project the CDF will assist them in steps to be taken next towards a project request. A CDO is not only meant to mobilize funds from Plan, but also as a negotiation tool in the mobilization of other resources.

The CSP (2000) mentions that Plan discusses already in the beginning that their intervention in the community is temporarily, because Plan does not want the communities to become dependent on them. However the duration of intervention is not fixed, for some communities it might be 5 or 10 years, for others it might be longer. Due to the age of Plan Cameroon, until now they did not leave any community they entered. At the moment people are working on a policy of leaving the community. The ongoing of projects is linked to the availability of sponsored children and on the objectives, priority and the capabilities of the community. If there are sponsored children it is compulsory to do at least one project a year. Intervention will at least always run out graduate. Plan will also try to create effective linkages between CBO's and other agencies in to ensure the sustainability of the development process once Plan phases out.

2.2.3 CMP-approach

A Community Managed Project (CMP) is a project that is initiated, planned, managed, monitored and evaluated by community members. This implies that the community is the main actor whereas Plan only fulfils the role of facilitator, in other words the community is in control instead of Plan. The main purpose of CMPs is to empower all the community members to make informed choices, plan, manage, identify, use and control their own resources. CMPs also aim to carry out

training activities during the project instead of after completion of infrastructure. One of the advantages of this approach is that is will ensure sustainability (Yunga, 2003).

One of the main differentiators between project approaches is the type of financial management. Inside CMP Plan distinguish four main types of approaches:

1. **Traditional approach:** The community provides local technicians and materials, Plan delivers materials and is monitoring and supervising the project;
2. **Learning approach:** Plan is paying and arranging contracts for suppliers, but the community selects the suppliers by themselves;
3. **Reimbursement approach:** The community selects suppliers, makes contracts and pays them initially with their own money. Plan reimburses the project costs in phases after justification and based on the agreements made;
4. **Disbursement approach:** Plan and the community enter a protocol agreement, where the number, moment and amount of payments from Plan are written down. After receipt of the money the community starts to select suppliers, makes contracts and pays the materials;

Running a reimbursement or disbursement approach requires the community to have a bank account, which can be operated by a project committee. This committee has to be elected during a community meeting and should be gender-balanced. Members should be occupied with the function of president, treasurer, financial secretary, purchaser, storekeeper, caretaker and others. Depending on the type of approach used, this project committee will receive training how to run the project. Participation of other community members will be through community meetings, contribution, awareness raising and mobilisation.

2.2.4 PHAST methodology

PHAST stands for Participatory Hygiene and Sanitation Transformation. Plan uses from these series the '*step-by-step guide for a participatory approach for the control of diarrhoeal disease*'. The different steps in this approach are written down in Table 2.

Table 2 - Steps to community planning for the prevention of diarrhoeal disease. *(Wood et al, 1998, p. 8)*

STEP	ACTIVITY
1. Problem identification	Community stories Health problems in our community
2. Problem analysis	Mapping water and sanitation in our community Good and bad hygiene behaviours Investigating community practices How diseases spread
3. Planning for solutions	Blocking the spread of diseases Selecting the barriers Tasks of men and women in the community
4. Selecting options	Choosing sanitation improvements Choosing improved hygiene behaviours Taking time for questions
5. Planning for new facilities and behaviour change	Planning for change Planning who does what Identifying what might go wrong
6. Planning for monitoring and evaluation	Preparing to check our progress
7. Participatory evaluation	Checking our progress

The purpose of the PHAST methodology is to involve the whole community in the process from problem identification to evaluation. It provides visual material, which can be used during workshops and community meetings. Plan has adopted the PHAST methodology for the second year to support programmes containing a water and sanitation aspect. Use of the PHAST methodology in the context of Plan aims on the adoption of good hygiene and sanitation practices and sensitisation of communities in maintenance and upkeep of sanitary facilities. This implies that instead of what might be expected, the methodology isn't used to support community participation towards problem identification and solution of water problems. Usually it is conducted after completion of a water project, so that training focuses on maintenance and hygienic use of water. The methodology replaces training on Hygiene and Sanitation, which used to be conducted after completion of a water system.

Inside Plan the commonly mentioned differences with formal training are:

- Involvement of the whole community in decision-making instead of only the leading community members;
- Awareness of the linkage between health and water/sanitation instead of recognition of missing elements in water and sanitation. For example 'we need to get better sanitation for our health' instead of 'we need latrines because we don't have them';

2.3 Conclusions

The objective of this chapter is to indicate how Plan Cameroon is implementing rural water supply systems. In the Northwest Province of Cameroon, Plan is mainly implementing gravity water system. This technology taps and channels water from mountainous sources to the communities using pipes and stand pumps/standpipes. Plan is only implementing public standpipes, preferably placed at schools, markets etcetera. Main parties involved are generally Plan, the community and the Government. Besides an infrastructural aspect, every project also contains several capacity building activities for the whole community and the water management committee to be elected. These activities enable the community to manage their water system after project completion.

A rural water supply project is always part of one of Plan's corporate programmes. Besides this it is also part from a development process inside the community. In this process acts Plan as a facilitator enhancing the communities to formulate their development needs and wishes in a CDO. This CDO also enables the community to mobilize other resources after Plan has been stepped out.

Two recent corporate developments inside Plan are the adoption of the CMP-approach and the PHAST-methodology. Both are aiming at a higher degree of participation from community members towards projects. A CMP aims to let the community members be in control from initiation to evaluation of a project. Depending on the degree of community management it allows a CBO even to select suppliers, make contracts and order materials with money distributed by Plan. The PHAST-methodology is also a tool to involve community members from problem identification to evaluation, but Plan conducts it only after the implementation of water projects. Use of the methodology aims on hygiene and sanitation improvements from which hygienic use of water and the importance of maintenance and upkeep of facilities are part.

3 Theoretical view on sustainability

This chapter gives a theoretical view on sustainability in the context of rural water supply. It gives an answer on the sub-question *'How can sustainability be defined and strengthened due to literature?'* The first paragraph gives an insight in the required performance to classify a water system as being sustainable. The second paragraph goes specifically into the relation between the used project approach and sustainability. The last paragraph summarises the main findings and will be a stepping-stone towards the assessment of sustainability in the case studies.

3.1 Sustainable water supply

This paragraph goes into the meaning of sustainable water supply. It subsequently discusses the definition and key constraints of rural water supply.

3.1.1 Definition of sustainable water supply

Before giving a definition of a sustainable rural water service, firstly two subjects related to sustainability will be discussed. This is in the first place the time-schedule of sustainability and in the second place the environmental aspect.

3.1.1.1 Time span

The first distinction between several definitions referring to sustainability is the interpretation of the lifespan. If water supply is being looked at as a project, sustainability might be defined as the maintenance of an acceptable level of services throughout the design life of the water supply system (Sara and Katz, 1998). This means that the facilitator only implements a water system for 20 or maybe 30 years, or whatever the designed life may be. To avoid the term lifespan Parkin (2000a,b. In Sohail et al, 2005) came up with the notion of *'capacity for continuance'*. This is also what Bamberger and Cheema (1990. In: Sara and Katz, 1998) use when they define sustainability as the capacity of a project to continue to deliver its intended benefits over the long term.

The combination of a project and an infinite lifespan might cause some confusion, since projects in generally are designed for a certain period. Although a water system might technically be designed for certain years, the intention of the system remains to keep providing water, year after year. This is why it is preferable to refer to a water system as a service instead of a project. In this report a water system implementation project covers the period between initiation and handing-over of the facilities. Due to this definition all O&M activities are regarded as post-project activities.

3.1.1.2 Environmental aspects

All definitions mentioned above don't contain an environmental aspect, but this might be important if the supply of water has to be continued over a prolonged time. Harvey and Reed (2003) take the environmental aspect into account in their definition:

> 'The water sources are not over-exploited but naturally replenished, facilities are maintained in a condition which ensures a reliable and adequate water supply, the benefits of the supply continue to be realized by all users over a prolonged period of time, and the service delivery process demonstrates a cost-effective use of resources that can be replicated'. (Harvey and Reed, 2003, p. 115)

This definition takes the environmental aspect of the source into account, but it gives just a narrow vision on this aspect. Not only might the source be over-exploited; the environment might also be effected negatively by site-effects like wastewater or erosion.

3.1.1.3 Chosen definition

For the purpose of this research the definition of Brikké will be used to define sustainability, see Figure 2. This definition takes into account all aspects required for a sustainable water system and makes the requirements already more operational. Furthermore it is in accordance with the policy of Plan Cameroon to hand a project over to the community after completion.

A water and sanitation service is sustainable when:

- It is functioning and being used
- It is able to deliver an appropriate level of benefits (quality, quantity, convenience, continuity, health) to all
- It continues to function over a prolonged period of time
- Its management is institutionalised
- Its operation, maintenance, administrative and replacement costs are recovered at the local level
- It can be operated and maintained at local level with limited but feasible external support
- It does not effect the environment negatively

Figure 2 - Definition of sustainability. *(Brikké, 2002. In: Cardona and Fonseca, 2003)*

The definition doesn't really go into the financial management required to recover costs. Since finances are often a problem in community-managed water systems, it is important to have a good understanding of this term. Brikké and Rojas (2001) state that financial management is effective when managers are able to budget the revenues and expenditures over defined periods of time, collect user fees, keep financial information and records and control and monitor the financial performance of the enterprise.

3.1.2 Key constraints

Soley and Thøgersen (2003) visited more than 50 communities to design a monitoring and evaluation system. These visits showed that more than 80% of the problems experienced by the communities are of managerial and financial nature, while less than 20% was of technical nature. Harvey and Reed (2003) mention for example five key constraints related to sustainability, from which just one is technical. The other constraints are related to community, financial, policy and/or institutional aspects. This also appears from the case studies, since management has the lowest performance and operational and maintenance problems often have a financial background.

In almost all literature about rural water supply you will encounter the term willingness to pay. It plays a key-role in sustainability and is often called a variable that can be influenced by certain project approaches. In fact, many of the approaches to strengthen sustainability are meant to strengthen the willingness to pay. Willingness to pay can be described as the decision taken under a situation of free choice to spend some of the available resources on a service or good. In general the willingness to pay is an expression of the willingness to contribute in cash, but also in kind.

There are several factors that influence the willingness to pay. On community level these are the characteristics of the community and their attitude. But it is also related to service factors like the

characteristics of the water supply and the nature. Ntengwe (2004) adds that the willingness to pay will be high if consumers derive a high social value from water service. The level of this social value depends on the awareness of people about water management. It is important to mention that there is always a gap between ability and willingness to pay and that there's no systematic correlation between these two variables. As the willingness to pay depends on many factors and is not directly correlated to the ability to pay, it is difficult to measure (Brikké and Rojas, 2001).

Strasser (2000) concluded after a research on the sustainability of rural water supply systems in the Northwest Province of Cameroon that trust plays a major role. Institutions are not trusted by the community, which has a negative effect on the willingness to pay. This distrust might be caused by the lack of accountability due to poor skills of the WMC, a lack of communication between the WMC and the community and a lack of knowledge about the costs of O&M. Cardone and Fonseca (2003) mention that insufficient willingness to pay can lead to a vicious circle of no financial capacity, no maintenance and a further declining willingness to pay. Figure 3 shows an interpretation from this vicious circle (the coloured boxes) and aspects that might cause this circle based on literature.

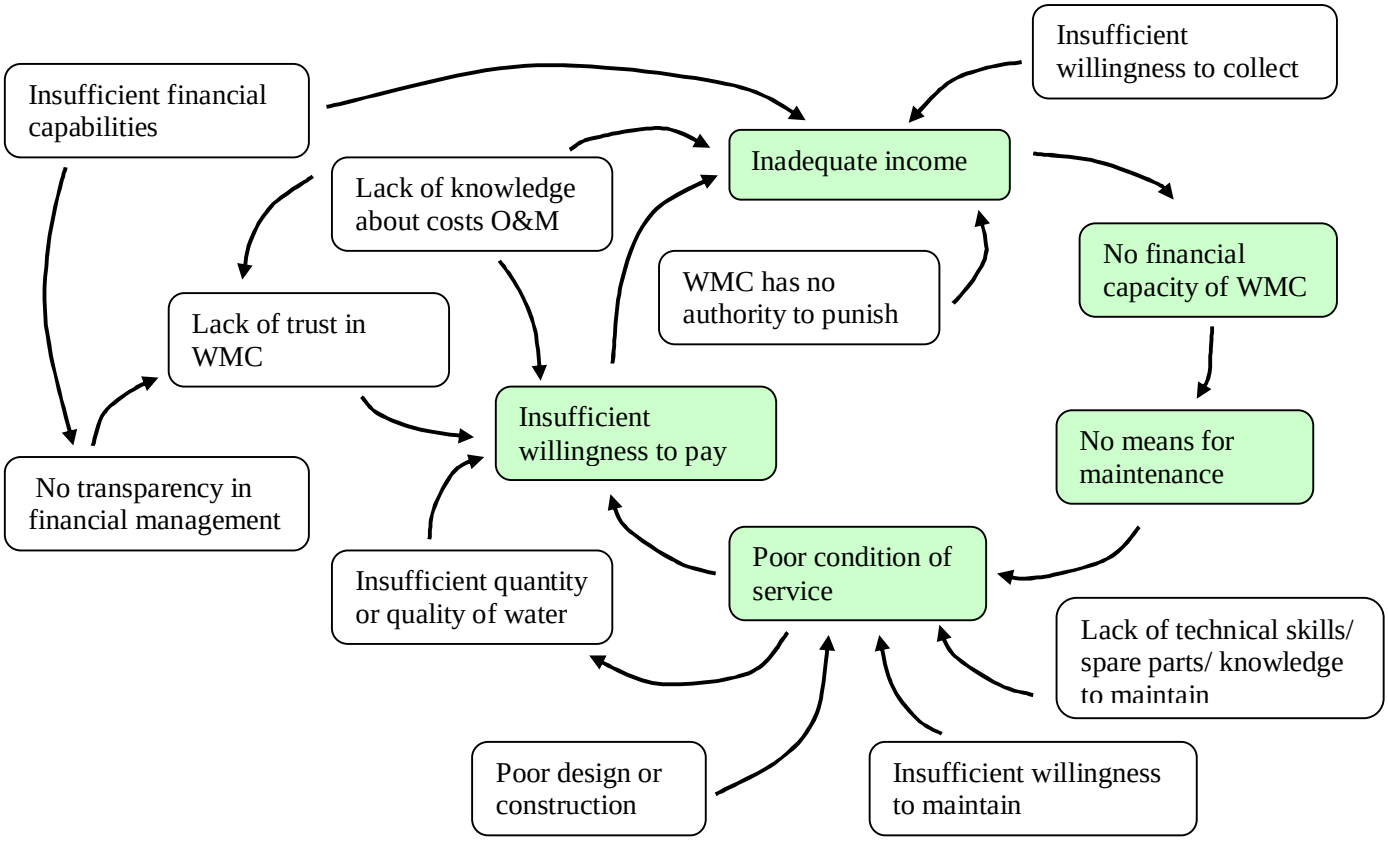

Figure 3 - Mentioned problems related to the sustainability of rural water supply service

3.2 Project approach and sustainability

This paragraph answers *'How does the project approach influence the sustainability of a project?'* It firstly discusses the context and history of project approaches. Further it will go into

some ‘basic’ aspects of a sustainable project approach. In other words: the crucial aspects of which most authors agree about their importance. Subsequently it will go into some aspects that are less obvious, i.e. the need for a demand-driven approach, cost-recovery and support from the provider towards O&M.

3.2.1 Context and history

The chosen definition of a sustainable water system indicates what kind of performance is required to call a service sustainable. One of the findings of a study involving 88 services in 15 countries showed that policies and approaches of the facilitator are having a significant influence on effective and sustainable service delivery (Brikké and Rojas, 2001). With a view on the key-constraints it appears that for instance the executed training might have a positive or negative effect on the performance of a service.

It is assumed that the used project approach is an important clarifying variable towards the sustainability of a system. Besides this, external factors like poverty or education level might also give an explanation for the sustainability of a system. An important difference however is that the project approach can be used to strengthen the sustainability of a project, while external factors are given or more difficult to influence in a project.

Concerning different project approaches Brikké and Rojas (2001) sketch a historical perspective for cost recovery, which gives an introduction in different project approaches. During the seventies it was thought that the use of appropriate technology that a community could effort was the key-requirement. During the eighties community involvement by a community based organization and gender awareness were added. In the early 1990s the idea of water as an economic good was launched. Recently the importance of a demand-driven approach is brought upon and it is a trend to believe that involvement of the private sector is essential for financial efficiency and sustainability. Aspects as appropriate technology; participation and the training required for participation will be seen as basic principles. The demand-driven approach, cost-recovery and the required support during the O&M phase are not so obviously and will be discussed more extensively.

3.2.2 Basic principles for a project approach

This paragraph will discuss some basic principles for the implementation of a water project. Firstly this is the use of an appropriate technology. Another basic principle is participation. The concept of participation and its implications in practice will be discussed. The last element to discuss is training or information, education and communication (IEC), which is required to let the community participate. Due to research of Sara and Katz (1998) training at household-level, the existence of a community based organization and the quality of construction have a major influence on sustainability.

3.2.2.1 Appropriate technology

The quality of construction is crucial for sustainability (Sara and Katz, 1998). Harvey and Reed (2003) state that the choice of a technology is not the only factor determining sustainability, but that it can have a significant impact. The technology choice should not only be made based on the cheapest solution, but also on the availability of spare parts and the costs of operation and maintenance. If local solutions and/or local materials are available, they are preferable since it will eliminate the problems with spare parts.

3.2.2.2 The concept of participation

The term participation is hard to define or as Netshiswinzhe (2000) says ' has become an almost meaningless buzzword over the last decade or so'. Authors do agree that the depth/extent of participation influences the sustainability of a water supply service. Like Evans and Appleton (1993. In: Sohail et al, 2005) argue: *'The shift from participation as users of a new service to the participation of the beneficiaries as owners, partners, and managers is thought to be an important contributory factor to the sustainability of a project* '.

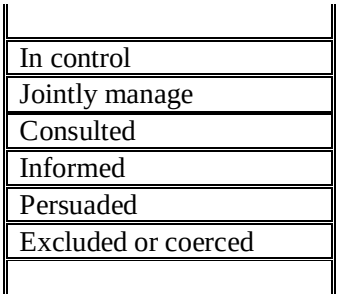

Figure 4 - Ladder of participation. *(Musch, 2001)*

White (1981) considers that the 'depth of participation' is the extent to which *all* members of the community are involved in *all* aspects of a project. To get a better idea from the extent of participation Arnstein introduced the ladder of participation in 1969, which describes the manner in which the community is involved in a project. Figure 4 contains a shorter variety on this ladder from Musch (2001). This ladder shows that the highest form of participation is the one in which the community feels in control in all stages of the project.

Netshiswinzhe (2000) argues that almost everybody agrees about the need for participatory development instead of a top-down approach, but still the reality remains that most development work is external driven or top-down. The kind of participation that works is the one in which 'all role-players actually believe that people, regardless of age, sex, educational background, socio-economic status and history, can actually solve their own problems.' (Breslin and Netshiswinze, 1999. In: Netshiswinzhe, 2000)

In summary implementing a project in a truly participatory way implies that the community members feel in control during all project phases and that the beneficiaries become owners, partners and managers.

3.2.2.3 Facilitation of participation

Musch (2001) describes three dimensions of participation in water projects: decision making; execution; costs and benefits. Full participation consists not only of a contribution in cash and kind, but also of participation in the decision-making and the benefits. To facilitate all these dimensions of participation there are a lot of participatory methods available. The PHAST methodology is one of the methods aiming to involve *all* community members in all the phases of the project. Due to Netshiswinzhe (2000) this methodology appears to be very useful.

Another aspect of participation is the involvement of *all* community members. Gross et al (2001) concluded that the gender and poverty sensitivity pays off substantially in sustainability. It appears from research that the more men, women, rich and poor are in control in all phases of a project, the more satisfied they are and the better the service will be sustained. Sara and Katz (2003) argue that participation at household level is necessary, since community representatives

seem to ignore the needs from woman and the poor. Mukhurjee and van Wijk (2003) argue that users will only sustain the service when it satisfies their expectations. Equity aspects, which involve sensitivity towards different gender, ethnic groups and socio-economic groups, play an important role in this respect.

The institution of a community-based organization to manage the project during and after implementation is also a form of participation. Sara and Katz (1998) prove that a designated community organization, which manage and oversee the system's operation, is a necessary component of success.' Netshiswinzhe (2000) argues that the more decentralised the system is operated, the better it is. She argues for the decentralization of maintenance and collection. Appointment of a responsible person for the maintenance and the cost-recovery of every tap will lead to rapid response on localized problems, shorter downtimes, a greater sense of ownership and better water point hygiene. Sometimes it even leads to lower tariffs for household as the costs of localized O&M is not included in the overall tariff. It is also better to localize the collection of tariffs as well. The local tap coordinator can forward it to a village committee and further.

Contribution of the community in cash and kind during all project phases is assumed as to enhance a sense of ownership. Sara and Katz (1998) however found out that it is often seen as a tax and that people don't see the link between their contribution and their choice for a water system. The reason for this is that there is no linkage between contribution and choices.

3.2.2.4 Training

Participation requires training on household- and committee level. At committee level the training should provide the needed competences to keep the system operational. Brikké and Rojas (2001) mention that an assessment of the management capacity before a project starts is crucial. If capacity building activities appear to be too complex, it might prove necessary to choose for another technology. This also indicates the needed training to run the service efficiently. Training should provide committees with technical information about how to prevent major problems, to operate the water system and repair parts. Further the committee should receive the needed financial and managerial training, especially those skills related to budgets, organizing bills, collection, recording expenses and revenue, monitoring, and applying sanction (Brikké and Rojas, 2001). With regard to financial training of the committee Netshiswinzhe (2000) mentions a problem. Financial training of the water management committee has mainly focused on basic bookkeeping. The result is that committees don't have the capacity to do financial planning, for example, to recalculate tariffs and deal with non-payment. Training should broaden the local level of financial management capacities instead of focusing on the individual.

At household level the main purpose of training is awareness to create user commitment. The first kind of awareness is on the linkage between hygiene and health. Ntengwe (2004) argues that this health and hygiene education should focus on single behaviours, which once they have changed have a positive impact on the community. The education should not be prefabricated, generalized messages, but depending on the situation inside a community. The second awareness is 'what it takes to produce water and have it delivered at the tap near or in households'. This contains the provision of information about cost of pumping, maintenance of lines, treatment, supply and their relation to the water tariff. Research proved that this kind of awareness has a positive effect on the willingness to pay, which will prevent financial problems during the O&M phase (Ntwengwe, 2004).

3.2.3 Demand-driven approach

A demand-driven approach plans and designs a project taking the point of view and desire of communities as a starting point. It is effective when implemented in a participatory way (Brikké and Rojas, 2001). Implementation of a project with a demand-driven approach in a participatory way is wrongfully often called demand-responsiveness. The concept of demand, the impact and implications of a demand-approach and what it takes to facilitate demand will be discussed in this sub-paragraph.

3.2.3.1 The concept of demand

Demand is an economic phenomenon that is influenced by an individual's budget, the price of the good and other goods and individual preferences. The demand for a rural water supply can be defined, as the *quantity and quality of water community members will choose to consume at a given price* (Sara and Katz, 1998). Or in other words the 'willingness to pay', based on 'informed choice' (Mukhurjee and Van Wijk, 2003). Price and willingness to pay is looked at in both cases not just as monetary resources, but as all valuable resources including time and labor.

Harvey and Reed (2003) get around the idea of water as an economic good by arguing that the distance to, the perceptions on and the quality of the existing water supply manufactures demand. Depending on these factors a community might express an interest to improve their water supply, but they also admit that this does not imply automatically that this demand is sufficient to finance the operation and maintenance of the system. So does participation in the first phases of the project never guarantee that the community will also participate in the O&M phase (Sohail et al, 2005). This leads to the conclusion that participation and expression of demand in itself might not be enough to make a project more sustainable. The financial aspect of demand will be discussed in sub-paragraph 3.2.4.

3.2.3.2 Demand-driven projects

When Sara and Katz (1998) proved that there's a significant correlation between the extent of demand-responsiveness and sustainability, they define demand-responsiveness as the allowance of consumer demand to guide key-investments. A project is less or more demand responding to the degree that users make choices and commit resources in support of these choices. This involves that users prioritise their needs; it links the willingness to pay with the level of service and allows the community to make informed decisions. In this view demand-responsiveness implies that community members have choices and understand the implications of these choices.

It is striking that many authors (e.g. Gross et al, 2001 and Mukhurjee and Van Wijk, 2003) assume that the kind of approach sketched here is the same as demand-responsiveness. A better word for a project in which community members have choices and know the implications is a demand-driven project. This approach cannot guarantee that a project appears to be demand-responsive, since this implies that the demand of all the users is the same and did not change in time. The other way round it is also possible that a project was not demand-driven, but that a demand has still been responded or that the user is still satisfied. User satisfaction and demand-responsiveness imply also two different things. A user can be satisfied about a project though it might not respond to his/her demand. Or the project responds to the demand, but this demand changed so it doesn't satisfy the person anymore.

In summary a project that tries to respond to the demand of all the users is called a demand-driven project. This implies that users have choices and understand the implications of these choices. This approach appears to lead towards a more sustainable system (due to research of Sara and Katz, 1998, Mukhurjee and van Wijk, 2003 and Gross et al, 2001).

3.2.3.3 Facilitation of a demand-driven approach

Facilitation of a demand-approach is not easy. From research of Sara and Katz (1998) it appears that many NGO's officially act in accordance to demand-responsiveness, but they don't apply these guidelines consistently in their projects. True demand-responsiveness asks for a lot of flexibility and information, education and communication so that an informed choice at household level is possible.

This requires in the first place the offer of a multi-sector choice at household level. This implies for instance that households are able to give priority to clean water above a health centre or a school. (Sara and Katz, 1998) When a community decides that they want to improve their water supply the facilitator should provide a choice in the kind of technology, the level of service (e.g. public tap or house tap), location of facilities, the local management, maintenance and finance systems and the candidates for training (Mukhurjee and van Wijk, 2003). In other words choice should not be restricted to the technology, the service level and the location, but also offer a choice in how, when, and by whom services will be delivered and sustained (Sara and Katz, 1998). The provision of choices requires a lot of flexibility in technical options and service level. Harvey (2003) also emphasizes the importance of choice in technology. Let the community decide what they want, instead of looking for the 'holy grail' of hand pumps that will never break down.

Making a choice without having an idea of the implications makes no sense. To make an informed request for a project, people must know in advance the terms of participation and responsibilities to sustain the project (Sara and Katz, 1998). This means the community is aware about the needed training, the management organization and the size of cash and kind contribution. When technology options and service levels are offered, information about the related costs and the implications for maintenance should also be provided. Further responsibilities and cost-sharing arrangements should be clear to the community. This might also prevent that contribution is regarded as a tax instead of a result of a fulfilled demand (Sara and Katz, 1998).

If demand at household level should guide key-investments an aggregation from demand of households towards community level is required. Sara and Katz (1998) argue that this is possible with 'social mobilization'. To improve information flows it is useful to employ a well-trained extension staff for this purpose. Brikké and Rojas (2001) argue that the implementation of the demand-approach requires a participatory sharing approach. The facilitator uses in this process his experience and those of the community members to raise their awareness and make them feel responsible for the choices that they make. This asks for a democracy where everybody is able to give their opinion, that people feel responsible for their behaviour and seek a collective goal. The success of aggregation depends on a good working attitude and on the use of participatory techniques.

3.2.4 Cost-recovery

There are several points of view to what extent costs should be recovered at local level. This subparagraph will at first discuss what water is, why people should pay for it and what the link is with sustainability. Further, the strategy of cost-recovery and the costs that should be taken into account will be discussed. The community-contribution towards the costs of a project is in this report regarded as an aspect of participation and will not be discussed here.

3.2.4.1 Economic good vs. basic need

Due to Sara and Katz (1998) during the 1990s water and sanitation professionals reached a global consensus about the appropriate approach towards water projects. Where the traditional approach focused on the design and construction of rural water systems, the new approach focuses on water as an economic good. Approaching water, as an economic good, requires that there should be a careful look at the consumer demand. They state that someone values a service if he or she wants to give another valuable source for this service. From this point everybody should pay for water, just like they pay for other services they value.

Just like economists, environmentalists also encourage the vision to see water as an economic good, since this will encourage conservation and protection of water resources. Social scientists emphasize however that water is a basic need and fear the economic approach will threaten equality. Water professionals prefer to see drinking water both as a social and economic good. This involves that beneficiaries should not pay for the water but for the service to provide safe water. Water is in this view rather a commodity than an economic good (Brikké and Rojas, 2001).

3.2.4.2 The concept and relevance of cost-recovery

Netshiswinzhe (2000) concluded that most of the issues threatening sustainability are related to cost-recovery. To ensure prolonged sustainability there needs to be money for maintenance and replacement. This view assumes that these costs should be recovered by the community, or in other words that the community should pay for their water. Strasser (2000) summarized several reasons why people should pay for water. Sound arguments for payment are that it is impossible to provide everybody with water for free or to provide more people from water it is necessary that people pay for water. Further, providing some people for free whereas others don't have access to water is dishonest or might enlarge inequality. In the context of sustainability it is said that payments increase a sense of value and commitment among users, which might affect the sustainability positively. Another argument is that subsidies discourage cost-effectiveness and the development of low-cost solutions. Brikké and Rojas (2001) view it as a fact that the trend is that some costs should be recovered. The advantage of a discussion about how and what is that it forces the facilitator and the community to optimise costs, search for other funds, service efficiency, effective financial management and the setting of an appropriate tariff.

