

ASSESSMENT

HELVETAS CAMEROON EXPERIENCES
IN CATCHMENT PROTECTION
ACTIVITIES

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EXECUTIVE SUMMARY

Helvetas Cameroon has been active for more than 10 years in water catchment protection in the North West Province. In this report a review is presented of the activities performed by Helvetas Cameroon in water catchment protection and the best practises are summarised. This was done by reviewing literature on water catchment protection and 6 field visits to sites where Helvetas Cameroon has been actively involved in water catchment protection.

In the last 10 years a more or less standard approach for water catchment protection has been developed. This approach includes sensitisation of the population, acquiring the land title of the catchment area, setting up of a water management committee, training of caretakers and implementing protective measures. These protective measures worked well in most cases and the technical approach followed by Helvetas can be used as a good basis for any water catchment protection project. These activities have been summarised in 'Best practises' in this report.

There are two existing manuals on rural water supply that include chapters on water catchment protection but these do not include all the best practises described in this report and a new updated manual should be produced. Problems with water catchment protection were encountered in all visited projects. Most problems originated from a lack of money or conflict of interest with land users. It is proposed that these two aspects should receive more attention in existing and new projects supported by Helvetas Cameroon. Councils should be supported to enable them to better manage different interests in water catchment protection and to enforce made agreements. Secondly the financial and organisational basis for water catchment protection should be better organised and Helvetas Cameroon should support the councils and the WMCs in this activity.

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ABBREVIATIONS

WMC	Water Management Committee
<h>	Helvetas Cameroon
LCB	Land Consultative Board
NWP	North West Province
DO	Divisional Officer
NGO	Non Governmental Organisation
CBO	Community Based Organisation

1. INTRODUCTION

1.1. General introduction

Helvetas Cameroon has commissioned Jaap van der Waarde to perform a desk study and field trip to assess the experiences of Helvetas Cameroon with water catchment protection. The project was carried out in consultation with Mr Markus Ischer and Mr Humphred Tebong Musa from Helvetas Cameroon and in accordance with the terms of reference between Helvetas Cameroon and Jaap van der Waarde, dated September 14 2004.

1.2. Background of the project

Helvetas Cameroon has been working in the water sector in Cameroon since 1964. More than 500 village water supplies were constructed with Helvetas Cameroon support during this time. One of the aspects that was also taken into account was catchment protection, as a means to sustain the durability of the implemented water schemes. It is based on this reasoning that Helvetas Cameroon has since 1993 supported and financed catchment protection as well as micro-watershed management mostly in the North West Province (NWP).

The overall goal of the water catchment protection is the conservation and regeneration of entire catchment areas and their drainage systems, through different physical and vegetative measures.

1.3. Objectives

The objective of the present study is to collect the catchment protection related data, information, best practises and experiences of Helvetas Cameroon during the last 10 years and to make these available, serving for the future elaboration of a manual "Best practises in catchment protection".

The expected results of this study were:

- Helvetas Cameroon experiences in catchment protection are compiled and summarised;
- Best practises and experiences are documented;
- Recommendations for a future strategy for supporting catchment protection activities are formulated;
- Catchment protection related information produced by Helvetas Cameroon (brochures, reports, manuals) is listed.

1.4. Set up of the project

Mr Jaap van der Waarde carried out the project with technical assistance from Mr Humprey Tah, an independent Bamenda based consultant who had worked for Helvetas Cameroon in water catchment protection since 1993. The project consisted of the following activities:

- Assessment of catchment protection related documents at Helvetas Cameroon;
- Field visits of a limited number of catchment areas where Helvetas Cameroon has been or still is giving support;
- Sum up of findings in a written report;
- Presentation of the report to Helvetas Cameroon;
- Finalisation of the report.

1.5. Reader

In chapter 1 the background of the study and the objectives are explained. In chapter 2 the performed activities are described. In chapter 3 the results of the literature study are summarised. In chapter 4 the main finding from the field visits are described. In chapter 5 the results are discussed, followed by conclusions and recommendations in chapters 6 and 7. All cited literature is listed in chapter 8, documentation produced by Helvetas Cameroon is marked.

2. ACTIVITIES

2.1. Literature study

The library of Helvetas Cameroon was searched for documentation related to water catchment protection. A selection of documents was reviewed for this report. The project administration of all recent water catchment projects at Helvetas Cameroon was reviewed. If documentation regarding a specific project could not be retrieved, Mr Humphrey Tah was asked to supply the knowledge he had of the project.

2.2. Field visit

Field visits were made to a limited number of catchment areas. These catchments were selected in collaboration with Helvetas Cameroon. In all selected sites Helvetas Cameroon has been working relatively short (1-3 years) in water catchment protection. Therefore the Bambui watershed was added as an example of an 'old' watershed, Helvetas Cameroon started working here on catchment protection in 1994. A letter was sent to the mayor and to the chairman of the water management committee (WMC) to inform the people involved and to organise a meeting at a proposed date. People invited included the mayor or his representative, the chairman, secretary and treasurer of the WMC, the caretakers, a representative from the village development association and the councillor for natural resource management.

The following sites were visited.

Batibo Rural council: Guzang watershed (27/9/2004).

Jakiri rural council: Wainamah (29/9/2004).

Jakiri rural council: Noi (29/9/2004).

Kumbo rural council: Mah, Kishong, Kovifem (30/9/2004).

Kumbo urban council: Njingalai (Tobin) (30/9/2004).

Tubah rural council: Bambui (5/10/2004).

2.3. Presentation

A final presentation was made to Helvetas Cameroon on November 5th at the Helvetas Cameroon office in Bamenda.

2.4. Final report

The report was finalised taking into account the comments made to the concept report and comments made during the final presentation.

3. INTRODUCTION INTO WATER CATCHMENT AREA PROTECTION

Threats to water catchment areas

The area that supplies the water to any given well is called the watershed or catchment area. The term watershed or river basin is generally used to describe the valley or series of valleys that feed a stream or river. The term catchment area is used to describe the area immediately upstream from a source or well. When talking of catchment protection of water sources in the NWP, usually this implies protective measures in a restricted area of one to several hectares surrounding the well or water source. Human activities in the area upstream from a spring or water well may affect the quantity and quality of the water that is obtained. Felling of trees in the catchment area may lead to increased evaporation of water from the soil and loss of ground cover, leading to erosion. The same effect may be observed as a result of bush fire, the seasonal burning of the ground cover to improve grazing conditions for cattle. This has a negative impact on the water buffering capacity of the catchment, leading to water shortage in the dry season. Run off from soil will also effect the water quality negatively. Farming in the direct vicinity of the source may

also lead to contamination of the source with silt, nutrients and agro chemicals used in farming. Grazing of cattle may lead to contamination of the water with diseases while nutrients from the urine and manure will affect water quality negatively as well. Human activities like washing in the stream or construction of latrines upstream of a water intake point or source may also affect water quality. These effects are most evident in the direct vicinity of the source, but human activities at a larger distance upstream from the dam or source may also affect water quantity and water quality in the long term.

Water catchment protection

Several measures are routinely proposed by Helvetas Cameroon to protect catchment areas and allow sustainable water production. These measures include organisational and physical activities. Two types of catchment areas are distinguished: spring protection, if the water intake is at the spring, or river bank protection, if water intake is from a river or stream.

In general a participatory approach is followed, where the local population is trained and empowered to manage their own water catchment area. In a typical case, the ownership of the catchment area is obtained by a local WMC that employs caretakers to manage the catchment area. The area is clearly demarcated and fenced with barbed wire to keep cattle out. A life fence is planted to create a permanent and sustainable protection of the area against cattle and bush fires. Fire tracing against bush fire can also be applied. Indirectly, catchment protection is facilitated by introducing income generating activities for graziers and farmers with the aim to prevent them from entering the catchment areas. The local population who has been sensitised on the topic is then supposed to manage the catchment area in collaboration with the WMC at their own time and expense.

Manuals on water catchment protection

Several manuals have been produced that include sections on water catchment protection in the NWP, one in 1999 by the local consultancy BOTA in collaboration with Helvetas Cameroon [1] and one in 2002 by the Dutch development organisation SNV [2]. The Draft water management committee reference manual for rural communities in Cameroon [1] gives a very graphic explanation of the do's and do not's in the catchment area. Do fence and do plant trees, do not farm, graze, burn, spray chemicals, build toilets or hunt in the catchment area. A difference is made between immediate catchment (30 meters from source) and enlarged catchment area (100 meter from source).

The Water maintenance manual for rural councils [2] has roughly the same content and purpose as [1]. The immediate and extended catchment areas are defined by a 50 and 300 meter radius from the well respectively. The same do's and do not's are suggested as by [1]. The manual [2] is laminated to allow use under field conditions and contains formats for various documents to be used by the WMCs.

