

The background of the image is a close-up photograph of a pile of agricultural waste. It consists of numerous dried, brown leaves, some of which are curled or broken, and several dark, charred sticks or branches. The waste is scattered on a reddish-brown soil surface. The overall scene suggests a rural or agricultural setting where such waste is commonly found.

Biochar Fund Trials In Cameroon Hype And Unfulfilled Promises

**by
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and Biofuelwatch**

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EXECUTIVE SUMMARY

Biochar, fine grained charcoal added to soils, has been promoted with claims it can sequester carbon in soils for "hundreds to thousands of years", improve soil fertility and hence increase crop yields and also provide renewable energy from pyrolysis production. Yet scientific research, particularly field trials, are woefully lacking. Field studies that have been done do not support these claims (for review see the accompanying report: "Biochar: A Critical Review of Science and Policy").

A significant number of biochar "trials" and projects have been initiated in Africa by companies and NGOs. These trials are based on assumptions that biochar "works" and can contribute to improving livelihoods by boosting food production and providing income from carbon finance. This "win-win" poverty alleviation framing is used to advocate for scaling up production and use of biochar – and for inclusion of biochar in carbon markets. Some advocates are advancing biochar on a very large scale as a "climate geoengineering" technique.

Biochar Fund trials in Cameroon were expected to be the largest and longest lasting biochar trials to date, with potential to provide useful insights. Preliminary data were published in late 2009 indicating dramatic positive results on maize yields. Media headlines pronounced "Exceptional Results From Biochar Experiment in Cameroon". However, the data were preliminary. It was indicated that further data were forthcoming but these were never made publicly available. Biochar Fund's website was subsequently terminated.

Benoit Ndameu traveled to the area to assess the trials, and to interview participants about their experiences in April 2011. To our knowledge, this is the only independent assessment of any biochar trials.

Mr. Ndameu found that participating farmers had donated time and land to the trials. Biochar Fund and Key Farmers provided them with literature proclaiming the "benefits" of biochar. Of the 75 plots established, farmers failed to follow through to completion on 31, for a variety of reasons. Some interviewed participants reported enthusiasm for the maize yield results from plots with large amounts of biochar added - 20 tonnes per hectare. These yield increases could have been due to pH effects of biochar on soil, and/or to nutrients contained in ash associated with biochar – however long term yield increase was not demonstrated. The trials had been abandoned, with no indication they would be continued. Yet farmers were still being told that when funds arrived, the project would continue and some were still awaiting this 18 months later. In particular, participating farmers had been led to expect that the next phase of the project would result in income from the sale of carbon credits for biochar. Materials provided to them by Biochar Fund indicated these would be forthcoming, even though currently no carbon markets offer credits for biochar use.

Biochar had been produced for the trials by Biochar Fund and Key Farmers staff, using a (very inefficient) single barrel stove method which did not offer any chance for producing renewable energy. Farmers were not trained or equipped to carry forward with biochar production themselves. Data collected were not scientifically useful due to lack of replication and randomization in the trial design. While reports indicated that data were to be collected from two maize harvests, the trials were halted following a single harvest. Soil analysis data, though apparently collected were never reported.

Laurens Rademaker, Biochar Fund's founder and director formerly ran a bioenergy web and consultancy service. He now offers his consultancy services, claiming on his website to have attracted over a million dollars in funding for projects since 2009 and to have established 9 NGOs mostly within Africa. He is also a cofounder of Green College Africa, as well as Equator Oils (now Agroils) which invests in jatropha projects.

Rademaker claimed in an interview in 2010 that the Cameroon trials were still ongoing, and used the proclaimed "success" of the Cameroon trials as leverage to obtain funding for another project in the same region (A project involving Cocoamasters, for which Rademakers serves advisorial role). He also used the proclaimed success of the Cameroon trials to obtain support from the Congo Basin Forest Fund for biochar trials in DRC, a project in partnership with Congolese NGO ADAPEL. This project was based on the claim that using "slash and char" instead of "slash and burn" could reduce deforestation. Little information is available about the current status of these DRC trials.

Developing interest in biochar is similar to what occurred with biofuels, especially jatropha about which claims of remarkable productivity on “marginal” lands have proven false. Baseless claims resulted in major investment, speculative and otherwise, in jatropha - driving land grabs and displacement of peasant farmers rather than alleviating poverty.

With interest growing in using carbon and other forms of finance to spur development of improved agriculture practices in Africa, farmers are vulnerable to being drawn into participation in trials and feasibility projects that can be both costly to them and also may generate false expectations.

CHAPTER 1: INTRODUCTION

Biofuelwatch

This report is about a biochar project undertaken in Southwest Cameroon by the Belgian-based 'social for profit organization', Biochar Fund, in collaboration with a local NGO, Key Farmers Cameroon. Media reports suggested that this was the biggest biochar project worldwide to date, involving around 1,500 local farmers, that it had successfully helped to raise small farmers' maize crop yields, and could reduce demand for agricultural land, hence reducing deforestation, provide renewable energy and bring income to farmers via sale of carbon credits. During April 2011, Benoit Ndameu undertook a 7-day field visit during which he interviewed local farmers, some of whom had been directly involved in the project, members of Key Farmers Cameroon and members of local institutions about their experience with the project. To our knowledge, this is the first independent investigation of any biochar trial involving communities in Africa or indeed any Southern country. As the report below shows, there are significant discrepancies between project information published on websites and in the media and the information obtained locally by Mr. Ndameu through field interviews and examination of written materials the project organizers had distributed to farmers

What is biochar?

Biochar is basically fine-grained charcoal applied to agricultural soils. It can be a byproduct of a type of bioenergy production called pyrolysis, which produces syngas and bio-oil, both of which can be used for energy, as well as char. However, most so-called biochar projects and trials so far, including the Biochar Fund's project described in this report, rely on adding crushed charcoal to soils.



As described in the accompanying Biofuelwatch report “Biochar: A Critical Review of Science and Policy”¹, biochar has been presented as a “win-win solution” based on unfounded claims that it is capable of sequestering carbon “for hundreds or even thousands of years” while simultaneously improving soil fertility. A review of the scientific literature however reveals a lack of any basis for such claims.

Nonetheless, biochar advocates have been lobbying strongly for subsidies and carbon credits for biochar. Their goal is to facilitate large-scale global application – as a means of addressing global warming, improving soil fertility and possibly even “geo-engineering” the climate with biochar.

A number of companies and NGOs have sought to gain experience with biochar by engaging small farmers in Africa and elsewhere in the global South in experimental “trials”. These are presented as opportunities to alleviate poverty for participants by increasing crop yields and gaining cash income from the sales of carbon credits. The experimental trials are taking place at a time when there is intense lobbying for soil carbon sequestration to be included in major carbon trading mechanisms, including the UN's Clean Development Mechanisms (CDM) - from which all soil carbon (including biochar) schemes are currently excluded. A 2009 report “Biochar Land Grabbing: The impacts on Africa” by the African Biodiversity Network, Biofuelwatch and the Gaia Foundation², updated in

¹ www.biofuelwatch.org.uk/2011/a-critical-review-of-biochar-science-and-policy/

² [www.gaiafoundation.org/sites/default/files/Biochar%20Africa%20briefing\(2010\).pdf](http://www.gaiafoundation.org/sites/default/files/Biochar%20Africa%20briefing(2010).pdf)

Background to the Biochar Fund

Biochar Fund was founded as a 'social profit organization' in March 2008.¹ It was set up by Biopact, a Brussels-based bioenergy web and consultancy service which has since been dissolved.² Laurens Rademakers, formerly of Biopact, is the founding and Managing Director of Biochar Fund. We have not been able to find records of any directors or members other than Laurens Rademakers working for Biochar Fund. Farmers interviewed indicated that Laurence Goddiman, from Manchester, UK was the Biochar Fund's project manager for the trials. We found no relevant web-references under that name, however, and Mr Rademakers gave Kumba as one of his addresses at the time of the trials. As Laurens Rademakers' personal website shows,³ Biochar Fund has been only one of many different enterprises which he has been working on in recent years. He also describes himself as Managing Director of Farmers for the Future' (farmersforthefuture.org) and Fast Forward Farms (fastforwardfarms.com), as scientific and technology advisor to a range of NGOs including CocoaMasters (cocoamasters.org/), Key Farmers members based in the same region where the biochar trials discussed in this report took place, Women for Green Growth (womenforgreengrowth.org/) and Techniciens pour le Developpement, and senior lecturer and co-founder of Green College Africa (www.green-college.org). Mr Rademakers also states that he was co-founder of Equator Oils, an Italian jatropha consultancy company now trading under the name Agroils SA (www.agroils.com). Agroils announced in 2009 that they had invested in jatropha projects in Brazil, Cameroon, Ghana, Morocco and Senegal,⁴ however we have been unable to find any more recent information about jatropha investments by them. Mr Rademakers describes himself as a 'consultant to NGOs, government agencies, foundations and companies.'