Globally some say that costs should be recovered by the user and others that costs can be recovered by anyone as long as they are recovered. The first idea is also called 'the user pays principle' and regards water is an economic resource (Winpenny, 1994. In: Ntengwe, 2004). This idea involves that costs have to be recovered fully by the users. For this view are a lot of arguments in the context of equality and scaling up. But there's no prove or reasonable argument that full cost-recovery by users will enhance sustainability. From cost-sharing arrangements and the discussion about cost-recovery on the other hand, it is assumed that it will have a positive impact on sustainability. This view argues that national-, regional- or local authorities, external support agencies, NGO's, CBO's or communities/users can realise full cost-recovery. The aim of cost recovery in this context is 'to recover ALL of the costs associated with a water system, program or service to ensure long-term sustainability' (Cardona and Fonseca, 2003). The other aspect of cost-sharing arrangements is how it should be done. At the moment, several authors plead for the sharing of costs based on consumer demand. Sara and Katz (1998) argue that communities should pay for water; based on the level of service a community wants. Cost-sharing arrangements should be an expression of demand, in other words people should pay more if they want a higher service level. Brikké and Rojas (2001) state that the user should pay something for water as a starting-point and argue that a clear strategy is needed to reach sustainable cost-

recovery. If a project approach lacks a clear strategy, cost-recovery will indeed become one of the main threats instead of a contribution towards sustainability.

3.2.4.3 Strategy for cost-recovery

Brikké and Rojas (2001) try to work out a strategy for sustainable cost-recovery. They mention that one of the current approaches is that cost-recovery is often seen as the need to collect enough money to cover the costs of the installed system. The challenge in that case is to get people using the system and to pay. Strategies to reach this are awareness campaigns, improved customer relations, introducing disconnection for non-payment, revising institutional or payment structures. They argue that cost-recovery should be part of an integral approach instead of series of corrective measurements for insufficient revenue collection. This involves a planning for cost-recovery which looks after the way a project is introduced, a decision by whom and how costs are recovered, analysis of the willingness to pay, the setting of an appropriate institutional framework and the definition of accompanying measures as education and promotion activities. Putting cost-recovery into practice asks for an appropriate tariff, optimising costs, access to other sources (for instance micro-credit), effective financial management and service efficiency.

Aspects of the strategy that will enhance sustainable cost-recovery are consumer-awareness and the demand-approach. Brikké and Rojas (2001) argue that concerning the way a project is introduced the demand-approach has advantages, since this approach responds better to local realities and expectations. Ntengwe (2004) proved that consumer awareness has a big impact on willingness to pay and therefore also on cost-recovery. Concerning the setting of an appropriate tariff, Sumanasekera (2003) defines this as a tariff that covers not only the formal operational costs, but also some additional charges to cover future breakdowns and replacements. This might be the case in general, but actually an appropriate tariff is one that correspond to the agreed upon cost-sharing arrangements.

3.2.4.4 Recovery of which costs

Cardona and Fonseca (2003) emphasize on the importance to take *all* costs into account in the cost-recovery strategy. This can be done by tariffs, subsidies, overseas development assistance, micro-credit, social development funds or community funds. 'Sustainability requires the matching of ALL costs related to providing a sustainable service, with ALL available sources of funding' (Fonseca, 2003. In: Cardona and Fonseca, 2003).

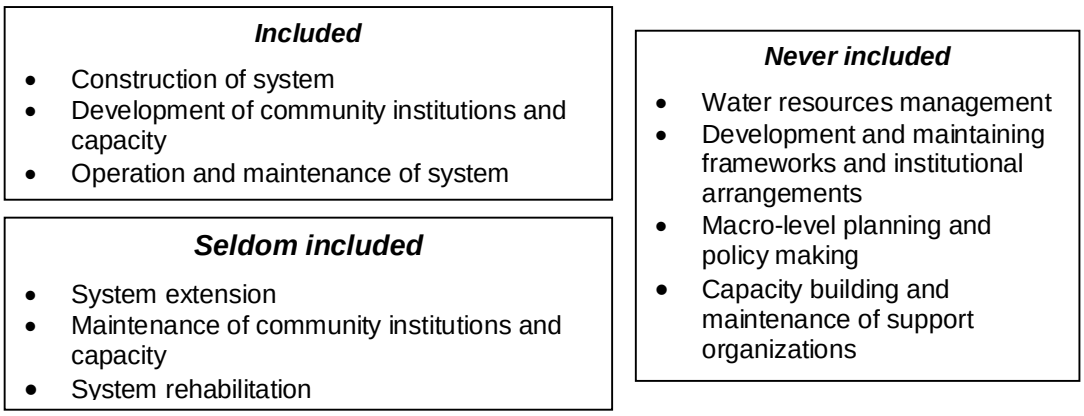

Figure 5 - Extent of cost recovery in essential activities for sustainability. *(Fonseca, 2003. In: Cardona and Fonseca, 2003)*

Due to Brikké and Rojas (2001) the extent of cost recovery is made up of the degree to which O&M costs, initial investment costs, replacement and rehabilitation costs, costs of sanitation and

waste water are recovered. Due to Cardona and Fonseca (2003) the traditional approach is that only financial costs like operation and maintenance, investment and service costs are included. This approach does not include economic costs like environmental and opportunity costs. It also excludes costs to sustain the service over the long term, such as those related to institutional capacity building and skills training; monitoring and assessment; policy and enabling environmental aspects (like wastewater management). (See Figure 5)

3.2.5 Support O&M

If and how the implementer decides to support the project after implementation is part of the post-project strategy. The post-project strategy in general is about what a facilitator undertakes to ensure the sustainability; this can for instance be the establishment of strong CBO's or a reliable back-up system (Sumanasekera, 2003). Some aspects of a post-project strategy have been discussed already; this subparagraph will focus on whether and how a facilitator should give support towards the O&M of facilities.

3.2.5.1 Project vs. service

Due to Harvey and Reed (2003) the traditional approach towards rural water supply is one of a project with a finite lifespan. This implies that the focus has been on the implementation of the facility, from which it is hoped that the beneficiaries will keep it operational. This is a convenient situation for NGO's, but conflicts with the principle of sustainability. They argue that 'water supply is a service, and any service requires ongoing management and support.'

Some donors already mention this and they are moving to a programmatic approach, but still the need for ongoing support is not recognized. All responsibilities for O&M are shifted from facility-provider to end-user after a project is handed over. The question is whether it is reasonable to think that communities are able and willing to sustain their system, without any ongoing support. In other words: does some training make community members capable to ensure sustainability of their water system?

Nedjoh et al (2003) conclude that implementation of a Water and Sanitation Program should always have a clear and focused approach on how O&M will be done. It is highly irresponsible to have not such an approach and poor beneficiary communities will become the ultimate victims. This should involve ongoing support, which can be reduced gradually over time, depending on local conditions, needs and wishes. This ongoing support can either be fulfilled by a NGO or a government partner (Harvey and Reed, 2003). Nedjoh et al (2003) give an example that shows the effectiveness of support O&M. When a certain amount of money is invested yearly in a region and 6% will be spent on the support of O&M, the coverage level of safe drinking water will be 100% after about 20 years. When investing yearly the same amount of money, but spending no part of that money on the support of O&M, the coverage level of safe drinking water will be only 67% after 20 years.

3.2.5.2 Facilitation of ongoing support

Nedjoh et al (2003) work out the concept of support in the development of an O&M profile. This profile has to be made in cooperation between the facility-provider and the community and is a necessary part of an implemented program.

It starts with the identification of performance indicators, to monitor the system. Netshiswinzhe (2000) mentions that the current approach towards monitoring and evaluation is focused on figures like 'how many projects are implemented?' and 'how many people are trained?' This should change in a focus on issues related to sustainability like use of the system, community

involvement, maintenance and repair and functioning of the system. Soley and Thogerson (2003) state that monitoring should at least measure the performance of management, operation, maintenance and hygienic operation. The management of a monitoring system and data processing must be done at the level of the NGO. From fieldworkers, it is expected to fill the monitoring reports and have a proactive approach towards the results.

These monitoring reports provide a good base for the planning of O&M action. An O&M profile should further facilitate the preparation of specific, periodically O&M action plans, development of O&M records for the WMC, capacity building both through training and coaching, direct assistance (especially in case of peculiar problems and non-responsive communities), development and distribution of some O&M materials and IEC materials. In addition to this Sumanasekera (2003) mentions the institution of a forum for CBO's to share their experiences and knowledge and the importance of the provision of tools and equipment for O&M. Harvey and Reed (2003) mention that it must be sure whether spare parts are available. In case that the private sector is not able to supply this, this might be done by NGOs, churches or the government.

3.3 Conclusions

The objective of this chapter was to define sustainability and to identify factors that can strengthen this sustainability. This paragraph answers this question in an ordered way, so that the different indicators that will be introduced further in chapter 3 already appear.

From the chosen definition three indicators for a sustainable water system appear: operation, maintenance and management. These indicators imply that:

1. **Facilities are operational and benefits all the users;** this means that the facilities are (now and in the near future) technically in a good condition as well as the environment around the facilities, so that it always delivers a satisfying colour, quantity and quality of water at an accepted distance to all the intended beneficiaries, so that they can benefit from a better health.
2. **Facilities are maintained;** this means that most of the spare parts, tools and means to keep the system operational are available in the community, that capable and available caretakers know and fulfil their responsibilities, so that facilities are monitored and cleaned regularly and all (preventive) maintenance is carried out.
3. **Finances are managed;** this means that a capable and trusted water management committee has been elected by the community and is institutionalised. so that they can set an appropriate tariff system that covers administrative, operation, maintenance and replacement costs (based on the cost-sharing arrangements), so that fees are collected and finances accounted, managed and controlled, so that facilities continue to function over a prolonged period of time.

The definition also requires that the facilities will 'continue to function'. This implies that that in operation, maintenance and management also future aspects are already taken into account. These aspects are for instance budgeting for future repairs, possibilities for extension and financial planning.

Strengthen the sustainability can be done by applying a certain project approach that enhances sustainability. The elements of a sustainable approach are summarized in six aspects. These aspects are each one of the indicators for the assessment of the sustainability of the different project approaches. Some basic principles for the implementation of a sustainable water project are:

1. **Appropriate technology**, which involves quality of design and construction and the possibilities to maintain the technology.
2. **Participation**, which involves the degree to which *all* community members contribute and are involved in execution, decision-making, costs and benefits.
3. **Training**, which involves awareness at household level and competences at committee level to keep the system operational.

Further there are some specific aspects of a project approach that can strengthen the sustainability further. Although all these aspects are also part of the mentioned aspects, they are focusing on very specific requirements.

4. **Demand-driven approach**, which involves specifically that part of the participation process concerning the providence of information and choices at household level in project design, which is aggregated into a choice at community level.
5. **Cost-recovery**, which refers to the extent to which *all* costs are part of a discussed cost-sharing strategy.
6. **Support O&M**, which involves the support of the facilitator after implementation in providing needed material, assistance, knowledge etcetera.

4 Assessment of sustainability

The main objective of this research is to measure the sustainability of an implemented water supply system in two communities. To carry out this assessment the question '*How can sustainability of projects implemented by Plan be identified and measured in practice?*' needs to be answered first. The first paragraph goes into several aspects related to the methodology of the case studies. The second and third paragraphs clarify the framework to assess the project approach respectively the performance of the system. Paragraph 4.3 goes into the choice of the case studies. The last paragraph describes the collection and classification of data. Annex C and D are providing more information on the used frameworks and the dilation of and used sources.

4.1 Methodology

This paragraph starts with the presentation of several ways to measure sustainability. Based on this, the objectives and time-schedule of this research a strategy has been chosen. This strategy is described in the second paragraph.

4.1.1 Methods for measurement of sustainability

The UNDP-World Bank Water and Sanitation Program (1999) developed a framework, which focuses on measurement of sustainability indicators at community level. The indicators are: effective functioning and use, demand-responsiveness, participation in service management (O&M) and participation in planning, organization and construction. These indicators capture the key aspects of sustainability: the usage and performance of the infrastructure, the effectiveness of village-level institutions (institutional), the adequacy in cost recovery (financial) and the participation of women and disadvantaged groups (social). This proves sustainability is not only measured by the current state of the facilities and the management, but that participation in earlier phases is also important. However, by putting all these elements in one framework it is also suggested that for instance informed choice is a way to measure sustainability. Of course there are reasons to assume this, but it is not an absolute truth.

Sara and Katz (1998) provide another interesting assessment of sustainability. This is a quantitative study with sustainability as a dependent variable in relation to the independent variable 'level of demand-responsiveness' (see § 1.3.1), project-related factors and external factors. Indicators for sustainability identified by them are the physical condition, consumer satisfaction, operations and maintenance and willingness to sustain the system. This report proves linkages between the project approach and the performance of sustainability, by statistically excluding external factors. This is the kind of approach that is truly needed to prove linkages between a certain project approach and sustainability. Unfortunately it is not possible to prove statistically the linkages between these factors for just two case studies. This is why literature and research of others will be used to draw some tentative conclusions about the linkage between sustainability and project approach.

Lastly Soley and Thøgersen (2003) are worth mentioning. They designed a monitoring and evaluation system for rural water supply. This system is based on four performance indicators namely the management performance, operational performance, maintenance performance and hygienic operation performance. Their design is meant to combine various ways of monitoring into one system. This report shows how the performance of a project on sustainability can be measured apart from the project approach.

4.1.2 Strategy

The objective of these case studies is to provide information on the performance of projects and the used project approach from Plan. As it appears from literature study, the used project approach is proved to have a direct influence on sustainability. That's why many authors measure the used project approach and the performance in one framework. This framework provides all information to compare different projects, but also creates unproved relations between sustainability and project approach. That's why for the purpose of this research two frameworks of indicators will be defined, one for the performance and one for the project approach. This allows drawing separate conclusions first, which can be linked together in a later stage. Both frameworks are applied to two case studies to be chosen. The research framework with all the indicators and sub-indicators is written down in Annex C. The different questions to be asked for the assessment of each sub-indicator are for the assessment expressed as sub-sub-indicators.

The two case studies should provide enough information on the performance of the system to draw conclusions on the sustainability of gravity water systems in general, on the condition that the systems are implemented some years ago. It is more difficult to draw conclusions on the project approach. The first issue is that a 'sustainable project approach' can never guarantee sustainability, because external factors are also influencing this. In the second place a variety of assumptions exist about a 'sustainable project approach'. Thirdly Plan Cameroon is always changing their project approach. This makes information from projects carried out years ago outdated. This leads to the following strategy:

- Most commonly called 'sustainable project approaches' will all be compared with the used project approach. This will indicate how far Plan Cameroon has been using different aspects of the approaches.
- The case studies are chosen in a way that it enable comparison of two project approaches, the traditional and the CMP-approach. Another recent development, use of the PHAST-methodology will not be assessed in the case studies, since this methodology is adopted too recently to assess sustainability.

Both case studies will be done in three steps. Firstly a brief appraisal will be done on the characteristics of the community and the project. This will provide an introduction into the case studies, but is also important for the understanding of differences between the case studies. The aspects to characterise the projects are written down in Table 3.

Table 3 – Identification of general project and community aspects.

General project aspects	Community aspects
History & context of project	Population size and density
Objectives	Poverty
Lay out of facilities	Education level
Involved parties	Distance to water before and after project
Costs allocation	Ethnic composition
Time schedule	Distance from major city

The second step is to compare the used project approach with the recommended project approaches derived from literature, using the project performance framework. The third step is to measure how sustainable projects with two different approaches actually are. For this purpose a framework with performance indicators is designed. The frameworks of indicators used for step 2 and 3 will be discussed in the next two paragraphs. The next two chapters are discussing the results derived from the case studies. Reflection on the performance and the use of different project approaches will be discussed in chapter 7. The use of the PHAST-methodology has not

been assessed in the case studies, but after document studies and attendance of an activity it will be possible to indicate whether this will enhance sustainability or not.

4.2 Framework of project approach

The project approach indicators aim to indicate to what extent the project approach used by Plan will enhance sustainability. The indicators themselves are based on the several theories that are described in paragraph 3.2 and are divided in several sub-indicators and sub-sub-indicators. The indicators are technology, participation, training, demand-driven approach, cost-recovery and support O&M.

4.2.1 Technology

It is assumed that whether a technology is appropriate depends on the quality of design and construction. The first sub-indicator is 'guidelines'. Guidelines can be an appropriate measure to ensure the technology is appropriate when they are meant to ensure the quality of the construction during design, construction and operation but are also allowing flexibility depending on local circumstances. This means that guidelines should not prevent from implementing the most appropriate technology. The second sub-indicator is the quality of design and construction. A bad design might already occur during construction, but also appear during operation. This will be judged as far as it is possible at the moment. Other elements of an appropriate technology are the attention for involvement of experts in design and construction and the role that maintenance aspects like costs, spare parts and intensity of maintenance have been played during the project.

4.2.2 Participation

Participation is about the extent to which *all* community members are in control during *all* phases of the project. This is in decision-making, execution, costs and benefits. The involvement of households during initiation will be indicated by the use of a demand-driven approach. The indicator participation will indicate other aspects of participation, like the empowerment through a community-based organization, the presence of participatory activities, gender-sensitivity, efficiency and transparency of the participation process. The attribution of scores towards all these sub-indicators will be done based on the degree to which the community is allowed and felt to be in control. This can be very good when community members are directly involved, good when they are involved through a chosen representation of the community etcetera.

4.2.3 Training

The project approach towards training is for both committee- and household level indicated by the training done and by the effectiveness of the training. The effectiveness at household level will be indicated by attendance and awareness. At committee level it is determined by attendance and received topics. The effectiveness is not easy to indicate, but depending on the knowledge people show during interviews and the attendance lists it is possible to indicate whether it is good or bad.

4.2.4 Demand-driven approach

The demand-driven approach is part of community participation, but whereas participation assesses the contribution of the community towards all aspects of the project, the demand-driven approach focuses specifically on the expressed need for the project, based on provided information. It is assumed that this approach is most effective when executed at household-level. This implies that when an element of demand has been expressed directly from household level it is accounted as very good. If demand has been expressed by Plan it is very bad, by CBO and Plan

is just bad, by CBO is average, by CBO through community is good. The first indicator is the initiation of the project, which refers to the request and the priority of the project for people. The other aspect is informed choice, which is divided in the sub-indicators choices and informed decision. The first one refers to the availability of choices whereas the second one refers to the provided information needed to consider these choices. Sara and Katz (1998) define contribution (in labour, time or money) also as a sub-indicator of demand-responsiveness. In this report it is chosen to organize this contribution under participation.

4.2.5 Cost-recovery

The first sub-indicator of cost-recovery is the degree to which all costs are taken into account to be recovered. When for instance the costs of rehabilitation are part of the agreement and/or training the maximum score of this element is average. When costs are tried to be recovered somewhere (there are agreements for instance) it is good, when costs are really fully covered it is excellent. The second sub-indicator is the presence of a strategy for cost-recovery. This sub-indicator is divided into the sub-sub-indicators planning and practice. The planning is classified as excellent if a decision on cost-recovery, analysis of willingness to pay, setting of appropriate institutional framework and the measures to take to reach this are defined in the planning. The sub-sub-indicator practice is judged on the presence of an appropriate tariff, optimising costs, access to other sources, effective financial management and service efficiency. This indicator does not refer to the cash contribution in money from the community towards the project, since this is already an aspect of participation.

4.2.6 Support O&M

Support O&M indicates the efforts of the facilitator to provide assistance in the planning, monitoring and execution of O&M. The first sub-indicator for this is the existence of a monitoring system, which is meant to monitor the performance on sustainability. The other ones are related to the fact whether the facilitator gives assistance in planning, materials, coaching and training. If something is clear available or done by Plan it's very good, if it's not available or done at all it is very bad.

4.3 Framework of performance

The definition of a sustainable water system is the starting-point for the indication of the performance on sustainability. The definition of a sustainable rural water supply system has already been worked out in the conclusion of chapter 3. In accordance to this the indicators for the performance are operation, maintenance and management.

4.3.1 Operation

A system is operational when it is functional and provides appropriate benefits to all users. An appropriate benefit is for instance a good quality of water, always enough water or health improvements. Information about the condition of the facilities and the environment is mainly obtained from observations and sanitary inspections. Qualitative information was also available about the quality of the water, since a laboratory has just measured this for all water systems from Plan. Information for indicators like distance, quantity, health and hygiene, continuity and access is mainly obtained from interviews. The benefits felt by users plays an important role, but scores are also based on more objective information, like the design and the observed distance.

4.3.2 Maintenance

Maintenance refers to the management of the service that is needed to keep the system operational. This is in the first place the execution of activities like cleaning, monitoring and repairs. To make this happen people need to be responsible and organized, and resources like knowledge, money, tools and spare parts need to be available. Participation in maintenance activities, especially cleaning, is not seen as a necessary component of sustainability, but is assumed to have a positive influence on sustainability. Other aspects like back up may not appear to be relevant in the short run, but it is absolutely relevant for a prolonged lifetime of the facilities.

4.3.3 Management

Management refers to the financial management and the institutional framework that is required to keep the facilities operational over a prolonged time. It is assumed that for effective financial management the committee needs to calculate, plan, collect and account well, but the community needs also to be willing to pay. When working with money, trust plays an important role, especially in a country like Cameroon. Indicators for this trust are whether the composition of the committee is a reflection of the community, if the committee communicates their outputs effectively, but a monitoring body might also have a positive impact on this trust. Other aspects that might enhance payment are tariff differentiation, with the possibility to pay in kind for the poor, and authority of the water management committee.

4.4 Choice of case studies

The choice for the two case studies is based on some criteria. These criteria are described in the first sub-paragraph. On base of these criteria two communities are selected to be part of the case studies, the selection of these communities is described in sub-paragraph 4.4.2.

4.4.1 Criteria

Several criteria have been formulated for the selection of the case studies. The criteria are written down from more towards less important.

1. *Completion date*: The project must have been completed at least one year ago, but longer ago if possible.
2. *Used approach*: One community should have been approached with the CMP approach and one with the traditional approach.
3. *Used technology*: If the same technology has been used it is easier to compare the projects.
4. *Other project characteristics*: Context and history of project, objectives, involved parties, costs allocation and the time schedule must be as similar as possible.
5. *Community characteristics*: The communities must be as similar as possible
6. *Accessibility and distance*: Communities closer to Bamenda, to each other and easier to access are favourable.

Especially the first criteria is regarded as very important, since sustainability can only be measured if a project is finished and even better if a project is finished longer ago. The younger a project, the more predictions are needed to determine the sustainability.

4.4.2 Selection of alternatives

Taking only the two most important criteria into account in conference with Plan, the choice for the two case studies was already determined. There were not many choices since Plan Cameroon is only implementing water projects on a bigger scale since a few years and the choice for a

project executed following the CMP-approach and one executed following the traditional approach appeared also to be very restricting. Further, it appeared that in practice the accessibility and distance weights also heavier in the decision than expected.

These considerations made that only two communities qualified for the selection of the case studies: Bamali and Mbemi. The Bamali water project is case study for the CMP-approach. The first part of this project has been finished about two years ago. For the traditional approach the Mbemi water project is selected. This project has been finished about two and a half years ago. Some differences between the projects exist: the communities don't have the same size, one project consists of several phases, whereas the other had just one. The projects do have similarity on the size of the implemented facilities and access to water before the project.

4.5 Collection and classification of data

This paragraph describes how data is obtained and classified. The first sub-paragraph goes into the sources that have been used. The second sub-paragraph describes the classification of data and results.

4.5.1 Dilation of sources

The first data to obtain is the general project and community characterises. Used sources to be used are Plan documents like the baseline survey and project files and knowledge from employees of Plan. Subsequently as much information as possible will be retrieved from the field. For the fill in of the indicators the community concerned is the main source of information. Regular community members will provide information about the used project approach as well as the current performance of the system. People involved in the project committee will be asked more specific questions about the execution of the project, whereas the maintenance committee (m.c.) will be asked more specific information about the post-project activities. For both the project approach and the performance the community members are also an important source of information. In total 11 people have been interviewed inside each community. Besides this several examinations like sanitary inspection, examination of the facilities, records and minutes have been done. Other sources of information are project files from Plan, reports and employees from Plan. Based on all these sources of information the different indicators are filled in. It is assumed that the use of different resources has excluded as much cultural bias as possible. See also Annex D for lists of interviewees, interview questions and points of examination.

4.5.2 Classification

Both frameworks of indicators are divided into indicators, sub-indicators and sub-sub-indicators. Information obtained from different sources will be used to fill in the different sub-sub-indicators. These sub-sub-indicators are formulated in a way that the presence or working out of this element is supposed to have a positive effect on sustainability of the project. To allow comparison of the case studies and a quick interpretation of weak and strong aspects, towards every sub-sub-indicator a score between 0 and 100% is contributed. Generally, a five-points scale will be used, only when figures (f.i. for the water quality) are available a score might be somewhere between these classifications. The meaning of the classification is written down in Table 4.

The average scores of several sub-sub-indicators together form the score of a sub-indicator. The average scores of several sub-indicators form together the result of an indicator (see for example annex E-6). Averages are taken without ascribing weight factors to the different elements. The indicators are chosen in a way that the same weight can be ascribed. Besides this the results will not be used to prove relations or something.

Table 4 - Classification of sub-sub-indicators

Score (%)	Classification	Meaning
0	Very bad	Element is absent or very bad
25	Bad	Element is there but executed or perceived badly
50	Average	Element is average, not good nor bad
75	Good	Element is good, but improvements can still be made
100	Very good	Element is worked out and/or perceived very well

Based on the scores of the different sub-sub-indicators results can be drawn on the performance of the indicators. How scores can be interpreted is written down in Table 5. However, it still remains difficult to say whether a system is sustainable or not, since only prognoses are made and sustainability depends on so many external aspects. Especially the sustainability of a project approach is very difficult to classify. A system can after all appear to be sustainable even though for instance participation during implementation was very low. That's why the results should mainly be used to compare the case studies and for identification of weak and strong aspects.

Table 5 - Interpretation of results

Classification	Grading of indicator and sub-indicator results
0-25%	Unsustainable approach or performance
25-50%	Elements of sustainability, but not enough
50-75%	Quite many elements of sustainability, but improvements can still be made
75-100%	Sustainable approach or performance

4.6 Conclusions

The objective of this chapter is to discover how sustainability can be identified and measured in practice. Others did this before by taking into account the performance and project approach into account, proving relationships between approach and performance or just monitoring and evaluation. For the purpose of this research the assessment of sustainability will be done through two different frameworks: the project approach and performance framework. The performance framework enables comparison between sustainable performances in theory with performances of Plan projects on operation, maintenance and management. The project approach framework enables comparison of a 'sustainable project approach' with the used project approach and comparison of two different project approaches. Results of the case studies are classified which makes it easier to compare and to get a quick idea of weak and strong points, but are not meant to prove relations between approach and performance statistically. Chosen case studies are the Mbemi water project with a traditional project approach and the Bamali water project with a CMP-approach. It was not possible to assess the use of the recently adapted PHAST-methodology in the case studies; this is only done based on reports and the attendance of one activity.

5 Mbemi water project

This chapter will answer the question *'How sustainable is the performance and approach of a project that is executed following the traditional project approach?'* Paragraph 5.1 introduces the Mbemi water project. The second paragraph will discuss the results of the used project approach. The third paragraph will do this for the performance. The answer of the question will be summarized in the last paragraph, the conclusion. More information and project results are written down in Annex E.

5.1 Introduction

This paragraph gives a short introduction into the project. Annex B contains more information about the design, the time-schedule and responsibilities of the project.

5.1.1 History & context

Mbemi village is located in Mbengwi central sub-division in Momo Division. Since 1983 the water supply from Nyen, a neighbouring village, was extended to Mbemi. This extension consisted of 14 standpipes providing most quarters of Mbemi village. This water supply was the result of a bilateral agreement between these villages witnessed by the Department of Community Development. There was however a clause that the outlet of the main supply of Mbemi should be located 10 cm higher than the one in Nyen. This was probably to guarantee that Nyen had always some water, even during the critical periods. By 1990 the villages started to experience acute water shortages, especially during the dry seasons. They discovered in 1992 a new spring source, which can be tapped to reinforce the existing water supply system. Mbemi started some work to get water from this source, but the work stopped since they didn't have the funds to obtain materials. During 2000 the community requested Plan for help to reinforce their water supply system. This involved the connection of the existing standpipes to the new source and the extension of water supply to two quarters of the neighbouring village Nyen, also called Upper Mbemi.

5.1.2 Community

Mbemi village has a population of about 2500 inhabitants. The village is located about 5 km from Mbengwi Town, which is Momo's divisional headquarter, about 40 km east of Bamenda. During the training of the water management committee there were no difficulties with a language barrier encountered. For the hygiene and sanitation training, pictures were used. Since there was no water at all available during the dry season, the community had to track long distances to get good drinkable water. This involved risks and a lot of time. Besides this, the community also suffered from water borne diseases. There are no specific figures available about education or executed training in Mbemi.