3.1. Activities Helvetas Cameroon

One of the first written reports on Helvetas Cameroon activities in the field of catchment protection is a seminar on water catchment protection in 1993 in Bamenda. The invitation document gives a wealth of technical/scientific information about the water cycle and introduces measures for catchment protection [3]. The 50-meter and 300 meter demarcation for immediate and extended protection zone are mentioned. Especially grasses are promoted for catchment area protection. The document concludes with formats for monitoring reports. During the seminar the point is made that water catchment should be the responsibility of the newly formed water management boards [4].

A report in 1994 by Helvetas Cameroon describes an assessment of a situation in the Bambui watershed [5]. After an extensive interview program with local farmers, a clear socio-economic analysis of the problem is presented and a strategy is proposed. This strategy is centred around including different farmers groups, who appear to be endangering the catchment area, in the

watershed committee. Helvetas Cameroon assumes the role of surveying the improved farming systems. A proposal is made that encompasses many aspects: regulation of land ownership, training of farmers in good farming practises, establishment of tree nurseries, protection zones of water catchment areas, division of land rights among users and planning of land use. This program is implemented at a great pace and 4 months later significant progress is reported [6]. Tree nurseries have been set up, farmers have been trained, collaboration between farmers (Bambui farmers) and graziers (Fulani) in the watershed committee is successful and trespassers of made agreements are prosecuted. The system of land use rights has been agreed on and needs to be implemented. Especially one group of young farmers is very active in implementing and supporting the project. However, one group of farmers (Babanki) do not collaborate which jeopardises the whole project. The input from Helvetas Cameroon appears to have been significant: financial contribution towards materials like raincoats, shovels, new water supply points, project housing, transport (horses), tree nurseries and (almost full time) technical assistance.

The same report describes the situation in the Guzang watershed [6]. A presidential decree has forbidden any grazing in the area and 14 farmers were forced out of the watershed. The watershed was especially threatened by illegal grazing by local farmers with little knowledge of cattle breeding. It is proposed by the author to reforestate only part of the area, plant the rest of the area with grass and allow some controlled cattle breeding. In this way protection of the catchment can be achieved without losing the support of the local farmers who need to execute the project.

A technical report by a student in tropical agriculture who worked in the Bambui project describes technical problems with the nursery occurred during the project and gives practical tips for tree nursery management [7].

Workshops on sensitisation against bushfires were held by Helvetas Cameroon in 2001 in the Kumbo area [8]. In general, the people appeared to be very aware of the problem of bush fire and know the main causes and solutions. Graziers burn the grass to improve grass growth after the dry season, hunters burn the grass to get a better chance at hunting animals while to a lesser extent farmers can cause burning or people set fire to a catchment as a means of revenge. Since most graziers are Fulani people, sensitisation should also include them. Proposed solutions against bush fire are technical (fire tracing), social (sensitisation of farmers, Fulani and even whole communities) and organisational (arresting defaulters, or performing traditional rites against them). It is even suggested that Helvetas Cameroon should organise and pay for guards around the catchment areas.

Since land ownership was a reoccurring theme in water catchment protection, Helvetas Cameroon supported a project carried out by legal professionals into land tenure systems [9]. Three workshops were held in Wum (Menchum and Boyo divisions), Kumbo (Bui and Donga/Mantung divisions) and Batibo (Ngoketunjia and Momo divisions) respectively. The workshops were held with involvement of the traditional councils, water management committees, landlords and Fulani ardors, councillors, mayors and on one occasion the regional parliamentarian. One main conclusion from these workshops was that although there appears to be sufficient legal basis to allow proper protection of water catchment areas, insufficient knowledge of these rules results in improper protection of water catchment or conflict. Conflict over land is common in the NWP, and water catchment areas also incite small conflicts among stakeholders. The document summarises relevant legal information about water catchment protection to facilitate protection. A WMC is legally installed with the consent from

- The local administration, represented by the Divisional Officer;
- The local council, represented by the Mayor,
- The inhabitants of the community.

The WMC has a legal status that allows it to own and dispose of land. There are several laws dealing with land ownership in Cameroon that are relevant to the WMCs. One especially important law (96/12) allows a community to reserve land for the general interest, e.g. water

catchment. The user/owner of the land however should receive some form of compensation. In case of conflict a so-called Land Consultative Board (LCB) is installed. Obstruction of the LCB ruling is subject to legal punishment. It is suggested by the authors that Helvetas Cameroon should only work with WMCs that have acquired land certificates for the catchment areas, or help these WMCs in obtaining these documents.

In 2001 a logical framework is presented as baseline for work in catchment protection [10]. This logical framework sums up all activities done by Helvetas Cameroon in a routine approach and the expected results when starting a new catchment protection project.

In the Kumbo local council area this logical framework was implemented in 2001 in a total of 16 catchments. After one year the projects were evaluated. In all but one projects the activities were performed according to plan and positive results (increased quality and quantity of water) were observed. In one project political rivalry resulted in sabotage of the project. Less financial input from Helvetas Cameroon and more input from the local community (materials) and the council (punishment of offenders) is proposed [10].

The Nseh-Takov project that started in 1994 was evaluated in 2001. The project failed in first instance because the farmers revolted against the project, presumably because of the top to bottom approach that was followed (direct orders via the Fon). A few years later a new participatory approach was more successful and the watershed was effectively protected with the collaboration of the farmers involved.

The Chomba project, started in 1998, appears to be successful also thanks to the introduction of alternative farming methods (pig and hen production) to the farmers involved.

In the Kai-Momo project, started in 1998, success was reported in 2001. Farmers were allowed into the catchment area as long as strict good farming methods were applied, improving living standards and nutritional values for the farmers.

The Akum project, started in 1997, is reported successful with a protected watershed and clean water. Again the living standards of people have been increased by improved or new (beekeeping) farming methods [10].

The Pinyin project, started in 1999, is also reported as successful with a protected watershed and improved living standards for the people thanks to better or new farming practises.

Other activities in 2001 included bush fire sensitisation meetings with the Kumbo and Ndu councils, a children's theatre for environmental education and training of farmers in improved vegetable farming methods [10]. The bush fire sensitisation meetings helped towards a better understanding with the population why bush fires should be prevented in catchment areas. It appears from [10] that in most catchment areas no bush fires are reported, but that some catchment areas are regularly burned. The children's theatre performances were seen by many (several thousand) people in different villages. The children liked the activities but not all teachers were motivated. In most schools environmental clubs had sprung up after the project and several schools had tree nurseries or flowerbeds installed at school. However it often proved difficult to maintain these initiatives since materials were lacking or stolen and school gardens were destroyed by animals or rain. Furthermore the project should have been performed in only one or a limited number of places and for several consecutive years instead of a one-off event in several places [10].

The training on improved farming methods aimed at increasing crop production by farmers at their home farms while persuading them to stay out of catchment areas. The training was successful and the farmers indeed learned a lot about farming crops but no mention is made about the effect on catchment protection in the areas the farmers came from [10].

Early 2003 a three-year review is presented on Helvetas Cameroon activities in water catchment [11].

The Akum project is still successful; activities include training of caretakers, planting of trees, improved agriculture and agro forestry trainings and introduction of beekeeping. Technical problems were diseases in the trees planted and stolen beehives.

The Nseh-Takov project is still successful. Trainings for caretakers, improved agriculture and bee keeping have been given. It is suggested that community based organisations (CBOs) should be strengthened so they can implement the conservation activities themselves.

The Chomba project is successful. Caretakers have been trained, fencing planted, trees and vetiver slips planted. Active participation of a local specialist and the Fon helped the project.

The Kai-Momo project was successful in getting constant water supply and introduction of beekeeping and vegetable farming. But caretakers expected payment from Helvetas Cameroon and cattle still came into the catchment.

The Pinyin project is successful. Caretakers have been trained, bee keeping is introduced and the Fulani now use fodder banks. Some technical problems with poor growth of plants are observed.

The Belo project faced problems. Villagers still washed their clothes in the water although an alternative was given, the WMC wanted money from Helvetas Cameroon and the caretakers only wanted to perform their tasks in return for cash. The farmers however use better farming methods. It is not stated what the status of the water supply is.

The Kesu project has not picked up yet. The area has not been demarcated and bush fire remains a threat. Furthermore bee keeping training has not had a multiplier effect and the WMC does not pay the caretakers. Much work still needs to be done but Helvetas Cameroon has stopped financial contribution. So far the community did not meet the required kind contribution and above all, the water supply project became too expensive for Helvetas to support financially.

The Nsei-Bamessing project is successful, good quality water is flowing all year, the catchment is respected and beekeeping and fodder banks have been introduced successfully. Apparently the Bamessing Development Association delays the decision taking process of the WMC, this could be improved.

