Quantification understanding and prediction of carbon cycle and other GHG gases in Sub Saharan Africa

4-Monthly NewsLetter

Special Issue!

No. 8: September 2009

CONTENTS

Special Issue on Research Activities Carried Out by African Students and Young Researchers

Editorial

Dear reader,
We are very pleased to present the CarboAfrica NewsLetter N. 8. This is a special issue mainly dedicated to the work of African students and young researches in the field of climate change, greenhouse gases, forestry, biomass and related subjects in Africa. CarboAfrica has been already proactive in supporting training activities aimed at forming the next generation of African people expert in environmental issues. The young will face the most of the consequences of global change and they will be the decision makers of tomorrow. It is therefore very important to have the highest number of young people playing an active role in environmental protection and sustainable development at the same time. We believe that the contributions showed in this special issue are of great value and are the demonstration that many efforts have been already done towards the right direction. With this NewsLetter we intend to give visibility to these efforts.

The CarboAfrica Secretariat

The role of post logging forest treatments in a climate change era

Winston A. ASANTE
Kwame Nkrumah University Of Science and Technology, KNUST, Kumasi, Ghana

Forests play a major role in the economy and national development in Africa. It also provides livelihood resources for a great and poor majority of the population in Africa who predictably, are most vulnerable to climate change impacts and will definitely need the forests as lifeline for their adaptation to climate change.
In Ghana, nearly all of the timber resources come from the high forest in the south-west of the country. The southwestern part also represents the best cocoa growing area. However, with 80% of off-reserve areas having been cleared for agriculture, settlement etc, the forest reserves represent the only permanent forest estate and therefore, the most important source of forest produce.
In spite of the dependence on the forest for timber and other services, satellite imagery shows that the forest reserves in Ghana are still largely intact sixty years after reservation. , a closer look often reveals a much degraded resource, both in structure and content. This situation has often been attributed to logging.
Logging activities disturb the soil properties which affects plant regeneration, and also the future carbon stocks of the forest. However, regeneration following selective logging is increasingly becoming critical, due to nutrient losses and compaction. Whiles observed inability of the forest to completely regrow in the 40 years felling cycle for some logged forest reserves, raises major concerns about the sustenance of the forests to continually provide goods and services to dependent communities, and at the same time serve as the country's major source of timber.
In the face of all these concerns, much less emphasis has been placed on how forest ecosystems and dependent communities may adapt to this change, even though IPCC encourages "planned adaptation",

that is deliberate steps aimed creating the capacity to cope with climate change impacts. As a result, it is hard to identify the roles and potentials of tropical forests to reduce the vulnerability of ecosystems and society to climate change impacts.

There is therefore the need to mainstream forest ecosystem management strategies as a means of responding to climate change adaptation. Which will ensure the continual flow of ecosystem goods and services. One means is through soil scarification which been noted to improve on natural regeneration, and thus hastening forest recovery.

Scarification trails in the high forest of Ghana have resulted in marked improvement in regeneration, sending a clear signal that it is time for post logging forest treatments which will go beyond the use of selective logging as the only silvicultural system, to complement other management options.

The alarm bells have been sounded and the signs are clear, climate change is real and the forest reserves, our only permanent forest estate can and should be used to adapt. More importantly now that the current management practice does not ensure good recovery before the next felling cycle, and in the wake of current climate change concerns. There is the need to actively manage forests and rehabilitate degraded areas, as a way of focusing more on anticipatory adaptation, rather than a reactionary one.

Establishing the first three suitable charcoal tree species in Kintampo North district of Ghana. An urgent response to loss of biodiversity.

Akwasi ASAMOAH[1], Charles ANTWI-BOASIAKO[1], Kwasi FRIMPONG-MENSAH[1], Gifty AHADJOR[1] and Dohan M. SOMA[2]

[1]Kwame Nkrumah University of Science & Technology, Kumasi, Ghana, asamoah38@yahoo.com

[2]Institut de l'Environnement et de Recherches Agricoles

Charcoal tree species have been named preferred in the Tahiru kura, Atta kura and Kaaka communities of Kintampo North district of Ghana simply because charcoal producers have used them over time on availability (Blay et al, 2007) and not because they have special suitability for charring. For effective management, there is the need to scientifically select charcoal tree species. Hence the aim to select first 3 suitable charcoal tree species out of 10 presently exploited ones in the above communities based on energy profiling and bio-physical attributes. This project seeks in each of the above-mentioned three communities to:

1. Identify the first 10 tree species preferred for charcoalling.
2. Establish the first 3 suitable charcoal tree species based on energy profiling.
3. Enumerate the first 3 suitable charcoal tree species.
4. Determine the physico-chemistry of the soil on which the first 3 suitable charcoal tree species thrive.

This project is of the conviction that:

1. The above three communities have tree species preferred for charcoalling.
2. The above three communities could prefer some tree species out of the whole lot of tree species preferred for charcoalling based on energy profiling.
3. The above three communities would know how to sustainably use first 3 suitable charcoal tree species if they knew how much of them is growing in the wild.
4. The above three communities could easily plant the first 3 suitable charcoal tree species if they knew which types of soils they thrive on.