5.1.3 Project

The objective of the project was to provide access to portable and drinkable water in the village. The project consisted of the construction of a spring catchment, a pressure break chamber, a storage tank of $15m^3$, four new standpipes and the completion of the pipelines. These pipelines connect the existing standpipes with the new source. Further the water management committee received training and the population received IEC on hygiene and sanitation.

Parties involved were Plan, the community, the government and another NGO. Initially the project should run from December 2001, which was later changed to July 2002, until August 2002. This changed into a time frame from August 2002 with an end date in December 2002. To cover the running and unexpected costs of the project, the community already contributed about one million FCFA that was kept in the bank account of the Development Union.

5.2 Results project approach

The results of the project approach are summarized in Figure 6. Two aspects of the project approach are scoring quite well; these are participation and the demand-driven approach. Most of the other aspects are not that good; especially the support by Plan for O&M is almost absent. Generally it can be said that there are a lot of points for improvement. For every indicator the score will be explained in the next sub-paragraphs.

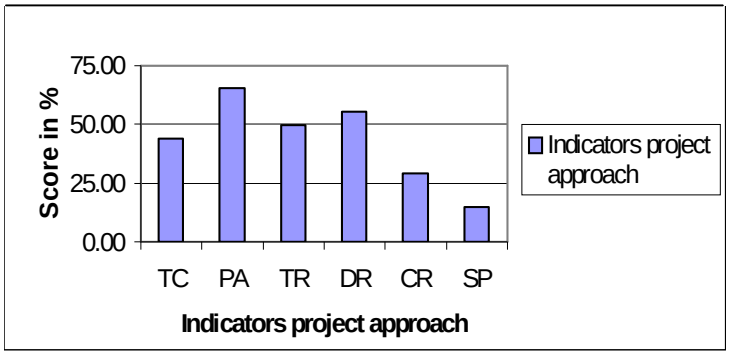

Figure 6 – Sustainability of project approach of Mbemi water project

5.2.1 Technology

Though Plan tries to control the quality of the infrastructure officially there are just a few guidelines. The most important one is that there should be a feasibility study for every project. This leaves a lot of flexibility, which in the case of Mbemi resulted in standpipes without soakaways, which is not preferable. Already during construction the foreman decided to deviate from the design. During operation it also appeared that the design lacked the construction of low points. The maintenance committee has solved this after project completion. Another weak point was that there has been no attention for the maintenance of the infrastructure after completion. Very strong was the expertise of persons involved in construction; especially the foreman had a lot of expertise on water projects.

5.2.2 Participation

Though the community was not empowered to execute the project by themselves, the participation in the project was quite good. The community was really willing to contribute towards the project, which had a positive influence on the efficiency and contribution during the project. Further the community members were informed very well about the project. The only difficulty in participation was the involvement of beneficiaries from another community Nyen. This was especially a problem during preparations of the handing-over.

5.2.3 Training

Both at household as well as committee level the training on O&M was done poorly. During household trainings there was almost no attention for O&M aspects. Concerning the committee

training there was some theoretical training on O&M. However, this training was not very extended and was not accompanied by practical training. At committee level the training on finances was very basic and the aspect of communication was a bit missing. At household level several trainings has been carried out on hygiene and sanitation, this turned out during the interviews. In all the households at least one person had attended training and most of the people knew how to treat water.

5.2.4 Demand-driven approach

This project is considerably driven by demand from the community. This is mainly caused by the fact that the community already started the project. Most of the standpipes already existed, the choice for a gravity water system was already made and the project committee already existed. However other choices like how the technology should further look like or how the maintenance should be shaped were mainly inspired by Plan, since they provided training, provided a technician to carry out a feasibility study and determined what the community should contribute towards the project. The acquaintance of the community with the procedures during the project was quite high, but they didn't really know what the responsibility for e.g. O&M involves.

5.2.5 Cost-recovery

Talking about the extent to which all costs are recovered, it is only sure the implementation costs are fully recovered. The costs of O&M are supposed to be recovered, but are not really covered in practice. Costs of extension are only covered at standpipe level; people are paying for their own house connection. But there is no budget for extension of the storage tank or something else. This is probably also due to the lack of a strategy. Though a committee is appointed and supposed to collect levies, no appropriate planning has been made and collection only started 1,5 year after construction. In practice there's no appropriate tariff, access to other sources or effective financial management. This makes it clear that there's not enough attention for the costs of the project, especially after implementation.

5.2.6 Support O&M

It is clear that support of O&M is not part of the project approach. Since Plan is still working in the community, the CDF keeps an eye on the facilities and sometimes asks around. Further Plan is still conducting trainings for committee and community both. But there's no case of a purposive approach concerning monitoring, planning, assistance, coaching or training. Spare parts were available after construction from parts left from the project, but maintenance tools used are the properties of the people concerned with maintenance.

5.3 Results project performance

The results on the performance of the project are summarized in Figure 7. The operation and maintenance are performing quite well, both around 60%. Only the management of the system is not going on very well, the performance of the management is only about 40%. This performance beneath average is mainly due to the lack of financial planning and the low efficiency of tariff collection. However, this doesn't result yet in serious problems affecting the operation and maintenance of the system. But whether the committee is able to keep the system operational over a prolonged period of time is very doubtful. The outcome of every indicator will be discussed further in the next sub-paragraphs.

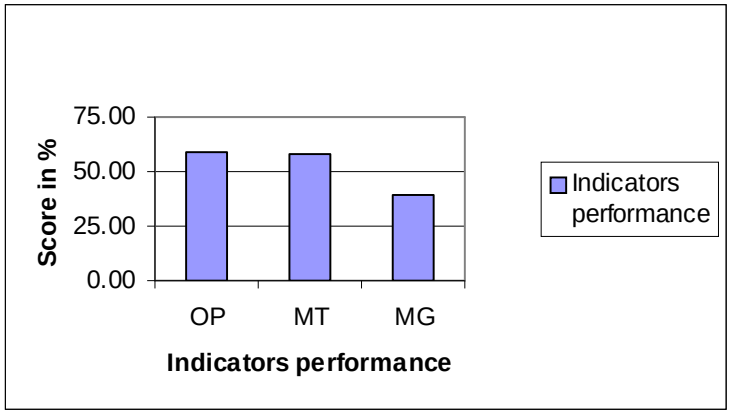

Figure 7– Sustainability of performance of Mbemi water project

5.3.1 Operation

Generally the user satisfaction about the system is very high. The water is almost always accessible to everybody. Many people even do have a house connection, which restricts the distance to a few meters. Among users there are only two problems mentioned. The first one is that the water is not always flowing at the last standpipe or that the pressure is very low. This is for a matter of fact not received as a big problem, since there's another standpipe really close. The second problem is that the water sometimes has a brown colour during the rainy season. This is probably caused by the lack of a rain diversion system at the catchment chamber, which allows muddy rainwater to enter the chamber. However, when the system is examined more critically it appears that all chambers do have a high risk for contamination. That this risk is real appears from the laboratory results. These results show that the water quality in all chambers is very poor, though it is good at household level. One remark to these results is that people found a rat in the collection chamber when taking a sample to measure the quality. But it remains that it is quite easy for little animals and insects to enter the different chambers, since every chamber has several uncovered pipes, and that there are agricultural activities in the catchment area. At standpipe level the main problem is that there are water pools, which attract mosquitoes, since the standpipes lack soakaways.

5.3.2 Maintenance

The maintenance of the project is carried out quite good. The aspect of maintenance with the lowest score is 'money available'. All people concerned with maintenance agree that there is enough money to do simple repairs, but not to do more expensive repairs or to buy tools for maintenance. There's also no money available to pay the caretakers for their work. Another weak

aspect is the monitoring of the system. This is probably done monthly, which is averagely, but thorough monitoring of quality and quantity of water is not done at community level. All maintenance activities are most of the time done by the caretaker, the chairman and the financial secretary together. Both the caretaker and the chairman have a lot of experience in plumbing work and even in the construction of water systems. The community is participating in cleaning activities at their standpipes and also about once a year at the catchment area.

5.3.3 Management

The financial management of the facilities is mainly limited to the collection of some levies and bookkeeping of revenues and expenditures. The collection of levies is supposed to be done monthly by two appointed people from the committee, but this is not the case for beneficiaries from another village, two quarters of Nyen. The efficiency of the collection in the four quarters of Mbemi is still very low, since from a sample it appeared that only 25% of the people paid all their levies for 2004 and nobody paid anything for 2005. It seems very difficult to involve the Nyen people into the management of the system. Most of the time the representatives from Nyen are not attending the meetings of the committee, they have no responsible people for the collection of fees and refuse to do this monthly. This has also to do with the fact that the other part of Nyen is provided by another system that has a yearly system of collection. Concerning financial planning and budgeting the main issue is that there has been insufficient training and that the financial persons lack financial experience. For example the financial secretary doesn't even know how much revenues he's supposed to receive during a year.

5.4 Conclusions

The objective of this chapter was to assess the sustainability of a project following the traditional project approach. It appeared that the performance of the Mbemi water project cannot be called sustainable, but that several sustainable elements are there. Two weak points are the operation of the system at the catchment level and the financial management of the system. Both could have been prevented by more attention for O&M during and after project completion. From the results of the project approach, it appears that there has been slight attention for monitoring, planning, coaching and support of financial and technical aspects after project completion. The lack of a rain diversion ditch, soakaways and other unsanitary situations could have been prevented by a more appropriate design. Determination of the costs for O&M in a feasibility study, would have improved the financial planning. It is sure that the financial situation would have been better when the committee would have received coaching on financial management besides training.

6 Bamali water project

The question to be answered in this chapter is *'How sustainable is the performance and approach of a project that is executed as a community-managed project?'* The first paragraph will give an introduction into the project. The next two paragraphs present the results on sustainability of the project approach respectively the project performance. More information about the project and the results is written down in Annex F.

6.1 Introduction

This paragraph gives an introduction towards the Bamali water project. Subsequently the history & context, the community and the project are discussed. Extended information of the system, time-schedule and results is written down in Annex F.

6.1.1 History & context

Bamali is part of the Ndop central subdivision in Ngeketunjia Division in the Northwest of Cameroon. The Ndop Plain is noted for their water problems, especially during the dry season. Since the community does not have the capabilities to solve their water problems, they decided in 1998 to send a request to Helevetas. Unfortunately they failed to raise the funds needed for the project. But it resulted in a feasibility study done by the government partner in the Ndop division for community development. Unfortunately governmental resources and capacity cut back so that the population had to finance these studies by themselves. When Plan entered Bamali in 2000 they handed these feasibility studies over to Plan. This resulted finally in a request from the community for financial and technical help from Plan, which has been approved by the country director of Plan Cameroon during November 2001. This led to several feasibility studies and a risk analysis on the management of the project by the community. It was decided that this project would be used as a pilot for Community Managed Projects (CMP's). Due to problems like money transfer and contradicting feasibility studies the implementation of the first phase finally started in September 2002. Until then Plan had already been building up a history in the community; they have been providing mosquito nets, classrooms, pit toilets, school desks and scholarships for sponsored children among other things.

6.1.2 Community

Bamali is about 38 km away from Bamenda, along the Bamenda-Kumbo road and about 10 kilometres away from the sub divisional town Ndop. Bamali, Bafanji, Bamunka, Bamukumbit and Bambalang are made up of the "Mangeh group", from which it is believed that they have the same ancestor. The 'Mangeh group' is the major ethnic group in Bamali and also regarded as the only ethnic group. The inhabitants of Bamali are divided over 16 quarters. Depending on the used figures and the number of quarters the population fluctuates somewhere between 7000 and 12.489 inhabitants. The project is technically designed for about 11.470 persons in the year 2022, whereas the population was said to be 7000 in the year 2002. Figures from the Ministry of Health counted a population of 12.489 in 2002, but the final project is said to have 10.000 beneficiaries.

The community members live for 99% from agricultural products. The average villager produces hardly a saving of 10.000 CFCA per year from sold crops, which consists mostly of beans, corn and rice. Due to population pressure and the falling price of coffee the income of the farmers has been declining. There are no figures about the education level in Bamali. The risk assessment indicates that most community members speak English and most person's interviewed had at

least finished primary school. Further some community members have had specific training on secretariat and some are civil servants. The Baseline study (2005) indicates that in the Northwest Province about 50% of mother or female caregivers in Plan communities (15 years or older) are able to read, write and do basic mathematics.

The inhabitants used to go for water for several kilometres to dripping springs, or to one of a few hand-dug wells or the main river. These sources are all doubtful since animals are using this water also or the recipients themselves contaminate the water. The wells are swallow, which is a problem especially during the dry season, whereas in the rainy season the water table can be higher than the ground level. This is the cause that most of the population and especially children are suffering from water-related diseases.

6.1.3 Project

The objective of the project is to reduce the incidence of water borne diseases by providing a good source of potable water to the entire population of the village. The project is divided in several phases and will finally provide a gravity water system with 12 standpipes and 16 wells to provide all the quarters with water. Since the total sum of this system amounts to 50 million FCFA, Plan decided after a while to implement the project in several phases. This decision led to a new agreement between Plan and the community in which Plan obliged to contribute 10 million FCFA towards the first phase whereas the community would still contribute 5 million FCFA. This money has been used to implement a gravity water system and a training for capacity building inside the community. The system consists of two spring catchments, a collection chamber, a storage tank and pipelines towards five standpipes. Training has been done for the project committee on CMP, for the maintenance committee how to maintain the system and there was IEC at community-level on hygiene and water.

Officially this construction was implemented on the 30th of June 2003, but there was still work to do before the handing-over took place 23rd of August 2003. This final project output is quite different from the requested one, since the request asked for 12 standpipes to be completed in October 2002. This delay has of course to do with delay in the starting date, but besides this the project had also to deal with failures and changes in design, lack of participation etcetera. The parties involved in the project were the government, the community and Plan.

6.2 Results project approach

The results of the project approach are summarized in Figure 8. Generally the more common indicators of a project approach – appropriate technology, training and participation – have quite many elements of sustainability. The other indicators that are discussed – demand driven approach, cost-recovery and support O&M – are not worked out very well for the Bamali water project. The results will be discussed for each indicator in the next sub-paragraphs.

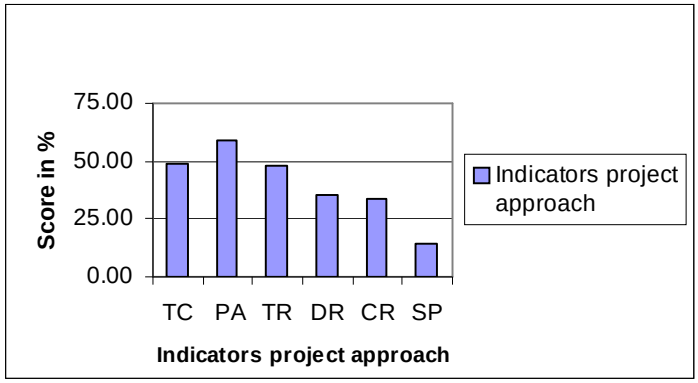

Figure 8 – Sustainability of project approach of Bamali water project

6.2.1 Technology

The appropriateness of the technology used by Plan is quite good. Guidelines are available to ensure the quality of the project, but are not limiting flexibility. The guideline says for instance that every gravity water system should have a thorough feasibility study, which should be approved by the Rural Infrastructure Engineer (RIE) from Plan. The only thing is that there are no rules about which contents should at least be part of the study. All feasibility studies for Bamali didn't contain information about the O&M aspect of the system, which might cause problems. Concerning the expertise it was striking that people involved had a lot of expertise, but that this didn't result in an appropriate design. There was still the wish to add an extra catchment, which changed also other things in design. Further there were already failures in the design. The final implemented system is probably good, but the design was not that good that the construction is implemented as designed.

6.2.2 Participation

The Bamali water project was a CMP, which is visible in the score for participation. The empowerment of the community was very high, since community members purchased materials and were responsible for monitoring. The community members also contributed quite a lot in cash and kind, though they were not able to provide all skilled labour. Though the agreements of the project changed during the project, the committee and most community members still value the transparency of the project as good. Concerning the efficiency of the project the committee is quite satisfied, but the foreman and Plan are thinking differently about this. Since agreements changed, local materials were not delivered in time and many people did not receive community participation as smoothly, the efficiency of the participation was quite bad. It seems logical that the more empowerment, the more problems can be expected with the efficiency of participation. However, this is in my opinion no reason for the problems related to community work or change of agreements. Equality and participatory activities both scored average. The problem with equality is that this project doesn't serve the whole community and that women where

represented badly in the committee. Further it is striking that though the project evaluation is said to be participatory, it was not accessible for regular community members and even the foreman didn't visit the evaluation.

6.2.3 Training

At household level the training and awareness about 'what it takes to deliver the water at the tap' is mainly bad. There has been training on hygiene and sanitation and there's an average awareness on this at community members. But concerning O&M the people only have a little idea about the tasks and costs. Further it is remarkable that community members who visited the training were only able to give a little bit of useful information about this.
At committee level the training was quite good. The committee received much training during the project and also about maintenance of the project. Although the training was good, some committee members were not even able to reproduce the parts that were useful for their function. But the main reason why the training was not that effective was that attendance of committee members lay only between 50 and 75%.

6.2.4 Demand driven approach

The demand-drivenness of the project approach is not that bad when it is about initiation of the project. The community really needed water from a higher quality and already started feasibility studies. It's only difficult to estimate whether the Development Union really acted on behalf of their members, which are the community members. People living in the village are not able to join all the meetings, even though they are the first people to benefit from projects. The availability of an informed choice at household level is very low. Most decisions are made by Plan, representatives of the community or the technician who makes the feasibility study. For most community members it was clear from the beginning what they had to contribute towards the project and that the community would be responsible for O&M. But it was not clear what the responsibility of O&M involved in terms of contribution and efforts.

6.2.5 Cost recovery

Cost-recovery was good when looking at project level, but after the project it is bad. The community is supposed to collect money for O&M and has been trained on it. This training also included aspects as that there should be money for major breakdowns and for training and travelling from the CBO's, but it lacked costs of extension and any real estimation for rehabilitation. Though Plan is working on other aspects of cost-recovery through networking and capacity building, this is not part of the cost-recovery of a water supply system. Through the training there has been a kind of strategy for cost-recovery, but this didn't contain a discussion on the degree of cost-recovery by the community nor a true planning for cost-recovery. The community received some training on how to mobilise other funds, but is not really bringing this in practice.

6.2.6 Support O&M

Most aspects related to the support of O&M score really bad. The main problem is that there's no real strategy on how Plan wants to support O&M. The CDF might give some assistance or do monitoring when he passes by, but this not based on structural monitoring. All kinds of assistance might be given if necessary, but there are no agreements about the assistance to be given after completion of the project. Coaching in Bamali has been done during a meeting between the caretaker and an engineer from Plan. This was really necessary since the caretaker didn't visit the initial training. During this visit the caretaker also received some information on how often he has to monitor the system and where he has to look after.

6.3 Results project performance

The operation, maintenance and management of the Bamali water project were all valued below average. In summary the problem is that management is arranged poorly, that operation of the system is not good enough to catch this lack of management, which affects even the maintenance badly. The results are summarized in Figure 9.

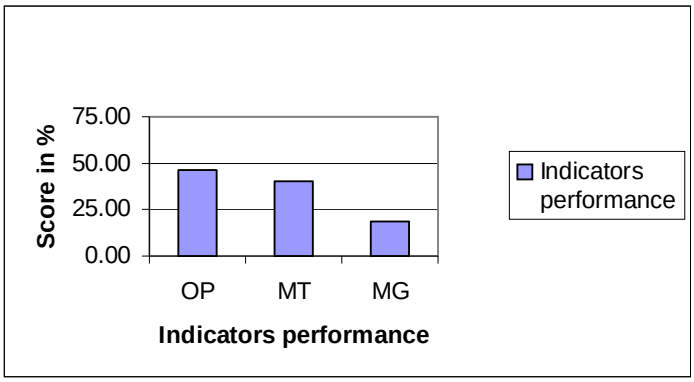

Figure 9 – Sustainability of performance of Bamali water project

6.3.1 Operation

From inspection it appeared that both the physical condition and the environment around the facilities is not performing very well. The most striking result was that one of the standpipes provided by Plan was not functioning for about one month. Another problem in Bamali is that not the whole community is supplied by the first phase and even some people who can use the piped water are still going to the stream to get water from. This has mainly to do with the distance to the standpipes, which is for many people longer than the distance to the stream. When people are not really convinced about the bad influence of the stream on their health, maybe in combination with dissatisfaction about the quantity or continuity of water at the standpipes, people are not willing to walk a longer distance. Nevertheless the people who are using the standpipes are quite satisfied, mainly because their health has improved. Though it is not easy to provide enough water at the standpipes, people are generally satisfied even though the water is cut off about two times a week from 5 p.m. till 6 a.m. One of the concerns is the quality of the water at household level, which is very bad. Maybe this also has to do with the fact that the area around the standpipes is not clean and that many people are keeping the water in their houses for three days.

6.3.2 Maintenance

One of the most bothering things concerning maintenance is that there's no money available. Shortly, there's only one caretaker, who is not satisfied about the state of affairs and has not enough tools to do the maintenance well. Fortunately the caretaker is currently training four new people to assist him, which relieve him and make more people available in the future. Another positive development is that the general assembly for development (PECUDA) is planning to discuss this month a monthly allowance of the caretaker. But still the problem remains that there are no appropriate tools to do repairs and cleaning, that the community does not participate actively in the cleaning activities and that there are serious problems related to the collection of maintenance levies. Though the caretaker is known as capable and available he cannot work without having good tools and spare parts.

6.3.3 Management

The biggest problem with the management of the facilities is the lack of management. Due to almost everybody, except the caretaker, the committee is not collecting levies. Besides this the communication, both internal and external, is not good, officially the committee is not elected and it doesn't represent the users of the system. No collection makes many other indicators useless, since there's no accounting, no budgeting, no auditing and no tariff. The reason that maintenance is still been done is that standpipes are maintained from quarter funds and that PECUDA or committee members pay other maintenance activities.

6.4 Conclusions

Considering the low overall performance of Bamali water project the project cannot be called sustainable. The fact that already one out of five implemented standpipes is not functional for about one month is one of the alarming consequences of poor agreements about the financial structure of O&M. Striking is that despite a lot of attention for capacity building, especially on financial management in general, this doesn't appear to have a positive influence on the effectiveness of financial management. Reasons for the poor financial management might have been replacement of the committee, occupancy of the committee with the second phase of the project or unwillingness to pay from community members. However, all these arguments don't seem to apply for this project. This leads to the conclusion that the CMP-approach might have been too demanding for this community, which has led to ignorance of the maintenance aspect of the project. Another striking point was the low willingness to participate into the project committee and community work. This shows that the CMP-approach didn't make the community members of Bamali more concerned about their water project.

7 Reflection

This chapter reflects on the outcomes of the case studies and the different project approaches from Plan. The question to be answered is *'How do the different project approaches from Plan Cameroon and their outcomes correspond to literature?'* The first paragraph compares the results and the used project approaches of the case studies with the expected outcomes. Paragraph 7.2 reflects on the effectiveness of the different project approaches from Plan. The last paragraph gives an answer on the research question of this chapter.

7.1 Reflection on results

This paragraph will reflect on the results of the case studies and compare this to the literature described in chapter 3. Firstly this will be done for the performance of the studied water systems. Sub-paragraph 7.1.2 reflects on the results of the project approach.

7.1.1 Sustainable performance

For the performance indicators the definition of sustainability together with mentioned key constraints formed the basis for the framework of indicators. That's why the reflection will also be based on these two elements. The adopted definition assumes that a sustainable system, a system that will continue to function and benefit over a prolonged period of time, needs to have an institutionalised management, recover costs, operate and maintain at local level, benefit all users, have a future vision etcetera. It also includes exclusion of environmental effects. Though very important, it doesn't play a major role, especially not on short-term. Further no other elements from the definition turned out to be irrelevant.

Chapter 3 also sketched the main issues and constraints related to sustainability. The first thing mentioned is that most (80%) of the problems have a financial and managerial nature and only few (20%) have a technical background. This was affirmed by the case studies, the indicator management has the lowest performance and operational and maintenance problems often turned out to have a financial background.

It was assumed that the willingness to pay would play a major role in the financial problems. This was illustrated by the vicious circle, which is presented in a reduced form in Figure 10. Though the projects from the case studies are still too young to recognize this vicious circle, the circle doesn't seem to represent the major reasons of a poor performance in the case of Plan Cameroon. Firstly it doesn't seem that insufficient willingness to pay, mainly caused by a lack of trust, is the cause of inadequate income. It is true that collection in Mbemi didn't start directly, because people were not willing to start paying directly. Some committee members in Bamali are also arguing that people are not willing to pay. But from interviews in both villages was learned that community members were not really reluctant to pay. The poor financial situation seems to be caused rather by the poor functioning of the committees. This

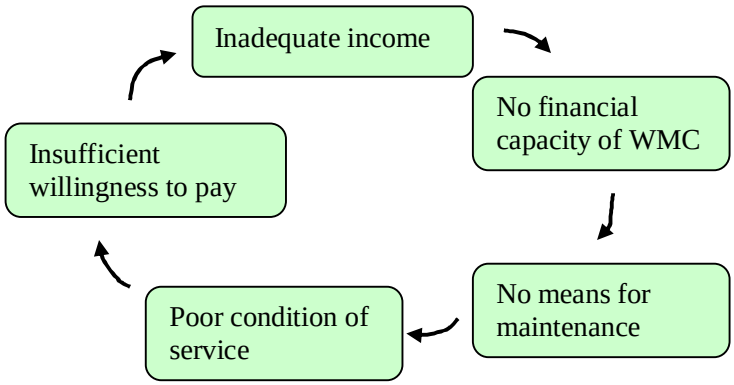

Figure 10 - The vicious circle as presented in chapter 3

was showed by the lack of financial planning and appropriate tariff-setting, ignorance towards non-payment, unclear agreements, poor follow up of agreements. Further, especially the facilities at 'catchment area level' are performing poor, which is indeed partly caused by lack of finances to buy appropriate tools. Both communities are managing maintenance with the available or their own tools, but the situation is not ideal. The other reason is that during design and construction not enough attention has been paid towards operation and maintenance.

The vicious circle closes with the relation between the poor conditions of the service, which is influencing the willingness to pay. This relation seems also not to do exist on the first sight: the condition of the service in Mbemi is lower, but the payments are higher. It seems that not the actual condition of the service is influencing the willingness to pay, but the benefits experienced by the users. These benefits and not the actual condition reflect the user satisfaction, which is an important determinant for the willingness to pay. These relations have not been researched extensively, but the willingness to pay, the user benefits and satisfaction were all very low in Bamali. People were not willing to pay for repairs, only some quarters are having access, the distance is for many people longer than before, quantity hasn't left over and the water is cut off regularly. Though users are all recognizing the improvement of health, this doesn't seem to countervail against a longer distance for non-users who are supposed to benefit.

7.1.2 Sustainable project approach

Comparison of elements in literature that are proved to strengthen sustainability with the implementation of projects by Plan Cameroon, shows that Plan can make a lot of improvements on the sustainability of their project approach. From the case studies appeared that especially the indicators cost-recovery and support of O&M scored very low. Participation scores quite good and technology, training and demand-driven approach somewhere between (see also Figure 11, next page). Some remarkable points per project indicator are:

1. **Technology;** No attention for maintenance aspect in design and insufficient attention for operation and maintenance aspects in general, for instance for water quality aspects.
2. **Participation;** Empowerment has no relation with the performance of participation in general, but seems to depend more on community-related factors.
3. **Training;** Sanitation and health aspects are good, but O&M aspects very weak, however the effectiveness of training in general is doubtful.
4. **Demand driven approach;** Priority was in both cases very high, since both communities really needed water, however it seems difficult to provide an informed choice at household-level, especially in a big community. In both cases people knew quite a lot about the project, but there was no knowledge about what will happen and is required from them after project completion.
5. **Cost recovery;** It is clear that Plan has no appropriate strategy at all to recover ALL costs. There's no appropriate planning nor is a strategy worked out in practice.
6. **Support O&M;** The present support of O&M is only done by ad hoc assistance and monitoring and refresher trainings. There's no support by providing monitoring approach, planning or materials.

Reflection on all the indicators shows that Plan's attention for all aspects related to O&M is very low. This appears from the lack of a clear post-project strategy, but also from inappropriate attention for O&M in the feasibility studies, design and training. Generally, the results show that it was very clear to community members that they would be responsible for O&M, but that even the project committee has no clear idea what this responsibility involves, how much it costs or how it exactly should be done. Participation of the community appears to be a difficult issue. Empowerment of the community doesn't imply that community members are indeed more

involved. Rate of involvement of community members seems currently more related to external factors than the used project approach. Though the community is obliged to collect water user fees, they seem to take this responsibility lightly.

7.2 Effectiveness of project approaches

This paragraph will reflect on the effectiveness of the different project approaches used by Plan. This effectiveness is determined by comparing proposed methodology and objectives with the execution and outcomes of the project approach. The first sub-paragraph reflects on the CMP-approach by comparing both case studies. This reflection leads to some conclusions about the effectiveness of the CMP-approach, which is written down in sub-paragraph 7.2.2. The last sub-paragraph reflects on the use of the PHAST-methodology by Plan.