Background to Key Farmers

Key Farmers Cameroon, based in Kumba, Southwest Cameroon, describe themselves as 'a non-profit organization with the mission of promoting sustainable agriculture and rural development'. Key aims are helping farmers who are members to 'increase food production, and develop renewable energy projects, etc in order to alleviate poverty'. According to Key Farmers coordinator, Mr. Etchi Daniel Jones, in addition to work on biochar, they are working on promoting biodiesel including from jatropha and palm oil.⁵ Mr Etchi Daniel Jones is also Director of Green College Africa, which was founded by Mr Rademakers.⁶ Key Farmers also encompasses CocoaMasters, which successfully applied to the Congo Basin Forest Fund for a grant for (non-biochar) renewable energy project in Cameroon, Sao Tome and Principe and Equatorial Guinea with Laurens Rademakers.

1. <http://news.mongabay.com/2008/0310-biochar.html>
2. www.biopact.com/aboutus.html
3. <http://laurens-rademakers.com>
4. <http://af.reuters.com/article/investingNews/idAFJJOE54701620090508>
5. www.gvepinternational.org/en/community/directory/6041
6. http://green-college.org/index.php?option=com_content&view=frontpage

December 2010, showed the significant number of different biochar projects across Africa as well as the wider policy context in which most such trials are being used to justify future biochar carbon offsets. Although such biochar projects are commonly called 'trials', they are not scientific field studies with the primary intention of publishing results in peer-reviewed articles.

Prior to this investigation into the Biochar Fund project in Cameroon, no independent assessment or information had been published about any biochar project in Africa.

Biochar Fund's Cameroon project was chosen as the subject for this investigative report for several reasons. First, according to the figures published by Biochar Fund, it involved more farmers than any other biochar project worldwide – 1,500 in total, although, as the report shows, there are serious questions about this number.

Second, having commenced in December 2008, it would, at the time of assessment, have been ongoing long enough to expect meaningful results, at least about short-term effects.

Third, although Biochar Fund itself is a 'small social profit organization', the Cameroon project had broad implications. It was endorsed and supported by the International Biochar Initiative (IBI), the main global biochar advocacy organization. IBI selected the Cameroon project as one of its "9 country projects" for "biochar work in developing countries". The IBI's aim for those projects was to

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"help [developing countries] develop and evaluate cost effective approaches for the widespread introduction of biochar."

The Cameroon project has been very widely reported as a 'success story' for biochar - by the IBI³ and by many in the media. The project was chosen as one of the top ten entries⁴ and in the 'Manchester Report', a competition for "ideas for solving the climate crisis" by the Guardian and Manchester International Festival and chaired by the Lord Chief Justice of England and Wales in 2008. One UK commentator impressed by Biochar Fund's reported results in Cameroon was Chris Goodall.⁵ Goodall is a partner in a consultancy firm, Oxford Climate Associates, which helped draft the 'carbon neutral' strategy for the Government of the Maldives.⁶ It appears that, persuaded at least in part by Biochar Fund's announcements, he succeeded in convincing the Maldives President that biochar should play an important role in meeting his Government's Zero Carbon Goal.⁷

Finally, the Cameroon trials are of interest because their experience in Cameroon helped they were used to help Biochar Fund and another of their partner organisations organizations, ADAPEL, to leverage around 315,000 Euros in funding from the Congo Basin Forest Fund (CBFF) for a different another biochar project, in DR Congo. This became the first and to our knowledge, so far the only, biochar project supported by a multinational fund in the context of REDD (Reducing Emissions from Deforestation and forest Forest Degradation). This is particularly significant because (presumed) carbon sequestration in soils and croplands does not form part of current UN proposals for REDD, yet there is strong lobbying by carbon traders and a range of interest groups that would profit from their inclusion. Biochar Fund's Fund and Key Farmers' trials in Cameroon's Kumba Province are also mentioned in another successful proposal to CBFF, by CocoaMaster (. CocoaMaster is a member group of Key Farmers that works closely with Biochar Fund and their Managing Director Laurens Rademakers), which. That project involved using renewable energy to dry cocoa.

What claims were used to justify the Cameroon trials? What were the results? How were those results used? What impact did these trials have on participants? These are key questions relevant not only in this particular case, but also to the larger context of efforts underway to "improve" agriculture and forestry practices in Africa, as envisioned, funded and commonly directed by outside, often Northern funders, organizations and companies. The development of biochar carbon offsets has been one of the declared aims of the Biochar Fund projects both in Cameroon and DR Congo. When publishing the "interim" (and so far only) trial results from Cameroon, Biochar Fund founder and director Laurens Rademakers stated: "*[Local farmers] are enthusiastic about the idea that they can play a role in mitigating climate change...The worlds' carbon credit' are the talk of town here.*"⁸ And the successful proposal for the ADAPEL/Biochar Fund DR Congo project included a 'carbon package, whereby farmers will be introduced to the voluntary carbon market and efforts to sequester carbon through biochar use in soils will thus be compensated."⁹ Biochar Fund's Cameroon trials were one of several biochar projects in Africa and other Southern countries, and one of a much larger number of agricultural and REDD 'pilot projects' supposed to test the feasibility of integrating different agricultural practices into the carbon markets. This field report provides an insight into the experiences of farmers involved in one such project, one in which their hopes about future income from carbon markets were raised, even though biochar carbon offsets are not yet a reality.

CHAPTER 2: ASSESSMENT OF CAMEROON TRIALS

Benoit Ndameu

The overall objective of this investigation was to:

- 1) Provide an independent assessment of the trials and their impact on participants.

³ www.biochar-international.org/cameroon

⁴ www.guardian.co.uk/environment/2009/jul/13/manchester-report-climate-change1

⁵ www.carboncommentary.com/2009/10/01/761

⁶ www.oxfordclimate.com

⁷ www.reuters.com/article/2009/09/22/idUS127353+22-Sep-2009+PRN20090922

⁸ www.carboncommentary.com/2009/10/01/761

⁹ http://cbf-fund.org/sites/default/files/ADAPEL_0.pdf

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- 2) Compare the Biochar Fund’s claims with the results and other information available about biochar and about pressure on forests in the region.
- 3) Collect and analyze information about the existing farming practices and pressures on forests in the areas.

While the trials commenced in late 2008 and preliminary results were made publicly available in late 2009, Biochar Fund's Managing Director Mr Rademakers still spoke about the project as ongoing in August 2010.¹⁰

The trials were undertaken in conjunction with a local partner NGO, Key Farmers’ Cameroon. They were based in Kumba and surrounding areas and in 11 villages of the Meme (10 villages) and Manyu (one village) divisions of Southwest Cameroon. The results from the preliminary stages of the trials were published, with much fanfare, claims of improved crop yields and photographs of smiling farmers.

A field trip was undertaken from 5 to 12 April 2011, during which interviews took place with farmers, the coordinator of Key Farmers Cameroon and other individuals. According to what we were told, the Project Manager from Biochar Fund was called Laurence Goddiman, based in Manchester. The brochure given to participant farmers, however, lists Laurens Rademakers' as the contact for and Managing Director of Biochar Fund. Biochar Fund and Key Farmers’ staff were responsible for, organizing and managing the groups (CIGs). Key Farmers’ coordinator, Mr. Etchi Daniel Jones advised us during an interview with him that the budget was close to 20 million CFA (about 30,000 Euros).

Key Farmers Cameroon describe themselves as an umbrella organization active in the field of sustainable agriculture and rural development in Southwest Cameroon. According to information given to farmers during the biochar trials, as well as the Key Farmers website, Key Farmers are constituted “of 50 autonomous organizations and 1200 members...from 25 villages.”¹¹ The “autonomous organizations” are CIGs.

Most of the farmers who participated in the trials and were interviewed were representatives/delegates of Common Initiatives Groups (CIGs). A CIG is a type of association recognized under Cameroonian law, set up to enable individuals who share a common interest to unite their efforts in order to achieve common goals. CIGs exist in various different sectors and contexts. In the rural sector for example, they are perceived as strong tools/units through which financial and technical investments can be made available by government institutions, bilateral or multilateral partners, banks specialized in the agricultural sector and non governmental institutions, with a view to boosting rural development.

CIGs whose representatives we met with during the field trip had been in existence before the biochar trial started. Many of them had been set up early in 2000 or before. The CIG KOYAFA (Kosala Yamba Farmers) for instance, was created in 1996. Participation in the Biochar Fund project was seen as a new opportunity to widen their quest for improving the welfare of the group.