The Kumbo watershed project was not quite successful. The Kumbo water authorities set the goals of the project too high according to Helvetas Cameroon and the latter pulled out of the project. Also the project area is too large for the few local managers.

The Sehn-Wowo project was initially successful. Caretakers are trained, the catchment area is reserved, life fence and trees planted, bee keeping and fodder plots introduced. However bush fire may not be completely under control and dispute with the Fon about land use resulted in Helvetas Cameroon stopping the program.

The Gadiwalla project appears to be successful. Caretakers were trained, life fences erected, trees planted and fodder plots introduced. Conflicts in the area have prevented Helvetas Cameroon from monitoring the project, but the catchment appeared to be OK.

The Ngwah project catchments were protected with life fencing, no more bush fires were reported and water is flowing. Caretakers received only training on the job (no formal training).

The Kedjom-Ketinguh projects was successful, the catchments are fenced, trees and Vetiver planted. The Fulani who were initially ignored made their own way into the project.

The Kikai-Kom project was successful. Caretakers were trained, catchment protected with fencing, no bush fires occurred and there was no water shortage.

With the Kumbo urban and rural councils catchment protection was achieved in a total of 10 villages. All cases were a success with marked improvement in water quantity in many villages. Part of the success was due to the joint collaboration between the WMCs and the councils, including monthly meetings at the Kumbo urban council.

Several training sessions were held in addition to the site-specific training programs to support the water catchment protection program. Inter village training sessions were held to stimulate knowledge exchange and capacity building of WMCs and caretakers. It appeared difficult to measure the result of these workshops. The only measurable effect was the extent of implementation of work plans agreed during the workshops. Roughly 25% of the villages implemented these plans completely, 50% partly and 25% not at all. The workshops were too spread out over a large region to allow proper monitoring, also the villagers liked to be trained by Helvetas Cameroon rather than a local NGO.

The workshops on improved farming methods had better results. Most farmers implemented the knowledge obtained and disseminated this knowledge among fellow farmers. Impact on catchment protection however is not mentioned.

Workshops on land tenure systems were partly successful. For Helvetas Cameroon acquisition of a land title through involvement of the LCB has become a prerequisite for any water catchment protection project and a draft manual describing the legal background of land ownership and use was produced. The impact for the local communities/WMCs is unclear. This draft manual remained only at the level of Helvetas office, in just a single copy, and it is not clear whether the manual has reached the target groups.

A recommendation is made that project supervisors should be locally qualified and well-experienced people working in the village/council and that their contract with the beneficiaries should be very clear to avoid duplication of work [11].

In 2003 the strategy of Helvetas Cameroon further shifted from the hands-on involvement in water catchment protection activities to a more facilitating role, focussing on organisational aspects. The councils, senior divisional officers, and governmental organisations dealing with land issues became focus of attention, in line with the priority given to the acquisition of land titles for the WMCs in water catchment areas. The actual implementation of water catchment protection activities was steered towards the local WMCs and supervised and supported by an externally hired consultant.

The activities were focussed on 4 councils (Kumbo-urban, Kumbo-rural, Jakiri-rural and Batibo) and consisted mainly of consultancy to empower the councils to effectively manage the water catchment areas [12].

Kumbo urban: Kikai-Kom. A total of five catchment areas have been protected in the past. Most catchments were not well maintained, with the fences degrading. Only one, Tasha, was well maintained. It was suggested to allocate budget for each catchment individually and provide motivation for the caretakers.

Kumbo-urban: Kitiwum. The catchment is well protected, mainly thanks to the chairman and his caretakers. Some controlled farming was allowed inside the protected catchment to provide some motivation for the caretakers. It is considered a success.

Kumbo-urban: Tobin (Njingali catchment). This is a new project, demarcation and fencing was installed, a WMC installed. A new element is a bracken elimination pilot, not aimed at catchment protection directly but at improving grazing conditions adjacent to the catchment area. The main problem is management of the project by the council. The responsible people do not pay sufficient attention and payment to the supervisor is irregular.

Kumbo-rural: Kishong, Mah, Kovifem. The whole 'standard' range of activities was implied to install these catchments: sensitisation of the local community, demarcation, life and dead fencing, fire tracing, installation of tree nursery and pasture improvement for the graziers. Again, only a few people (caretaker) do most of the work and their payment is irregular. Better organisation of his payment is needed, or the community should be better involved to share the workload.

Batibo-rural: Guzang. The watershed is extremely large (115 ha) causing some difficulties. The fencing is not completed and the graziers do not collaborate. Again the caretaker is not paid regularly. The local population and the mayor support the project very well.

Jakiri-rural: Wainamah (3 areas) and Noi (3 areas). The Fulani community was sensitised, all catchments demarcated and survey beacons planted by the LCBs. In most catchment areas life and dead fencing was successfully installed, some nurseries set up. Problems occurred with poor growth of the seedlings in one place, slow pace in fire tracing and poor quality barbed wire fencing in one place. Again, the caretakers do most of the work with very little involvement of the communities. The Fulani appear to be collaborating although 'accidents' do occur. Payment of the caretakers is irregular [12].

In 2003 the financial management of the projects was laid in the hands of the councils, while funds were channelled through separate project bank accounts. Training sessions were held on catchment protection (2), improved agriculture and livestock production (1) and pasture

improvement (3). Six communities managed to legalise 12 catchment as protected zone with the LCB. Less success was sometimes obtained in implementing income generating activities, including all parties involved (Fulanis), strength of fencing (cows break through) and monitoring (no information on plant production). In general the approach to hand over the organisation and financial management of water catchment activities to the local councils worked well. Some weak points observed were:

- Distrust between villages and council over ownership land titles;
- Councils overloaded with work can not manage their tasks;
- Councils not competent for the tasks cannot implement the work [13].

It was concluded that in most cases, the mayor and the caretakers are dedicated to the projects, whereas the rest of the community, including the councillors, are not. If these projects are to succeed in the long term, payments of the caretakers should be guaranteed and regularly paid. Further sensitisation of the caretakers and the community is needed [12].

Interviews were held by Helvetas Cameroon staff with the provincial delegate of MINEF, the provincial chief of lands, the delegate of MINPAT, the provincial chief for of service for local councils and with the agency chief of the council support fund FEICOM [14]. The conclusions of these visits are not known.

Several additional measures were taken in 2003: a school theatre project in Akeh, training sessions on improved farming in collaboration with the Presbyterian Rural Training Centre (PRTC) in Fonta, and a training on production of medicinal plants [13].

The teachers and pupils from the schools perceived the theatre workshop in Akeh as a success. Closer collaboration between the schools and the WMCs was envisaged. At least, many young people were told about the importance of water catchment protection and the children informed the community as a whole through theatre plays. It was intended to erect environmental clubs at the schools. However no fixed plans were made and no monitoring results are known [15].

A manual was produced on the production of medicinal plants in catchment areas [16]. Actually this manual contains information on the potential herbal remedies against a range of tropical diseases, dosages for treatment and recipes for herbal medicines. It is unclear whether this manual has reached the target groups.

3.2. Overview of catchment protection projects by Helvetas Cameroon

In Table 1 an overview is given of all sites where involvement of Helvetas Cameroon in catchment protection has been reported. Locations with the starting year <1999 have been mentioned in [10] in a survey of bush fire occurrence. The final year is the year that Helvetas Cameroon stopped the contribution. **In bold:** locations where Helvetas Cameroon was still actively involved in water catchment protection in 2003. Locations include locations with catchment protection and/or watershed protection.

Table 1. Helvetas Cameroon involvement in catchment protection in the NWP.

Subdivision	Village	Number of catchments	Starting year	Final year
Fundong	Akeh	3		
Babessi	Babessi	2	< 1999	
Belo	Baingo	2		
Balikumbat	Balikumbat	1	< 1999	
Tubah	Bambili	2	< 1999	
	Bambui		1994	
	Bamengwah (I)	1	2000	
	Bamengwah (II)	1	2000	
Ndop	Bamunka	1	< 1999	

Deleted: ?

Deleted: ?