7.2.1 Comparison of the case studies

Generally it was expected that the Bamali water project would perform better than Mbemi water project, since this is a project executed following the CMP-approach. Theoretically a community-managed project is after all more participatory, since these projects are initiated, planned, managed, monitored and evaluated by community members. Comparing these objectives with the hypothesis that a higher degree of participation leads to a more sustainable project, it seems logical that the CMP-approach will have a positive influence on the sustainability. From the results it appears however that the participation of the Bamali water project is not better than for the Mbemi water project and that it performs worse on every performance indicator. See also Figure 11.

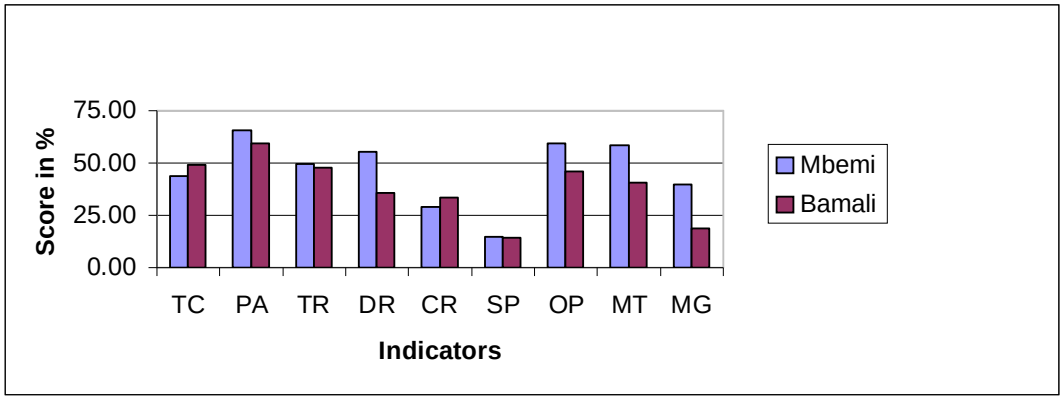

Figure 11 - Results for project approach and performance of the case studies

Bamali was one of the first communities were the CMP-approach was carried out in practice. Maybe it is not the best example to judge the effectiveness of CMP, since only the first phase of the project is completed and it concerns a pilot project. To find out whether the execution or the intentions of the CMP-approach are weak, the objectives of the CMP-approach are for both case studies compared with the executed project. This comparison is summarized in Table 6.

Comparison of the first phase of the Bamali water project with the Mbemi water project shows that in practice only representatives of the community are more empowered, but not community members themselves. It also shows that the degree to which community members felt in control was only higher concerning management and monitoring. But this control was still through a CBO, which was trained to manage the project.

Comparing both communities it is important that Bamali is a very extended village, where Mbemi is just a little village, which makes it more difficult to let community members be in control. On the other hand, the number of beneficiaries of the first phase of Bamali is about the same as the beneficiaries in Bamali. It would have been possible to let these beneficiaries feel more in control, since the quarters are strongly organized in Bamali, whereas Mbemi is only organized at community level.

Table 6 - Comparison of both case studies on objectives of CMPs.

Project stage	Traditional approach (Mbemi)	CMP-approach (Bamali)
Initiation	Community already started the project by themselves, Plan came in later	Development Union acts on behalf of community and initiated project.
Planning	Most members felt involved in planning through community meetings	Members didn't feel involve and idea exists that Plan mainly made planning
Management	Daily management by community, but mainly done by Plan	Chosen representatives were managing the project
Monitoring	Monitoring mainly done by people provided by Plan.	Monitoring is done by the project committee and Plan both
Evaluation	Community members were part of evaluation through community meeting	Representatives of quarters visited the project evaluation.

7.2.2 Effectiveness of the CMP-approach

Comparing the two project outcomes with each other and with the objectives of the CMP-approach, some conclusions on the effectiveness of the CMP-approach can be drawn. Firstly, the CMP-approach might easily enhance inequality inside a community. Theoretically CMP is meant to let community members be more in control. However, the main difference between CMP and the traditional approach in practice seems to be that only some representatives of the community are trained to be more in control. It is true that a CBO in Bamali was empowered and Plan fulfilled the role of facilitator, but this is not the same as empowerment of community members. This is proved by the fact that community members of Mbemi felt involved in especially planning and evaluation whereas the people in Bamali didn't feel involved at all.

Further, it appeared that the extra capacity building related to CMPs doesn't necessarily improve the sustainability of a system. It is true that training on community-managed projects will enlarge the financial capacities of the people trained. Benefits after project completion will only be received when the same people are also concerned in the maintenance committee. In practice it seems that management of a project is already asking so much, that people are not really motivated any more, to fulfil this task too. In the case of Bamali the project committee and the maintenance committee are the same, but this committee is mainly concerned at the moment with the second phase of the project. This is for a matter of fact no explanation for the bad management performance, since there was about one year between first and second phase to put things in place.

The third conclusion is that involvement of community members asks more organization in bigger communities, but nevertheless it is possible. In bigger communities involvement may have to be arranged at quarter level, which has to be passed on towards the project committee. This doesn't seem to bother involvement, since bigger communities have a strong structure inside quarters.

The last conclusion is that the empowerment by giving control to use project finances is doubtful. The reimbursement approach provides the community money, but to use the money they still have to ask Plan for permission when they want to spend above 150.000 FCFA (about € 230).

This might lead to the conclusion that it is not effective at all to apply a 'more sustainable' project approach. The Mbemi water project shows for instance that a higher degree of perceived participation indeed leads to a more sustainable project. But appliance of a more sustainable project approach is no guarantee for sustainability, which shows the importance of evaluation.

7.2.3 Use of the PHAST-methodology

The use of the PHAST methodology in practice is not examined thoroughly, but documents and the visit of a PHAST activity makes it possible to do some reflection on the use of the methodology. Firstly there seem to be several ideas inside Plan about the use of the PHAST methodology. Yunga (2003) mentions PHAST as a tool to analyse the present situation and to find solutions. Ganye (2005) however works it out as a tool to sensitise the community concerning maintenance and to adopt better hygiene practices. This affects the way in which the PHAST-methodology is currently used inside Plan. It is in the first place carried out generally after completion of a water project and in the second place the focus is on health, hygiene and sanitation problems with little attention for water.

Comparing the PHAST-methodology with the outcomes of the project approach indicators, it is assumed that the PHAST-methodology can be an appropriate tool to improve the participation of community members in the whole project cycle of a water project, unless starting activities are carried out before or during project initiation. Executed in this way it can be used as a tool to make the project approach more sustainable on the demand-driven approach, participation and awareness.

7.3 Conclusions

The objective of this chapter was to identify how the results of the case studies and the method of approach from Plan in general correspond to literature. The outcomes of the case studies show that Plan's implemented water systems are scoring especially weak on the indicator management. Problems related to operation and maintenance also seem to have a financial or managerial background. The main reason doesn't seem to be the willingness to pay, but rather the incompetence of committee members to make an appropriate planning.

Comparing the used project approaches, with a 'sustainable' project approach, still a lot can be done. In both case studies is especially the attention for O&M during and after the project a weak point, though literature shows that it can be a very strong instrument to strengthen sustainability of projects. For instance, the lack of competences to make a financial planning or to monitor can be improved easily by coaching of committee members.

The CMP-approach doesn't seem to lead to a more sustainable project. Theoretically projects executed following the CMP-approach would be more sustainable, since it is more participatory and pays more attention towards capacity building. In practice, extra capacity building doesn't lead automatically to a more sustainable project and 'more control' not to more participation but rather to inequality. This doesn't imply that project approaches are not effective in general, but that evaluation on the effectiveness is indispensable.

8 Conclusions and recommendations

The central thesis of this research is '*How sustainable are rural water supply systems implemented by Plan Cameroon and how can they strengthen this?*' The first paragraph of this chapter will summarize how sustainable rural water supply systems in fact are, based on a comparison of literature and reality in two case studies. The sustainability of the project implementation is derived from the Plan's current way of working and the turned out way in working in the two case studies. The results of this are summarized in the second paragraph of this chapter. The third paragraph will do recommendations about how Plan can strengthen the sustainability. This is done based on the efforts Plan is already making and the problems encountered in the case studies.

8.1 Conclusions on the sustainability of systems

In the Northwest Province of Cameroon Plan is mainly implementing gravity water systems. The sustainability of such systems has been assessed, by comparing a sustainable performance with the actual performance of two implemented systems. This assessment is based on the definition of a sustainable rural water supply system, which is made operational in a framework of indicators.

An advantage of gravity water systems is that it is relatively easy and cheap to maintain. This might also give an explanation why the systems in both case studies are still functional most of the time, in spite of the poor financial management. However this 'managing of the situation' is not in accordance with the definition of sustainability. Comparing the definition of sustainability with the results of the case studies shows that the facilities are functional and being used for about 95%, that it has institutionalised management and that it can technically be operated and maintained at local level. Both systems lack however the recovery of costs at local level and – especially Bamali – lacks the delivery of appropriate benefits to all users. Most striking is that the lack of planning doesn't give the facilities the capacity to continue to function over a prolonged time of life. This leads to the conclusion that though some elements of sustainability are there, both systems cannot be called sustainable. Results show also that the project implemented with the traditional approach is more sustainable than the one implemented with the CMP-approach.

8.2 Conclusions on the sustainability of project implementation

Due to the definite period that Plan will support a community, all responsibilities for a water system will be handed over after project completion towards the community, eventually in cooperation with a government partner. To enable the communities to manage their system they have to appoint a water management committee. Training of this committee will be supported by Plan. Besides this Plan also provides IEC on hygiene and sanitation, involving education on collection, transportation and storage of water.

A more recent development is the empowerment of the community already during a project, the community-managed project approach. This approach aims to let the community members in control during all phases of the project. From comparison of a CMP with a project executed following the traditional approach it appears that the CMP-approach has not been able to deliver a more sustainable system. From this single comparison it's not able to prove whether this is caused by the CMP-approach or community-related factors. In principle there are however some objections against the way the CMP-approach has been implemented. The focus of the CMP-approach on training of the project committee might enhance inequality, since it doesn't involve

community members, and is not providing the supposed advantage of ensured sustainability. Further, the CMP-approach might be too demanding and it is doubtful whether the committee is truly empowered to manage their project budget. In theory, the CMP-approach should enhance sustainability, but this is not the case for the way it has worked out in this project.

Another recently adopted methodology is PHAST. This methodology provides tools that enable participation of community members from problem identification to project evaluation. Plan has been adapted this methodology to sensitise people about maintenance and to adopt better hygiene practices. Currently this program is executed after completion of a water project, which doesn't improve the participation of community members in the project itself. During a visit of the activities it appeared that there was a focus on health, hygiene and sanitation and just little attention for water. The PHAST methodology can be a strong and appropriate instrument to improve the participation of community members in the whole project cycle, when starting activities are carried out before or during project initiation. The way it is carried out now, it doesn't replace the IEC on hygiene and sanitation of the past, which focused more on water and hygiene.

Comparing the project approach to literature is appears that Plan is not paying a lot of attention towards the O&M projects. Comparing this to the results of the performance of projects, it is assumed that the sustainability of projects can improve a lot by paying more attention towards O&M in design, construction and training. Further there's currently no post-project strategy to support O&M so that sustainability is monitored and enhanced.

8.3 Recommendations to strengthen sustainability

After the dissatisfying results of the CMP-approach, doubts about the benefits of a change in project approach might rise. Anyway, the project approach is the easiest way a facilitator can influence the sustainability of implemented projects. In arbitrary order, the following recommendations are made to Plan to strengthen the sustainability of their implemented water systems:

- More attention for O&M during design and construction. Guidelines might be useful to guarantee the presence of e.g. a rain diversion ditch, soakaways, protection against little animals in design and the calculation of at least costs for O&M in the feasibility study.
- Provide more information on the implications of the project and O&M responsibility in a begin stadium of the project for all community members, so that everybody knows how much they have to contribute exactly towards the project in cash and kind and when and what is expected from the community. The PHAST-methodology can be useful for this purpose if executed before the project starts, since it allows community members to plan their project.
- Adapt a systematic monitoring approach of a project after completion. This should at least involve the fulfilment of agreements by the community.
- Support coaching of the committee in financial and technical monitoring and planning. This involves that financial planning and budget, an appropriate tariff, agreements about collection, monitoring points for facilities, planning of monitoring etcetera is not only part of a training, but is done in cooperation of responsible committee members and experts.
- Provide maintenance committees with appropriate spare parts and tools or ensure that the committee have this at their disposal.

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Annexes

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Annex A - Cameroon

A - 1 Geographical

Some facts and figures of Cameroon (CIA, 2005) are:

Total area:	475 thousand sq km
Population:	ca. 16 million
Capital:	Yaounde
Economic centre:	Douala

Figure A.1 - Map of Cameroon. Source: Ministerie van Buitenlandse zaken, 2004

A - 2 Administrational structure

Cameroon is divided in 10 provinces. These provinces are each divided in divisions. The Northwest Province is divided into 7 divisions; these divisions have each there own division head. Every division is divided in several sub-divisions that consist of several villages. Every village is divided in several quarters, depending on the size of the village.

Besides the administrative division there's also a traditional hierarchy, which is very strong. Cameroon consists of about 300 tribes, who have each there own language and fon. A tribe can cover one or more villages and is governed by the 'ngumba'. The 'ngumba is the highest authority and consists of the fon and several notables. Every village also has there own council, which is an independent body that administer justice. This quarter represents the different quarters in the village. Every quarter has their own quarter head and assistant, together with some people chosen by the fon, they form the council. Communication towards the community is most of the time done through council meetings from where the quarter representatives pass the information on to quarter meetings. Besides this most villages in the Northwest Province have also a Development Union. This is a controlling and guiding umbrella for all other committees engaged in water, road, health, school or other issues.

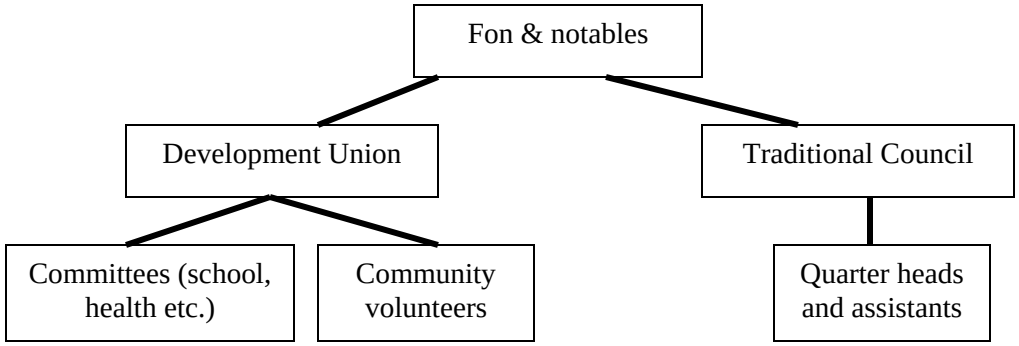
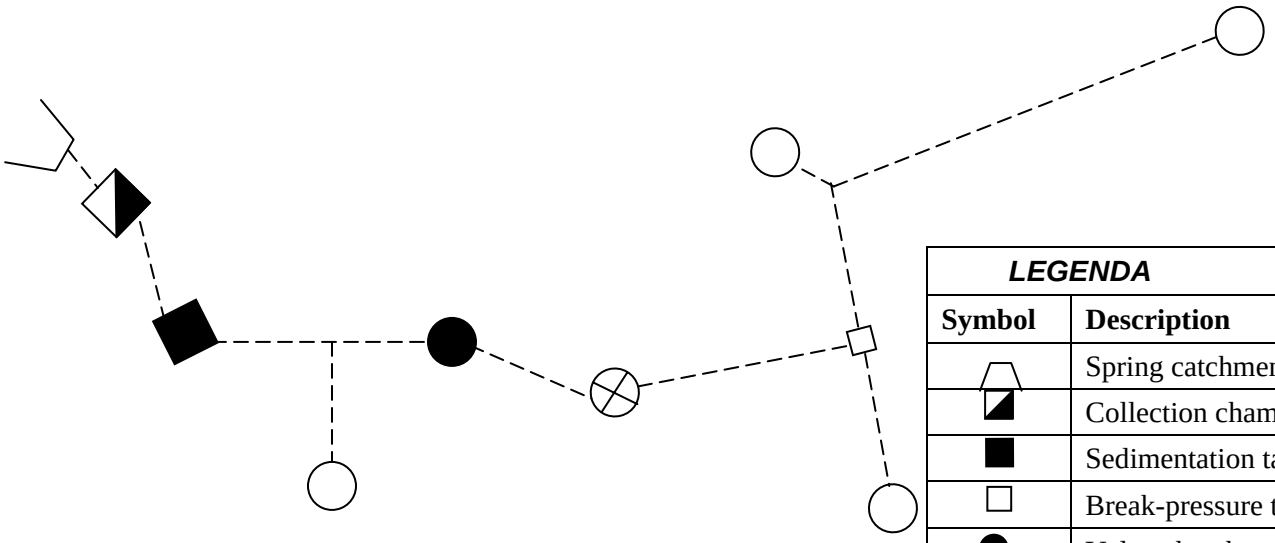


Figure A.2 - Administrational village structure

Annex B - Implementation of gravity water systems

B - 1 Description of system

Every gravity water system needs a reliable source were water can be taped from. This source might be an open stream, like a waterfall, but preferable is that the source is a spring. Generally water from a spring doesn't need much treatment before it is useable. At the source water is catched in a catchment/intake chamber, this will also break the pressure of the water a bit. From this chamber the water might be lead to a collection chamber, where the pressure will be reduced further, or to a sedimentation tank where the sand is settled. When water is catched from an open stream there's a need for further treatment of the water. At the moment Plan is implementing one project which has a treatment station. This treatment station consists of two filtration basins, where the water is cleaned with sand. Since this is a complex design and not used very often, it will not be discussed here. From this point the water is guided further to a storage tank in most of the cases. From here the water is led to public standpipes or house connections. Between all these elements the water is guided by iron or plastic pipes. Since the pressure of the water might be high, there's sometimes a need for pressure-break chambers. Further valvechambers and high or low point chambers might be part of the construction. The purpose of these chambers is to prevent the pipelines from explosions, which might occur when there's an air lock in the system. Public standpipes can be constructed with or without soakaways. The purpose of soakaways is to prevent that waste water from the standpipes remains as waterpools in the area around a standpipe, which might attract mosquitoes. To prevent this, a standpipe can be equipped with a pipe which leads leftover water away to a drain-away-room. These rooms are made from stone.



LEGENDA	
Symbol	**Description**
	Spring catchment
	Collection chamber
	Sedimentation tank
	Break-pressure tank
	Valve chamber
	Storage tank
	Pipeline
	Standpipe

Figure B.1 - Lay out of a gravity water system

B - 2 Guidelines

This chapter consists of two paragraphs, one is based on 'Implementation guidelines approved CPOs' (Plan, 2005) and one with a more extended version of guidelines based on 'Implementation guidelines rural infrastructure' (Plan, 2005) and other documents.

B - 2.1 Official implementation guidelines

This paragraph contains official guidelines for gravity flow extensions, IEC on hygiene and water and training of the WMC.

Gravity flow extension

The description of gravity flow extension reads 'mountainous water sources are taped and channelled to the communities using pipes and stand pumps'.

Implementation guidelines are:

Target population: entire population

Activities:

- Community requests to tap and channel or extend an existing gravity water system
- A technician does a feasibility study
- After a favourable outcome Plan and the community are contributing towards the project
- Community contributes in local materials such as stones, sand, unskilled labour, etc, and Plan contributes money for materials that are not available locally including cement, rods, hand pump, skilled labour, etc

Result: Potable water is available at standpipes in the community for the population to collect and to use.

Requirements related to Child Centred Community Development (CCCD) are:

Participation:

- Facilitation of needs analysis through PHAST methodology working with women, children and men.
- Decision for system must be made by the community, while they are aware of implications of maintenance/sustainability
- Encourage exploration of local designs and use of local materials.

Child Centred:

- Facilitate reflection on impact of situation for children during needs analysis
- Identify possible roles by the children at all levels of project

Groups and organizations:

- Carry out PHAST process in the context of CBO's to ensure acceptance of process

Partnerships:

- Government and local council workers responsible for water and sanitation must be involved in PHAST process up to monitoring and evaluation.

IEC on hygiene and water

The description of IEC on hygiene and water reads ‘where water projects are realised there is a training of trainers on proper use and storage of water, also to ensure proper management through user fees for sustainability. CCCD requirements are about the same as the one of above.

Implementation guidelines are:

Target population: entire population

Activities:

- Some community members constituting the WMC are trained on maintenance which permits that good quality of water be made available to the community
- Trained on maintenance and personal hygiene issues to ensure proper storage and use of water

Result: Water systems longevity ensures, as well as proper storage and use of water.

WMC training

The following implementation guidelines are available for Water Management Committee (WMC training:

- Can be carried out by in house personnel or external NGOs or consultants
- Curriculum should be obtained from the RIE
- Specialized NGOs or consultants should receive this curriculum to prepare the training course.
- NGOs should be invited to tender; the best tender in terms of course material should be selected
- Duration of a training must not exceed two days
- Though for the project committee it is also important that some village heads are attending
- Always organize training on days chosen by community members.

B - 2.2 Other guidelines

This paragraph is based on guidelines for the implementation of gravity water systems retrieved from the RIE.

Guidelines for springs and sources:

- Choice is collective responsibility of community and should be made during a village meeting where most of the members are represented.
- The source must have been observed for at least five years to confirm that it will not going dry
- No agricultural activities should be done within 50 meters from the spring and grassing should be avoided within 100 meters.
- The source must be located higher than the intended supply points
- If the source is located in a land belonging to another village there must be an agreement

Guidelines for construction:

- Every project should start with a thorough feasibility study that is reviewed by the RIE.
- The quality of the water should be checked prior to the construction
- Local materials like sand and stones should be provided close to the project site
- Stressing of pipelines must be done by qualified technician or engineer in accordance to the design.

- There must be people with experience in water projects and bricklayers and plumbers should have experience.
- Preparation should start during the rainy season so that construction can be done during the dry season.
- There must be regular supervision of the RIE especially at the beginning of the project.

Guidelines for management

- A caretaker must be nominated and accepted before the project starts. Training will also be provided to enable him to follow up the project after implementation.
- There should be an active project committee, which tries to be gender-balanced.
- A system and rate of collection of maintenance fees should be fixed with the community members immediately after the completion of project implementation.

Guidelines for participation:

- Gender consideration towards the people who carry water.
- Joint project with community ownership promoted
- Leaders of the children's club should participate in the planning meeting
- Children should have the opportunity to say something during the evaluation.
- Children should have the chance to participate in light activities during implementation
- Children should participate actively in cleaning activities.

Concerning the contribution of the community it is known that Plan aim for a contribution that is about 30% of the total project costs is cash or in kind. Concerning the contribution from Plan it is also known that they have guidelines about the costs of skilled labour for a project, when costs are higher it should be paid by the community. (Other sources)

Annex C - Research framework

C - 1 Project approach indicators

Code:	*Indicator:*	*Source[1]:*				*Questions to be answered (sub-sub-indicators):*
	Technology	Plan	HH	CM	TC	
TC1	Guidelines	x				Are there guidelines to ensure quality of the infrastructure during design and construction? Are these guidelines flexible i.e. do they allow local solutions?
TC2	Quality control	x		x	x	Did any failures of design or construction already appear? Is the construction implemented as designed?
TC3	Expertise	x		x	x	Did persons involved in design and construction have expertise with this kind of projects?
TC4	Maintenance	x				Did maintenance aspects play a role in design i.e. aspects like costs, spare parts availability and intensity of maintenance?
	Participation					
PA1	Empowerment	x	x	x	x	Was a CBO responsible for day-to-day supervision & monitoring, contracting & supply? Did the community elect this CBO? What's the sense of ownership inside the community during and after the project?
PA2	Contribution	X	x	x	x	How was the community contribution in cash and kind towards the implementation of the system (comparing to Plan standards)?
PA3	Transparency	X	x	x	x	Was the financial policy of Plan (obligations, payments) clear? Were responsibilities of community clear towards community? Was ongoing of project, contribution different parties etc. presented during community meetings?
PA4	Efficiency	X		x	x	Was the project completed in time? Are appointments about planning, mobilization and contribution fulfilled by all parties involved? How smooth went participation due to Plan and project committee?
PA5	Equity	X	x	x		Is sensitivity towards different gender, ethnic and socio-economic groups applied and part of the project approach? Does the project aim to benefit the whole community?
PA6	Participatory activities	X	x	x	X	Were planning, taking-over participatory activities?
	Training					
TR1	Household level	X	x			How far was training provided on hygiene and sanitation, O&M activities and costs of O&M at household level?
TR2	Effectiveness & awareness household	X	x	x		How many villagers attended the training? Are people aware of hygiene and sanitation, O&M activities and costs of O&M at household level?

[1]Plan = employees, documents or reports from plan Cameroon; HH= household; CT= committee (project and/or maintenance); TC = technician (foreman and/or caretaker)

Code:	*Indicator:*	*Source[2]:*				*Questions to be answered (sub-sub-indicators):*
	Training	Plan	HH	CM	TC	
TR3	Committee level	x		X	X	Did the committee receive adequate training in hygiene sanitation, O&M (also practical), management & communication and finance & administration?
TR4	Effectiveness committee	x		X	X	How many can people still remember from the training? How was the attendance (especially from executives)?
	Demand driven approach					
DR1	Initiation of project	x	x	X	X	Who initiated the project? Was this project the most important one for the community i.e. more important than others? How far was demand expressed at household level?
DR2	Choices	x	x	X	X	How far was there a choice at household level in technology, location and number of standpipes, local management and contribution?
DR3	Informed decision	x	X	X	x	Was information provided about project responsibilities, contribution, training activities and maintenance responsibilities, activities and contribution?
	Cost recovery					
CR1	All costs	x		X		Is recovery of project, O&M, extension, rehabilitation, CBO maintenance and other costs somewhere, part of the project approach (training) and practice?
CR2	Strategy	x		X		How far was a planning for cost-recovery made? How far were accommodations made to bring a chosen cost-recovery strategy in practice?
	Support O&M					
SP1	Monitoring	X		X	X	Does facilitator monitor regularly? Did facilitator provide approach how to monitor? Is available monitoring based on sustainability indicators?
SP2	Action plans	X		X	X	Did facilitator provide an initial planning for O&M? Is jointly planning still going on, on base of monitoring results?
SP3	Assistance	X		X	X	Does the facilitator provide technical and/or managerial assistance? How accessible is this assistance?
SP4	Provide materials	X		X	X	Were some spare parts, O&M and monitoring tools and IEC materials provided?
SP5	Coaching & training	X		X	x	Is the facilitator providing technical and managerial coaching? How far is training still going on and will continue in the future?

[2] Plan = employees, documents or reports from plan Cameroon; HH= household; CT= committee (project and/or maintenance); TC = technician (foreman and/or caretaker)

C - 2 Performance indicators

Code:	*Indicator:*	*Source[3]:*					*Questions to be answered (sub-sub-indicators):*
	Operation	Plan	HH	CM	TC	EX	
OP1	Technical state				X	x	Are the chambers (catchment, sedimentation and storage tank), the pipes and standpipes physically in a good condition?
OP2	Environment				X	x	In how far are there contamination risks in the environment of the catchment chamber and other tanks? How sanitary is the environment of the standpipes?
OP3	Quality water	x	x		X	x	How is the quality of the water at the different facilities? How sanitary are the different chambers? How satisfied are the users about water quality and color?
OP4	Quantity water	x	x		X		How is the quantity of the water comparing to design? Will the quantity be enough in the future? Are users satisfied about quantity?
OP6	Distance		x	x			Is the distance to water shorter than before? How satisfied are people about the distance?
OP7	Health and hygiene		x		X	x	Do users recognize an improvement of health? How good is the quality of the water at household level? Is the water used hygienically at the standpipes?
OP8	Continuity		x	x	x		How far is the water provided all day, all week and all year round (how often break downs, maintenance activities, not enough water)?
OP9	Access	x	x	x			Has the whole community access to water? Do people who have access only use this source?
	Maintenance						
MT1	Cleaning activities		x	x	x	x	How often is the catchment area and standpipes cleaned? Does the community participate in cleaning activities?
MT2	Organization		x	x	x	x	Is it internal and external clear which people are responsible for maintenance? Are these people capable (have plumber background, receive training)?
MT3	Back up						Are their more persons inside the committee competent and available? Are there other people in the village or committee who can assist in difficult problems?
MT4	Money available			x	x		How far and fast is money available for maintenance? Are caretakers paid for monitoring and maintain the system? Are caretakers satisfied about financial situation?