We interviewed representatives of the following 11 CIGs:

Village	Common Initiatives Groups (CIG)
Kumba	Humble Ladies (Otoko quater)
Kosala (Ekindi-Maley)	KOFAPRU (Kosala Farmers Producers Union)
Kosala	KOYAFA (Kosala Yamba farmers)
Kosala	Yamba women group
Ikiliwindi	Amueh group
Kake II	Ambitious women
Barombi-kang	Rainbow Farmers
Mabonji	Agro Satellite

¹⁰ http://news.mongabay.com/2010/0816-hance_rademakers.html

¹¹ www.keyfarmers.org/

Village	Common Initiatives Groups (CIG)
Ediki	Young farmers association; Yaounde Quarter
Mbalangi	Solidarity
Teke	Firm Hands farmers

Table1: location of the CIGs which took part in 2009 trials.

We also met with other farmers, including ones who had not participated in the trials but were based in villages where tests plots had been cited; and farmers whose activities were located in the Bakundu forest reserve area). Furthermore, we interviewed local officers of the Ministry of Agriculture and Rural Development (MINADER), the Ministry of Forestry and Wildlife (MINFOF) and the Cocoa and Coffee Seedlings Project (CCSP).

We were told, that neither Biochar Fund nor Key Farmers formally sought the collaboration of the Region's locally based institutions, such as the departmental services of the Ministry of Agriculture and Rural Development (MINADER), the departmental services of the Ministry of Forestry and Wildlife (MINFOF), the departmental services of the Ministry of Environment and the Nature Protection (MINEP), nor the formal collaboration from regional state development programmes such as the Institute for Agricultural Research for Rural Development (IRAD), the Cocoa and Coffee Seedlings Project (CCSP) or the RUMPI Programme. However, the project succeeded in developing close collaboration with individuals from some of these institutions. For example, an extension worker with MINADER was the Key Farmers' project supervisor during the trial. Through her contacts and capacity, she easily mobilized groups that took part in the trial and she was also a key person during some thematic workshops attended by farmers. Key Farmers' coordinator obtained cocoa seedlings from the CCSP during our visit to that institution



Members of Common Initiative Group discuss their experience with Biochar Fund trials.

While we had initially intended to cover Kumba and the 11 villages where the trials took place, logistics dictated that we were only able to visit plots in Kumba and a few neighbourhoods. The Key Farmers Coordinator contacted farmers in advance and those who were available were visited. We interviewed farmers and met with people in the Meme division where 95% of the trial took place. We were unable to visit members of the CIG in Malende, even though initial contact was made, and we could not visit Kemden, the one village involved in the project located in the Manyu division.

In total, nineteen (19) interviews were undertaken. These interviewees were as follows:

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- 11 farmers who had participated in trials and were interviewed individually or in groups; All of those were farmers who had completed biochar trials. Five of these interviews with farmers took place in the presence of three or more other members of their respective groups (CIGs).
- 2 Key Farmers’ officials (the Coordinator and the Project Supervisor);
- 3 farmers living in villages where trials took place but who had not participated in them (1 farmer living in Konye, 1 living in Kake and 1 farmer from near Lake Barombi, in the Bakundu Forest reserve);
- 3 officials from local government institutions: one official from MINADER, one from the CCSP and one from MINFOF. We chose to interview them in order to gain some insights into their experience of local problems and challenges.

From the field survey, it appears that only a small number of farmers actively participated in the trials. Those farmers belonged to CIGs that had signed up to the trials, but not all members of the CIG actually participated, in fact most individual CIG members appear not to have been involved at all. A brochure produced by Biochar Fund and Key Farmers, and given to farmers at the start of the trial (discussed further below), states that the plan had always been to involve just 75 farmers in the trials a figure which accords with the information we obtained during the interviews. Published reports of trial results refer to a much larger number of participants, apparently because all members of CIGs were counted rather than just those who actually participated.

Selection and training of participants

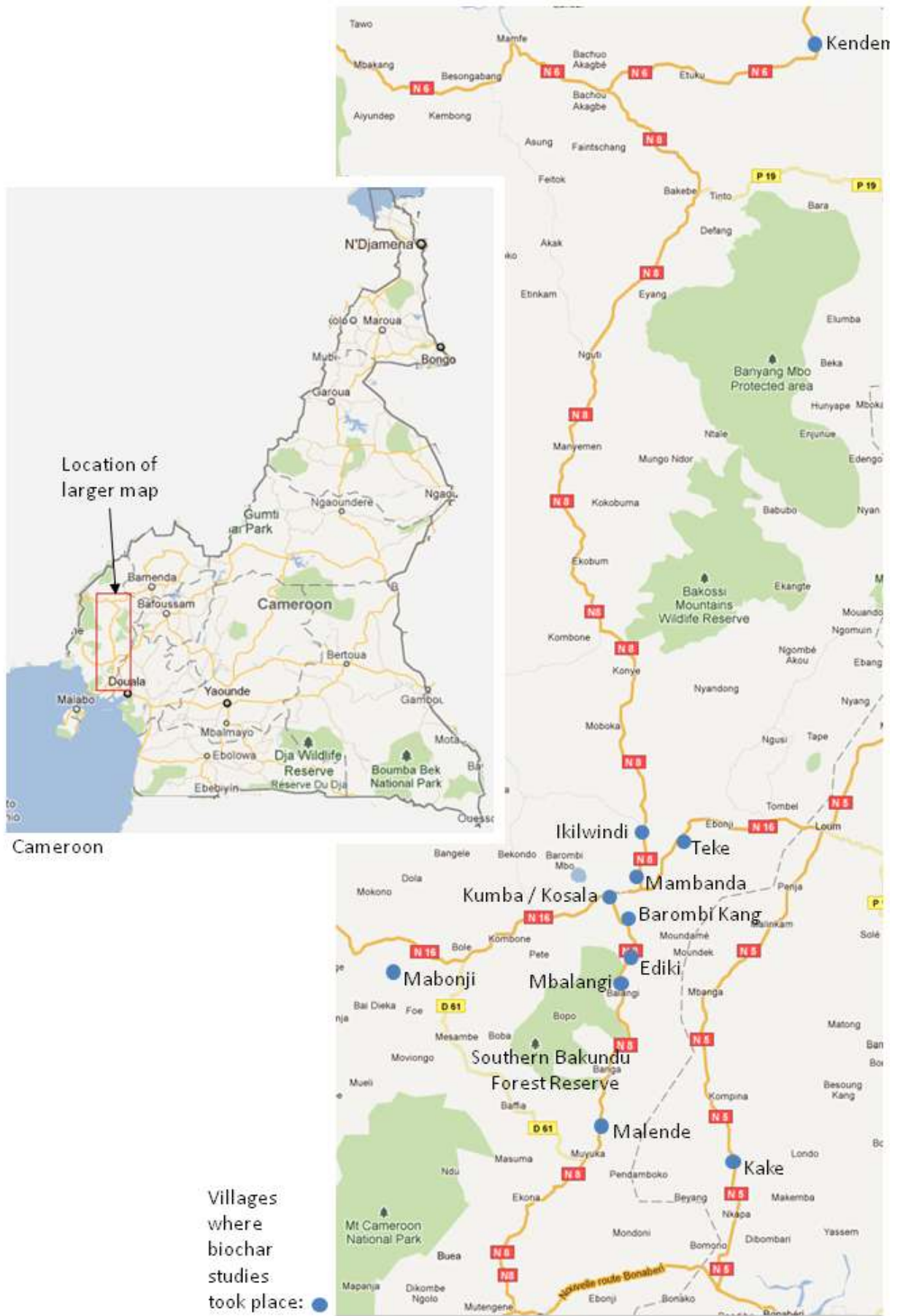
We were informed that the Biochar Project Coordinating Team had distributed application forms to groups that might potentially be willing to participate and had then selected from amongst those who applied.

The manner in which the decision to participate was made within CIG groups varied from one group to another, depending on the internal structure, the leadership capacity of the delegate (the key person and usually founder of the CIG) and the number of members (the size of the group). In most groups, the delegate and a few members made the decision. Some of the members were then designated as active participants in the trials. In Teke for example, the CIG set up a 'biochar committee' with a dedicated chair person.

The practical groundwork for the biochar trials appears to have started in January 2009, with background preparations having begun a few months earlier, in the second half of 2008. It was explained that a set of workshops and training events had been organized at the time. Farmers who participated in trials took part in those training events and were also provided with inputs including maize seeds and chemical fertilizers. They did not however, receive any financial rewards or compensation for their participation in the trials. The project organizers considered that winning farmers' support and dedication would be important for the future of the project, especially if further funding to expand the project was to be attained.

What were farmers told about biochar?

Key Farmers advised that they were told by the Biochar Fund's representative that biochar was a proven technique for improving soil fertility. Farmers were told that biochar would improve their farming practices and increase crop yields. The Biochar Fund provided Key Farmers’ Cameroon with various forms of literature (reports, studies and leaflets), all of them discussing the 'benefits of biochar'.