After implementation of each objective in each of the above-mentioned three communities:

1. A list of the first 10 charcoal tree species (which satisfies hypothesis 1).
2. A map of the gross calorific values and the ash contents of the first 3 suitable tree species (which satisfies hypothesis 2).
3. A map of the stock of the first 3 suitable tree species (which satisfies hypothesis 3).
4. A map of the physico-chemistry of soil under which the first 3 suitable tree species thrive (which satisfies hypothesis 4).

Contribution du parc agroforestier a *Faidherbia albida* (Del.) A.Chev. de la communaute rurale de Touba Toul a la sequestration du carbon et a l'adaptation aux changements climatiques (Sénégal).

Patrick M. ONDO OKAMA et Cheikh MBOW

Institut des Sciences de l'Environnement, Laboratoire d'Enseignement et de Recherche en géomatique, Faculté des Sciences et techniques, Université Cheikh Anta Diop de Dakar-Sénégal. Mail: ondookama@hotmail.fr; cheikh1.mbow@ucad.edu.sn

La communauté rurale de Touba Toul est située dans l'ancien bassin arachidier du Sénégal et a été la zone de production exclusive de l'arachide. Cette zone a connu une baisse généralisée de la pluviométrie et une hausse des températures moyennes annuelles depuis les années 1970. L'application de politiques agricoles peu adaptées s'est traduite par une dégradation du couvert arboré et de la fertilité du sol. La présence d'un parc à *Faidherbia albida* (Kad en Wolof), permet avec sa phénologie inversée (perd ses feuilles en saison des pluies) une restauration de la composition organique du sol. Cette pratique agroforestière permet de maintenir une bonne production agricole et à soutenir la résilience des populations face aux changements du climat.

L'agroforesterie contribue à la fois à l'atténuation et l'adaptation aux changements climatiques qui sont les deux piliers de la CCNUCC. Ce travail a pour but d'évaluer le potentiel des systèmes agroforestiers issus du maintien du Kad dans les champs (Figure 1), en termes d'atténuation et d'adaptation aux changements climatiques. Pour l'instant nos activités de recherche, financées par le programme START (PACOM-2008), n'ont pas de liens directs avec CarboAfrica et on souhaiterait que les résultats contribuent à cette importante initiative.

La méthode a consisté à un inventaire des ligneux dans trois parcelles d'un hectare et distantes de 450m (Figure 1). Les paramètres mesurés sont le diamètre (DBH) et la hauteur (H) de l'arbre (calculée par la méthode trigonométrique au moyen d'un clinomètre via la relation H=L tan + h). Des régressions allométriques ont permis de déterminer la biomasse aérienne. La biomasse racinaire a été calculée en utilisant un facteur de conversion par défaut. La biomasse totale a été convertie en Carbone (C) en utilisant le facteur par défaut 0,5 proposé par l'IPCC.

Ci-dessous présentées les équations utilisées :

Biomasse aérienne (kg/ha):

$Y=EXP^{(-1,996+ (2,32*lnD))}$ (r^2=0,89), avec D le diamètre hauteur de poitrine (Brown *et al*., 1997)

Biomasse racinaire1 (kg/ha):

Y=EXP (-1,0587+0,8836*lnBA), avec BA la biomasse aérienne. (IPCC., 2003)

Biomasse racinaire2 (kg/ha) :

Y=BA*0,28, avec 0,28 un facteur de conversion quand BA>20 t/ha. (IPCC., 2006)

Le stock moyen de carbone du parc agroforestier de la zone étudiée est de 30,42 (tC/ha). En outre, la production moyenne de biomasse aérienne s'apparente aux valeurs du GIEC des plantations de forêts tropicales sèches, 30 à 70 t.ms/ha (GIEC, 2003).

A l'aide d'un SIG, nous avons rectifié une image de la zone d'étude datant de décembre 2002 capturée sur Google Earth ; puis une digitalisation des couronnes des arbres a été effectuée. Un taux de couverture de 5,5 % et une densité arborée à l'hectare de 7,31 ont été obtenus.

Des interviews semi-structurées sur des groupes cibles ont permis d'avoir la perception générale du parc à *Faidherbia albida*, et de faire une évaluation participative des options d'adaptation aux changements climatiques. Les interviewés ont une perception positive du kad. Les populations sont conscientes de la variabilité climatique et identifient le vent et surtout le déficit pluviométrique comme facteurs climatiques néfastes pour la production agricole. Parmi leurs réactions à ces stress, on a noté, des stratégies communautaires d'anticipation (protection de jeunes kad, diversification des intrants agricoles et pastoraux, utilisation de variétés à cycle végétatif court) ; mais surtout des stratégies réactives dont la vente du bétail, l'abreuvement du bétail à partir de l'eau du robinet, le recours aux prêts et microcrédits, abandon de certaines terres par manque de semences, les stratégies d'évitement du stress, l'exode rural et la prière.