[3] Plan = employees, documents or reports from plan Cameroon; HH= household; CT= committee (project and/or maintenance); TC = technician (foreman and/or caretaker)

Code:	*Indicator:*	*Source[4]:*					*Questions to be answered (sub-sub-indicators):*
	Maintenance	Plan	HH	CM	TC	EX	
MT5	Maintenance done				x		How long did maintenance activities take until now? Was it possible to do this maintenance without external input (knowledge, money)?
MT6	Monitor facilities			x	x		How regularly are facilities monitored? Are tools available to measure water quality and quantity? How complete are monitoring activities?
MT7	Tools and spares	x			x		Are tools and spare parts to do repairs available in the community? Are cleaning tools available in the community? How accessible are shops (distance and knowledge)?
	Management						
MG1	Constitution		x	x		X	Did the community elect the WMC per function? Is the WMC a presentation of the community (gender, socio-economic, ethnic)? Does the community trust the WMC?
MG2	Authority	x	x	x			Has the WMC authority to call the community for a meeting, to set the tariff of fees and to sanction in case of non-payment?
MG3	Communication					X	Are the committee meetings regularly, attended by all members and minutes made? Does the WMC present their activities towards the community? Is the WMC known by community members?
MG4	Collection		x	x		X	Are there agreements about how, when and who collects the fees and are they complete? Are fees collected regularly? How efficient is the collection of fees?
MG5	Budgeting		x	x	x	X	Are revenues and expenditures budgeted periodically? Are their savings? Is there any future vision and planning?
MG6	Accounting			x		X	Are there agreements about where to keep the money, who can make money available and for what? Is there a functional bank account? Are treasurer and financial secretary capable (financial background, receive training)?
MG7	Monitoring & control		x	x	x		Is there any supervision committee to audit accounts? Is this committee auditing regularly? Are there indicators to monitor and control revenues and expenditures?
MG8	Tariff mechanism	x		x			How far is there differentiation in tariff? Is it also pay tariff in kind? Does the tariff correspondent to the cost-sharing arrangements made?

[4] Plan = employees, documents or reports from plan Cameroon; HH= household; CT= committee (project and/or maintenance); TC = technician (foreman and/or caretaker)

Annex D - Dilation of sources

D - 1 List of respondents

In both villages 11 people have been interviewed. Their names and relation to the water project is written down below.

D - 1.1 Respondents in Mbemi:

Mr Ngyah Jeremiah	Caretaker of Maintenance Committee and Project Foreman
Mr Tayong Oscar	Chairman of Maintenance Committee
Mr Noyonge Peter	Financial secretary
Mr Njoh Gabriël	Chairman Development Union
Mrs. Mufu Loveline	Secretary
Mr Ndah Samuel	Community member and volunteer for Development Union
Mrs. Anumu Margaret	Community member and volunteer for Development Union
Mrs. Ngoros	Community member
Mr Minyonge Robinson	Community member
Mr Ngy Marcus	Community member
Mr Ngy Richard Muki	Community member

D - 1.2 Respondents in Bamali

Mr Tangfeh Peter Ngong	Foreman of project, not a community member
Mr Kenji Joseph	Caretaker of Committee
Mr Chombong Joseph	Chairman of Committee
Mr Someta Amour	Financial secretary of Committee
Mr Komofor George	Treasurer of Committee
Mr Komupah Peter	Storekeeper of Committee
Mr Baba Ibrahim	Community member
Mr Nkongwa Eduard	Community member
Mrs Teresia Mboh	Community member
Mr Ntanikweh Mathias	Community member
Mrs Pasman	Community member

D - 2 Community member interviews

Name:
Profession:
Relation to water project:

Demand-driven approach

DR1 Who initiated the project?
DR1 Did you also want this project?
DR1 Was this project your first choice?
DR2 Who decided the technology, number and location of standpipes and the source?
DR2 Who decided what you should contribute?
DR2 Who decided how the management should be arranged?
DR3 When you made choices did you know what you should contribute during implementation?
DR3 Did you know that the community is responsible for O&M?
DR3 Did you know what kind of contribution is required from you after implementation? (cash and kind)

Participation

PA1 Did you elect the PMC?
PA1 Who is the owner of the facilities at the moment?
PA2 What did you contribute in money before and during the project?
PA2 How many hours did you work during project implementation?
PA2 Were you paid for this in any way?
PA2 How did you contribute in material?
PA2 Was the ongoing of the project presented during community meetings?
PA2 Were the contribution of different parties also presented?
PA2 Was presented what was required from the community (time, money)?
PA2 Do you know what different parties agreed about responsibilities?
PA3 Did the project give equal opportunities to men and women?
PA3 Did the project give equal opportunities to all groups in the village (rich, poor, ethnic)
PA4 Did you when the institution of CBO, planning, taking over, evaluation took place?
PA4 Did you visit these activities?
PA4 Where you able to give your opinion?

Training

TR2 Why did you want a water system?
TR2 What do you know about hygienic collection, transport and use of water?
TR2 Do you know how a tariff is calculated in general, which costs?
TR2 Do you know what kind of maintenance is required to keep the system operational ?
TR2 Did you attend a training on hygiene and sanitation?
TR2 If yes, what did this training involve?

Operation

OP3 Is the water quality always good?
OP3 Do you know if someone is measuring the quality?
OP3 Is the area around the standpipes always clean?
OP4 Is the quantity of water enough for you?
OP4 Are there any appointments/limitations about the quantity of water you can use?

OP5 Has the water a good colour?
OP6 How far do you have to walk for water?
OP6 How far did you walk before?
OP7 Is the health of you and your children better with this water source?
OP7 What do you have to do to use the water proper?
OP8 Is their water all day?
OP8 Is their water all year round?
OP8 How often did facilities break down and for how long?
OP9 Does everybody from the community use the water facilities?
OP9 Do people also use other water?

Maintenance

MT1 Do you ever help or clean around the standpipes, catchment or reservoir?
MT1 If necessary would you help?
MT2 Do you know who are the caretakers?
MT2 What is your opinion on the caretakers? Capability/availability?
MT6 How often do the caretakers look after the facilities?

Management

MG1 Did you vote for the members of the WMC?
MG1 Did you also vote for functions?
MG1 Do you think the proportion of man and woman is right?
MG1 Do you think the different types of ethnic groups are presented enough? (if there are different ones)
MG1 Do you think these people are trustful and capable?
MG2 What can the WMC do if you are not paying you user fees?
MG2 Is the WMC able to cut off service or call a meeting?
MG3 Who are currently member of the WMC?
MG3 What are the responsibilities of the WMC?
MG3 Does the WMC present how they use the fees?
MG3 Do you know when and for what the WMC uses the money?
MG3 Do you know if you are allowed to take a glance at the books?
MG3 If allowed, would you use this opportunity?
MG4 How often does the WMC collect the fees?
MG4 Do you always pay your fees immediately?
MG4 Why do you or not?
MG7 Do you know if another body audits the WMC?
MG8 Is everybody in the community paying the same amount?
MG8 Are people also contributing in another way than money?

D - 3 Committee interviews

Name:
Profession:
Relation to water project:

Demand-driven approach

DR1 Who and how was the project initiated?
DR1 Was this project the first priority in the community?
DR2 Did the WMC and/or the community participate in decisions in the design (source, technology, number and location of standpipes)?
DR2 Was there a choice for WMC and community in what and how the community contributed and how local management should be arranged?
DR2 Did you also make choices in the time planning of the project?
DR3 Did you know from the beginning the contribution of the community?
DR3 Did contribution also depend on the design wanted by the community?
DR3 Where the responsibilities (O&M and implementation)of the community clear from the beginning?
DR3 Did you know from the beginning which training activities were required?
DR3 Did this knowledge (responsibilities, contribution) also influence your choices?

Participation

PA1 What were the responsibilities of the PMC during implementation?
PA1 Did the community elect this PMC?
PA1 Who is the owner of the facilities at the moment?
PA2 What did the community contribute in cash and kind before and during implementation?
PA2 Was it difficult to mobilise the community?
PA3 Was the financial policy of Plan clear?
PF5 Were their any conditions/obligations related to the financial assistance?
PA3 Did the PMC present ongoing, finances and needed contribution present during community meetings?
PA4 Did all parties involved fulfill appointments about completion date, mobilisation and contribution?
PA4 Were responsibilities of Plan and community always clear divided?
PA5 Were contribution in the project equal for everybody?
PA5 Were events, meetings accessible for the whole community (equity)?
PA6 Were institution of CBO, planning, taking-over, evaluation participatory activities?

Technology

TC2 Who controlled the quality during the project?
TC2 Is the project implemented as designed?
TC3 Who did feasibility studies, design and construction?
TC3 Do these people have experience with this kind of projects?

Training

TR4 Which training-activities did you visit?
TR4 What did these training involve?
TR3 Have you been trained in the functioning and responsibilities of a committee?
TR3 Have you been educated in what to do if people don’t want to pay?
TR3 Have you been educated on technical and financial monitoring?

TR3 Have you been educated in the accounting of the fees?
TR3 Have you been educated in how and when to use money?
TR3 Have you been educated in how you should calculate and set the tariff?
TR3 Have you been educated on budgeting?

Cost-recovery
CR1 What kind of costs where initially recovered by the community?
CR1 Which costs are covered by the user fees?
CR2 Has their been discussion on recovery of costs by the community?
CR2 Did the community also look for other resources for recovery?

Support O&M
SP1 Does Plan monitor or provide a monitoring system?
SP1 What does this monitoring involve?
SP2 Did Plan help with planning of O&M?
SP2 Is planning still going on based on monitoring?
SP3 Are people from Plan available for technical or managerial help when needed?
SP4 Did Plan provide tools for maintenance and spare parts?
SP4 Did Plan provide some IEC materials to be used after project completion?
SP5 Is training available for new people?
SP5 Do people of Plan discuss the going on of O&M?

Operation
OP6 How far do people averagely walk for water?
OP6 How far did they walk before?
OP7 Do people know how to use water properly?
OP7 Who looks after the cleanliness around the standpipes?
OP8 Is the water available during the whole day?
OP 8 Is their water all year round?
OP8 How often did facilities break down and for how long?
OP9 Does everybody from the community use the water facilities?
OP9 Do people still use other facilities?

Maintenance
MT1 How often are the standpipes, catchment and reservoir cleaned?
MT1 Does the community contribute in cleaning activities?
MT1 Is it difficult to mobilise people for this work?
MT1 Do the people who contributed have any advantage?
MT2 Who is responsible for maintenance?
MT2 Is this person always available?
MT2 Does this person have a plumber background?
MT3 Are there also other persons who can do this?
MT3 Are there persons who can help in complex problems?
MT4 How are the caretakers paid for their work?
MT4 Did it ever happen that there was not enough money for maintenance?
MT6 How often are facilities checked?

Management
MG1 Which people are members of the WMC and what are their functions?
MG1 What are the election procedures?
MG1 Do you think the proportion of man and woman is right?

MG1 Do you think the different types of ethnic groups are presented enough? (if there are different ones)
MG2 What can you do if people are not paying their user fees?
MG2 Are you able to call the community together directly for a meeting?
MG3 How often do you meet each other?
MG3 Are you making records of these meetings?
MG3 Are all the members of the WMC always presented?
MG3 How often and how do you present your activities towards the community?
MG3 Are people allowed to take a glance through the financial records?
MG4 Did you make agreements about how, when and who collects the fees?
MG4 How often do you collect the fees?
MG4 How long does it take to get all the money?
MG5 How often are you budgeting and recalculating the tariff?
MG5 What are the savings at the moment?
MG5 For which purpose will this savings be used?
MG6 Are there agreements about where to keep the money, who can make money available and for what?
MG6 Does the treasurer have a financial background?
MG6 Did the treasurer receive training?
MG6 How often is the treasurer updating the books?
MG6 How often is money brought from a bank account?
MG6 Who has access to the bank account?
MG7 Are their people who are checking the books?
MG7 How are you controlling revenues and expenditures?
MG8 How is the tariff calculated for a community member?
MG8 Is it also possible to contribute in kind?
MG8 Does the tariff recover the replacement etc. costs?

D - 4 Technical interviews

Name:
Profession:
Relation to water project:

Technology

TC1 Was the design restricted by guidelines?
TC1 Did this reduce flexibility?
TC2 Who controlled the quality of design, materials and labour?
TC2 Where there any construction problems?
TC2 Is the construction implemented as designed?
TC3 What kind of person did the design and feasibility study?
TC3 Did people in the community have expertise with this kind of projects?
TC3 Did other people involved have experience with this kind of projects?

Demand driven approach

DR1 Who initiated the project?
DR1 Was this project the one most wanted?
DR2 Did you discuss the design with the person who made the design?
DR2 Who decided the technology, source, number and location of standpipes?
DR2 Who decided the type of management and the contribution?
DR3 Did you know about different costs of options?
DR3 Did you know about the different implications for maintenance?
DR3 Did you know about responsibilities and training when you choose the project?

Participation

PA1 Who was responsible for supervision of the project?
PA1 Did you make any agreements with suppliers/contractors or something?
PA1 Who was responsible for the monitoring of planning, materials, construction etcetera?
PA2 What did the community contribute?
PA2 Did they also provide skilled labour?
PA3 Was the community acquainted with the ongoing of the project? How?
PA3 Did you have a clear idea about your responsibilities during the project/ after the taking over?
PA4 Are all agreements fulfilled by al the parties? (Completion date, delivery of materials etc)
PA5 Did you join the planning, evaluation, taking over etcetera?

Training

TR4 What kind of training did you receive?
TR4 Which topics were discussed?
TR3 Have you been trained in the costs of O&M?
TR3 Have you been trained in how to solve common problems and do repairs? How?
TR3 Do you know how to protect the source against contamination?
TR3 Did you have training on tree planting?
TR3 Do you know how to protect against erosion around standpipes?
TR3 What kind of preventive maintenance is required? Been trained?
TR3 Have you been trained in how to measure water quality?
TR3 Have you been trained in what to do if the water quality is not al right?

Support O&M

SP1 Did Plan provide a systematic approach to monitor the facilities?
SP1 What were told to be important aspects of monitoring?
SP2 Did Plan provide a planning for activities to be done?
SP3 Are people from Plan still available after completion of the project?
SP3 Did Plan provide maintenance tools and some spare parts?
SP4 How do you train new caretakers?
SP4 Do you still meet the engineer from Plan? (for coaching)

Operation

OP1 Are all the pipes, standpipes, reservoirs and the catchment in tact?
OP2 Are there any environmental threats towards the environment at the moment?
OP3 Are people sometimes complaining about the colour, quality or quantity of the water?
OP3 Are there any things possibly threatening the quality of the water?
OP4 Is there always enough water?
OP4 Will there be enough water in the future?
OP7 Is the water at the standpipes proper used?
OP8 Is water provided all day and all year round?

Maintenance

MT1 How often and by whom are (the areas around) standpipes, reservoirs and catchment cleaned?
MT1 Does the community help? Why not?
MT3 How many persons are available for maintenance?
MT2 How are tasks divided between caretakers?
MT2 Is it always clear who does what?
MT2 What kind of technical experience and education did you have?
MT2 Are you always available to solve problems? And the others?
MT3 Where can you get technical assistance?
MT4 How long does it usually take before you get money to repair something?
MT4 Who do you have to ask for it?
MT4 How are you paid? Satisfied about loan?
MT5 What kind of maintenance (repair) activities has been done until now?
MT5 How long did it take before the repairs has been done?
MT5 Did you do it by yourself or someone from outside?
MT6 Do you have tools to measure water quality and quantity?
MT6 How often do you measure it?
MT6 How often do you inspect the physical condition of the pipes etc?
MT7 Are there some spare parts (pieces of pipes, tap heats) in the community?
MT7 Do you know where to get that and other things?

Management

MG3 How often does the WMC meet?
MG5 Who is budgeting future repairs?
MG5 Does the WMC discuss future planning? Rehabilitation, extension…
MG7 Are you monitoring expenditures?

D - 5 Points of examination

D - 5.1 Project approach

For the project approach many examinations have been done on documents of Plan. This gave insight in distribution of responsibilities, participation, contribution, technology and all kind of other things. There were a lot of standard documents to obtain this information like monthly reports, project outlines, project completion reports, minutes from meetings etcetera. For Mbemi there were also reports available on conducted training. Information on training of the committee in Bamali has been obtained from notes from a participant.

D - 5.2 Operation

Concerning the operation of the system examinations have been done mainly to attribute scores towards the physical condition, the environment and water quality (which is also an aspect of health and hygiene). The way these examinations have been done will be discussed shortly.

Physical condition

The physical condition of all the facilities is judged on base of the presence of necessary parts and the condition of the whole construction. In case of the catchment a non-functional overflow pipe, a non-functional cover or cracks in the cement are indicating for instance a poor physical condition. For the pipelines the presence of uncovered pipes and leakages are indicators for a poor physical condition. For the standpipes this in general whether they are all functional, but also whether they are having functional soakaways.

Environment

To examine the environment of the system the sanitary inspection form, provided during a training on 'Water quality and sanitation' executed by CSQARDEM Water testing Laboratory, has been used. This form contains the following questions:

Specific diagnostic information for assessment	Risk
1. Is the spring box not protected by masonry or concrete wall or spring box and therefore open to surface contamination?	Y/N
2. Is the masonry protecting the spring source faulty?	Y/N
3. If there's a spring box, is there any unsanitary inspection cover in the masonry?	Y/N
4. Does the spring box contain contaminating silts or animals?	Y/N
5. If there is an air vent in the masonry, is it unsanitary i.e. not clean?	Y/N
6. If there is an overflow pipe, is it unsanitary i.e. not clean?	Y/N
7. Is the area around the spring not fenced?	Y/N
8. Can animals have access to within 10m of the spring source?	Y/N
9. Does the spring lack a surface water diversion ditch above it, or (if present) is it non-functional?	Y/N
10. Are there any latrines uphill of the spring?	Y/N

Every question answered with 'yes' might form a contamination risk. A risk score from 9-10 is very high; 6-8 is high; 3-5 is intermediate; 0-2 is low.

The environment of the standpipes is judged on the presence of freely walking animals, water pools, cleanliness and erosion.

Water quality

The quality of the water is obtained from reports on water testing executed by CSQARDEM Water Testing Laboratory during the first quarter of 2005. They have been testing all the water systems implemented by Plan Cameroon in the Northwest Province on bacteriological and physico-chemical parameters. Only the bacteriological results have been used and are interpret on the classification provided in the reports.

D - 5.3 Management

Examinations on management are done on base of two main sources: minutes from meetings and financial records.

Minutes

Minutes are providing information for the following indicators:

- Constitution: names and gender of people inside committee
- Communication: attendance of people during meetings and the regularity of meetings
- Collection: presence of agreements in the minutes

Financial records

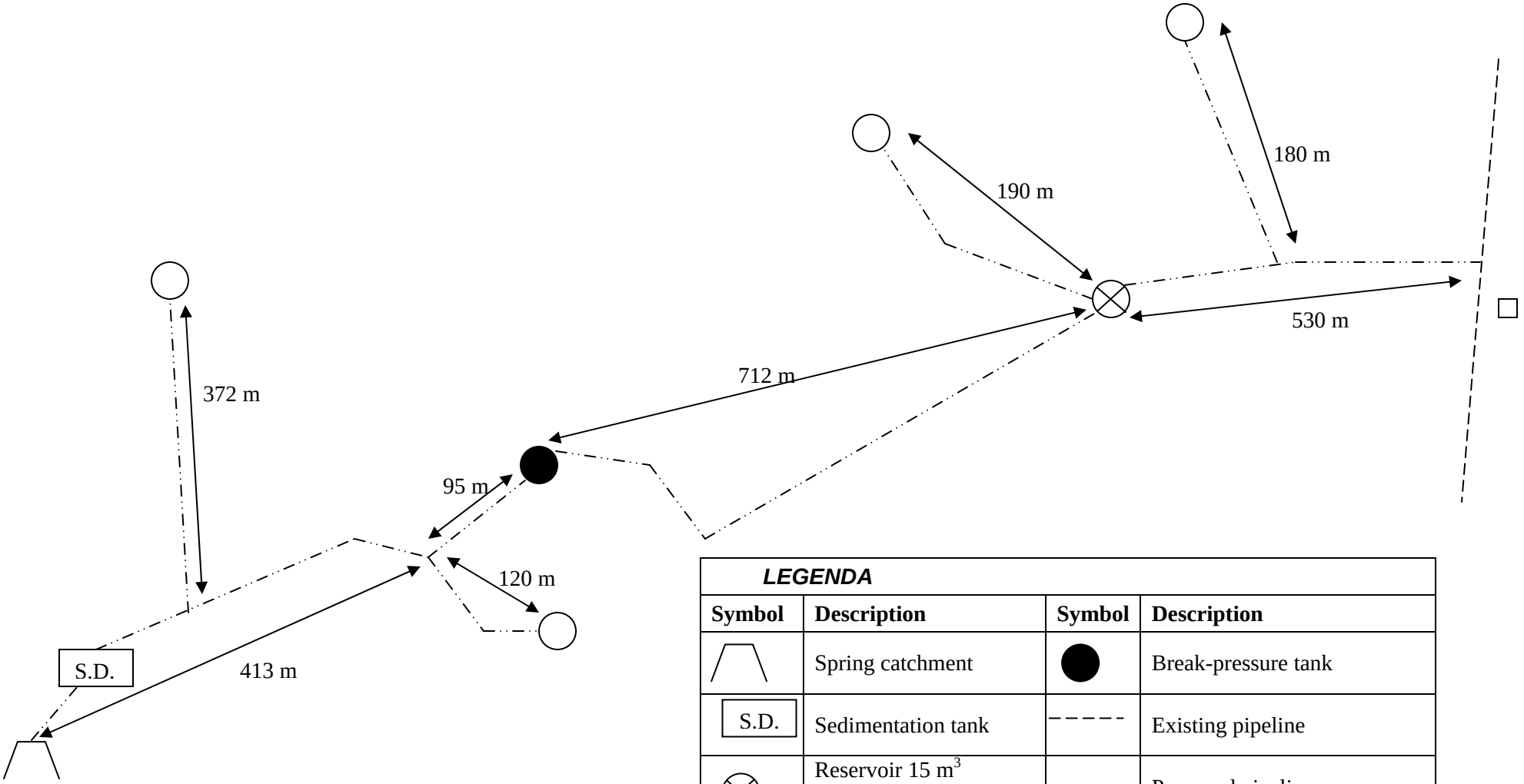
Financial records have been used for:

- Collection: efficiency of collection
- Budgeting: availability of a yearly budget or something like that and savings
- Accounting: presence of accounting books and bank receipts

Annex E - Mbemi water project

E - 1 Situation map of Mbemi water project

Indication of system, no scaling



LEGENDA			
Symbol	**Description**	**Symbol**	**Description**
	Spring catchment		Break-pressure tank
S.D.	Sedimentation tank		Existing pipeline
	Reservoir 15 m^3		Proposed pipeline
	Standpipes		Wash place

E - 2 Time schedule

Period	**Output/ done activity**	Done by
March 2001	Request to complete pipelines	Mbemi community
April 2001	Feasibility studies and technical report	Community Development and Rural Engineering engineers
August 2001	Community Project Request Form	Plan
December 2001	Election of project committee	Mbemi community
December 2001	Community Project Agreement	Plan and Mbemi community
December 2001	Digging trenches for pipes	Community
January 2002	Providence of rods and cement	Plan
January 2002	Providence of local building material	Community
February and March 2002	Construction of reservoir	Community
April 2002	Supply of pipes	Plan
April until June 2002	Lay piping network, construction of break chamber, catchment and standpipes	Community
June 202	Completion of construction	Plan, government and community
July 2002	Water Management Training	NGO
August 2002	Information, Education and Communication on hygiene and sanitation	NGO
December 2002	Inauguration and taking over of the project	Community

E - 3 Infrastructural aspects

This chapter describes all the aspects related to the infrastructure. This includes design and construction, physical condition, supply and use at standpipes and maintenance.

E - 3.1 Design and construction

Due to the history of the community, already 14 standpipes existed in Mbemi village. The problem was that the source they were using at that moment didn't provide enough water, especially not during the dry season. People in Nyen already started the construction of a catchment at a new source. When Mbemi requested Plan for help, Plan decided that this source should be used to provide Mbemi from water. Plan mentioned a technician who was able to do the feasibility study, which was paid by the community. Further it was agreed that the project should provide four standpipes at Upper Mbemi/Nyen The location is these new standpipes was discussed with some people living in this quarter, when the engineers came to do fieldwork for the feasibility study. The design made didn't contain soakaways at standpipes, probably because they did also not exist at the standpipes in Mbemi. Another failure in the design appeared to be the lack of low points. This caused several explosions, where after the caretakers decided to catch this up.

Design	Change during project	Changes after project
Rehabilitation of 1 catchment	Adding of a vent-pipe and overflow pipe	None
1 sedimentation tank	None	None
1 storage tank 15 m^3	Enlargement of storage tank to 16m^3	None
1 break-pressure tank	None	None
-	-	Low points valve chambers added (about two)
1686 m pipes	None	Connections to houses
4 standpipes in Upper Mbemi/Nyen	None	Extension with 5 house connections since 1st phase

Table E.1 - Changes in the infrastructure of Mbemi water project

The spring has a capacity of 0.55 liters per second (March 2001) and is flowing throughout the year. This is more water than is currently needed by the community. To be prepared for the future the foreman however decided to heighten the storage tank with 10 cm. Further the overflow pipe is constructed in a way that the storage tank can easily be extended towards 18 m^3. The community also rehabilitated the existing standpipes a bit before the handing-over took place.

E - 3.2 Physical condition

Condition catchment area

During the visit of the catchment area of Mbemi water project it appeared that there were several risks for contamination. One of the issues is that the area of the catchment doesn't belong to Mbemi, but to a farmer who is conducting agricultural activities in this area. Since the area is not the property of the committee it is impossible to fence the area. The catchment chamber further shows some cracks in the cement.

Since all the chambers are not closed very well, it is easy for little animals to enter the chambers through pipes or little splits between chamber and inspection cover. This is just the same to

rainwater, since there are also no functional diversion ditches to protect the chambers against muddy rainwater. The main risks for contamination are summarized in the sanitary inspection form below. This shows that the risk for contamination is for all the chambers very high. Which is true, since every visit there are some little animals like frogs and spiders and even a rat has been discovered once.

There hasn't been a sanitary inspection for the storage tank, but this chamber has to deal with the same risks of contamination.

SANITARY INSPECTION	Contamination risk		
Topic of investigation	***Catchm.***	***S.T.***	***P.B.***
Presence of masonry	NO	NO	NO
Condition of masonry	YES	NO	NO
Presence of unsanitary inspection cover	YES	YES	YES
Presence of contaminating silt or animals	YES	YES	NO
Presence unsanitary air vent	YES	YES	YES
Presence unsanitary overflow pipe	YES	YES	YES
Presence of fencing around spring	YES	YES	YES
Access of animals within 10 metres to source	YES	YES	YES
Presence and functioning of water diversion ditch	YES	YES	YES
Presence of latrines uphill	NO	NO	NO
Total score of risk:	**8/10**	**7/10**	**6/10**

Table E.2 - Results of sanitary inspection Mbemi water project

The interpretation of the results is as follows: 9-10 = Very high risk; 6-8 = High risk; 3-5 = Intermediate risk; 0-2 = Low risk on contamination

Condition standpipes and pipelines

The standpipes are located as followed:

- 4 public standpipes in two quarters of Nyen
- 14 public standpipes distributed over four quarters of Mbemi
- 5 house connections constructed after second phase
- About 10 house connections already constructed after first phase

Especially the environment at the house connections is kept clean; this is different for the public standpipes. Water is flowing at all standpipes, but the pressure at the last public standpipes is sometimes very low. During the visit there were no animals walking freely in the area around standpipes. Unfortunately no public standpipes have soakaways, which causes pools of water around several standpipes that attracts mosquitoes.

During my visit there were no leakages in pipelines known, but since water was not flowing at the last standpipe though it was rainy season, it is likely that there was a leakage somewhere in the pipelines. Further several uncovered pipes are mentioned, especially around the catchment area.

E - 3.3 Supply and use at standpipes

User aspects

The water source is covering all the quarters of Mbemi and two quarters of Nyen, sometimes also called Upper Mbemi. All the respondents say that everybody uses the water and that water from the stream is only used for building activities, gardening, laundry and the washing of vehicles. It's

not allowed to use the public standpipes for the washing of vehicles or clothes. People who are using the water for building activities or gardening pay extra levies.

Generally all the users are satisfied about the supply of water. This is probably because their water supply has improved drastically since the second phase took place. Whereas they used to fetch water from the stream or springs far away, the water is now flowing almost all the time. All the users are also recognizing an improvement of health.

Though there seems to be more than enough water, several users mentioned that there's not always enough water at the last standpipe. During an interview in this quarter it appeared that mainly the pressure is sometimes very low. That's why people are sometimes using the other standpipe in that quarter which is also very close. At the moment of the visit this was also case, but this was likely caused by a leakage somewhere, since this should normally not happen during the rainy season.

Most people know how to use the water properly, but there are a few cases of carelessness. This is also the case with cleanliness around the standpipes. It happens also sometimes that leakages are not reported. Generally the frequency of breakdowns varies between two times in a month to once in three months. The water is at least once a month not available, due to cleaning activities. This is always announced on beforehand and lasts normally about one day.

Quality of water

Concerning the quality of the water almost all the users are satisfied, but are also admitting that the colour is not always good. This occurs especially after heavy rainfall, when rainwater mixes up with water from the source. This makes the water sometimes not potable. When samples were taking from the water, the quality appeared to be very bad, especially at the level of facilities. It is not likely that the quality is always that bad, since a rat was found in the catchment chamber during the sampling. At household level the quality of the water proved to be good, which also shows that people know how to use the water properly.