We were further told that when the trials started in early 2009, Biochar Fund presented to farmers concerns about climate change and the potential for obtaining carbon credits as key motivations. These concerns were brought up during training sessions. A brochure distributed to all participants states: *"climate change or 'global warming' is the result of the emission of the so-called 'greenhouse gases' into the atmosphere. These gases trap heat and warm the planet."* It then refers to biochar as *"one of the most effective strategies to reduce the amount of CO₂ in the atmosphere. When plants grow, they suck up CO₂ and store it in their stems and leaves as carbon. When we turn this biomass into char, and then store the char into the soil, we are actually putting the dangerous gas away for a long period of time. Biochar can remain unaltered in the soil for hundreds of years. Contrary to others types of biomass, it does not decay and does not release CO₂. This is why it can help us win the fight against climate change"*¹²

Climate change was not an altogether new topic for farmers. A member of KOFAPRU (Kosala Farmers Producer Unit) cited as an example that the International Institute of Tropical Agriculture (IITA) had also raised awareness of climate change, as had other organizations that work in the area. IITA is an international NGO with an office in Yaoundé, which works with groups of farmers in the area through the Sustainable Tree Crop Project (STCP).

The focus on climate change was also confirmed by other CIG representatives. A representative of the CIG Koyafa (Kosala Yamba farmers) explained that *"during one of their workshops, the organizers held discussions on the issue of climate change: what it is all about, the consequences, if the situation continues as we observed today, etc."*

The potential for earning money from the sale of carbon credits for biochar was mentioned as an incentive by some farmers we interviewed. They had been told that following the initial trial, the sale of carbon credits would be possible by 2010. The brochure given to participants claims: *"Wealthy countries are ready to help solve the problem by financing actions to prevent climate change. They do this via the so-called 'carbon markets'...The Biochar Fund and Key Farmers Cameroon will present the results of the trials in Kumba to the European voluntary carbon market, with the aim to start a larger project in 2010. This expanded project would attract a considerable number of 'carbon credits'. This money would then be distributed amongst the participating farmers."*

From the interviews we conducted with farmers, it appears that their motivation to participate was at least partly based on the prospect of such future revenues. One participant in the trial, explained that his group *"rented a piece of land close to the village for the trial and would have been ready by 2010 to devote 12 hectares of community land for the purpose"*.

At the start of the planting season (March and April), farmers started preparing the land by removing and burning weeds. As usual, they practiced 'slash and burn' which involves cutting and burning forests or woodlands in order to create fields.

The maize variety used for the trials came from the Cocoa and Coffee Seedlings Project (CCSP). The CCSP Centre is based in Barombi-kang. CCSP is a sub-division of the Government-owned Institute of Agricultural Research for Development (IRAD), which specializes in the production of seeds. The variety of maize, known as CMS 8704, is planted in most areas of Cameroon, in particular in the Centre, South, East, Southwest, Littoral and North Regions. A nursery worker with the CCSP stated: *"The variety has a composite genetic background and a productivity range between 5 and 6 tonnes per hectare"*. This variety had been distributed to farmers free of charges in the past (i.e. before 2009).

What were farmers' experiences as participants?

Farmers stated that they had found the training for the biochar trials a difficult exercise overall. For each of the plots, they had to do exactly as instructed, with all plots labeled in the same manner. Plots were divided into 12 sub-plots and each of the subplots had a specific assignment.

From what we were told, the size of the plots appears to have varied from one group to another depending on the area of land made available. In general, the average area per subplot appears to have been around ten square meters (10m²).

¹²

A copy of the brochure is available to the authors of this report and can be obtained on request.

Control Plot (no treatment)	Plot with organic fertiliser	Plot with chemical fertiliser	Plot with organic and chemical fertilizer
Char 10	Char 10 + organic fertiliser	Char 10 + chemical fertiliser	Char 10 + organic and chemical fertilizer
Char 20	Char 20 + organic fertiliser	Char 20 + chemical fertiliser	Char 20 + organic and chemical fertilizer

Table 3: Subplots within a plot for the trial¹³ Note: 'Char10' refers to biochar added at the rate of 10 tonnes/hectare' and 'Char20' to biochar added at the rate of 20 tonnes/hectare. (Adapted from brochure supplied to farmers by Biochar Fund and Key Farmers.)

Land made available for trials was provided by farmers, generally contributed by a member of the CIG. That person was in most cases a member or the delegate of the CIG. These sites had different types of status and ownership. In some cases the land belonged to members of CIG groups, in other cases they were home gardens, or were rented from the owner on an annual (or longer) basis. In those cases, the farmers would thus have been paying rent for the land made available. In some cases plots were situated in gardens next to homes; in other cases the plots were close to the villages and were either a home garden or a piece of land intended for future construction of new houses. In other cases, plots were on farms, often situated far from the village houses. Key Farmers' coordinator, Mr Etchi Daniel Jones also made part of his home garden available.

According to those farmers who completed the trial and were interviewed, many were convinced that biochar appeared to have produced good results.

For example, during our introductory meeting in Kumba with local farmers who participated in the trials and with the Coordinator of Key Farmers Cameroon, the farmers told us that they had been impressed by the quality and quantity of the maize harvested, particularly in the subplots with 'biochar 20' (i.e. 20 tonnes of biochar per hectare). This may have been particularly noticeable given that soil quality in the area is very poor.

One person stated that “the soil quality of the area is not good for planting maize seed, that the experience with biochar produced good yields, helping to retain a number of soil nutrients.” One participant farmer advised us that the size of the maize they produced in the biochar plots had been a subject of curiosity amongst the members of the group and from other groups that exist in the village, saying “people were asking if the maize they harvested was from a new variety of seed?”

It should be noted that we were only able to interview farmers who had been contacted by Key Farmers Coordinator Mr Etchi Daniel Jones, and further, only those who had completed the trials. A large number of participants did not complete the trials however (discussed below). Furthermore, the introductory meetings were all organized by and held in the presence of Key Farmers staff, i.e. the project partners.

Many participants failed to complete trials

In spite of the apparent yield benefits, participation in the trial was clearly not always beneficial for farmers. A large number of plots were completely abandoned prior to completion. From the information we were given by Key Farmers, trials started in early 2009 with 75 operational plots. At the time the project ended, in December 2009, only 31 of the 75 plots had reached completion (meaning that all the harvesting, weighing and analysis required had been completed). Fifty-eight percent of the plots would therefore have been unsuccessful as far as the trials were concerned. Biochar Fund stated in their published information that partial data had been obtained from a further 10 plots.

Three main reasons explained the low rate of successful participation, according to those interviewed, including Key Farmers staff: 1) Some of the groups did not properly follow the instructions provided for the trial and therefore their group and plots were eliminated from the process. 2) Some plots were set in places where the quality of soil was not appropriate for farming.

13 Adapted from the brochure handed to participating farmers

Soils in the area are Ferralitic and some of them are sandy with high level of acidity. The high level of acidity and low level of nutrients in these soils made farmers less interested in farming there, and plots established on such soils could not produce good results and were abandoned. Initially the idea had been to test the capacity of biochar to enrich these particularly poor soils, but unfortunately, this appears not to have worked. 3) In some cases, the maize was stolen, making it impossible to provide measurable results. In general, theft is widespread in the Kumba area and its neighborhood, due to demographics and the poor soil condition in the area. According to a local farmer from Kosala, theft of maize crops is a *"situation that occurs during the harvesting period of maize. It is easy for someone on foot to steal some corncobs without being caught. The maize produced from the biochar trials was stolen because others wanted the variety for their seeds, so that they could use them during the next planting season. They didn't know that the variety of the maize seed used is the same as is sold everywhere here and some of these people who stole even had it in their seed stocks. It is only because we planted them with biochar [that they appeared to be a different variety]."*

Those who had completed the crop growing phase of trials were instructed to harvest their maize harvests which would then be collected and taken to the Key Farmers' office in Kumba to be weighed and tested. Mr Etchi Daniel Jones, the Key Farmers' coordinator explained *"the series of tests were done to assess the quality and the quantity of the production of each plot"*.

Farmers did not always adhere to these final instructions. In some cases, this was apparently because they were concerned about security/theft. Some mentioned having grown impatient while awaiting authorization from the coordinating team, or they did not understand fully what was expected due to lack of communication.



Searching for remains of biochar plot

What was the fate of biochar trial plots?

The trials ended in the second half of 2009. Indeed, the brochure given to participant farmers at the start of the trials outlined a 'work plan' according to which the trials would only involve a single

harvest and the project would end with a report in December 2009, with efforts made to obtain carbon finance for a larger project in 2010. This is very different from information published elsewhere by Biochar Fund before, during and after the trials. The brochure was produced in English only, not in the farmers' local language and some may have relied on Key Farmers staff for a translation. We therefore do not know how many farmers were aware the biochar trials were to end in late 2009, but from our interviews it was clear that they had expected the project to continue and to obtain funding from it. Many still expected this to happen in the future.