Kumbo	Banten			
Belo	Belo	1	< 1994	2002
Andek	Bonatu	1	< 1999	
Santa	Buchi	1	< 1999	
Bamenda	Chomba	1	1998	2002
	Chuku (I)	1	2000	
	Chuku (II)	1	2000	
Njinikom	Fuanantui	3		
Santa	Gadiwalla	1	< 1999	
Batibo	Guzang	2	1994	
Mbengwi	Kai	2	< 1999	2002
Kumbo	Kai	3	< 1999	2002
Santa	Kapcho-Akum	1	< 1999	2002
Tubah	Kedjom-Ketinguh	2	< 1999	
Wum	Kesu	1	< 1999	
Kumbo	Kikai-Kelaki	1	< 1999	2002
Kumbo	Kikai-kom	5	< 1999	
Kumbo	Kishong	1		
Kumbo	Kitiwum	1	< 1999	
Kumbo	Kovifem	1		
Nkor	Lassin	1	< 1999	
Tubah	Leide	1	< 1999	
Wum	Magha	1	< 1999	
Kumbo	Mah	1		
Kumbo	Mbuluf	1	< 1999	2002
Nkor	Mee	1	< 1999	
Kumbo	Melim	2	< 1999	2002
Kumbo	Meluf	3	< 1999	2002
Misaje	Misaje	1	< 1999	
Wum	Naikom	1	< 1999	
Wum	Ndakwe	1	< 1999	
Ndu	Ndu	20	< 1999	
Misaje	Ndumbu	1	< 1999	
Bamenda	Ndzah	1	< 1999	
Kumbo	Ndzenshwai	1	< 1999	2002
Fundong	Ngwah	3	< 1999	
Kumbo	Njavnyuy	1	< 1999	2002
Bamenda	Nkwen	1	< 1999	
Jakiri	Noi	2	< 1999	
Kumbo	Nseh-Takov	1	1994	2002
Ndop	Nsei-Bamessing	1	< 1999	2001
Santa	Ntamandam-Akum	1	1997	2002
Mbengwi	Nyen-Mbewi	1	< 1999	
Santa	Pinyin	1	1999	2002
Tubah	Sabga	1	< 1999	
Ndu	Sehn/Wowo	2	< 1999	
Kumbo	Tadu	3	< 1999	2002

Deleted: ?

Deleted: ?

Andek	Teze	1	< 1999	
	Tihkebeng	1	2000	
Kumbo	Tobin	1	2003	
Wum	Upkwa	1	< 1999	
Jakiri	Wainamah	3	< 1999	
	Wainchia (II)	1	2000	

3.3. Overview of methods applied by Helvetas Cameroon in catchment protection

The following activities have been described in reports as part of catchment protection performed or supported by Helvetas. This list may not be complete as not all activities may have been reported or not all literature may have been retrieved.

Sensitisation

Sensitisation meetings on catchment protection
Sensitisation meetings on bush fire
Theatre plays at schools

Organisation

Set up of water management board
Support WMCs in obtaining land rights
Training of caretakers
Manual for WMCs

Implementation

Demarcation of catchment area
Planting of survey beacons
Life-dead fencing of catchment area
Planting of Vetiver to reduce erosion
Planting of fire resistant plant species
Eradication of *Eucalyptus/cypress* species
Training + set up tree nurseries

Income generation

Planting of trees/agro forestry
Training + introduce bee keeping
Training + introduce pig or poultry farming
Training improved farming methods
Introduction of fodder banks as alternative to cattle grazing in catchment
Signing of agreement for farming in catchment area under strict conditions
Removal of bracken fern
Manual on medicinal plants

Monitoring

Amount of silt in water well
Occurrence of bush fires
Growth of life fences
Grass cover in catchment area
Dead fencing intact
Water supply in dry season
Turbidity of water
Type of farming activities in catchment area
Detailed report of activities to the council

4. FIELD VISITS

4.1. Introduction

In all field visits the response was very good, usually between 10 and 20 persons attended the meetings. The meetings started with a visit to the catchment with a limited number of people (usually the caretakers) followed by a discussion back in the village with a larger audience. The visits were appreciated by the participants in all cases.

4.2. Batibo Rural council: Guzang watershed

Participants

Asanji Godfrey (Formerly trained treeplanter but now chairperson of the WMC), Dan Nji, (secretary), Elizabeth Ngwa, (treasurer), Henry Fongo (caretaker/treeplanter), Mbah Cletus, Mbah Vincent, Ngo John (council trained tree planter), Akeh Denise (councillor in charge of hygiene).

Site description

The site is a large area with water intake from a little stream. The catchment above the intake is about 114 hectares. The catchment is open space with natural grassland. Thanks to a presidential decree dating 1974, no housing is present in the catchment area.

Present status catchment protection

The intake area covers 500 meters from the dam upward and 50 meters away from the stream line on both sides of the banks up to 500 meters.

The area is protected through forestation, planting of fodder banks and a ditch to divert storm water. The forest is quite old and no new planting was visible in the immediate catchment. The fodder banks line the forest and a width of approximately 30 meters. There is a small nursery for fodder grass (*Guatemala* grass) next to the water intake point. The grass is used by so called 'zero grazing' farmers, farmers in the village that keep their cattle in the stable. The storm water ditch is situated at a distance of approximately 50 meters from the stream and lines the stream right up to over 500 meters. The extended or enlarged catchment area is not used for any activities. Attempts are made to protect the borders of the larger catchment area. In parts, barbed wire is in place, but in many places this is absent or destroyed by farmers who encroach into the catchment. It was said that almost the whole area had been lined with life fencing. These trees however could not be found because the grass was too high (2 meters). It must be feared that the trees have died under this grass. In some parts neighbouring farmers have been given permission by the council to manage a row of life fencing in the catchment in return for permission to farm 4 rows of crops inside the catchment. These trees were still growing. However, all farmers have gone beyond the maximum of 4 rows of crops (typically several dozens of rows) and many of the plots do not have trees. Also the farmers grow crops that were not allowed and it is feared that they use pesticides (tomatoes) or involve tilling of the earth (cassava) leading to silting of the stream and water intake. The plant beds are not continuous, as opposed to the agreement, and have paths leading down the slope, resulting in silt run off and contamination of the river. Farming is increasing in the catchment according to the WMC. Bush fire and cattle encroachment of the catchment is still occurring very frequent, except in the intake area.

Evaluation

The collaboration with Helvetas Cameroon had a bad start when Helvetas Cameroon advised planting of *Eucalyptus* and later came back to this point and advised to remove all *Eucalyptus*. This was 30 years ago but is still remembered by all present. The whole range of activities like sensitisation of the population, training of caretakers, life and dead fencing and agro forestry were seen as essential to the undertaking. Several problems exist according to the participants.

The caretaker died not long ago. His assistant, now fully employed by the WMC, has not received salary (15000 CFA/month) for 4 months. A new assistant caretaker is unwilling to start a training on the job if there is no payment (5000 CFA/month). The WMC has financial problems. The income of the WMC is 3000 CFA/public tap per year, equalling roughly 50 CFA/family/year. People are unwilling to pay this money and the WMC now blocks the tap of debtors. The WMC manages 98 public taps, bringing an income of 300.000 CFA/year. The water filters at the intake get clogged with sand and earth because of the farming activities in the watershed. Cleaning and replacing sand filters costs the WMC approximately 1.000.000 CFA/year. Plumbing of the water system is done by the chairman of the WMC at no charge. There is no money left for water catchment protection. The caretaker only works on the water system and is not involved in water catchment protection.

The council has tried to involve stray cows herdsman in catchment protection but they fail to show up at meetings. These herdsman are not entitled to the *Guatemala* grass.

The council owns the land of the catchment area. The mayor has invited farmers to farm in the catchment under conditions (see above). The farmers do not obey these rules and the council does not enforce them. The WMC does not feel authorised to enforce the rules. The council wants to adopt a strategy to allow farmers to farm and plant trees, and as the trees grow, the farmers shift lower into the valley, until the whole valley is forested. The WMC does not believe in this strategy and wants to start full protection at the source, and then gradually work their way down the valley until the valley is forested.

The council received money from Helvetas Cameroon to plant trees in the catchment. The WMC is not involved in these activities. Villagers see paid council workers planting trees in the catchment, an activity they are supposed to do for free for the WMC. Villagers therefore request payment from the WMC so no participatory work is done in the catchment. The chairman did receive raffia seedlings from the mayor which he is planting in the catchment. The chairman of the WMC does most of the work himself (several days/week) with no payment. Reimbursement of material costs were denied to him by the general meeting of the WMC since villagers want to spend money only on sand filter replacement.

Suggestion by participants

The councillor (John Ngo) has been trained by Helvetas Cameroon but would appreciate technical back stopping by Helvetas Cameroon. This is not because of lack of knowledge but "If an expert says something in the village it has more impact than when I say it".

The *Guatemala* grass is not touched by the stray cow herdsman, since they know it has economical value and does not belong to them. A life fencing of *Guatemala* grass might keep them therefore out of the catchment, possibly better than dead or life fencing which has no economic value to the herdsman.

Plant seeds directly in the catchment after a bushfire, the plants might not need nursing and have a competitive advantage.

The mayors of the different villages should talk to each other to agree to keep herdsman at their own grazing fields.

Place the nursery next to or in the catchment, so the plants are acclimatised to the area and no transport costs are needed for the seedlings.