Results of water quality sampling (26-02-05):

Location/level	**Bacteriological contamination (units F.C[5].)**
Catchment (MAN)	50
Storage tank	>100
Standpipes	>100
Household level	2

Interpretation of results:

Result	**Grading of results**
0 cfu	Excellent
1-10 cfu	Acceptable
10-50 cfu	Unacceptable
> 50	Grossly polluted unacceptable

Table E.3 - Water quality results. Source: Csqardem laboratory, 2005

E - 3.4 Maintenance

Activities and responsibilities

The most common maintenance activities as cleaning, monitoring and doing repairs are done by the chairman, the caretaker and the financial secretary together. The caretaker and the chairman are both seen as very capable persons, who are almost always in the village. The caretaker and the chairman have both a plumber background and the caretaker has also a lot of experience with water systems. This made that there was never a need for assistance from outside the community.

[5] Fecal Coliform Bacteria

The community is also participating in cleaning activities around the catchment when they are called for community work. Other members of the committee have the task to monitor the cleanliness around the standpipes in their quarter. Some of them are also assisting with the cleaning of the chambers.

Activity	Carried out by	Frequency
Cleaning standpipes	Quarter population	When it's dirty and monthly during rainy season, once in 2-3 months during dry season.
Monitoring cleanliness standpipes	Committee member in quarter Caretakers	Daily Once in three months
Monitoring catchment area	Chairman, caretaker and financial secretary and others	Monthly
Cleaning chambers	Chairman, caretaker and financial secretary and others	About once in 2-3 months, varies between seasons
Cleaning storage tank	Chairman, caretaker and financial secretary and others	Yearly
Cleaning surroundings catchment	Community	About yearly to twice a year
Do repairs	Caretaker, chairman and financial secretary	Varies between two times a month to once in three months

Table E.4 - Overview of maintenance activities

Due to the committee Plan did never provide training or indications concerning monitoring or inspection. The committee figured out where they have to look after and how often. They are also not receiving coaching on how to maintain or receiving technical assistance. Nevertheless when they are in trouble they will write Plan through the council.

Tools and spares

Since the caretaker and the chairman are both having a plumber background they both have tools to do repairs. The committee itself does officially not have any tools and they were also not provided by Plan. They are also not having appropriate tools to take water samples to measure quality and quantity, but the committee did also not do this until now. It is unknown, which tools there are in the community for cleaning activities, but there are not really appropriate tools at the moment.

Spare parts were directly after the project available from what was left after construction, but it was also not provided by Plan. Currently there are always spare parts available in the community. Spare parts can be bought in Mbengwi or in Bamenda which is about 20 minutes to 1,5 hour away.

E - 4 Management aspects

A managerial challenge of this project was that all infrastructures for this project have been constructed within Nyen village. So Mbemi village are consuming water capped, piped and transported in Nyen Community. Though people from Nyen are also provided with water and participated in the project, people from Mbemi have been played the leading role. The standpipes at Nyen are mainly implemented to compensate people from Nyen for the use of their land. This annex will discuss all aspects related to management, like institutional frameworks, the distribution of responsibilities between different parties involved including community participation and aspects related to capacity building at household- and committee level.

E - 4.1 Institutional framework

This paragraph will go into the constitution and functioning of the institutional framework. Firstly it will go into the traditional village structure, than the project structure and conclude with the management structure.

Village authorities

Mbemi has just as most of the Cameroonian village a fon and several notables, who are called the king-makers. This is the highest authority that is governing the Development Union and the Traditional Council. The Development Union of Mbemi is called Mbemi Development and Cultural Association (MBEDECA) and is responsible for all project committees and the maintenance/management committees. MBEDECA has its own regulations, byelaws and bank account and is affiliated to MECUDA, the sub-divisional Development Association. The traditional council consists of all quarter heads and their assistants, the councilors. The councilors have in their own quarters a small council.

Mbemi has no meetings at quarter level. There are regularly meetings at village level that are accessible for all the villagers. These meetings are held whenever a decision needs to be taken on the development of the village. During the water project the development meetings from Nyen and Mbemi were held together, since it was a jointly project.

Project committee

Since people in Mbemi were already trying to improve their water system, a project committee already existed. This committee was chosen by the community and was obliged by Plan to monitor and supervise the mobilization, payment, ongoing, construction etcetera of the project. The division between project committee and Development Union is not really clear, since there are many people who have a function in the Development Union who had also a function in the project committee.

Maintenance committee

The maintenance or management committee of the project was also elected during a community meeting. Every quarter proposed two or three candidates, depending on the size of the quarter. During a training (that took place one day before election) provided by Plan the duties of the different functions were taught. During a community meeting at the 29th of June 2002 there were functions ascribed towards seven people the executive members. The other eight people are regular members of the committee. The whole committee holds general meetings; during these meetings decisions are made. The executives meet after the general meetings to take decisions into actions. Functions of the executives are chairman, secretary, treasurer, financial secretary, caretaker and one male and one female advisor.

The whole committee consists of seven women and eight men, but out of the seven executives there are only two women, the secretary and one advisor. There are four people representing the two Nyen quarter, none of them is an executive member.

From all the general meetings minutes are made, this is not done from executive meetings. From the attendance lists of the meetings appears that there have been 13 general meetings and 5 executive meetings. General meetings were 3 in 2002, 1 in 2003, 6 in 2004 and 3 in 2005. Executive meetings were 2 in 2002, 1 in 2003, 1 in 2004 and 1 in 2005. Executives attend almost all the meetings. The attendance from people from Nyen was only 3/13, 2/13, 1/13 and 7/11. The explanation for this is that all the meetings are held close to the palace of Mbemi, which is quite far for people from Nyen. From interviews it appeared that members of the Development Union are also attending the general meetings.

The responsibilities and rules of the committee are written down in byelaws, made at the 17th of July 2002 during a general meeting. There hasn't been a new election for the committee yet, since the work really started in 2004, normally there are new elections every two years.

E - 4.2 Participation

This paragraph will discuss firstly the distribution of management tasks and responsibilities during the project. Further it will discuss the participation of the community towards the project, the participation of different parties in O&M activities and the transparency of the whole participation process.

Project management

The responsibilities of the project committee were written down in a protocol agreement between Plan and the community. This contained the members and tasks of the project committee. This committee was supposed to be composed of at least 50% women as executive members; this doesn't seem to be the case in practice. The members of several technical teams were also laid down in this agreement.

Due to most of the respondents Plan provided materials that were not locally available. Further Plan did sent weekly engineers to supervise the project. This was the engineer from Plan or Community Development Engineers who also made the feasibility study. Besides this Plan was obliged to monitor the project and to build the capacity of community leaders.

Involved party	Design	Implementation	Monitoring	Evaluation
Community	Participate in planning; identified need for project	Provide local materials and cash	Give feedback of progress of work	Part of evaluation team, by providing feedback on project-outcome
Plan	Project Outline design	Provide industrial material	Do monitoring reports	Part of evaluation team
Government		Supervision of work		Part of evaluation team
NGO		Training of m.c. and IEC campaign		

Table E.5 - Participation of different parties due to the Project Outline (Plan, July 2002)

The Development Union was supervising the project daily with two persons. Officially the project committee was responsible for the daily supervision of the work, but in practice this was an interaction between foreman, project committee and Development Union. One person said that the Development Union did the daily supervision whereas the project committee communicated with Plan.

Community participation: project

The initiation of the community in the start of the project was high, since the community (or maybe people from Nyen) had already been started the project by construction of a catchment. When Plan came in they offered to assist the people of Mbemi to connect this source to their existing standpipes. Before the community was able to do a request they had to provide first a feasibility study. Since they probably didn't know someone who was able to do this, Plan provided them an engineer. However the water problem was a really bothering the community and was far and away the most important project.

The planning of the project was globally agreed upon between Plan and the community, but the Development Union made a monthly schedule for the work. In the filling-in of the frequency of the work the community members were involved, since this was agreed upon during a community meeting. Concerning technology, the community had already a gravity water system, so this was already chosen. But the community didn't have a choice how the extension should really look like in terms of a choice for soakaways or size of storage tank. Due to the committee the community decided the location and number of standpipes together with Plan. In practice people from Nyen felt involved in the location of the standpipes, people from Mbemi not. This is logical, since no new standpipes were added in Mbemi. Plan required that the community should contribute 30%, on base of this some community representatives decided the community contribution. The community decided the local management of the project, since the project committee already existed (though it didn't really match with requirements from Plan as gender-balanced). The maintenance committee was however more inspired by Plan, since they defined the functions and tasks of the committee.

During construction the participation from the community was quite good. All the needed labor was provided by the community, even the skilled labor. All respondents argue that it was not difficult to mobilize the community, since the need for water was very pressing. Most of the community members worked several mornings a week. People who were not able to work paid some money or provided food.

The handing-over was a ceremony for the whole community of both Nyen and Mbemi, but the preparation of this ceremony didn't take place without stresses. The Nyen people were not involved in the preparation and it also appeared that there were still a few things to do to complete the project. Plan also wanted the community from Mbemi to rehabilitate the existing standpipes, since the ceremony took place in Mbemi. Concerning the date of the handing-over there were also some constraints, the community insisted that it should take place in December, whilst Plan wanted it to take place in October.

The participation of the different parties is by most people taken as very positive. All parties did what they were supposed to do and the main activities of the project were done faster than initially planned by Plan.

O&M participation

The agreement between Plan and the community also obliges the community to elect a maintenance committee to maintain the infrastructure. This involves the collection of fees,

payment of operators/caretakers, purchase spare parts and ensure sustainability. As said the maintenance laid their responsibilities also down by themselves in byelaws. These byelaws are made during a general meeting of the committee and are laying down the tasks of the committees, but also the tariff rate. In case of non-payment the general meeting will decide whether they will send the defaulters to the council for sanction. The committee is not able to sanction people by themselves and they can only call the community for a meeting through the council.

The agreement between Plan and the community has no time-schedule and contains no obligations for Plan concerning the maintenance or sustainability of the project. Since Plan is till working in Mbemi they CDF will see whether the facilities are functioning or will ask around. Further Plan is still providing training directly or through the council.

Transparency

When the project started it was very clear to the community that they would be responsible for the maintenance of the project. To the committee it was not clear what this responsibility involves when it is about costs, intensity of activities etcetera. The initial contribution towards the project was also quite clear to everybody. This is not the case for the expected contribution after project completion. Concerning training it was clear that training would be provided, but not how many sessions or what it did involve. It is also unknown whether training will continue in the future or not. Knowledge of this would not change their choice, since they really needed the water system.

Most of the respondents agree that the ongoing of the project, the distribution of responsibilities and the contribution from different parties was presented during community meetings. Many community members felt involved in planning of the project during a community meeting. The community decided that they wanted to work several days a week, so that the project would finish earlier. There was also an evaluation during a community meeting, but many community members did not visit this one.

Until now the community has been informed once officially about the activities and finances of the committee. This was done at the end of 2004 during a general meeting where all committees were presenting their results. Most people know the executives of the committee and the members inside their quarter. They are also acquainted with the tasks of the committee. Most of the people trust the members and regard them as capable and available. Some respondents are acquainted with the auditing body of the committee, but this is not really known.

E - 4.3 Capacity building

Training has been done at the level of the committee and the level of households. This chapter will discuss the contents, the effectiveness and the existing knowledge of the committee and the training, effectiveness and awareness at household level.

Committee

The first training received by the committee took place at the 28th of June 2002, the same date as the election of the committee. This training was conducted by 'Positive Vision Cameroon'. This first training was mainly an introduction into the functions and tasks of water management committee. Further some management topics and maintenance issues were mentioned briefly. Refresher training has been taking place at the 3rd of May 2004. The first day was full of lectures again about the functions, tasks and problems of a committee and about a work plan and bookkeeping. FRANK-LIN conducted this training on initiative of Plan.The last training they received was a three-day training on water quality and sanitation from the 30th of June until the 2nd of July 2005. Training consisted of a practical and theoretical part about how to take water

samples, conduct sanitary inspections, clean chambers and care for the water quality. This training was maybe attended by 40% of the committee.

Due to committee members the last training was the first training with a practical part on O&M. The trainings have mainly been done on basic principles about management of a water system. For instance there has been training on bookkeeping, but not on financial management in general. This might also explain why the financial secretary is not budgeting or planning. Both the financial secretary and the treasurer don't have a financial background. This is different for the people who are doing maintenance. The caretaker has a lot of experience with water systems and the caretaker and chairman are both having a plumber background. Further the village provided all skilled labour, so there are more people who can care for O&M.

Household

For the community there has also been a training on hygiene and sanitation at the 6th of August. This started with an introduction on water hygiene, which also touched what it takes to deliver water at the tap. But it didn't go into the costs of O&M and what was required from the committee. Further the training mainly focused on collection, transportation and storage of water at household level. Other topics were personal, environmental and food hygiene and HIV/AIDS. After this training there has at least been one other training on Hygiene and Sanitation on initiative of the council, but paid by Plan and probably even another one.

The availability and attendance of all these trainings was quite good. Even 70 people already visited the first training, which is a lot for a little village as Mbemi. This expressed itself also during the interviews at household level: all the respondents themselves or one of the other household members visited training session. Most of the respondents are also aware about how long they can keep water in their house, that they need to use clean containers, should keep surroundings clean etcetera.

E - 5 Financial aspect

This chapter describes the financial structure of the project and O&M.

E - 5.1 Financial structure project

Both the community and Plan Cameroon financed the project, the contribution from both parties is summarized in Table E.6. Plan asked the community to contribute about 1/3 of the project costs, the community agreed upon this condition. The community collected initially about 1 million FCFA from community members. Men paid 1000 FCFA and women 500 FCFA, whilst elites living outside the village paid more, since they were not able to contribute in labour. This amount has been used to pay skilled labour and other running costs of the project. Some people in Mbemi doubt whether people living in Nyen paid an initial contribution, but at least one respondent was sure that he paid for this.

Plan delivered materials and paid the community partly for skilled labour and for the transportation of materials towards the project site. Plan also paid for education of the committee and the community. Though it is not really clear how the cash of the community has been used, the contribution of Plan is received as clear. The payment of the community however is not mentioned by anybody. One person who did skilled labour even says that he still has to be paid by Plan. The Development Chairman explained that he maybe didn't finish his task, which means that he's not paid.

Community		**Plan Cameroon**	
Allocation	*Amount FCFA*	*Allocation*	*Amount FCFA*
Local materials and labour	1.170.000	Materials	2.706.500
Feasibility study	70.000	Payment of community	920.000
		Training WMC	200.000
		IEC hygiene and sanitation	300.000
Total	**2.240.000**	**Total**	**4.126.500**

Table E.6 - Financial structure Mbemi water project

E - 5.2 Financial structure O&M

During a general committee meeting in July 2002 the contribution was decided to be as described in Table E.7. This tariff has some differentiation, depending on level of service, use and gender. The collection of the levies didn't start directly after project completion. The community asked for respite of collection till 2004, since they already contributed a lot of money towards the project costs.

Type of fee	**Yearly fee (FCFA)**
Public standpipe	Man 600 Woman/youth 300
House connection	1800 per household
Gardening	1000
Building	1000
Connection to main line for house connection	20.000 to pay once

Revenues & expenditures	**Amount (FCFA)**
User fees between 01/01/02 and 09/05/05	65.780
Connection fees from house connections	100.000
Expenditures	40.890
Balance/in cash	**82.110**

Table E.7 - Financial structure O&M Mbemi water project

About the collection of fees it is agreed that every quarter in Mbemi has two responsible committee members who are collecting the fees monthly. This collection is announced during community meetings or in church. Further it is also possible to pay the financial secretary directly and get a receipt, normally receipts are written during general meetings and than passed on to the community members.

In practice the collection is hardly done monthly and the efficiency is very low. Also not everybody in a quarter has to pay, only the people who can effort, which implies that older people don't have to pay for instance. A sample for one of the bigger quarters in Mbemi, where official 44 people are supposed to be the collection efficiency was:

- 43% completed payment until July 2004
- 25% completed payment of 2004
- Nobody paid for 2005

Further it appeared from the accounting books that the financial secretary never received levies from people living in Nyen. People from these quarters have their own system of collection, but since the committee members didn't attend meetings when agreements were made, there are no responsible persons to collect fees. Due to the respondents in Nyen they are paying their user fees yearly, but it's unknown where this money is kept.

Normally when the fees are collected, they are brought to the financial secretary who records the money and brings the money to the treasurer. The treasurer keeps the money in the house, since there's no bank account. When the caretaker needs to buy things he budgets and requests money during a general committee meeting. When the chairman has approved the request the treasurer gives the money. It happens also quite often that the money never reaches the treasurer but is passed to the caretaker from the financial secretary. Normally the financial secretary keeps the records and the treasurer keeps the money.

The financial secretary is not budgeting revenues and expenditures. The tariff rate is based on the amount of money the community can effort and the committee has no idea about the total amount they are supposed to collect or are supposed to spend yearly. When money is needed, the balance will be made up, the amount will be checked and a decision will be taken.

Most committee members agree that there's not enough money for maintenance. There's no money to buy maintenance tools that are belonging to the committee, there's no money to pay the caretakers, there's no money to do bigger repairs not to mention extension of the catchment area or rehabilitation of the system. The financial secretary already wrote other NGO's for assistance, but didn't receive an answer yet.

The checking of the books is supposed to be done by the Development Union who passes them on to the council. Until now not all the accounting books have been checked. Since the Development Union attends meetings, they know the financial condition of the committee and are also looking at the accounting books. For community members it is also possible to see the accounting books, this is also believed by the majority of the respondents at household level.

E - 6 Results project approach

	Technology	**43.75**	
Code	***Sub-indicator***	***Score***	***Explanation***
TC1	Guidelines	50.00	
	1.1 Ensure quality of infrastructure	*25*	Officially only the demand of a f.s.
	1.2 Flexibility	*75*	Every project has own f.s.
TC2	Quality	33.33	
	2.1 Design	*25*	Failures in design, no soakaways
	2.2 Construction	*50*	Better than design
	2.3 Implemented as designed	*25*	Several changes
TC3	Expertise	75.00	
	3.1 Design	*75*	Done by technicians provided by Plan
	3.2 Construction	*75*	Many experienced people available
TC4	Role maintenance	16.67	
	4.1 Costs	*0*	Not part of f.s.
	4.2 Spare parts availability	*25*	Not part of study or considereration, but available
	4.3 Intensity	*25*	Maybe consideration since there are no soakaways

	Participation	**65.63**	
Code	***Sub-indicator***	***Score***	***Explanation***
PA1	Empowerment	43.75	
	1.1 Supervision and monitoring	*25*	Only daily supervision at project site
	1.2 Contracting and supply	*25*	Only f.s. is arranged by community
	1.3 CBO elected by community	*100*	p.c. is elected by community per function
	1.4 Ownership	*25*	Low sense of ownership inside community
PA2	Contribution	75.00	
	2.1 Cash contribution	*50*	Community contributed 1/3, which is average
	2.2 Kind contribution	*100*	All labour and local materials
PA3	Transparency	66.67	
	3.1 Financial policy	*75*	Payment of skilled labour was unclear
	3.2 Responsibilities	*75*	Quite known
	3.3 Presentation to community	*50*	Information was not always communicated well
PA4	Efficiency	75.00	
	4.1 Completion in time	*75*	Completed fast, but some things left
	4.2 Fulfillment of agreements	*75*	Some things left until last day before handing-over
	4.3 Smoothness participation	*75*	Quite smooth, though problems with Nyen
PA5	Equity	58.33	
	5.1 Gender sensitivity	*50*	Hardly women in p.c., but different tariff
	5.2 Socio-economic sensitivity	*25*	No differentiation in tariff, only extra payment if not working
	5.3 Benefits whole community	*100*	Everybody benefits
PA6	Participatory activities	75.00	
	6.1 Planning	*75*	Discussed during community meetings
	6.2 Evaluation	*75*	Evaluation during community meeting, which was input for Plan
	6.3 Taking over	*75*	Nyen was not involved in preperations

	Training	**49.48**	
Code	***Sub-indicator***	***Score***	***Explanation***
TR1	Household level	41.67	
	1.1 Sanitation and health	*100*	There has been two quite extended trainings
	1.2 O&M activities	*25*	Part of hygiene and sanitation training
	1.3 O&M costs	*0*	No training on financial aspect
TR2	Effectiveness & awareness household	50.00	
	2.1 Attendance	*75*	About 70 people attended the first one, also been a second one
	2.2 Awareness hygiene	*75*	Most people are aware
	2.3 Awareness O&M	*25*	Not really clear idea about O&M
	2.4 Awareness costs	*25*	Aware that it takes money, but not about how a tariff is calculated
TR3	Committee level	56.25	
	3.1 Sanitation & health	*100*	Done through community training
	3.2 Operation & maintenance	*25*	No special training for caretaker or practical part
	3.3 Management & communication	*75*	Average, but missing communication aspects
	3.4 Finance & administration	*25*	Very basic, not enough about financial planning
TR4	Effectiveness committee	50.00	
	4.1 Received topics	*50*	Average effectiveness
	4.2 Attendance	*50*	Several people didn't attend, though executives did

	Demand-driven approach	**55.56**	
Code	***Sub-indicator***	***Score***	***Explanation***
DR1	Initiation of project	83.33	
	1.1 Source of request	*75*	Community already started, Plan offered help
	1.2 Priority/importance	*100*	Very important, pressing problem
	1.3 Demand expressed by h.h.	*75*	High need at household level
DR2	Choice at householdlevel	50.00	
	2.1 Technology	*50*	System partly existed, but technicians made choices left
	2.2 Number of standpipes	*50*	Most already existed, further discussion Plan-f.s.-quarter
	2.3 Location of standpipes	*75*	Some discussion took place in Nyen
	2.4 Local management	*50*	p.c. already existed, m.c. partly Plan, partly community
	2.5 Contribution	*25*	Determined by Plan and D.U.
DR3	Informed decision	33.33	
	3.1 Project responsibilities	*75*	Quite clear to everybody
	3.2 Project contribution	*100*	Clear from the beginning
	3.3 Training activities	*50*	Known that training would be part, but number unknown
	3.3 Maintenance responsibilities	*75*	Known that community was responsible
	3.4 Maintenance activities	*25*	Quite unknown what maintenance involved
	3.5 Maintenance contribution	*0*	Contribution after project was unknown

	Cost recovery	**29.17**	
Code	***Sub-indicator***	***Score***	***Explanation***
CR1	All costs	33.33	
	1.1 Project costs	*100*	Recovered by community and Plan
	1.2 O&M costs	*75*	Supposed to be recovered by the community
	1.3 Extension costs	*25*	Paid by community members
	1.4 Rehabilitation costs	*0*	Not recovered
	1.5 Maintainance of CBO's	*0*	Not recovered
	1.6 Other costs	*0*	Not recovered
CR2	Strategy	25.00	
	2.1 Planning	*25*	Only institutional framework and decision made
	2.2 Practice	*25*	Only service efficiency

	Support O&M	**14.58**	
Code	***Sub-indicator***	***Score***	***Explanation***
SP1	Monitoring	8.33	
	1.1 Monitoring by facilitator	*25*	Not systematic, but CDF keeps an eye on the facilities
	1.2 Monitoring system provided	*0*	Not part of training or provided
	1.3 Monitoring sustainability	*0*	No systematic approach to measure sustainability
SP2	Action planning	0.00	
	2.1 Initial planning	*0*	No planning suggestions made
	2.2 Ongoing planning	*0*	No ongoing planning, based on monitoring
SP3	Assistance	33.33	
	3.1 Managerial assistence	*25*	The CDF might give assistence
	3.2 Technical assistence	*25*	The engineer from Plan might be available
	3.3 Accessebility of assistence	*50*	Plan will be approached in general
SP4	Providence of materials	6.25	
	4.1 Spare parts	*25*	Some parts left from construction
	4.2 O&M tools	*0*	Use of own O&M tools
	4.3 Monitoring tools	*0*	Monitoring tools are not available
	4.4 IEC materials	*0*	IEC been done, but without providence
SP5	Coaching and training	25.00	
	5.1 Technical coaching	*0*	No technical coaching
	5.2 Managerial coaching	*0*	M.c didn't receive managerial coaching
	5.3 Ongoing training	*75*	There has been several trainings

E - 7 Results project performance

	Operation	59.26	
Code:	***Sub-indicator***	***Score:***	***Explanation***
OP1	Technical state	50.00	
	1.1 Physical condition chambers	*50*	Cracks and not clean
	1.2 Physical condition pipes	*50*	Probably one leakage, some uncovered
	1.3.Physical conditions standpipes	*50*	All in use, no soakaways
OP2	Environment	25.00	
	2.1 Sanitory inspection catchment	*25*	Risk is 8/10 which is high
	2.2 Sanitory inspection tanks	*25*	Risk is 6 resp 7/10, which is high
	2.3 Inspection standpipes	*25*	Generally quite clean, no animals, pools of water
OP3	Quality water	25.00	
	3.1 Laboratory results facilities	*0*	More than 50 at all levels, which is very bad
	3.2 Sanitory inspection	*25*	Risk is averagely 7/10, which is bad
	3.3 User satisfaction	*50*	Satisfied, but sometimes brown during rainy season
OP4	Quantity water	75.00	
	4.1 Comparing to design	*100*	More than design
	4.2 Future	*75*	System can be extended easily
	4.3 User satisfaction	*50*	Not always enough water at last standpipes
OP6	Distance	100.00	
	6.1 Comparing to before	*100*	Improved for whole community
	6.2 User satisfaction	*100*	Everybody is satisfied about distance
OP7	Health and hygiene	75.00	
	7.1 Improvement of health	*100*	Recognized by all users
	7.2 Laboratory results household	*75*	2 c.f.u. which is good
	7.3 Use at standpipes	*50*	Depending
OP8	Continuity	83.33	
	8.1 Day continuity	*100*	Lower pressure during afternoon
	8.2 Week continuity	*75*	No regular cut offs during the week, only for maintenance
	8.3 Year continuity	*75*	Water all year round, but lower pressure at sp during dry season
OP9	Access	100.00	
	9.1 For whole community	*100*	Whole community provided
	9.2 Use of other sources	*100*	No use of other sources

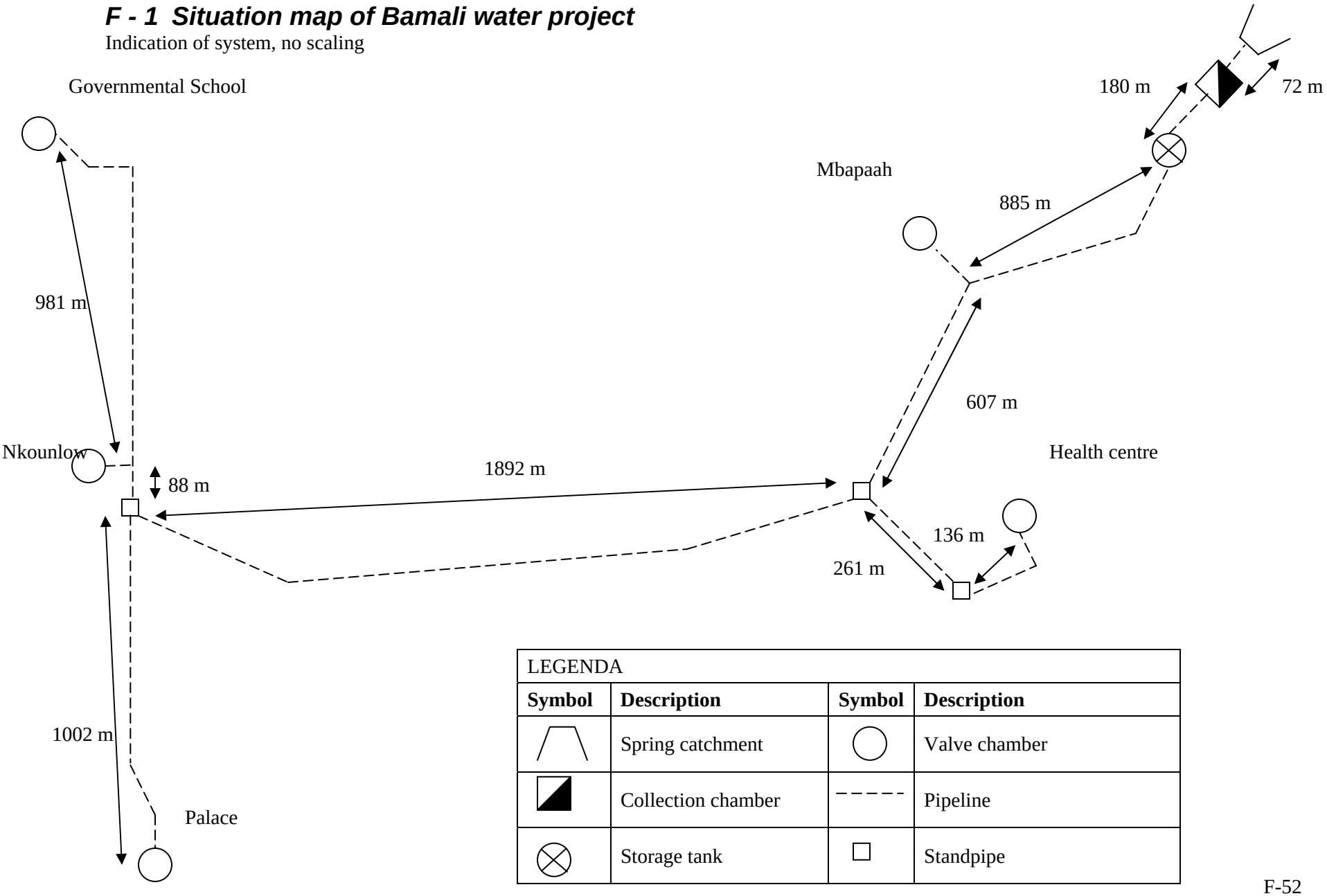
	Maintenance	**58.33**	
Code	***Sub-indicator***	***Score***	***Explanation***
MT1	Cleaning activities	66.67	
	1.1 Regularity at catchment area	*75*	More than four times a year
	1.2 Regularity at standpipes	*50*	When dirty or monthly
	1.3 Participation community	*75*	Through community work at c.a. and at standpipes
MT2	Organisation	83.33	
	2.1 Internal clearness	*75*	Chairman and caretaker are most responsible
	2.2 External clearness	*75*	Almost everybody knows caretakers
	2.3 Capability	*100*	Many experience and followed all trainings
MT3	Back up	62.50	
	3.1 More caretakers	*75*	Officially one, but work is done by three
	3.2 Technical assistence	*50*	There are people in the village, but no names are called
MT4	Money available	25.00	
	4.1 Availability of money	*50*	Until now enough, but not for future and problems in past
	4.2 Payment of caretakers	*0*	Not done
	4.3 Satisfaction about finances	*25*	Not really satisfied
MT5	Maintenance done	62.50	
	5.1 Time	*50*	1 day to 2-3 days
	5.2 External input	*75*	No need for external assistence
MT6	Monitor facilities	41.67	
	6.1 Regularity of monitoring	*50*	Montly done
	6.2 Monitoring tools	*25*	No appropriate tools for monitoring water quality or quantity
	6.3 Completeness of examination	*50*	All facilities, but not thoroughly
MT7	Tools and spares	66.67	
	7.1 Repairs	*75*	Tools and spares available in community
	7.2 Cleaning	*75*	Tools available in community
	7.3 Accessibility of shops	*50*	Not asked