During our field visits, some of the farmers interviewed expressed weariness about the contribution they had made. The time spent on training and workshops attendance was costly to them, especially because the technology was not something the participants felt able to use themselves in future. The Key Farmers coordinator, Mr Etchi Daniel Jones appeared notably embarrassed at times during the field trip when asked by farmers' to visit their plots. Farmers repeatedly asked questions about the purpose of the visit, and also asked if we were staff involved with the project management.

The trial plots used for the Biochar Fund project trial have in most cases been subsequently abandoned or converted to fallows (several plots in Kossala), or cultivated, using pre-trial farming methods, with maize, cassava and/or other food crops (Ediki, Barombi-kang, Ikiliwindi, Kumba). In one case, the plot was used for construction of a house (Teke). Of all the plots visited, none had been subjected to any follow-up in relation to the trial.

Only one CIG, in Teke, having participated in the trial, subsequently took the initiative to produce their own char (from palm nuts) which was applied to a plot growing chilli peppers.

For the former trial plots which subsequently in 2011 were being used to grow maize, it was not possible at the time of the field visit to assess whether previous biochar application still influenced yields since harvesting had not yet occurred – (harvests generally done between the end of June and July). Assessing the influence of prior biochar application will be difficult since farmers practice slash and burn and often apply the resulting ashes to garden plots.

Status of plots visited during our visit in April 2011

Village	CIG	Status of the plot*	Remarks
Kumba	Humble Ladies (Otoko quater)	1	The plot is now used to grow cassava and a variety of crops (banana).
Kumba (mile 1)		1	Growing yams and maize
Kumba (mile 1)		1	The plot was first abandoned but then cultivated this season (maize, yams,etc)
Kosala (ekindi-Maley)	KOFAPRU (Kosala Farmers Producers Union)	1	The plots are now use to grow cassava
Kosala	Etchi's home garden	1	Abandoned
Kosala		1	Abandoned
Kosala	KOYafa (Kosala Yamba farmers)	1	Abandoned
Kosala	Yamba women group	1	Abandoned
Ikiliwindi	Amueh group	1	growing cassava
Kake II	Ambitious women	1	Growing food crops
Barombi kang	Rainbow Farmers	1	The wife of the CIG delegate planted maize and peanuts this year
Mabonji	Agro Satellite	1	The plot was burned over to grow maize

Village	CIG	Status of the plot*	Remarks
Ediki	Young farmers association Yaounde Quater	1	Abandoned but now used for growing maize and cucumber
Mbalangi	Solidarity	1	Not cultivated
Teke	Firm Hands farmers	2	On the original plot, a house was built and the family devoted a piece of their home garden to replicate the experience by using char derived from palm nuts.
Mambanda	-/-	1	Growing maize
Malende	-/-	1-3	Cocoa plot could not be taken into account because it is a long term crop.

Table 5 : Status of trial plots as of April 2011.

* Legend: 1 Still in place; 2 relocated somewhere else; 3 abandoned.



Biochar making barrel. Most of the equipment had been discarded. One group had preserved a barrel and made a batch of biochar for application to a garden following the trial.

Since the completion of the preliminary trials in 2009, many groups had received no communications from Key Farmers' representatives concerning the project. In Ediki, for example, one farmer interviewed could not even remember if his group had participated in the trial. He said: "Since 2009,

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I have not received any news from the white man, nor from Key Farmers. That’s why I could not easily remember the project again or where the plots were situated”. Farmers were still wondering if the project would continue as they had been led to believe. The Key Farmers coordinator who had been involved with field work seemed embarrassed when groups met and inquiries were made about the future of the project.

Biochar production and its impacts

According to Key Farmers, the biochar used in the trials was produced at: 1) Kosala, a neighborhood of the main town 2) Kumba, at the residence of Mr Etchi Daniel Jones, the coordinator of Key Farmers; 3) Kendem, for the Manyu division.

During our field trip to Kosala, it was not possible to see active biochar production. Most of the barrels that had been used to produce biochar were out of use; except one in which old biochar was kept. Our understanding of how the biochar had been produced comes from discussions with Etchi Daniel Jones from Key Farmers and from a leaflet entitled “Biochar for Developing Countries”¹⁴ which illustrates char making barrels similar to those found in Kosala. Holes were made at the lower ends of the barrels to allow some air to enter and, when the fire gets underway, the top end is covered. The leaflet states: “*As the fire moves down the heat drives off gases below the fire and these ignite and add to the heating thus reducing the amount of wood needed.*” No energy generated from the process was recovered and used. Mr Etchi explained that during biochar production, the barrels were heated to a very high temperature – and it was necessary to keep some distance away from them. He also pointed out that producing good biochar depended on using the right feedstock.

Procuring the biomass for the production of biochar was the task of Biochar Fund and Key Farmers’ staff and did not directly involve the farmers. A few farmers who had participated in the trial, pointed out that since farmers had not participated directly in the production of biochar, it was quite difficult for them to assess whether there might have been any impact for example on local biodiversity. Farmers were told that the biochar was made from weeds, palm trees branches and some pieces of wood. Their impression was that this could be a good thing to use weeds as collecting those could not pose a problem.

According to Key Farmers, the feedstock included cassava stems, palm trees branches and weeds as well as pieces of waste wood, collected from woodwork stores. It was generally difficult to assess the quantity or proportion of each type of feedstock used, since that information was not recorded. Feedstock was collected and stacked to allow drying prior to use. The weed species used for biochar production (*Chromoleana odorata*), is commonly known as *bokassa*. It is recognised as one of the most invasive weed species in the tropical area. Once a farm is abandoned, it is likely to be invaded by bokassa.

The trial also used wood collected from nearby cultivated areas. An article that had been published on the Biochar Fund website explained: “*The biochar was made in a low-technology kiln using agricultural wastes from the previous harvest and some wood cut back from trees surrounding the cultivated areas*”. Key Farmers’ coordinator pointed out that they had to mix char derived from residues with char from wood in order to produce biochar that was bulky enough. Denser wood produced bulkier char and was preferred. It was not possible in retrospect to determine which type of wood had been used for making the biochar. Amongst the residues of the feedstock which had been used in Kosala we found a piece of a red wood whose common local name is acajou. Acajou is found in the area and often used by woodworkers to produce household goods of high quality.

No long-term system for ongoing production of biochar was put in place, nor were steps taken to ensure ongoing supplies of biomass. Planting crops or trees to produce biochar had not been considered as an option for the project. The main goal appears to have been to popularize the biochar concept with low cost investment.

Traditional agriculture practices in the region

Agriculture – for food and cash crops - is the main activity amongst the population in the villages found in the Meme division.

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The main cash crop is cocoa. Many of the farmers in the area are landowners and growing cocoa contributes important annual income for the family, with cocoa prices having increased since 2005-2006. Oil palms are also grown as a cash crop, but less commonly in this region.



Traditional crop practices

The most widely cultivated food crops in the area are cassava, plantains, groundnuts, maize, banana, yam, cucumber, plums, oranges, grapefruits and lemons. Food crop cultivation is practiced mainly for subsistence although the surplus is sold. The main cash crop in this region of Cameroon is cocoa. Many of the farmers in the area are landowners and growing cocoa contributes important annual income for the family, with cocoa prices having increased since 2005-2006. Oil palms are also grown as a cash crop, but less commonly.

Cash crop cultivation is often considered to be work for men, as the head of the family. Growing food crops on the other hand, is often a task undertaken by women. This division of labour is not observed as strictly as was traditionally the case. Choosing what to farm in rural areas is a question of opportunity and depends on the land tenure system and on decisions made by the person who has the right to the land. Farmers who have their own land can set aside part of it to grow cash crops, including ones which remain in place over long term such as cocoa or palm trees. Farmers, who rent a piece of land – usually for a period of two to five years - can only grow short rotation crops such as maize. This was the case for some groups who participated to the trial, i.e. they rented the land used for the biochar trial in order to grow maize.

Villagers, most of whom are living in poverty, use slash and burn to clear lands prior to planting. Strategies used by farmers for improving soil fertility include crop rotation, leaving land fallow and applications of compost. These practices are familiar to farmers, but using biochar was not. Fertilizers use is generally possible only for those with the financial capacity to purchase them and are most often used for cash crops. Farmers interviewed said they did occasionally use chemical fertilizer for growing vegetables, on small plots. Compost, generally made from kitchen residues, as well as other food residues and leaves was used for food crops. Biochar production requires some of

“Biochar Fund Trials In Cameroon Hype And Unfulfilled Promises” by B Ndameu and Biofuelwatch the same feedstock elements and could thus potentially compete for the same material used otherwise for composting and for traditional rearing of domestic animals.