4.3. Jakiri rural council: Wainamah

Participants

Nformi (chairperson, Mbibah Ndzewir (chairperson, Ngwatang network), Oliver Shey (caretaker/tree planter), Julius Fonjoh (caretaker/tree planter), Emmanuel Sinyuy (president village development association), Evaristus Ndzelagha (treasurer), Ngah Peter (secretary) and Boniface Sevidzem (councillor NRM).

Site description

Wainamah has three catchment areas, one close to the village (500 meters) and two further and higher on the hill (3 km away). The lowest catchment is cut off from grazing ground by the ring road. The two higher catchment areas are both in grazing land.

Present status catchment protection

The lowest catchment (A) is well protected. The dead fence is intact and of good quality. The life fencing grows well and seems to be effective in only a few (2) years. There are no problems with this catchment.

Catchment B is surrounded on all sides by grazing lands. The dead fencing is of good quality in most places but at some places the wire is down and cows break through occasionally. In some places the soil is rocky and only grass will grow, life fencing is not growing well in these portions. In other portions life fencing is doing very well and already 2 meters high. The catchment gives good water all year round. The graziers living around the catchment do not help with protection and are suspected to purposely send cattle in or rather not preventing them from coming in.

Catchment C is on the same ridge as catchment B but sloping to a different valley. Around the source *Raffia* palm is present. These palm trees date from before the catchment protection and belong to a farmer who still taps palm wine here. The dead fencing is of good quality, life fencing seems to be growing. A row of *Vetiver* was planted inside the catchment along the fence at a point where run off water entered the catchment, a storm gutter was also dug to prevent storm water from entering.

Evaluation

The village tried catchment protection before but the Fulani herdsman did not respect these fences. After a new start the land title was obtained and the Fulani's were given a drinking trough for cattle and a stand tap for themselves. Getting the administration involved and obtaining the land title was crucial. Within this year, cows came in again and the council and Divisional Officer (DO) were contacted. They ordered the offender to come to the council but apparently the herdsman did not respond and it is unknown what happened next. This frustrated the people and took their trust from law enforcement.

The training of Helvetas Cameroon and advice on which plants to plant were important.

Twice a year the WMC call the villages for work in the catchment, each village quarter has a part of the catchment to work on. The WMC meets every month, each catchment has a WMC and one caretaker. The WMC charges 300 CFA/person /year for maintenance, the village has 3000 people. This should bring an income of approximately 750.000 (children do not pay). Last year 15.000 CFA was paid, this is 2% of the potential income. The three caretakers are not paid. The council monitors and supports the WMC when requested.

Suggestions by participants

The mayor should enforce the rules on trespassers.

Plant life fences around rocky areas, do not follow the demarcation line over rocky surfaces if poor growth is foreseen but plant inwards around the rocks.

4.4. Jakiri rural council: Noi

Participants

Usmanou Waisiy (chairperson), Yaro Fonkika (caretaker), Johnson (caretaker), including: treasurer, secretary, chairperson village development association, Boniface Sevidzem (councillor NRM) and cross section of the villagers (18 persons).

Site description

The site is composed of three catchments. Catchment A is relatively low on the hill at the entrance of the village. The catchment is enclosed on three sides by grazing land. At the bottom a farmer has a coffee plantation, in the catchment is a raffia bush tapped by a local who owns the trees dating from before the protection project.

Catchment B is higher up the hill above the village. Catchment C is at the far end of the village on a steep hill side. Catchment C is protected but not in production, it is an investment for future use.

Present status catchment protection

Catchment A is well protected. The vegetation in the catchment is clearly better developed than outside, with high grass, bushes and trees. The dead fencing was broken at one place. Life fencing picks up really well in most places. Fire tracing is very thorough, grass is removed up to the barren soil. A storm water gutter was dug. No problems with the catchment were reported, the graziers respect the catchment.

Catchment B was only an erosion infested field one year ago, now most erosion gutters have overgrown and the vegetation in the catchment looks much better than outside. The dead fencing is of good quality, life fencing picks up well. Two rows of life fencing are planted, plants are planted at high density. In some stages the life fencing is already sufficient, a good result after only 1 year. The local grazier is actively involved in the catchment protection and will show the caretaker repairs he has made on his own account.

Catchment C is very recently installed, the dead fencing is installed but life fencing still needs to be planted. The farming activities in this catchment have stopped.

Evaluation

Noi has only one but one very active and motivated caretaker. The man loves plants and tries any plant or tree he sees for planting in the catchments. He is able to motivate both the villagers and some of the graziers to work on the catchments. The villagers have all come out to extinguish a bushfire in Catchment A and they will work in the catchment when asked. The mayor is very supportive of the project and has settled problems with graziers when cows entered the catchment. The caretaker does not receive money, the villagers only pay an one off entrance fee (5000 for women, 10.000 for man) when their quarter is connected. Costs are still covered by the project money from Helvetas Cameroon.

The women mentioned they have learned from catchment protection and now also prevent erosion at their farms with storm gutters and vetiver planting. The income of the local health clinic has dropped last year with 300.000 CFA, almost exclusively due to less medication for water borne diseases.

The main concern of the villagers is that graziers will come into the catchments. There is also concern about potential negative effects of Raffia palms in the catchment on water quality.

Suggestions by participants

A trench for storm water diversion also keeps cattle away from the catchment and might be an effective cow barrier. The observed trenches were 0,5 meter wide and 0,5-1 meter deep. The education should be done slowly and repeatedly, just like the planting. A herbal zone will be introduced in the catchment to eventually raise money. A through could be installed/offered to the graziers to prevent future conflict. Training is needed to start with honey production.

4.5. Kumbo rural council: Kishong, Mah, Kovifem.*Participants*

Michael Yudzesi (overall chairperson), Yongs Michael (chairperson Mah), Godlove, Elias and Shey Ivo (caretakers/tree planters), Hilda Bongsisiy (treasurer), Secretary of the WMC, Councillor, including a cross section of villagers, especially women (9).

Site description

The site consists of three catchment, all on the same hill and next to each other. Catchment C is quite large (about 5 ha) and consists of grass. Catchment B and A are smaller (about 3 and 2 ha respectively) and have some trees in the centre. All catchments are completely surrounded by grazing land.

Present status catchment protection

Catchment C faces problems. The dead fencing is weak due to poor quality barbed wire and continuous attacks by cows, goats and horses. The fencing is broken in many places and fresh cattle traces are seen everywhere in the catchment. The planted trees were all lost last year when the catchment was, allegedly on purpose, burnt. Inside the catchment a well developed tree nursery is situated, this nursery is effectively protected against cattle by wood fencing. The villagers have placed both the dead fencing and life fencing outside the land beacons to increase the catchment by 1 meter on all sides. Vegetation inside the catchment is poor and similar to that outside the catchment. The caretakers visit the catchment every day to keep cattle out but not in the weekends. Every Saturday cattle is in catchment C.

Catchment B and A are much better developed, life fencing is planted 1 meter inside the dead fencing and is doing well. Catchment B and A do fine, in several years the life fencing can be good enough to be effective. A nearby 7 year old catchment (Kitiwum) has a very effective 3 meters high and 2 meters thick life fencing. The catchments have not been burnt and look good.

Evaluation

Catchment C causes frustration and anger with the villagers who blame the graziers for deliberately damaging the catchment. The graziers would only agree to the catchment after the council and Helvetas Cameroon were involved in the catchment. But still problems occur frequently including last years bush fire. Erosion is also a problem in catchment C, which is fought with Vetiver but not very effective. A storm water gutter would be much more effective against erosion and possibly cattle but this idea was not really supported by the WMC and caretakers. It was questioned whether it was legal to place the dead fencing outside the land beacons and might have alienated the graziers. According to the WMC and caretakers the graziers had to respect the catchment and placing the fencing outside the pillars was more a clever move than an offence.

The work is divided over the village quarters, each village has one caretaker. They seem to be doing most of the work now and are not paid. There is no charge yet for water since the water supply project is not completed yet. In the future a fee is envisaged of 300 and 500 CFA/year for women and man respectively which would bring an income of 1 million CFA/year. The costs are not known yet but might involve an expensive pump.

Suggestions by participants

Talk to the council before you start your catchment protection. Let the council do the talking to the graziers but involve community members. Obtain demarcation by the LCB. Allow costs of rain coats, boots and calculator or even horse (transport) in your cost estimate.