	Management	39.58	
Code:	***Sub-indicator***	***Score:***	***Explanation***
MG1	Constitution	75.00	
	1.1 Election per function	*100*	No new election of m.c., only election of p.c.
	1.2 Representation of users	*50*	No children, people of Nyen no executives
	1.3 Trust by community	*75*	almost everybody trusts the m.c.
MG2	Authority	50.00	
	2.1 Call meetings	*50*	Through council
	2.2 Set tariff	*75*	In general meetings probably
	2.3 Sanction	*25*	Not directly, but through traditional council
MG3	Communication	50.00	
	3.1 Committee meetings	*50*	Executives are there, but Nyen members seldom
	3.2 Presentation of activities	*50*	Done once officially until now
	3.3 Acquaintance of committee	*50*	Most people know several executives and people in quarter
MG4	Collection	41.67	
	4.1 Agreements how, when, who	*50*	Available for Mbemi, but not for Nyen
	4.2 Regularity of collection	*50*	Said to be monthly but not consequently done
	4.3 Efficiency of collection	*25*	Only 25% paid all levies for 2004
MG5	Budgetting	16.67	
	5.1 Periodically budgetting	*0*	No idea's about revenues and expenditures
	5.2 Savings	*50*	About 80.000 FCFA mostly from houseconnections
	5.3 Future vision and planning	*0*	Planning is done ad hoc
MG6	Financial accounting	16.67	
	6.1 Agreements how, when, who	*25*	Agreed that book-keeping is done by f.s.
	6.2 Functional bank account	*0*	No bank account for m.c.
	6.3 Capabilities of responsibles	*25*	Visited trainingg, but no financial experience
MG7	Monitoring and control	41.67	
	7.1 Supervision committee	*75*	D.U. and council are checking, most c.m. have idea about this
	7.2 Functioning of supervision	*50*	Attending meetings, checking book-keeping, not at qaurter level
	7.2 Monitor and control indicators	*0*	No indicators for monitoring and control
MG8	Tariff mechanism	25.00	
	8.1 Tariff differentiation	*50*	Differentiation between household and men-women
	8.2 Pay in kind possibility	*0*	Not yet, maybe in future
	8.3 Correspondence with costs	*25*	Until now enough money, but not based on costs

Annex F - Bamali water project

F - 1 Situation map of Bamali water project

Indication of system, no scaling



LEGENDA			
Symbol	**Description**	**Symbol**	**Description**
	Spring catchment		Valve chamber
	Collection chamber		Pipeline
	Storage tank		Standpipe

F - 2 Time-schedule of Bamali water project

Date	Output/activity	Done by
August 2001	Feasibility studies and technical report for Mbeman (quarter in Bamali)	Divisional delegation of agriculture
Oktober 2001	Project proposal catchment protection	Org. for Rural Dev. And Environmental Protection
November 2001	Approval of Community Project Request Form (48.838.000 FCFA)	Plan
March 2002	Appointment of project management committee	
April 2002	Risk assessment community managed projects	Plan
April 2002	Feasibility studies and rapid assessment on all phases of the project	Consultant engineer Plan (Community Development Worker and RIE?)
April 2002	Initial collection of levies of 5.407.500 FCFA available at PECUDA account	Community
May 2002	Project Protocol Agreement	PECUDA[6] and Country Director of Plan
May 2002	Community Management Project Training for 11 project committee members, phase 1	NGO
June 2002	Providence of local materials (sand and stones) and cleaning at catchment site	Community
June 13th, 2002	Opening of a separate project bank account	Project committee members
June 18th, 2002	Transfer of money to project account 7.000.000 FCFA	Plan
June 2002	New Project Protocol Agreement, only for phase 1 (10.000.000 FCFA Plan and 5.000.000 FCFA community)	PECUDA and Plan
July 2002	Providence of local materials (sand and stones) at storage tank site	Community
August 2002	Detailed feasibility study report on phase 1 of project (Touniho source). Change in location of storage tank and size of phase 1	Infrastructure Development Consultants (IDC)
September 2002	Site preparation: transport of sand and stones to new storage tank site	Community
September 2002	Shaping of stones at catchment site	Local technicians
October 2002	Community Management Project Training for 11 project committee members, phase 2	NGO
October 2002	Construction of two spring catchment (instead of 1 as proposed)	Skilled labour
January 2003	New design and cost estimates for storage tank (enlarged from 10 to 15 m^3) and collection chamber (reinforcement)	Project supervisor
February 2003	Construction of collection chamber	Skilled labour
March-June 2003	Construction of storage tank and public standpipes and the laying of pipes	Skilled labour

[6] PECUDA is an abbreviation of Peuchop Cultural and Development Association - Bamali

April 2003	Transfer of 2.200.000 FCFA for completion of construction	Plan
June 2003	Final technical report	Project supervisor
June 2003	Water Management training for 10 members of WMC	NGO
June 2003	IEC on hygiene and water	NGO
July-August 2003	Finish the project: repair failures etcetera	Community
August 2003	Handing-over of the project	Community, Plan

F - 3 Infrastructural aspects

This chapter describes all infrastructure aspects from Bamali water project. Subsequently discussed are design and construction, physical condition, supply and use at standpipes and maintenance.

F - 3.1 Design and construction

The first phase of Bamali water project suffered from several technical problems that led to serious interruptions of the project. One interruption was in November 2002 because the supervisor had no copy of the drawings and feasibility studies. During December and January it was also not possible to continue with the construction, since the project was implemented different as designed and the design contained technical errors. (See also table…) This finally led to a new design for the storage tank and a design for the collection chamber, which was available in February 2003. It also involved that more material was needed and that there were several moments that people didn't know what to do next.

The main reason why the design was not appropriate was that the capacity of the spring was measured near the location of the storage tank, since it was not possible to reach the headwater of the spring because this area was too bushy. After the area around the source was cleaned it appeared that the spring didn't have one eye, but at least three. To collect as much water as designed the water from every eye of the source had to be collected. This is why it was decided that at least two catchments had to be constructed. At the moment people are even constructing a third catchment. The uncertainty about the quantity of the water led also to enlargement of the storage tank.

Another change after project completion is the extension with one standpipe at the palace in order of the fon. This standpipe doesn't have a soakaway and is connected before the existing standpipe. This causes that there's sometimes no water at the standpipe provided by Plan, but only at the one provided by the fon.

Design	**Change during project**	**Changes after project**
1 catchment chamber	1 additional catchment and change in constrcution	A third catchment under construction
-	Added 1 collection chamber/ sedimentation tank from 1 m^3	None
1 storage tank 10 m^3	Enlargement of storage tank to 15m^3	None
2 valve chambers	None	None
3 low points	Only 2 points constructed	None
2 high points	Only 1 point constructed	None
5970 m pipes	Pipeline not dug as designed, more pipes were needed	None
5 standpipes with soakaways	None	Extension with 1 standpipe at fon's palace

Table F.1 - Infrastructure changes of Bamali water project

The first feasibility studies were done on behalf of the community. Since these studies were contradicting a Plan consultant did a brief assignment and there has been an extended study by IDC. This organization has a lot of experience with the design of gravity water systems in Cameroon. The spring yield test conducted by an engineer from Plan at the beginning of March

2002 showed that the yield of the spring is 0,24 l/s. In the feasibility study of IDC it is assumed to be 0,23 l/s. Whether this yield will be collected after completion of a third catchment is not sure, but it is not reached at the moment, since the third catchment is not yet in use. Further it is quite sure that the source is flowing throughout the year, but it is convincing that the yield is not the same throughout the year.

F - 3.2 Physical condition

Condition catchment area

During some training in the beginning of July on water quality and sanitation the catchment area has been inspected. During the inspection and cleaning there were some remarkable point besides the sanitary inspection:

- Water from overflow pipe of sedimentation tank cannot drain away
- Roots from trees are breaking cement of the catchment
- Little animals inside the chambers
- Sedimentation tank was really dirty inside

Further it appeared from the sanitary inspection that there are cracks in the cement of the sedimentation tank and the second catchment. The covers are unsanitary since animals can still enter the chambers. Further there's also no fencing around the catchment area, which makes it possible for animals to enter the area and contaminate it. The last point to mention is that there's no functional water diversion ditch. This means that especially during heavy rainfalls the rainwater can enter the chambers and contaminate it. The sanitary inspection is summarized in table…

SANITARY INSPECTION	Contamination risk		
Topic of investigation	***S.D.***	***CI***	***CII***
Presence of masonry	NO	NO	NO
Condition of masonry	YES	NO	YES
Presence of unsanitary inspection cover	YES	YES	YES
Presence of contaminating silt or animals	YES	YES	YES
Presence unsanitary air vent	Absent	Absent	Absent
Presence unsanitary overflow pipe	Absent	Absent	Absent
Presence of fencing around spring	YES	YES	YES
Access of animals within 10 metres to source	YES	YES	YES
Presence and functioning of water diversion ditch	YES	NO	YES
Presence of latrines uphill	NO	NO	NO
Total score of risk	**6/10**	**4/10**	**6/10**

Table F.2 - Results of sanitary inspection Bamali water project

The interpretation of the results is as follows: 9-10 = Very high risk; 6-8 = High risk;
3-5 = Intermediate risk; 0-2 = Low risk on contamination

Condition standpipes and pipelines

As said there are five standpipes provided by Plan and en extension done by the fon. The situation around the standpipes is as followed:

1. Mbapaah (close to the storage tank): clean
2. Health centre: clean, maintained and cleaned weekly by health centre
3. Palace: not in use already for over one month and looks neglected
4. Nkounlow (between school and palace): clean

5. Governmental school: clean
6. Fon's extension: no soakaway; no normal tap hat; surroundings not clean.

The standpipes provided by Plan (that are in use) during the first phase are generally clean. But making a circuit through the village it is clear that at many standpipes animals are freely walking. Concerning the pipelines it is clear that not all pipelines from the first phase are fully covered. Further we discovered a leakage between the sedimentation- and storage tank.

F - 3.3 Supply and use at standpipes

User aspects

There are only four out of sixteen quarters benefiting from the first phase of the project, this are Mbapaah, Munkoh, Nkounlow and Njiamgwat. Due to the engineer from Plan the first phase of the project is only benefiting about 2500 people. The first and second phase of Bamali might provide about 4000 people from water. During the visit of Bamali it appeared that even people living in these quarters prefer to use water from the stream. Not everybody wants to walk a little but further to collect water from the standpipes, though some people do.

As discussed in F-3.1 the capacity of the spring might be lower as designed. It is sure that it will never provide enough water for the whole population of Bamali. Anyway from interviews it was clear that when the water is flowing there's enough water in the quarters provided. To refill the storage tank the water is cut off about twice a week between 5 p.m. and 6 a.m., unfortunately during the dry season (especially April and May) the storage tank refills only half. This makes that there's not always enough water in this period. Further especially people from other quarters are complaining, since they don't have access to piped water. This will be better in the near future, since the system will than be extended to more quarters. That the water is not flowing because of breakdowns happens due to users about three times a year. Due to the committee the breakdowns are once in 1-2 months and are generally lasting for 1-2 days.

The water is not always hygienically used at the standpipes and the surroundings around the standpipes are not always clean. This is monitored weekly by the chairman, who is responsible for the supervising of the cleaning around the standpipes. However all the users are recognizing an improvement of health.

Quality of water

All the respondents receive the quality and the colour of the water as good. But results from the laboratory show that the quality, especially at household level is not that good. The results show that mainly the bacteriological contamination is sometimes high. The physical-chemical parameters are good at all locations.

Results of water quality sampling (26-02-05):

Location/level	Bacteriological contamination (units F.C[7].)
Catchment I Tonigwoh Hill	12
Catchment II Tonigwoh Hill	44
Catchment III Tonigwoh Hill	28
Storage tank	33
Standpipes	40
Household level	80

Interpretation of results:

Result	Grading of results
0 cfu	Excellent
1-10 cfu	Acceptable
10-50 cfu	Unacceptable
> 50	Grossly polluted unacceptable

Table F.3 - Results of water quality testing. Source: Csqardem Laboratory, 2005

F - 3.4 Maintenance

Activities and responsibilities

The most important preventive maintenance activities are inspection and cleaning. There's one caretaker who mainly does this work, though community members are also assisting with cleaning during community work hours. Until now this assistance in cleaning has only been once a year. Currently the caretaker is training four people to assist him in preventive maintenance and repairs. Until now his children were the only ones assisting him with repairs. Doings repairs should not take longer than 1-2 days in theory, but due to financial problems it is taking sometimes much longer.

Activity	Carried out by	Frequency
Inspection of catchment area, pipelines and standpipes	Caretaker	Weekly
Inspection of standpipe surroundings	Chairman	Weekly
Supervise cleaning at heath centre standpipe	Storekeeper (also chief of health centre)	Every Saturday
Cleaning of tanks and surroundings	Caretaker	Four times a year
Cleaning of catchment area	Community	Once a year
Do repairs	Caretaker	Varies between weekly and monthly

Table F.4 - Maintenance activities Bamali water project

To keep the surroundings of the standpipes every quarter has own standpipes supervisor. The chairman weekly supervises these people.

[7] Fecal Coliform Bacteria

Tools and spares

The committee has bought some tools to de repairs, but these tools are not appropriate during to repair leakages during the dry season. There are also no appropriate tools for cleaning or to take samples to measure water quality or quantity, but taking samples hasn't been done anyway. Plan did not provide any tools or spare parts to do repairs or maintenance. The only mentioned thing was a cleaning product that was handed after IEC on water and sanitation.

Parts to do repairs like gum and pipes are not always available in the community. When the caretaker needs this he will go to Ndop, which is about half an hour away, if it is not available there he has to go to Bamenda, which is a 1,5 hour travel.

F - 4 Management aspects

The biggest management challenge of this project was that it was a pilot-project for the CMP-approach. This has been asking a lot effort from the project committee. Another difficulty was that the water project is divided into several phases. This implies that not al quarters are already benefiting from the first phase, but are already supposed to contribute towards the project. This paragraph will discuss the institutional framework, the distribution of tasks and responsibilities and capacity building.

F - 4.1 Institutional framework

This paragraph will discuss the traditional framework that already existed inside the village and the framework that has been institutionalised for the project and the maintenance of the project.

Village authorities

The highest village authorities of Bamali are the fon and the notables together, called the 'ngumba'. For the execution of specific development activities there's a Community Development Committee, known as Pechop Cultural and Development Association (PECUDA). Every community member (living inside and outside the village) is member of this association. PECUDA has a general coordination team, which is governing community members all over Cameroon. Besides this every province where community members live have a provincial board with treasurers, secretaries, financial secretary, legal and technical advisors. Decisions concerning village development are taken during general meetings. These meetings are once a year inside the community and also about twice a year somewhere outside the village.

Mobilization of community members is mainly done at quarter level. Every quarter has a quarter head with an assistant, who are both member of the council. The council meets once a week, this meetings are also the opportunity for committees to communicate information towards the quarters. This information is passed on by the representatives of the quarters during weekly quarter meetings.

Project committee

When Plan approved the request for the project they also asked the Development Union to elect a project committee who would supervise the whole project. Plan determined that this committee should consist of 11 people occupied with the function of chairman, secretary, financial secretary, treasure, storekeeper, purchaser and five members. Inside this committee the chairman had to put together a purchase committee that will be responsible for the selection of suppliers and materials. During a PECUDA-meeting in the village these people have been elected per function. The constitution of the committee has changed since not all the members were motivated to do this work without being paid. Further the project started with woman, but she dropped out after some time because the work was to heavy for her. Especially going up to the catchment was not easy. In general it is not easy to find capable women, since many are illiterate.

Maintenance committee

Since there were no other people in the village who were willing to enter the maintenance or management committee (or maybe this was assumed to be) the project committee became also the maintenance committee. Even though they are also responsible at the moment for the smooth running of the second phase of the project.

The constitution of this committee is the same as the one of the project committee. Unfortunately it hasn't been possible until now to take a glance through the minutes of the meetings. Due to the interviews meetings are during the project held every week and once in 1-2 months after project

completion or in case of any problems. The response on the attendance of the meetings varies, some say that everybody is attending, others that maybe 50% is there, others that attendance is low because people are rather going to drink their beer. The overall impression gathered from the interviews is that the attendance of the meetings is not very high. Most of the committee members agree that minutes from these meetings are made.

Women are not part of this committee, which is by most committee members received as negative. Most of the people agree that the maintenance committee was elected, but if there has truly been a new election of the maintenance committee yet is not sure. However most of the community members trust the people in the committee and everybody thinks that they are capable.

F - 4.2 Participation

This paragraph will describe the participation of the different parties towards the project. Firstly it will explain the official distribution of tasks and responsibilities in project agreements and documents. Further it will describe the participation of the community in practice. Further the participation of different parties in O&M will be discussed and finally the transparency of the whole participation process.

Project management

There main parties involved during the project were the community, Plan and the government. Due to the Project Outline form made by Plan, the participation of the different parties was divided as described in table Table F.5.

Party	Design	Implementation	Monitoring	Evaluation
Community	Expressed need and did elementary f.s.	Forefront of implementation; contributes in skilled and unskilled labour and finances	Project committee monitors	Part of evaluation team
Plan	Involved in project conception	Provide funds, training and expertise on CMP	Co-supervise the project committee	Part of evaluation team
Government	Technical supervision	Day-to-day technical supervision	Ensure quality of work	Do evaluation

Table F.5 - Participation of different parties. Source: Plan, 2003

The agreements between the community and Plan are written down in a Protocol Agreement, which is signed by a representative from PECUDA and Plan. This makes PECUDA liable for the sensitisation and mobilisation of the community, the proposal of the project site, the selection of local technicians, they will request funds, install a purchasing committee, manage, follow and monitor the project, mobilise other resources, inform Plan weekly and keep records from store, finances, reports and communications for 5 years. Plan promised to give technical and financial assistance, train committee on CMP, provide IEC training on hygiene and sanitation, assist follow up and monitoring and provide funds.

The assistance of the government has mainly been done by the providence of a Chief of Works Brigade. He is an employee from the Divisional Delegation of Agriculture in Ndop and was also the person who made the first feasibility studies. He was the person who supervised the quality of

the project and who directed the foreman. The foreman was directly responsible for the payment of skilled labor and the construction.

Community participation: project

Though the community conducted a feasibility study before requesting Plan for assistance, many community members don't know who initiated the project or are ascribing the initiation to Plan. The project committee considers it more as a jointly initiation of Plan, the development union and the community. The project was however seen by all the respondents as the most important one. This prioritization of the project is also shown by contribution in cash towards the project.

Since the community already made a feasibility study, choices for the design had already been made. However these feasibility studies were also on the construction of two wells, from where the water would be raised by an electric pump towards a storage tank at the highest pump. This proposal is not assumed to be sustainable and therefore not accepted by Plan. This made that the community requested Plan for a gravity water system in combination with hand-dug wells. There are different opinions inside the community who chose the number and location of standpipes, most likely is that it depended on the contribution from Plan, the vision of Plan (standpipes at schools, palace, markets etcetera) and the feasibility study. The contribution of the community was a requirement from Plan before starting the project. The layout of the project committee was designed by Plan, by providing training on how the management should be arranged. Community members themselves were not really involved in all these choices. Some have no idea how those choices have been made, others assume that these choices have mainly been made by representatives of the community like the fon, the committee or the development union or that is has been done by Plan.

The general date of starting and ending of the project was mainly suggested by Plan. Besides this the planning has probably been discussed in a community meeting, though many community members do not know about this. During the project the community members were supposed to work during community work hours. This is every Sunday for about 3-4 hours. Work to be done is carry sand and stones, dig trenches etcetera. Nobody is paid for this work and it's a community obligation. Due to several members of the project committee it was not always easy to mobilize the community for this work. A problem mentioned by Plan was that people didn't want to work on other days beside Sunday this delayed the project sometimes. Skilled labor, like masons and plumbers, were provided from inside and outside the community. The foreman for instance is not a community member. The project committee paid skilled labor through the foreman. Due to community members the project gave equal opportunities to men and women.

The evaluation of the project was mainly on the use of the money. At community level the project committee with representatives from all the quarters evaluated the use of their own funds. From interviews inside the community it appeared that there haven't been a collective evaluation yet. The handing-over was an activity for the whole community.

O&M participation

A tripartite agreement between Plan, the community and the government (represented by the administration of Ngoketunjia division) has been signed at the handing-over of the project. This agreement obliged the community to set up a user fees collection system that will serve a maintenance fund, to ensure effective use of the water system and to set up a permanent water user file management committee. The administration of Ngoketunjia is obliged to ensure that the project committee keeps the system functional for at least 10 years and that the community is paying water collection fees for properly maintenance. This agreement hand over all responsibilities from Plan towards these two parties.

In practice Plan is still monitoring the system through the CDF, but this is no obligation or on regular base. Further the caretaker is mainly concerned with maintenance, since the committee didn't really set up a clear system for collection of user fees. The committee is able to call the community together for a meeting, but only through the council. In case of any problems the committee tries to solve the problem, maybe with aid of the council or PECUDA.

The responsibility for O&M inside the community lies at the moment mainly by the caretaker. Sometimes the community is assisting in cleaning activities, but this doesn't happen very often.

Transparency

From the beginning the responsibility towards O&M was very clear to all community members, but not what this involved in contribution from the community. Not everybody knew what the community had to contribute towards the project, since it has been part of a yearly contribution towards development activities and what the contribution in kind involved was also not really known from the beginning. To committee members the required project contribution from the community was very clear, but most of them didn't really have an idea about the money that was needed to maintain the project. It was also clear from the beginning that this project would be a CMP and that training activities had to be attended. The knowledge about the project didn't influence the choices, though the caretaker also said that there were no options.

The responsibilities and contribution of different parties involved was very clear for the project committee. Everything was laid down in a protocol agreement; the only thing was that this protocol agreement has been changed once. The community members were also acquainted globally about what Plan and what the community had to do.

Due to the project committee they were briefing the council every month about the ongoing of the project. Further they are presenting their work during general assemblies of PECUDA. After the first agreement between Plan and the community they did a very extended briefing of the agreements made throughout whole Cameroon. Some community members agree did things were communicated through quarter meetings, but not everybody is visiting these meetings. Most of the people also agree that the committee is presenting their maintenance activities, but are not really acquainted with the things they are doing and also not with the members. Concerning the auditing body different responses are received, varying between unknown, quarter heads, chairman of committee and development union.

F - 4.3 Capacity building

Committee

At committee level already several trainings have been conducted during the implementation of the project. Unfortunately the reports of these CMP trainings seem to have disappeared. From notes from one of the committee members it appeared that the first training has been conducted at the 17th of May 2005. This training provided information about the management of finances during the project, contracting and supply and storage of materials. This training has been followed up by at least one other training on CMP. At the 28th of June training on the management of the system was provided. This training was about financial issues like what kind of expenditures should be expected, how to collect money, how to account and budget. Another aspect was the operation and management of the system; this was about fencing, inspection and doing repairs. It also emphasized on the importance of communication towards the community and the managerial qualities of a committee. While visiting Bamali training on Water quality and

sanitation was provided. This was the first training with a big practical part. During the other training about management the committee has been making a circuit around standpipes, but there was not really a practical training.

The attendance of the CMP-trainings is unknown, since there are no minutes or reports on these trainings. But it is known that some people, who are currently member of the committee, didn't join the committee from the beginning. About 8 out of 11 members attended the management training. Unfortunately the caretaker didn't join this training. The engineer from Plan has taken care off this lack of knowledge by going round with the caretaker and informing him on how to do repairs. Further the caretaker has been trained during construction, since he also doesn't have a real plumber background. Another key-member of the committee also didn't join the management training this was the financial secretary. He has some experience in accounting, since he did it in secondary school. Further he joined the CMP trainings, which was also on management of finances among other topics. The treasurer received only for a few years education on accounting in secondary school, but joined at least two trainings. The last training was in fact only fully attended by the caretaker. He also brought the people he's actually training with him.

From the interviews it appeared that most of the committee members received a lot of training, but are mainly remembering the parts that are applicable for their function. And even that is sometimes miserable. For instance the treasurer argued that he didn't receive training on accounting or costs of O&M, from his notes it appeared that he did receive in fact.

Household

At household level at least one training on hygiene and sanitation has been conducted at the 29th of June 2003. Minutes from the training show that 50 community members have been visiting this training. The minutes of this training also show that this training is the same one as the one conducted in Mbemi. This training contains some information on water, but is also about hygiene, sanitation, and diseases etcetera. The training did not really go into what it takes (costs, O&M activities) to deliver water at the standpipes.

Out of five respondents two have received training on hygiene and sanitation. One respondent was able to reproduce some knowledge about collection, transportation and storage of water, the other not really. A remark that was often made by respondents that for safe water chlorine has to be added to the water. Most of the people are further not really aware about costs and maintenance activities.

F - 5 Financial structure

F - 5.1 Financial structure project

The financial structure was also laid down in the protocol agreement between Plan and PECUDA. The contribution from Plan changed however after signing the first agreement. Instead of handing out 48.838.000 FCFA they decided to split the project up in several phases. During the first phase Plan would contribute only 10mln FCFA whereas the community still had to contribute 5mln FCFA.

The project was a disbursement project, this involves that the project committee will request funds and Plan will pay this installments as agreed. The funds will be distributed in portion and the next funding will only be done when liquidation and justification is satisfactory done. Practically it involved that the project committee was only allowed to spend above 250.000 after approval of the CDF and the PAM. Between 150.000- 250.000 they only need approval of the CDF. Though the financial policy is said to be clear by the project committee it has still been causing trouble during the project.

Plan	
Purpose	***Amount (FCFA)***
Gravity water system	7.000.000
Gravity water system	2.200.000
CMP training	unknown
Water Management training	500.000
IEC on hygiene and sanitation	300.000
Total contribution	**10.000.000**

Contribution Community	
Source	***Amount (FCFA)***
Women in village	2500
Men in village	5000
Elites outside village	10.000-60.000
Total contribution	**5.000.000**

Table F.6 - Financial structure of Bamali water project

The contribution of the community was collected during the yearly collection of money for projects. In case of non-payment of community members the amount was doubled and people had to pay a fine of 5000 FCFA. The contribution of the community would cover the running costs of the project like local materials, making of photocopies, transportation, payment of skilled labor, providence of food, pencils and other administration costs. Besides this contribution in cash the community also paid in kind through unskilled labor and local materials. This makes the contribution of the community higher than 1/3 of the project costs.

F - 5.2 Financial structure O&M

The management committee didn't really set up a system for the collection of maintenance fees. Due to the chairman every household is supposed to pay 400 FCFA. The person who is appointed to care for the standpipes in his quarter should collect this money. From household interviews it appeared that there had never been collection of maintenance levies. Even the other members of the management committee denied that there's a systematic approach to collect levies.

For the standpipe at the health center is applies that the health center pays when there are problems around that standpipe. For the other standpipe the quarter is supposed to pay. Every quarter has their own funds, which can be used to pay in advance for repairs; the costs of the repairs will be collected afterwards at households. At standpipe level it starts to be problematic when quarter funds are not sufficient or if a quarter refuses to pay, which is the case with the

standpipe at the palace. This structure does not cover costs of O&M at pipelines or at the catchment area. When there is a need to do repairs the caretaker will ask the chairman for money. He will pass the request to PECUDA and in case if they don't want to pay he or another committee member will take money from his own pocket.