Threats to forests in the region

This region of Cameroon is under tremendous pressure, due to economic factors strongly linked to the Structural Adjustment Programmes imposed by the IMF and World Bank. The Kumba region has grown rapidly in population and is now the largest city in Southwest Cameroon. Much of the populace is dependent upon agriculture for food and cash. Expanding demand for agricultural land both by farmers and by plantation companies (especially CDC) in combination with intense logging has resulted in serious degradation of surrounding forested lands, including the South Bakundu Reserve, which includes some of the villages involved in the biochar trials. Further details regarding forests in the region is provided in Annex 1.



Slash and burn: clearing forest for agricultural land

Were the trials a “success”?

Articles and reports published by Biochar Fund and others convinced by claims, state, amongst other things that the Cameroon trials illustrated “*the powerful benefits that biochar might bring to food availability*”¹⁵. Key Farmers’ Coordinator also hailed the 2009 biochar trial projects as a “success”, stating that the lessons learned would help to guide expansion of the project if they received funding. He pointed to the following indicators of success:

- 1) The project engaged farmers with strong potential agricultural practices and ecological knowledge about the production of food crops.
- 2) The organization of farmers into Common Initiative Groups (CIGs) allowed for a fast mobilization of members and a follow-up of the activities on the different sites.

¹⁵

e.g. www.biochar-international.org/cameroon

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- 3) The rigorousness applied to setting up the plots and the collection of data and final results, which underscored the relevance of the project at this trial phase.

Very little information was made available regarding the relationship between Key Farmers and their international partner, Biochar Fund. Since the completion of the trial, it seems that despite farmers' ongoing expectations of funding for a next project phase, none have been obtained. We found no information indicating what efforts, if any, were made by Biochar Fund and/or Key Farmers to obtain such funds.

Since the trials and the involvement of CIGs, relations between Key Farmers Cameroon and the local groups of farmers have clearly become more distant and Key Farmers' communications with a number of CIGs appears to have ended. A few groups situated in Kosala and the Kumba neighborhood still remain in close contact with the coordinator. Members of local groups we spoke to were still hoping - and still being reassured by Key Farmers' coordinator - that funds for the extension of the project would be available soon. Farmers indicated they would continue the project if there was funding and they were invited to do so. This may best be understood in light of the CIG group's purpose - which is to broaden their expertise with a variety of farming practices.

Additionally, there is a strong “myth” which embraces the notion of “white man” teaching Africans new techniques to lift them out of poverty. The biochar project in Cameroon, as it was implemented, reinforced this perception: By engaging farmers in villages of the Southwest Region of Cameroon to biochar techniques, Biochar Fund, through persuasive marketing of biochar, succeeded in perpetuating this 'myth' and instantly captivated the farmers' attention by assuring them about 'multiple benefits' of biochar. This “new technique”, for all the promises made to the farmers in the Southwest region of Cameroon, became a broken promise.

Many farmers, including members of Key Farmers expressed skepticism about what had happened to the project. Even farmers who had described participation in the trial as a positive experience at the time, were wondering what benefits - financial or otherwise, they had actually gained from the experience. Such skeptical attitudes were perceived when meeting with members of the CIGs involved in trials. In Teke for example members of the CIG that had participated in the trials openly asked KFC's coordinator where he had been since the completion of the trial. Key Farmers coordinator appeared very embarrassed by such questions when groups repeatedly inquired about the future of the project and asked about the silence which had prevailed since the termination of the trial in 2009. Most of the time he replied by reassuring farmers that “funding has not yet arrived to pursue the project further; when it will come, things will start as promised”.

Participating farmers in this case, were essentially experimental subjects. The cost to them in terms of time, labour, diversion of land area that could have been put to other uses etc, must be taken into account. Indications at this point are that the most participants gained was, in some cases, improved yields for one crop rotation. Ongoing benefits in terms of consistent improved yields, training and access to a new technology, access to finance from carbon markets or renewable energy have simply not been forthcoming.

CHAPTER 3: DISCUSSION OF FINDINGS FROM THE FIELD INTERVIEWS Biofuelwatch

In August 2010, Biochar Fund's Laurens Rademakers gave an interview to Mongabay in which he claimed: *“Our trials in Cameroon and Congo indicate that we can produce and apply biochar in a sustainable manner (we use biomass that would otherwise be burned, and farm residues) and make a profit, merely because of the crop yield increase. A carbon credit for sequestering carbon permanently in soils would be an added bonus. Money for the 'avoided deforestation' resulting from the intervention would be so too. We did this trial with 75 farmers' groups, representing around 1500 subsistence farmers.”*¹⁶

On what basis are these claims made? Do they fit with the findings reported in previous chapter?

¹⁶ http://news.mongabay.com/2010/0816-hance_rademakers.html

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The assessment was undertaken to investigate farmers’ experiences of the biochar trials, 18 months after the trials had been abandoned (although the farmers still had not been officially informed that the project would not be resumed). Verification of the actual trial results would have been impossible at this stage and was therefore not an aim of this investigation.

Nonetheless, Biochar Fund's claims about the success of the trial deserve scrutiny. As far as the data published from the trial and its analysis are concerned, we are not aware that results were ever submitted to any scientific journal for peer review – they certainly have not been published. Indeed the actual data which listed different yield results from different plots¹⁷ is no longer accessible since Biochar Fund’s website was closed down in early 2011. A debate about the accuracy and significance of the data would therefore have to be based on speculation. There are credible reasons why biochar additions may have resulted in a substantial short-term boost to crop yields. For example, if the soils were acidic, adding alkaline biochar would have led to more neutral soil conditions which would boost crop uptake of nutrients – we note that Mr. Ndameu was told that several of the plots on particularly acidic soils had been abandoned by farmers.. Furthermore, the trial results were seriously undermined by the low rate of trial completion and by the fact that different treatments were not replicated within each of the plots. According to the IBI’s Guide to Conducting Field Trials : *‘3 replicates of each treatment...is the minimum required to conduct statistical analyses of the data, and draw conclusions that will be accepted by the scientific communities.’*¹⁸

No soil analyses were ever published from the trials even though Biochar Fund’s website had reported that *“Soil data are currently being collected and require further analysis.”* The lack of soil analysis means no information was gained about soil properties, nor was it possible to assess whether biochar increased soil carbon levels.

Biochar Fund website also noted that two maize harvests per year were possible in this region and indicated data from the second harvest were forthcoming *« This first harvest closes the first phase of the project. However, the same exercise will now be repeated on August maize, which the farmers will plant on the 15th of this month. Thus, at the end of this year, a set of robust data will emerge which will allow us to draw several definitive conclusions on the effectiveness of biochar.»* No data from this second harvest were published.

From the point of view of biochar research, the trials appear, regrettably, to have been a lost opportunity.

Some claims made by Biochar Fund, for example in the above-cited Mongabay interview in August 2010, were clearly contradicted by the findings of this field assessment and, in some cases, also by the brochure given to farmers at the start of the trial:

Firstly, at the time the time Biochar Fund’s claims were made in 2010, according to the persons interviewed, research was not ongoing but had been abandoned at least eight months previously. The brochure given to farmers stated that only a 3-month long actual field trial had been planned and that the project would end in 2009, though funding for a new, larger project would be sought and farmers interviewed remained under the impression that they could expect this to be forthcoming. When Biochar Fund published their interim (but so far only) results, they promised: *“The results from the second maize sowing of the year (to be harvested in the next few weeks) will show whether the yields improvements continue.”*¹⁹ According to the project timeline given in the brochure, it appears that no collection of maize from a second harvest had been planned and from what the field interviews suggested, none took place.

The Biochar Fund's enthusiastic initial reports and 'interim result's were followed by a complete lack of further information about the trial or any future plans and then by the disappearance of Biochar Fund’s website in early 2011.

Secondly, the figure of 1,500 farmers is contradicted both by the information provided from field interviews and by the brochure which was given to farmers and which states that only 75 farmers would have been involved in the trials, with a possibility of 500 being involved in a larger 2010 project which, as we now know, has not occurred.

¹⁷ This data had been presented on the now defunct Biochar Fund website.

¹⁸ www.biochar-international.org/sites/default/files/IBI%20Biochar%20Trial%20Guide%20final.pdf

¹⁹ <http://www.carboncommentary.com/2009/10/01/761> and text from www.biocharfund.org downloaded April 2011

Thirdly, the trials did not show whether or not biochar could be produced and applied in a sustainable manner. This is partly due to the lack of scientifically verified and verifiable data and evaluation and partly due to the short duration of the trial (with the results published by Biochar Fund relating to only a 3-month period). The “sustainability” of biochar production cannot be assessed from the Cameroon trials since no information was made available about the materials and methods used, including how much biochar had been used in total and how much biomass feedstock had been charred – and thus how much feedstock farmers could expect to require if they were to adopt biochar as a future farming method. Furthermore, since the trial was discontinued after just a few months, no information was obtained to show how long observed yield benefits would have lasted and thus how often biochar would need to be applied to the soils in the trial area to maintain soil fertility. This means that the longer-term need for biochar feedstock remains unknown. It is clear that farmers were not prepared to carry forward with biochar. The setup of the trials did not, include any training or involvement in biochar production on the part of local farmers, who entirely relied on external inputs which were no longer available after the trials were abandoned. Out of the 11 CIGs contacted for the field study, only one, the CIG in Teke, appears to have subsequently made a small quantity of biochar for growing chili peppers.