The other side of the story

A private visit was made to a Fulani family for a horse riding trip in the Kumbo area mid October. As it happened, these people appeared to be direct neighbours of Catchment C. The issue of water catchment protection was discussed. According to the Fulani people, the villagers tried to fence off Catchment C without their involvement and the catchment was far too large. Their Lamido intervened with the aid of the DO and a smaller catchment was agreed, the present catchment C. The catchment was burned last year, according to the Fulani family by hunters, certainly not by them. There were sheep in the catchment. According to the Fulani these sheep were from villagers in the next valley since the Fulani up there do not keep sheep. Catchment B was originally a little pristine forest, protected by the Fulani man living above it. Now it is a catchment for the villagers, the Fulani man can not use it for his own water any more and he does not have a private tap from it. The general picture according to the Fulani is that they try to protect forests in the valleys for water supply, but that villagers come up from the valleys trying to destroy the forests and make farm lands. The villagers see the Fulani as 'strangers' and feel that they have the right to take the land from the Fulanis. There is little respect for the Fulanis.

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4.6. Kumbo urban council: Tobin

Participants

Margeret Lukong (first deputy mayor), Miyeh Martin (chairperson), Fon Rose (treasurer), Kinga Donald (councillor for NRM).

Site description

The site is newly constructed and is situated high up in the hills above Tobin. There are two catchments, both created within grazing lands. Catchment A is about 6 ha, catchment B about 3 ha.

Present status catchment protection

The catchments were only realised last year. A robust and impressive dead barbed wire fencing is in place (poles every 30 cm) and live fencing has been planted recently. However, cattle (horses, cows, sheep) were seen grazing in both catchments. Part of the live fencing had been ripped out, obviously on purpose. Some of the trees that had been planted last year seemed to be dead. These were planted only in November (too late) because of a dispute between council and graziers. One grazier who led his cattle into the catchment last year was taken by gendarmes and brought to jail with the aid of the council and mayor. The WMC made one of the settlers/graziers member of the WMC which was appreciated by him. Apparently the grazier in the WMC reported the defaulting grazier to the police. The councillor has been trained by Helvetas Cameroon as a caretaker and has established a tree nursery next to the council.

Evaluation

The project was initiated by the council who proposed the idea to the village. Tobin is a quarter with mainly public servants and they embraced the idea. The project is on a second start. The first initiative, taken a few years ago, stranded because of obstruction by graziers who saw their land taken away without their involvement. A second start was taken with involvement of all stakeholders. One farmer has lost part of his farm land and several eucalyptus trees, other graziers lost grazing land. Two independent estimates have been made for compensation for these people. No compensation has been paid for one year now and the council is still looking for funds to support this compensation.

In the last year the village has been working for more than 40 Saturdays in the catchment, sometimes with more than 150 people at a time. The WMC consists of 14 persons and is very active, involved cultural and religious leaders in promoting activities. The WMC is split up in working groups to share responsibilities and work more efficient. Work has stopped now because

of two reasons. Firstly, there is no money to support the work by the villagers, e.g. fuel money to transport the tree seedlings and people. Secondly, the council has not yet secured the funds to pay for the material costs for the water intake and piping system. The trenches dug by the villagers are already falling into decay, which undermines the enthusiasm of the villagers to continue. The villagers have agreed to the fact that they will have to pay to be connected to the water system and a maintenance fee has been mentioned to them, but no amounts were proposed.

Suggestions by participants

Split your WMC up into different working groups, e.g. transport, food, finance and work plan, to be more efficient as a group and to divide the workload.

Split the catchment up in areas and make each quarter responsible for its part.

Define which part of your volunteers are really active and give them responsibility (working group).

Involve graziers in your WMC, they are the eyes and ears of the WMC up on the hill also in the weekend and evenings.

Think how you will organise your financial compensation before you start your project.

Prevent that the project is perceived as a political manoeuvre by the villagers, prevent a one party dominance in the initiative and leave politics out of it.

4.7. Tubah rural council: Bambui

Participants

Clement Angafor (chairperson), Romanus Bicheh (tree planters), Paul Akabah (tree planters), Anthony Nubong and Ngwana Peter (caretakers), Michael Abongwa (treasurer).

Site description

The site is a large watershed, originating from the Sabga hills. The original Helvetas Cameroon project worked on all areas of the watershed (graziers on top of the hills, villagers in the valleys, farmers in the watershed) but the Bambui WMC now works only on a stream intake. The watershed that is protected is more than 2 km long upstream of the water intake from the river.

Present status catchment protection

There are virtually no catchment protection measures in place at the moment. There is no live or dead fencing to shield the area from intruding cattle. No fire tracing is done. Farmers are not allowed to farm in a radius of 25 meter from the riverbed and even so only perennial crops that do not involve tilling (e.g. plantains, raffia, coffee) are allowed. However in many places coco yams were seen grown right next to the stream. A large raffia plantation is present in the catchment area which was seen as positive. Coffee was also grown but the use of pesticides was feared. Farmers that violate the rules are monitored and sometimes reported to the Fon. No further actions are taken. Further upstream from the intake many trees were found that had been planted 10 years ago at the start of the Helvetas Cameroon projects. A life fence had been cut down but most trees seemed to survive and doing well, including well developed *Prunus africana* woodlot. Down stream from the intake several Vetiver rows were present that served as a demonstration for erosion control for farmers in the catchment.

Evaluation

Three years ago a Helvetas Cameroon sponsored project ended which involved a separate water catchment protection committee. Trainings had been given on a range of topics, mainly focussed on improving agricultural practises and income generating activities.

Horizontal cropping (no gullies sloping down the hill) was successfully introduced. Beekeeping was less of a success, there were not enough beehives for all sponsored by Helvetas Cameroon,

and beehives were stolen from the catchment. Farmers moved their beehives closer to their farms to shorten walking distance and increase security of the hives. At this moment possibly only one beehive is present in the catchment on a secret location. The training sessions were usually benefiting the farmers involved but not per se the catchment. Some farmers that took the techniques to their own farms did not have farms in the catchment. Other farmers picked up growing poultry but not using manure for soil improvement. Agro forestry as a whole was a success. The trees serve now as a source of fuel wood and wood for fencing material or furniture. They provide also shade and fruit for the farmers. Trees as a means of soil improvement (nutrients) was not recognised and appreciated by the farmers. As for now, the ownership of the trees may cause problems. The trees were planted with support from Helvetas Cameroon under coordination of the watershed protection committee. After Helvetas Cameroon pulled out the committee stopped to exist and now the trees grow in an ownership vacuum. Next time trees will only be planted on land that was acquired as catchment area with a land title to provide income for the WMC. Nobody started harvesting the *Prunus africana* yet but when it happens it may cause tension in the community.

The WMC focuses all their attention on keeping the water treatment system running. This comes at a high cost due to the sand filtration step. No activities are taken considering watershed protection, in fact only during the meeting it became clear to the WMC that this was their responsibility too. There is no communication with the rural council regarding watershed protection. Owners of a private taps (currently 110 users) pay 50.000 or 100.000 CFA for installation of the tap and 4000 CFA/year for maintenance. Most (80%) pay their fees. Users of public taps are supposed to pay 100 CFA/month but almost nobody pays and there is no fee collection system. Caretakers are supposed to receive 12000 CFA/month but have had none for the last 7 months. They spend approximately 4 hours /week on keeping the water filter running and do not work in the catchment protection.

The town has changed dramatically in the last 10 years and the drinking water system is grossly underdimensioned now. Two research institutes (RTC Fonta and ERAD) have moved in, each with several hundred students. Also the seminary (200 nuns) came in, all using showers and WCs. These institutes usually pay a lump sum amount for maintenance which comes at a lower rate per tap than private taps in the villages.

Suggestions by participants

Have trespassers punished by the Fon and local jujus. This works better and is much cheaper than getting the gendarmes in (fuel money + envelop).

Water intake is very expensive due to the filters involved (sand needs to be bought from Menchum), Bambui now wants to investigate development of a spring water intake further upstream.

4.8. Presentation

A final presentation was made to Helvetas Cameroon on November 5th at the Helvetas Cameroon office in Bamenda.

5. DISCUSSION

The work sponsored by Helvetas Cameroon in the last 10 years shows a clear shift from very technical hands on assistance in the field to a more advisory role towards councils in organising these activities themselves. This evolution comes as a natural process where the organisation learns from results obtained in the field and feed back given by partners. In the present study this process is summarised again, where many lessons learned have already been incorporated into Helvetas Cameroon services and partners practises.