Due to the chairman he's checking the accounting books of the quarters, but due to the financial secretary there are no accounting books at all for maintenance. Where the chairman says that there's no money because people don't want to pay, other people say that it's due to the lack of collection. From community interviews it appeared that community members are willing to pay if levies would be collected.

F - 6 Results project approach

	Technology	**48.96**	
Code	***Sub-indicator***	***Score***	***Explanation***
TC1	Guidelines	75.00	
	1.1 Ensure quality of infrastructure	*75*	Agreement with government and use of experienced labour
	1.2 Flexibility	*75*	Every project has own feasibility study
TC2	Quality	41.67	
	2.1 Design	*25*	Several studies done, but still failures in design
	2.2 Construction	*75*	Probably well done
	2.3 Implemented as designed	*25*	Several changes, some without new design
TC3	Expertise	62.50	
	3.1 Design	*75*	Done by IDC, long expertise
	3.2 Construction	*50*	Foreman had long expertise, but was the only one
TC4	Role maintenance	16.67	
	4.1 Costs	*25*	Costs not presented, but searched for lowest costs by community
	4.2 Spare parts availability	*25*	Available but did not play a direct role in design
	4.3 Intensity	*0*	Didn't play a role in design

	Participation	**59.38**	
Code	***Sub-indicator***	***Score***	***Explanation***
PA1	Empowerment	81.25	
	1.1 Supervision and monitoring	*75*	Most supervision done by community
	1.2 Contracting and supply	*100*	Done by community
	1.3 CBO elected by community	*100*	Done in community meeting
	1.4 Ownership	*50*	Sense of ownership high in committee, but not in community
PA2	Project contribution	75.00	
	2.1 Cash contribution	*75*	The community paid for more than 1/3 of the project
	2.2 Kind contribution	*75*	Community contributed a lot, but not all skilled labor
PA3	Transparency	66.67	
	3.1 Financial contributions	*75*	Received as clear, but change of amount by Plan
	3.2 Responsibilities	*75*	Clear to committee, but not to all community members
	3.3 Presentation to community	*50*	Not everything was received as clear
PA4	Efficiency	33.33	
	4.1 Completion in time	*50*	Officially completed in time, but work to do afterwards
	4.2 Fulfillment of agreements	*25*	Change of agreements, delay of local materials
	4.3 Smoothness participation	*25*	By several parties said to be difficult
PA5	Equity	50.00	
	5.1 Gender sensitivity	*50*	Unbalanced project committee, tariff differentiation
	5.2 Socio-economic sensitivity	*75*	Differentiation in tariff
	5.3 Benefits whole community	*25*	First phase doesn't aim to benefit whole community
PA6	Participatory activities	50.00	
	6.1 Planning	*0*	Mainly decided by Plan
	6.2 Evaluation	*50*	Representatives from quarters visited evaluation
	6.3 Taking over	*100*	For the whole community

	Training	**47.92**	
Code	***Sub-indicator***	***Score***	***Explanation***
TR1	Household level	41.67	
	1.1 Sanitation and health	*100*	There has been an extended training
	1.2 O&M activities	*25*	Part of hygiene and sanitation training
	1.3 O&M costs	*0*	No training on financial aspect
TR2	Effectiveness & awareness household	37.50	
	2.1 Attendance	*50*	About 50 people attended training
	2.2 Awareness hygiene	*50*	Some people are aware, some not
	2.3 Awareness O&M	*25*	Now a little bit about it
	2.4 Awareness costs	*25*	Most people aware that it takes costs, but not who is paying
TR3	Committee level	75.00	
	3.1 Sanitation & health	*100*	Done through community training
	3.2 Operation & maintenance	*50*	Made a circuit with caretaker and tehoretical training for others
	3.3 Management & communication	*75*	Average, but missing communication aspects
	3.4 Finance & administration	*75*	Extended, sinde CMP-project
TR4	Effectiveness committee	37.50	
	4.1 Received topics	*50*	Most people just remember some parts
	4.2 Attendance	*25*	Several people with key-role didn't attend training

	Demand-driven approach	**35.56**	
Code	***Sub-indicator***	***Score***	***Explanation***
DR1	Initiation of project	58.33	
	1.1 Source of request	*50*	CBO initiated the project
	1.2 Priority/importance	*100*	Most important to everybody
	1.3 Demand expressed by h.h.	*25*	Development union acts on behalf of community members
DR2	Choice at householdlevel	15.00	
	2.1 Technology	*50*	CBO decided technology through first f.s.
	2.2 Number of standpipes	*0*	Decided by Plan
	2.3 Location of standpipes	*25*	Probably discussion between Plan and CBO
	2.4 Local management	*0*	Designed by Plan
	2.5 Contribution	*0*	Determined by Plan
DR3	Informed decision	33.33	
	3.1 Project responsibilities	*75*	Clear that this was a CMP project
	3.2 Project contribution	*50*	Clear from the beginning, but contribution Plan changed
	3.3 Training activities	*50*	Known that training would be part, but number unknown
	3.3 Maintenance responsibilities	*75*	Known that community was responsible
	3.4 Maintenance activities	*25*	Quite unknown what maintenance involved
	3.5 Maintenance contribution	*0*	Contribution after project was unknown

	Cost recovery	**33.33**	
Code	***Sub-indicator***	***Score***	***Explanation***
CR1	All costs	41.67	
	1.1 Project costs	*100*	Recovered by community and Plan
	1.2 O&M costs	*75*	Supposed to be recovered by the community
	1.3 Extension costs	*0*	Not recovered
	1.4 Rehabilitation costs	*25*	Insurance for major break downs was part of training
	1.5 Maintainance of CBO's	*50*	Training, travelling etcetera
	1.6 Other costs	*0*	Not recovered
CR2	Strategy	25.00	
	2.1 Planning	*25*	Only institutional framework and decision made
	2.2 Practice	*25*	Only service efficiency

	Support O&M	**14.17**	
Code	***Sub-indicator***	***Score***	***Explanation***
SP1	Monitoring	16.67	
	1.1 Monitoring by facilitator	*25*	Not systematic, but CDF keeps an eye on the facilities
	1.2 Monitoring system provided	*25*	Caretaker received some training on monitoring
	1.3 Monitoring sustainability	*0*	No systematic approach to measure sustainability
SP2	Action planning	12.50	
	2.1 Initial planning	*25*	Caretaker has been told how often to go around
	2.2 Ongoing planning	*0*	No ongoing planning, based on monitoring
SP3	Assistance	25.00	
	3.1 Managerial assistence	*25*	The CDF might give assistence
	3.2 Technical assistence	*25*	The engineer from Plan might be available
	3.3 Accessebility of assistence	*25*	Most people are not aware of possibility of assistence
SP4	Providence of materials	0.00	
	4.1 Spare parts	*0*	Spare parts are provided by community
	4.2 O&M tools	*0*	O&M tools are provided by community
	4.3 Monitoring tools	*0*	Monitoring tools are not available
	4.4 IEC materials	*0*	IEC has been done, but no materials to do by themselves
SP5	Coaching and training	16.67	
	5.1 Technical coaching	*25*	Caretaker received some technical coaching in beginning
	5.2 Managerial coaching	*0*	M.c didn't receive managerial coaching
	5.3 Ongoing training	*25*	There are still trainings, but no systematic approach

F - 7 Results project performance

	Operation	46.15	
Code:	***Sub-indicator***	***Score:***	***Explanation***
OP1	Technical state	41.67	
	1.1 Physical condition chambers	*50*	Cracks, not clean
	1.2 Physical condition pipes	*50*	One leakage, some uncovered
	1.3.Physical conditions standpipes	*25*	One not in use for one month out of five
OP2	Environment	45.83	
	2.1 Sanitory inspection catchment	*37.5*	Risk is 4/10 resp. 6/10, which is intermediate resp high
	2.2 Sanitory inspection tanks	*25*	Risk is 6/10 for sedimentation tank, which is high
	2.3 Inspection standpipes	*75*	Generally quite clean, soakaways, some animals mentioned
OP3	Quality water	48.33	
	3.1 Laboratory results facilities	*25*	Fecal Coliform Bacteria between 10-50 cfu which is bad
	3.2 Sanitory inspection	*45*	Risk is 5.7 out of 10, which is intermediate to high
	3.3 User satisfaction	*75*	Users are satisfied, but still complaining towards caretaker
OP4	Quantity water	50.00	
	4.1 Comparing to design	*25*	Probably less water than designed
	4.2 Future	*75*	In the future there will be more water
	4.3 User satisfaction	*50*	Not always enough water
OP5	Distance	50.00	
	6.1 Comparing to before	*50*	Some have to walk further others shorter
	6.2 User satisfaction	*50*	Depending
OP6	Health and hygiene	50.00	
	7.1 Improvement of health	*100*	Recognized by all users
	7.2 Laboratory results household	*0*	80 c.f.u., which is very bad
	7.3 Use at standpipes	*50*	Depending
OP7	Continuity	58.33	
	8.1 Day continuity	*75*	Lower pressure during afternoon
	8.2 Week continuity	*50*	One out of five days of
	8.3 Year continuity	*50*	Problems during dry season, often break downs
OP8	Access	25.00	
	9.1 For whole community	*0*	Not at all, first phase only for 4 out of 16 quarters
	9.2 Use of other sources	*50*	Still use of stream for drinking water in quarters

	Maintenance	**40.48**	
Code	***Sub-indicator***	***Score***	***Explanation***
MT1	Cleaning activities	33.33	
	1.1 Regularity at catchment area	*50*	Four times a year, which is recommended
	1.2 Regularity at standpipes	*25*	Montly inspection, at health centre weekly
	1.3 Participation community	*25*	Community participates only about once a year
MT2	Organisation	50.00	
	2.1 Internal clearness	*75*	Only one person functional, which is clear
	2.2 External clearness	*25*	2 out of 5 didn't know the caretaker
	2.3 Capability	*50*	Plumber background, not attended training, known as capable
MT3	Back up	25.00	
	3.1 More caretakers	*0*	At the moment there's just one
	3.2 Technical assistence	*50*	There are people in the village
MT4	Money available	25.00	
	4.1 Availability of money	*25*	It takes often very long
	4.2 Payment of caretakers	*50*	Caretaker receives a little allowance
	4.3 Satisfaction about finances	*0*	Absolutely unsatisfied about financial situation
MT5	Maintenance done	50.00	
	5.1 Time	*25*	Normally 1-2 days but sometimes more than one month
	5.2 External input	*75*	No need for external assistence
MT6	Monitor facilities	66.67	
	6.1 Regularity of monitoring	*100*	Weekly monitoring
	6.2 Monitoring tools	*25*	No appropriate tools for monitoring water quality or quantity
	6.3 Completeness of examination	*75*	All facilities, but not toroughly
MT7	Tools and spares	33.33	
	7.1 Repairs	*25*	No appropriate tools during dry season
	7.2 Cleaning	*25*	No appopriate tools to clean system
	7.3 Accessibility of shops	*50*	Shops in Bamenda and Ndop (1/2 - 1 hour away)

	Management	18.75	
Code:	***Sub-indicator***	***Score:***	***Explanation***
MG1	Constitution	33.33	
	1.1 Election per function	*25*	No new election of m.c., only election of p.c.
	1.2 Representation of users	*0*	No women in m.c.
	1.3 Trust by community	*75*	almost everybody trusts the m.c.
MG2	Authority	33.33	
	2.1 Call meetings	*50*	On quarterlevel, not on community level
	2.2 Set tariff	*25*	Maybe possible, but unclear
	2.3 Sanction	*25*	Not directly, but through traditional council
MG3	Communication	25.00	
	3.1 Committee meetings	*25*	contradictionary results about regularity and attendance
	3.2 Presentation of activities	*25*	Maybe done, but quite unknown by community
	3.3 Acquaintance of committee	*25*	Most people know a few people
MG4	Collection	0.00	
	4.1 Agreements how, when, who	*0*	Really unclear
	4.2 Regularity of collection	*0*	No regular collection
	4.3 Efficiency of collection	*0*	No levies collected
MG5	Budgetting	16.67	
	5.1 Periodically budgetting	*25*	Caretaker is budgetting a little bit
	5.2 Savings	*25*	Some savings from project
	5.3 Future vision and planning	*0*	No future vision at the moment
MG6	Financial accounting	25.00	
	6.1 Agreements how, when, who	*0*	No accounting is done
	6.2 Functional bank account	*25*	Bank account for project, not for maintenance levies
	6.3 Capabilities of responsibles	*50*	Visited training and did accounting in secondary school
MG7	Monitoring and control	16.67	
	7.1 Supervision committee	*50*	PECUDA controls committee, but this is quite unknown
	7.2 Functioning of supervision	*0*	No supervision on maintenance
	7.2 Monitor and control indicators	*0*	No monitoring and control
MG8	Tariff mechanism	0.00	
	8.1 Tariff differentiation	*0*	No tariff yet, no planning for differentation
	8.2 Pay in kind possibility	*0*	Not yet, not going to be in future
	8.3 Correspondence with costs	*0*	No adequate tariff

Annex G - Summary results

G - 1 Little summary

Code	*Indicators project approach*	*Mbemi*	*Bamali*
TC	Technology	43.75	48.96
PA	Participation	65.63	59.38
TR	Training	49.48	47.92
DR	Demand-driven approach	55.56	35.56
CR	Cost recovery	29.17	33.33
SP	Support O&M	14.58	14.17

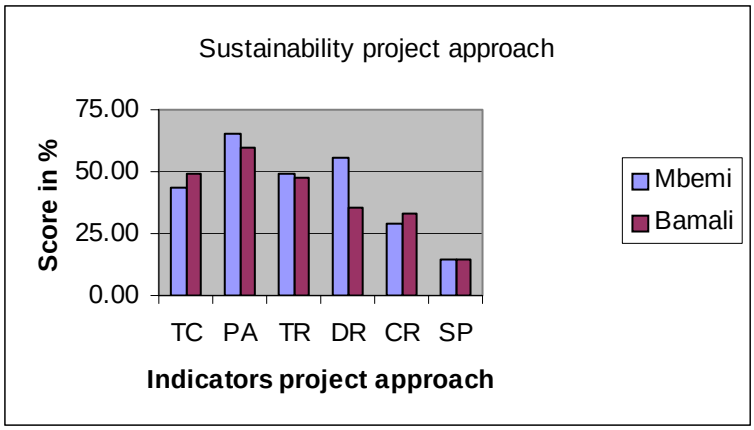


Figure G.1 - Results project approach

Code	*Indicators performance*	*Mbemi*	*Bamali*
OP	Operation	59.26	46.15
MT	Maintenance	58.33	40.48
MG	Management	39.58	18.75

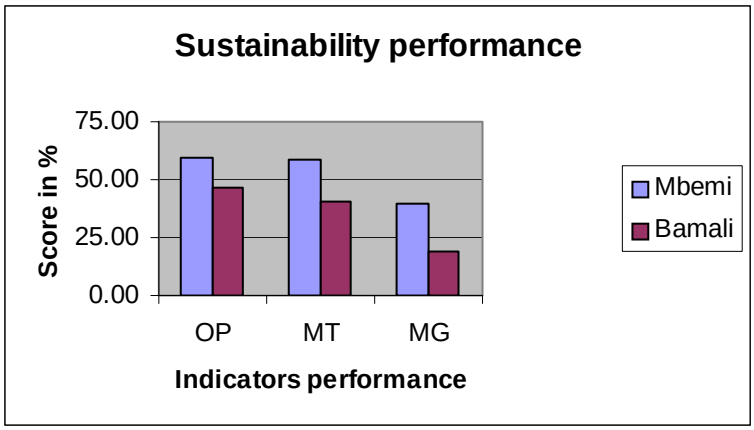


Figure G.2- Results performance

G - 2 Project approach indicators

Code	*Sub-indicator*	*Mbemi*	*Bamali*
TC	**Technology**	**43.75**	**48.96**
TC1	Guidelines	50.00	75.00
TC2	Quality	33.33	41.67
TC3	Expertise	75.00	62.50
TC4	Role maintenance	16.67	16.67

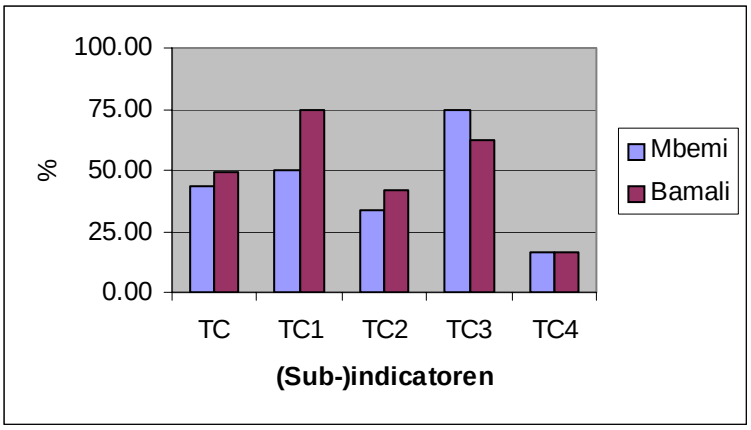


Figure G.3 - Results technology

Code	*Sub-indicator*	*Mbemi*	*Bamali*
PA	**Participation**	**65.63**	**59.38**
PA1	Empowerment	43.75	81.25
PA2	Contribution	75.00	75.00
PA3	Transparency	66.67	66.67
PA4	Efficiency	75.00	33.33
PA5	Equity	58.33	50.00
PA6	Participatory activities	75.00	50.00

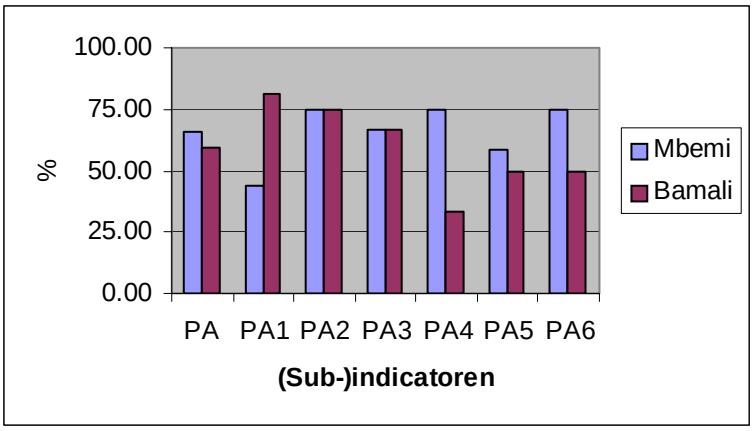


Figure G.4- Results participation

Code	*Sub-indicator*	*Mbemi*	*Bamali*
TR	**Training**	**49.48**	**47.92**
TR1	Household level	41.67	41.67
TR2	Effectiveness and awareness household	50.00	37.50
TR3	Committee level	56.25	75.00
TR4	Effectiveness committee	50.00	37.50

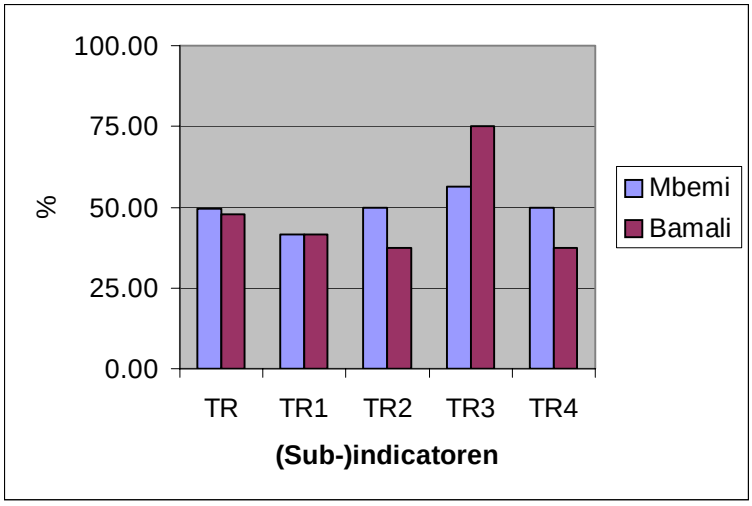


Figure G.5- Results training

Code	*Sub-indicator*	*Mbemi*	*Bamali*
DR	**Demand-driven approach**	**55.56**	**35.56**
DR1	Initiation of project	83.33	58.33
DR2	Choice at householdlevel	50.00	15.00
DR3	Informed decision	33.33	33.33

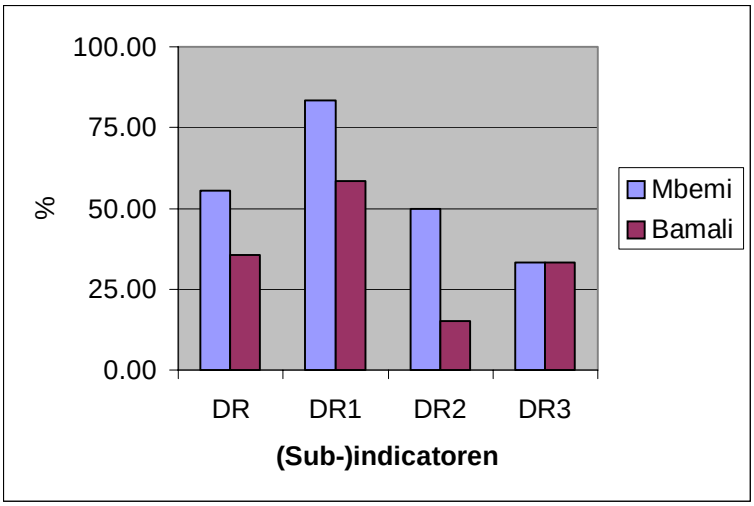


Figure G.6- Results demand driven approach

Code	*Sub-indicator*	*Mbemi*	*Bamali*
CR	**Cost recovery**	**29.17**	**33.33**
CR1	All costs	33.33	41.67
CR2	Strategy	25.00	25.00

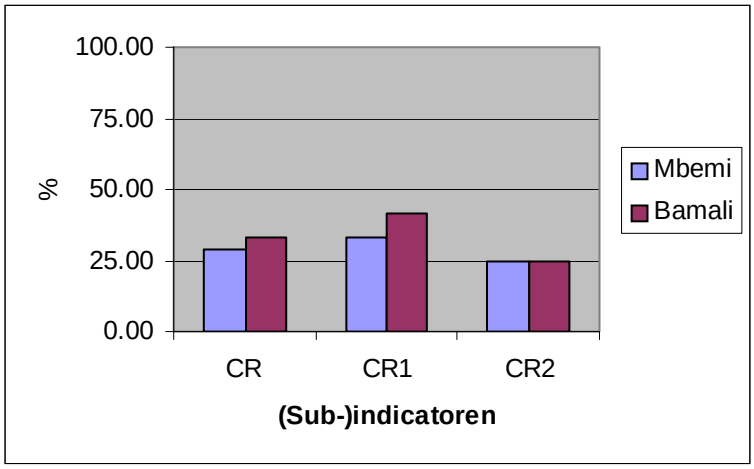


Figure G.7- Results cost-recovery

Code	*Sub-indicator*	*Mbemi*	*Bamali*
SP	**Support O&M**	**14.58**	**14.17**
SP1	Monitoring	8.33	16.67
SP2	Action planning	0.00	12.50
SP3	Assistance	33.33	25.00
SP4	Providence of materials	6.25	0.00
SP5	Coaching and training	25.00	16.67

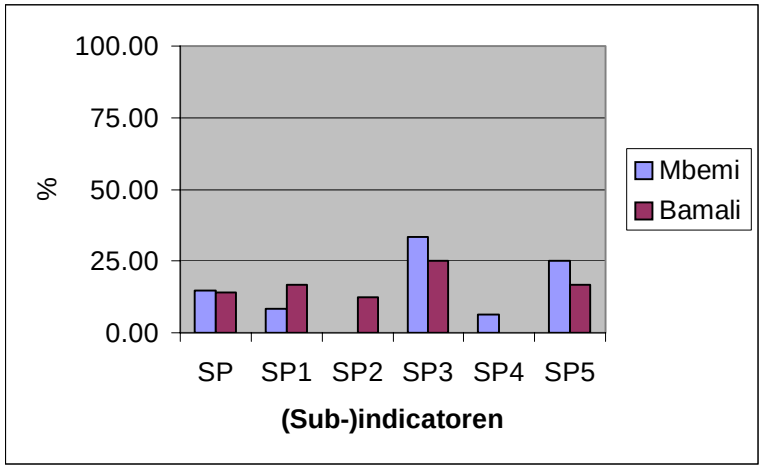


Figure G.8- Results support O&M

G - 3 Performance indicators

Code	Sub-indicator	Mbemi	Bamali
OP	**Operation**	**59.26**	**41.48**
OP1	Technical state	50.00	41.67
OP2	Environment	25.00	50.00
OP3	Quality water	25.00	48.33
OP4	Quantity water	75.00	50.00
OP6	Distance	100.00	50.00
OP7	Health and hygiene	75.00	50.00
OP8	Continuity	83.33	58.33
OP9	Access	100.00	25.00

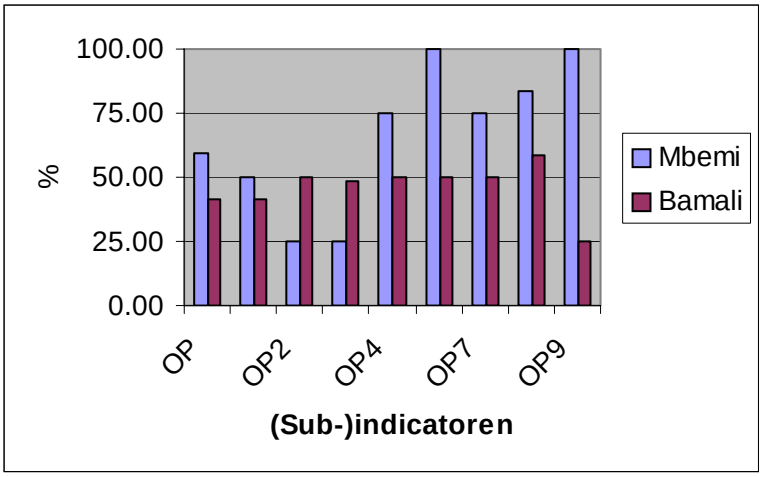


Figure G.9- Results operation

Code	Sub-indicator	Mbemi	Bamali
MT	**Maintenance**	**58.33**	**40.48**
MT1	Cleaning activities	66.67	33.33
MT2	Organisation	83.33	50.00
MT3	Back up	62.50	25.00
MT4	Money available	25.00	25.00
MT5	Maintenance done	62.50	50.00
MT6	Monitor facilities	41.67	66.67
MT7	Tools and spares	66.67	33.33

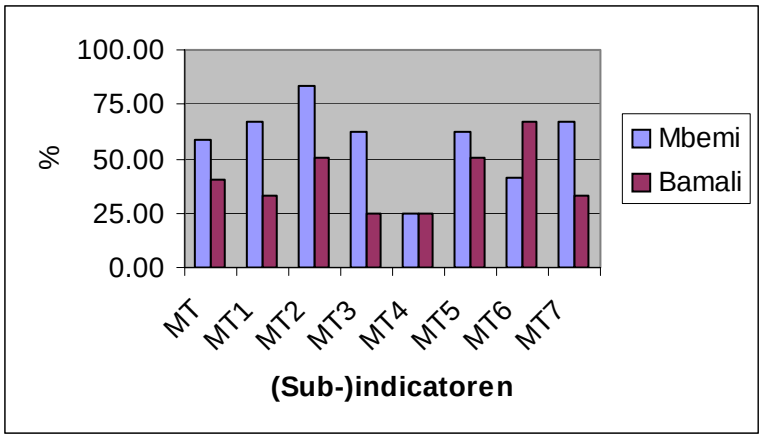


Figure G.10 - Results maintenance

Code	Sub-indicator	Mbemi	Bamali
MG	**Management**	**39.58**	**18.75**
MG1	Constitution	75.00	33.33
MG2	Authority	50.00	33.33
MG3	Communication	50.00	25.00
MG4	Collection	41.67	0.00
MG5	Budgetting	16.67	16.67
MG6	Financial accounting	16.67	25.00
MG7	Monitoring and control	41.67	16.67
MG8	Tariff mechanism	25.00	0.00

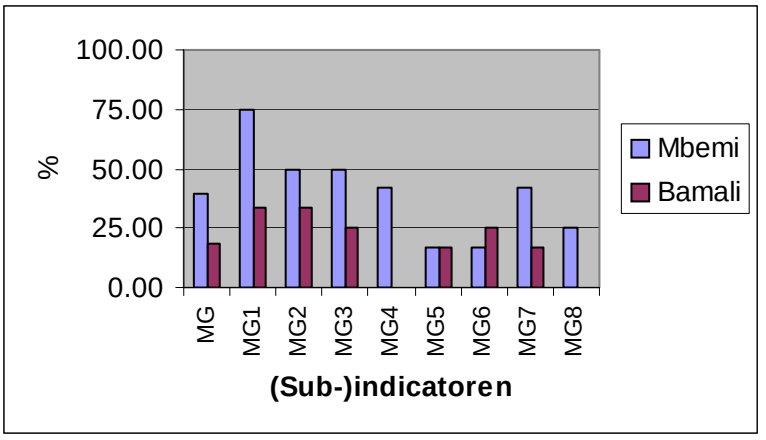


Figure G.11- Results management