Fourth, while it appears from the field interviews that farmers had not been trained in any methods for making biochar, the benefit of any such training based on the cheap and inefficient method used for the project would have been questionable. This is because the single barrel charcoal making method used has a reported efficiency rate of just 5-10%²⁰ and could not have been adapted to meet Biochar Fund's declared aim of alleviating energy poverty, since no energy can be recovered from the single barrel charcoal making process used.

Finally, the trials did not in any way prove whether or not biochar use could be profitable for farmers. Farmers made no financial gain from the project, even though local farmers' groups gave up a significant amount of time and in some cases donated or rented land which would otherwise have been used for different purposes. In some cases farmers appear to have rented land at their own expense to use for trial plots. No public records of any efforts made by Biochar Fund to obtain funding for continuing the trials exist and we found no indication that applications for public or private funds or for carbon credits to continue the trials were ever made. Below we discuss whether obtaining carbon credits, including through the European voluntary carbon market (as claimed in the brochure given to farmers) would have been a realistic prospect at all. No costs analysis of the trials, including details of the costs of biochar production, was ever published. Indeed, there is no published information providing any indication as to how the Cameroon trials were financed, discussed further below.

Other concerns raised by the this investigation include the fact that farmers were not advised about any health and safety issues or the need for safe procedures for biochar storage and handling. This would include protection from inhalation of charcoal dust and simple soil testing to rule out toxins which can become concentrated in biochar. This latter concern is acknowledged by, among others, the International Biochar Initiative who propose to address it through testing guidelines for biochar specifications.²¹

Were Biochar Fund's claims about carbon offsets by 2010 realistic?

The brochure handed to farmers who participated in the trials stated that the trial results would be presented to the European carbon markets with the aim of starting a larger project including carbon finance in 2010. As we have seen, farmers interviewed had been, and in many cases still were under the impression that imminent carbon finance was a realistic prospect. Soil carbon sequestration is currently excluded from most regulated carbon trading systems and biochar from all of them, so the voluntary markets would have been the only option for Biochar Fund. The prospect of financing a larger biochar project through the European voluntary carbon markets currently seems remote. First, the voluntary carbon markets overall are very small, accounting for less than 0.1% of all carbon credits traded globally.²² Projects related to agricultural soils accounted for only 2% of the voluntary carbon market in 2010. Second, 90% of voluntary carbon offsets are accredited by one of several standards. So far, none of those standards contains a relevant protocol which covers biochar

²⁰ <http://biochar.pbworks.com/w/page/9748043/FrontPage>

²¹ www.biochar-international.org/node/2843

²² www.forest-trends.org/documents/files/doc_2828.pdf

“Biochar Fund Trials In Cameroon Hype And Unfulfilled Promises” by B Ndameu and Biofuelwatch or has otherwise approved any biochar projects.²³ Finally, voluntary carbon offsets were traded at an average cost of \$6 per tonne CO₂e in 2010. This is far below the level that, for example, the U.S. Biochar Initiative predicts biochar could become economically viable if it were to be included in carbon markets.²⁴ Viable voluntary carbon finance for the Cameroon biochar project by 2010 (or indeed for the foreseeable future) would thus have been highly unlikely.

False promises

As the field investigation shows, farmers had been told to expect very positive results from biochar, as well as future funding through carbon offsets. Those who were interviewed and who had participated in and completed trial participation spoke about being impressed with the 'maize yields' from the trial in general and none of them expressed any doubt about what they had been told about the 'positive impacts' to be expected from biochar. Some still had high hopes for biochar, but there was a clear sense of disappointment and of having been let down in view of the abrupt termination of the project and the lack of communication between those who had run the project, especially Biochar Fund, and the local farmers. Even though there is no evidence of any interest on the part of Biochar Fund in reviving the Cameroon project or applying for any type of funding for it, farmers were still, even in 2011, under the impression that what they had been promised initially might still happen and that they might yet be able to benefit financially from biochar and carbon credits.

Who benefited?

Farmers clearly did not benefit much from the trials, financially or in terms of sustained higher crop yields or capacity to improve their yields in future.

Since little has been published about how the Cameroon biochar project was financed, we do not know whether Biochar Fund derived any immediate financial gains from the project. It would appear that the overall project expenses to Biochar Fund and Key Farmers would have been very limited: Farmers gave their time and access to their land for free. Biochar was produced from local feedstock through a cheap if inefficient method, and no data resulting from any (potentially costly) laboratory char or soil analysis was ever published. On the other hand, Key Farmers advised that around 30,000 Euros had been available for the project. However, the ADAPEL/Biochar Fund application to CBFF, for their DR Congo biochar project, states that 45,000 Euros had been made available for the Cameroon project by Biochar Fund and private investors. No information as to where Biochar Fund's investment would have come from, who the private investors were, how the money was spent and whether any of it was exchanged between Biochar Fund and Key Farmers has been made publicly available.

The Cameroon project 'experience' formed part of the successful application by ADAPEL and Biochar Fund to the Congo Basin Forest Fund.²⁵ Yet Biochar Fund (and biochar in general) is just one of a large range of different activities for which its founder director Laurens Rademakers has been raising funds, in many cases successfully, according to his personal website.²⁶ One of those, as mentioned above, is the CBFF funded project by CocoaMasters for passive solar and biomass combo ovens in Cameroon, São Tomé and Príncipe and Equatorial Guinea. Although biochar is not part of that project, it appears to have developed out of contacts made during the Cameroon biochar trials, with CocoaMasters being based in Kumba and members of Key Farmers and their website having been set up by their 'advisor' Laurens Rademakers. The websites of the other two partner organizations in the project were also set up by Mr Rademakers. CocoaMaster's CBFF funding application²⁷ referred to CocoaMasters having received substantial project funds from Biochar Fund and Farmers for the Future (without stating that both belong to the same person, Mr Rademakers) and Key Farmers Cameroon. It is not clear how such funds were raised, given that Key Farmers define themselves as a 'non-profit self help organization' and no information about any funding received by Biochar Fund is available (except potentially through their collaboration with ADAPEL in DR Congo). Particularly interesting is a statement in that application that Biochar Fund and Key Farmers paid CocoaMasters

²³ While some standards, such as the Verified Carbon Standard rely on protocols/methodologies, others, such as the Climate, Community and Biodiversity Standard, accredit projects according to broader principles.

²⁴ <http://www.biochar-us.org/>

²⁵ For the project application, dated December 2008, see http://cbf-fund.org/sites/default/files/ADAPEL_0.pdf . The application was approved in May 2009.

²⁶ <http://laurens-rademakers.com/> , accessed October 2011

²⁷ www.cbf-fund.org/node/262/2nd-Call-Winning-Proposals--

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20,000 Euros for an ongoing biochar project in Cameroon, no recent information about which appears to have been published.

For Mr Rademaker's wider project and consulting business, the benefits from the widely publicized Biochar Fund projects may have been quite significant. He advertises his services on his personal website by stating: "As a project writer I have successfully attracted major funding from some of the world's leading agencies and grant-makers in the very competitive arena which is that of public calls for proposals." Figures cited on his website about his recent 'portfolio' suggest he has obtained a total of \$1.325 million in funds for different projects since 2009, all but \$150,000 of this from 'public calls' and that he has created 13 different NGOs, 8 of them in Africa since 2006 which have each attracted funding and which, between them, employ between 125 and 220 staff.²⁸ Biochar is clearly a very small component in a large and, (according to the figures given on Mr. Rademaker's about his recent activities and successes), financially highly successful consultancy and project portfolio. Nonetheless, Rademaker's Biochar Fund projects appear to have helped him build up networks relevant to other projects and to gain greater credibility with at least one funder (CBFF). The very successful framing of biochar used by Biochar Fund appears to have been adapted by Mr Rademakers for framing other current project activities – for example speaking in terms of the potential for different practices to 'double' output by 'average African farmers'.²⁹

Questions about Biochar Fund's and ADAPEL's project in DR Congo

Assessment of the short-lived Cameroon project raises serious questions regarding Biochar Fund and ADAPEL's CBFF-funded project in DR Congo. Those questions can ultimately only be answered through an independent assessment of that project. The scarce details published by Biochar Fund underline the need for such an investigation :