In general the approach of water catchment protection has been conceived by Helvetas Cameroon as a participatory approach. This approach was reviewed by Rhoades [17] and several

suggestions were made to improve the effectiveness of the approach. These could also be of interest for Helvetas Cameroon when reviewing the future activities in water catchment protection. Rhoades identifies 8 potential problems:

1. Scale problems. Not every one has interest in the same scale (e.g. council, province, tribal area, hydrological watershed etc.). This problem does not seem to be effecting watershed protection projects in the NWP, where catchment projects are generally of local scale only.
2. Participatory fetish. Mainly the strongest voices may be heard in the participatory approach, alienating weaker groups in the community from the project. This is a reality. Village development organisations may use water as a good means of getting in new projects and obtaining power. Graziers were never heard in the field visits and their interests were not really perceived by those present. Nobody knew what the financial damage to a grazier was if he had to abandon grazing field or give up farming land.
3. Social under design. The success of water catchment projects may depend more on social aspects than on technical aspects. This appeared to be true for most projects: graziers would frustrate spring catchment protection by damaging the catchment or allowing their cattle to damage fencing and foul the water source. Farmers encroach catchment areas irrespective of previous agreements. Technical aspects were never the main reason for problems or failure of catchment protection.
4. No learning. Indeed most villages were not aware of experiences in other villages with catchment protection. Helvetas Cameroon is taking this point seriously with this study, but it only includes catchment protection projects in the NWP of Cameroon. Also the instrument of the inter-village training needs to be explored further.
5. Great expectations. In several sites the expectations raised were indeed greater than could be achieved in a short time. In Mah people will only want to work for catchment protection if they have water, but this is dependent on an expensive pump that may never come. In Tobin people expect water this dry season but the council has not even the hint of money to pay for installation while impatient graziers waiting for their compensation delay the project further.
6. Tragedy of the commons. Nobody takes responsibility of the whole project, short term goals dominate the agenda. This could clearly be seen in Bambui, where catchment protection, after a successful start, was all together skipped of the agenda when the Helvetas Cameroon subsidy ran out. They now pay the price with frequent replacement of the sand filters, just like in Guzang.
7. Duplicating management structures. While nobody questioned the reasons for having a separate WMC, their role and responsibilities were sometimes not clear. Village development organisations took over tasks (fee collection) or clear duplication of tasks was seen (tree planting in Guzang by the council).
8. Too complicated. Sometimes the situation becomes too complex with too many actors. The situation in Bambui may move in this direction, where a handful of good willing volunteers are now supplying not only their own village but also two research institutes and a large missionary with water. Their consumption exceeds the availability whereas the demands set by these users may also become too much for a non-professional organisation.

These lessons are discussed below according to four fields: technical aspects, social aspects, organisational aspects and financials aspects.

Technical aspects. In general the technical approach advised by Helvetas Cameroon for catchment protection has worked well in the field and there are hardly any failures to be reported. Not every measure was equally successful in all sites, but they all found their uses in one or more places. This means that the technical approach as summarised in table 1 still applies

and can be further advocated as an effective set of control measures for catchment protection. A few new approaches were seen in this study:

Use of trenches to divert storm water and also deter cattle from entering catchments;

Plant seedlings in the catchment directly after bushfire;

Place the tree nursery directly in the catchment to adapt the plants and avoid transportation costs;

All these technical aspects should be documented in a simple and handy format to support the work of caretakers, WMCs, councils for work in the field and for training purposes.

Social aspects. It should be stressed that the picture given in this report may be one sided, since the farmers and the graziers that apparently played a major role in the success or failure of catchment protection were not present during the meetings. The participatory approach was appreciated in all sites that were visited. However, it was obvious that the users of the water had little idea or appreciation of the interests of the graziers. They were often seen as lazy people who were unwilling to cooperate. This applies equally to the villagers as to the council. The trespassing farmers were usually fellow villagers but there was little social control. The council should play a more initiating and facilitating role here. It is both more democratic and more effective to respect different interests.

Organisational aspects. The emphasis of obtaining land rights was stressed by all interviewed. Strong support for the WMC from the DO, mayor, Fon and other members of the establishment was seen as very important by most. This creates authority for the WMC and facilitates their work significantly. Enforcement of the rules is still a weak point and the councils should play a more dominant role. Also the Fon and the jujus could be brought in more often to deter trespassers. Bigger WMCs might be subdivided in workgroups to divide the workload. Village quarters each get their own part of the catchment to look after. A clear separation between tasks and responsibilities between the WMC and the council is needed. Sites where these roles were not clear caused confusion and delayed activities. If Helvetas Cameroon gives money to the council for catchment protection this should be harmonised with the WMCs by this council. Otherwise, duplication of work may occur, the authority of the WMC may be undermined and the willingness of the villagers to perform voluntary work may decrease.

In some places the participatory approach may simply not be the best solution. In Bambui for example a more professional approach will be needed to guarantee a continuous and high quality water supply for the growing demand from the village and present institutions. In small villages like Noi however, this approach works well and gives a good prospect even with a growing population. This forecasting should be done before any new water project is perceived.

Financial aspects. In almost none of the visited sites a sound financial basis for catchment protection was in place. Most caretakers work on voluntary basis and their fees are nil or irregular. A maintenance fee is only sometimes collected from users and almost never used for water catchment protection. Catchment protection is either still a remnant from previous Helvetas Cameroon projects or dependant on the good will and enthusiasms of a particular caretaker. Some WMCs do not even see it as their prime responsibility.

It is advised that a financial plan is made for all projects where catchment protection is foreseen. This business plan should budget for catchment protection costs and allowance for caretakers. Enthusiastic caretakers may take a project a long way, but when they step down the project may fall into a vacuum that is not easily filled. People may feel uncertain to replace someone who has done such a great job, or simply not be as keen. A more professional approach with a job description, selection process and a paid salary will be more sustainable.

The role of Helvetas is still seen as a potential funding source and a free source of technical advice and training. This undermines the willingness of councils to hire local consultants and slows down the process of making a sound financial basis for catchment protection. On the other hand Helvetas Cameroon seems to have pulled out quite suddenly from water catchment

protection by most participants. The councils are generally not capable of replacing that role. This means that continuous support to the councils is needed to design, implement and manage water catchment protection schemes. Helvetas could still give some direct input to the WMCs and communities, e.g. in the form of sensitisation meetings and training sessions. Helvetas should stimulate and train the councils to pick up the role of supporting the management of water catchment protection activities.

6. BEST PRACTISES

As a result of this study, the best practises in catchment protection in the NWP were identified. These best practises include activities performed by Helvetas Cameroon that worked well in the field, practises performed by actors in the field and also some proposed solutions to identified problems. The following best practises have been identified:

Site selection

Think carefully about the type, place and size of the catchment. Although this is part of the water supply plan, the possibilities in the long term for catchment protection should be carefully evaluated. Some places are simply less suitable for catchment protection. A river intake may seem the best option, but as water quality may be beyond control, a spring catchment may be a better option, even if it involves longer piping and higher costs in the beginning.

Choose the right size: small is beautiful. Too large catchments are difficult to manage and may also incite protest among the land users (farmers, graziers, and landlords).

Sensitisation

Sensitisation meetings on catchment protection should be performed in the area. Sensitisation is not a one off event as explained by some, but should be done gradually and repeatedly, just like growing of plants. The different main topic (water quality, bush fire, land use etc) could be different each time to generate a lasting support for catchment protection.

Involvement of all with an vested interest in the project (potential consumers, land users, council, DO, authorities and Fon). Religious institutions (churches) and village groups should be used for conveying sensitisation messages and passing information to the communities.

Build on respect for each other interest and take them seriously. A water scheme may not be equally beneficial to all involved. Get all interests clear and qualify and quantify them. All compensation matters should have been negotiated, agreed and budgeted before any construction works begins.

Organisation

Set up a water management committee. It may sometimes be a good idea to involve not only villagers but also graziers or farmers in the WMC. The set up and functioning of a WMC has been well documented [1, 2].

Obtaining the land title for the WMC and demarcate the area with land beacons. Sometimes the council may own the land title, but in general it is better that the WMC owns the land title to avoid any confusion about legal status, rights and duties.

Train the caretakers. In practise most of the practical work comes down to the caretaker, so they should be carefully selected. Ideally the caretaker shows initiative, is good at plant growing and has good social skills to motivate the community if needed. Clearly define the tasks, responsibilities and payment for the caretaker, before he is trained.

Training caretakers in tree nurseries. Tree nurseries are essential to the catchment and a proper set up and maintenance of tree nurseries should be learned.

Design, organise and implement a financial scheme for water supply and catchment protection, for instance: preparing a budget, sources of revenues and expenditures. The caretakers should receive salary for the work, this salary should be paid regularly, based on a contract and work

plan. Water is for free, a maintenance fee should be charged to all consumers. This fee should include budget to pay for catchment protection activities (barbed wire, seedlings, transport costs, salary caretaker).

Implementation

Demarcation of catchment area. Get the authorities involved in demarcation of the land.

Planting of survey beacons.

Dead fencing of catchment area. Place your dead fencing within the boundaries of the land beacons, do not exceed the allocated area. Place dead fencing poles at close distance (ideally less than 1 meter) in areas with a lot of cattle. Place barbed wire at close distance close to the ground in areas with goats. Use good quality barbed wire, it will cost more in the beginning but save a lot of caretakers time in repairs later. Add life *Ficus* or *Erythrina* cuttings as fence as they will grow and not rot away. Do not nail barbed wire into life poles since they may die as a result but tie instead.

Life fencing. Use plants and trees that you know will grow in the area they will be planted. Take altitude and soil type into account. Dare to experiment with different types of trees and plants. Plant at close distance (50 cm) and plant in two rows to add density to your life fence. Always plant in an earth ridge inside the barbed wire to prevent grazing of the seedlings by cattle. Do not plant on rocky areas that will not support plant growth, but deviate inwards around them otherwise you will always be fighting cattle with dead fence at these places.

If valuable trees are planted in the catchment (fruit, *Prunus africana*) make arrangements for who will later benefit from these trees (e.g. caretaker, WMC, farmers).

Planting of Vetiver to reduce erosion. Rows of Vetiver can be planted at places where surface water flow is expected to reduce erosion.

Planting of fire resistant plant species (*Agave sisallina* or Sisal hemp) or cattle resistant species (thorns) like *Caesalpinia* is recommended for life fencing generally in altitudes above 700 meters sea level.

Eradication of *Eucalyptus/Cypress* species in catchment. *Eucalyptus* has been reported to consume high amount of water, as it is also used to reclaim land. Also like *Cypress* they do not compete favourably with other plants.

Set up tree nurseries in or close to catchment area. This will ensure that the seedlings are adjusted to the local climate and altitude of growth, as well as prevents high transportation costs at the time of planting.

Income generation

Preventing farmers from encroaching into the catchment area by supplying them with alternative income generating activities is in general a good idea. The effectiveness of the approach may be different in places and expectations should not be too high. A catchment protection project should never rely on the success of income generating activities.

Several income generating activities have been successfully implemented, although almost never the direct impact on catchment protection was known:

Planting of trees/agro forestry. Trees will provide shadow, fuel wood, fencing poles, furniture wood and sometimes fruits and medicinal products. Spring catchments can be densely planted with tree shrubs, but in agricultural areas bordering rivers planting should be sparse to avoid too much interference with the farming activities. Make sure the ownership and user rights of these trees have been agreed properly. Typically it will take at least 10 years before trees yield economic products, by this time different people may be working in the farms and WMC and conflict may arise.

Training and introduction of bee keeping is generally a good idea. Several precautions should be taken. Beehives are expensive and the farmers who take the training should be willing and capable to invest in beehives. Theft of beehives has occurred before and precautions should be taken, e.g. do not place the hives in too isolated places or hide them well.

Training improved farming methods generally is a good idea, especially placing crop in horizontal rows on the slope of the hill. Introducing gardening has also worked well in some places, allowing higher production without the use of land. Also the training in poultry and pig farming is usually successful. However, be aware that the effects of these activities on catchment protection may be small.

Removal of bracken fern works well in grazing areas to get grass back where it has been overgrown by bracken fern. Many Fulani settlements now use the technique. This technique may create goodwill and extra grazing land for graziers who have to give up grazing land for catchment protection.

Management

Good management practises include:

Involve the village for regular work in the catchment, typically twice per year (fire tracing in October, planting of live fence and ditch to divert storm water in May).

Allocate a specific part of the catchment and fence to each village quarter, this induces a feeling of ownership, the work becomes clearly defined and sense of pride or competition may be incited.

Have regular contact with the council about the water project.

Enforce the rule on trespassers, e.g. people who light bushfire, farmers who encroach into the catchment or do not obey the agreed rules, graziers who let their cattle enter the catchment etc. Immediate action is better than a late response. Involve the mayor and/or the Fon in correcting the defaulting party. Successes have been obtained with jujus threatening farmers not to go in no-go areas, mayor talking to graziers to stay out of the catchment. Less success has been obtained with calling the gendarmes and locking people up but this always remains as a last resort if everything else fails.

Pace your activities to the need of the project and repeat activities like training sessions and sensitisation meetings. Catchment protection requires a continuous effort and knowledge exchange is essential to keep the population informed and motivated and to have sufficient qualified caretakers.

7. CONCLUSIONS

- There is a broad appreciation and acceptance of the technical approach by Helvetas Cameroon in catchment protection.
- Almost all technical measures advised by Helvetas Cameroon on water catchment protection are clear and work in the field.
- Best practises in water catchment protection have been summarised.
- Literature by Helvetas Cameroon on water catchment activities has been listed.
- Conflict of interest between water users and land users (graziers, farmers) undermines catchment protection activities in many places.
- The role separation between WMCs and councils is sometimes not clear leading to delay or duplication of work.
- A sound financial basis for catchment protection is absent in all visited catchment protection projects initiated by Helvetas Cameroon, leading to weakening or neglect of catchment protection activities, especially when external funding stops.
- Continuous support from Helvetas Cameroon for water catchment protection, via the councils, will strengthen what has already been achieved and prevent the failure of what has been initiated in water catchment protection in the NWP.

8. RECOMMENDATIONS

- Summarise all good practises in water catchment protection in a simple and clearly written document that can be used by the council workers, the WMC members, village based caretakers and the local service providers.
- Supply or support regular training sessions (for a modest fee) as refresher course, improve self confidence or keep up with natural turn over of caretakers.
- Harmonise activities towards councils and WMCs. Make sure that Helvetas Cameroon money stimulates and not hampers collaboration between the council, the WMC and the villages.
- Avoid 'false competition'. If services could be provided by local entrepreneurs, the council or the villagers themselves with sufficient (Helvetas Cameroon) training, Helvetas Cameroon should not provide the service for free. This should be made clear to all involved, to avoid people 'waiting' if Helvetas Cameroon might come with a free service after all.
- Support WMCs and councils in the design and implementation of a financial basis for water production and supply in general and water catchment protection in particular. Draw up business plans for water supply schemes.
- Continue support to the councils to design, implement and manage water catchment protection schemes. Helvetas could still give some direct input to the WMCs and communities, e.g. in the form of sensitisation meetings and training sessions.

9. REFERENCES

All cited literature is listed below with the following information: author, year of publication, title, publisher, Helvetas Cameroon library code. References in bold are published by Helvetas Cameroon.

1. **Thomas Zimmerman. 1993. Seminar on water catchment protection. Helvetas Cameroon. (14-6)**
2. **n.n. 1993. Report on the seminar for water catchment protection. Helvetas Cameroon (37-3)**
3. Bamenda Office for Technical Assistance (BOTA). 1999. Draft water management committee reference manual for rural communities in Cameroon. (7-7)
4. Integrated Engineering Associates. 2002. Water maintenance manual for rural communities. SNV. (9-7).
5. **5. D. Wunderlin. 1994. Bambui watershed, present situation in the watershed and proposal to the Bambui authorities. Helvetas Cameroon. (93-7).**
6. **D. Wunderlin. 1994. Watershed protection in the NW-Province of Cameroon – a prerequisite for sustainable rural water supplies. The improvement of the Bambui and of the Guzang watershed. Helvetas Cameroon. (58-7).**
7. Y. M. Fonkwa. 1995. Tree nursery in agro forestry and watershed protection attached to the Tubah upland watershed project Tubah subdivision. Ministry of agriculture. (590-9).
8. **H.M. Tah. 2001. Participatory Partner Approach on sensitisation against bushfires in water catchment areas of the Kumbo central subdivision. Helvetas Cameroon. (44-3).**
9. **M. Mbufung and H. Tah. 2002? Land tenure system and conflict resolution in water catchment areas, the North West Province. Helvetas Cameroon. (161-7).**
10. **H. Tah. 2001. End of year report (2001): Water catchment protection Helvetas Cameroon. (-)**
11. **H.M. Tah. 2003. AUTO evaluation: 2000-2001-2002. Catchment protection & micro watershed development. Helvetas Cameroon. (71-6)**

12. T.P. Che. 2003. Consulting services for water catchment protection in Batibo, Jakiri, Kumbo rural and Kumbo urban council areas. End of year report 2003. ECO-consult. (77-6)
13. **H. Tah. 2003. Catchment protection. Annual report 2003. Helvetas Cameroon. (-)**
14. N.n. 2003. Mission of KW. ? (-)
15. **E.K. Forbid. 2003. Workshop on water management and catchment protection in Akeh. Helvetas Cameroon. (-)**
16. **B. Fru, P. Fon, H. Tah, N. Nji and N. Nyambi. 2004. Propagation of medicinal plants for water catchment protection in the Cameroon western highlands. Helvetas Cameroon. (172-7)**
17. R.E. Rhoades. 1998. Participatory watershed research and management : where the shadow falls. International institute for environment and development. (136-9)