- Although the CBFF grant was approved in May 2009 and, according to Biochar Fund, the project started in 2010, no data and no interim results have been published anywhere, even though soil scientist Christoph Steiner was to be a project partner and to guarantee soil analysis and scientific research arising from the project, according to the CBFF grant application³⁰.
- With the Biochar Fund website having closed in early 2011, it is not clear to us whether Biochar Fund still exists as a legal entity;
- A video released about the project released in June 2011³¹ only shows pictures relating to the very early project stages, i.e. biochar production and application to soil, even though the commentary alludes to long-term impacts. No evidence that any trial stages have been completed exists.
- According to the 2011 video, an 'Adam oven' (generally called Adam retort) is used for biochar production. Though reported to be more efficient than the simple single barrel method used in the Cameroon project, Adam retorts cannot be adapted to obtain and use energy. The CBFF grant application, however, promised an 'energy package, which introduces an innovative technology, the co-generation of electricity, useable heat and biochar'. CBFF Coordinator Clotilde Louisette Molo Ngomba who is interviewed in the video states that one of the benefits from the project and from biochar is the co-production of energy which will lead to people needing less firewood. Yet the Adam retort technique adopted does not make this possible.
- In the same video, Laurens Rademakers makes claims about the prospect of carbon finance for farmers, similar to what farmers in Cameroon indicated they had been told. Mr Rademakers states : 'There is a genuine market out there. At the moment it is worth about 20 Euros but the rate fluctuates...Getting into the market...can cost as much as 200,000 Euros [per tonne]...We intend to fight for our project on the market and intend to keep our cost down because it is important that the money benefits the poorest farmers around here.' He thus once again suggests that biochar carbon offsets are a viable option for farmers right now, at a time when not a single biochar methodology has been adopted for any carbon trading mechanism.

²⁸ www.laurens-rademakers.com/index.php?option=com_content&view=article&id=49&Itemid=56

²⁹ www.ted.com/conversations/3969/what_should_be_done_about_the.html?c=277584

³⁰ cbf-fund.org/sites/default/files/ADAPEL_0.pdf

³¹ tinyurl.com/brcjuuv (kaltura.endirectv.com)

RECOMMENDATIONS

- 1) Open an immediate investigation into the following projects currently funded by the CBFF, given the questions and concerns raised by this report about the reliability and veracity of claims and information by Biochar Fund and its Managing Director Laurens Rademakers:

ADAPEL: Phasing out slash-and-burn farming with biochar (in which Biochar Fund is a partner)

CocoaMasters CIG: Eliminating fire-wood consumption in the cocoa sector: passive solar + biogas combo ovens (in which Biochar Fund's Managing Director Laurens Rademakers is Project Coordinator)

In the case of the ADAPEL project, the importance of such an investigation is underlined by the fact that videos released earlier in 2011 suggests that there has been no attempt to implement one of the three 'packages', i.e. the 'energy package', for which the project received CBFF funding.

- 2) Investigate the basis on which the ADAPEL project was approved: Various of the claims on which the application was based are either contradicted by biochar field studies or have not been scientifically tested. For example, there is no peer-reviewed field study showing that biochar amendments are capable of raising soil fertility for longer than slash-and-burn farming.

General recommendations to funders, agencies and policy-makers

- 3) Based on the findings of this report as well as the Critical Review of Biochar Science and Policy report, funding for biochar deployment should be suspended since it is not justified by the science.
- 4) Farmers who have given up their time and (at least temporarily) their land for biochar projects including that in SW Cameroon should be compensated.
- 5) Other biochar projects in developing countries should be independently assessed evaluated, including the experience of local farmers who have participated in such projects. So far there appears to have been no other independent evaluation of any biochar project (other than purely scientific trials) in developing countries.
- 6) In general, claims that carbon finance will be gained from projects should be scrutinized to ensure they do not generate "false hopes" among project participants.

ANNEX 1: FORESTS IN SOUTHWEST CAMEROON

Threats to forests in SW Province and the region around Kumba

The biochar project took place in a highly biodiverse part of Southwest Cameroon considered to be part of the Lower West African Guinean Forest 'biodiversity hotspot'.

According to the UN Food and Agriculture Organization, Cameroon has been losing on average 220,000 hectares of 0.9 – 0.99% natural forest cover since 1990.³² According to a report published by the Global Forest Coalition, based on workshops organized by the Institute for Cultural Affairs (Cameroon) in 2009, the main underlying causes of forest loss in the country mentioned by participants are the Structural Adjustment Programme leading to greater poverty and thus more forests being converted to farmland, and an increase in rubber and oil palm plantations.³³

³² <http://rainforests.mongabay.com/deforestation/2000/Cameroon.htm>

³³ Getting to the Roots : Underlying Causes of Deforestation and Forest Degradation and Drivers of Forest Restoration, Global Forest Coalition, 2010, www.globalforestcoalition.org/wp-content/uploads/2010/11/Report-Getting-to-the-roots1.pdf

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A previous World Bank report in 2001, by Essama-Nssah and Gockowsky,³⁴ had listed timber exploitation, slash and burn agriculture, conversion of forests land into large scale plantations and gathering of firewood for households as drivers of forest destruction and degradation, suggesting that “agricultural expansion contributes between 85 to 95% in Cameroon.”

The environmental situation in the Southwest Region in general and Kumba area in particular is concerning. For the last two decades, the economic crisis which started in the 1980s has affected the economy of the entire nation and of this population in particular. The economic situation has impacted on earnings from cash crops and falling disposable incomes amongst rural communities whose livelihoods solely depend on agriculture. A Structural Adjustment Program imposed by the International Monetary Fund (IMF) and the World Bank, has impacted on Kumba by drastically increasing the number of local residents: People have had to leave nearby villages to move to Kumba, the main town, in search of new livelihoods from activities such as trading, driving or working for companies based in the town. It is now recognized that Kumba (K-town as it called colloquially) is the largest city in the Southwest Region, with 150, 000 inhabitants. This has also impacted severely on the surrounding environment as Kumba has become one of the main trading centres for cocoa and palm oil grown in the region. The forest in the Meme division has been progressively degraded by human activities in the quest for land. Lands available in Kumba and around are either converted to cash crops plantation (oil palm, rubber and cocoa plantations) or to food production.

In 2003, the Mount Cameroon Technical Operational Unit (TOU) was created by law signed by the Prime Minister. It covers three divisions (departments) of Southwest Cameroon, Fako, Meme and Ndian, and an area of 248,000 hectares. Kumba and its surrounding area is located in the Meme Division and thus inside the Mount Cameroon TOU. Forests within the Meme division include the highly biodiverse Southern Bakundu Forest Reserve (south-west of Kumba), with an area of 19,425 hectares. Part of the biochar trial area, and some of the farmers interviewed, were located inside and in the vicinity of this forest reserve.

The South Bakundu forest reserve: Continuous degradation due to poor management

Pressures on the South Bakundu forest reserve are alarming. Uncontrolled clearing for farming, harvesting of forest products and illegal hunting have led to ongoing depletion of natural resources and forest degradation. They have dramatically affected the equilibrium of the forest ecosystem. Restrictions on the use of and access to the forest reserve are not respected or enforced. Poor management practices are amongst the main factors which impede the protection of the forest.

Large areas of land in the Mount Cameroon TOI have been devoted to corporate agro- and timber business activities, especially rubber and oil palm plantations. Many of those plantations are owned by the Cameroon Development Corporation (CDC). Efforts to protect the Bakundu Forest Reserve are ineffective and poor management has severely affected the state of the forest reserve.

Industrial logging activities: Not good governance

Forest exploitation is an important economic activity within the Mount Cameroon TOI, including Meme division. Timber concessions have been the privilege of domestically and foreign owned logging companies. In 1996 for example, 8 logging companies were officially registered in Kumba. It has been reported that Asian logging companies, which have been operating in Cameroon since 1997, have also been active in the Meme division through local partners like the Mukete Plantations Company. Logging companies activities' have largely disregarded legal requirements and created social conflicts. In 2001, Transformation Reef Cameroon (TRC), a logging company which is still active in the Meme and Koupé-Manengouba divisions, and which owns the largest sawmill in the Southwest Region, was accused by inhabitants of four villages from two divisions for having destroyed their cash crops during logging and road building. The compensation process took place 5 years later and the sum of 20 million CFA (30,490 Euros) was paid to those villagers. Even though the compensation process took place, the chief of Ediki village, Mr Samuel Etonegwe said to the TRC representative: “*We suffered great damages when your company carried out activities in our village.*”

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This token cannot cover the loss we incurred. We do appreciate it anyway because I believe my people will use it to improve and extend farmlands. All our families depend solely on our farms."

Villagers experiences and views of the pressures on forests

From the perspective of the villagers interviewed, the main observed pressure on forests in the area is the quest of land for agricultural activities. This view was expressed by Mr Leke of Kosala, who told us: *"Look, from the road we see that the Bakundu forest reserve is beautiful; if you go inside what you will see will be completely different. People have cut down trees to create farms and the forest department here is doing nothing. All the resources found there in the past have been destroyed."*