Bibliographie

Brown S., 1997. Estimating Biomass and Biomass Change of Tropical Forests: a Primer. (FAO Forestry Paper -134). Roma, 48 p.

Groupe d'experts Intergouvernemental sur l'Evolution du Climat (GIEC). 2003. Recommandation en matière de bonnes pratiques pour le secteur de l'utilisation des terres, changements d'affectation des terres et foresterie, 594p.

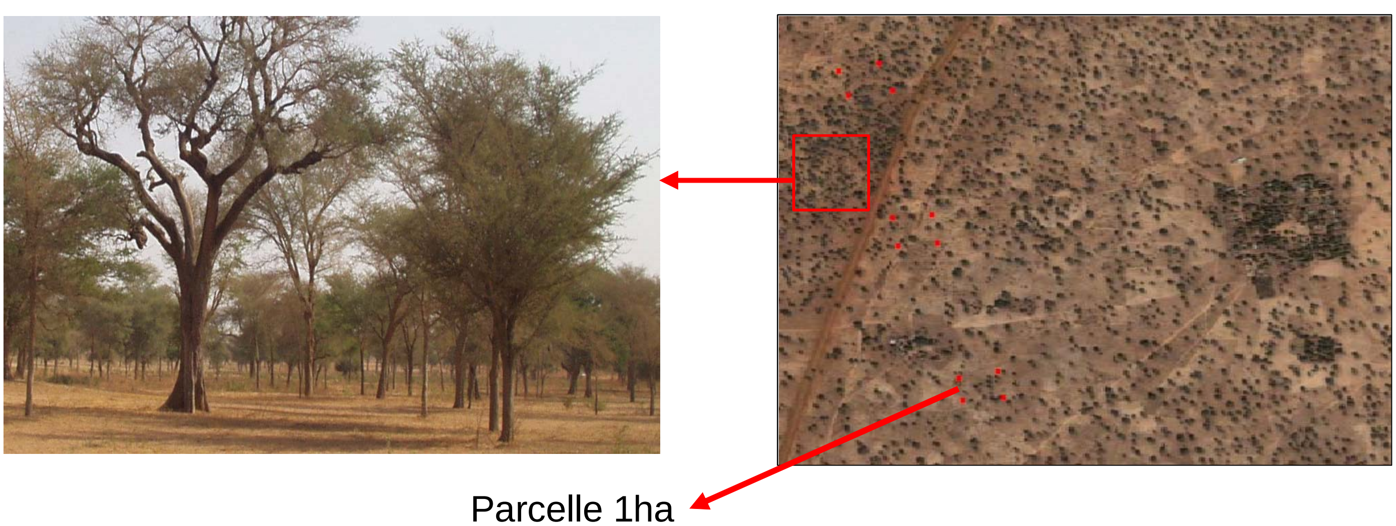

Figure 1. Structure et physionomie du parc à Faidherbia albida.

Groupe d'experts Intergouvernemental sur l'Evolution du Climat (GIEC).2006. Lignes directrices 2006 du GIEC pour les inventaires nationaux de gaz à effet de serre. Volume 4. 801p.

Carbon storage in cocoa agroforest at the peri-urban area of South-western Cameroon: an opportunity to mitigate climate change

Nathalie S. EYOHO EWANE[1,2], Denis J. SONWA[3], Stephan F. WEISE[4], Bernard. A. NKONGMENECK[2]

[1]International Institute of Tropical Agriculture, Sustainable Tree Crops Program (STCP), IITA-Cameroon
Email: nathewane@yahoo.fr

[2]Department of Vegetable Biology and Physiology (BPV), Faculty of Science, University of Yaounde I, Yaounde-Cameroun

[3]Center for International Forestry Research (CIFOR). CIFOR-Cameroon

[4]International Institute of Tropical Agriculture, Sustainable Tree Crops Program (STCP), IITA-Ghana.

Key Words: Carbon stock, agroforest, mitigation, Kumba, Cameroon.

Carbon stocks assessment in different forestry or agroforestry land uses, offers possibilities of knowing their potential in climate change mitigation program. These assessments can give opportunities to use these forest/agroforest lands within the framework of the CDM (Clean Development Mechanism) and REDD ("Reducing Emissions from Deforestation and Degradation"). Cocoa agroforest, such as the one found in South West Cameroon, could store important quantity of carbon beside their main function of producing cocoa and provide livelihood to farmer. In Cameroon, many studies on carbon stock have been carried out in the Center and Southern Cameroon (Zapfack et al.. 2002; Sonwa 2004).

The south-western Cameroon is the youngest and the most fruitful cocoa basin, and is an ecological zone with diverse characteristics compared with those of the Center and South. A cocoa agroforest in this part of Cameroon presents cocoa trees and associated plants including timber trees, fruit trees and medicinal plants. This study evaluates carbon stocks in the cocoa agroforests at the periphery of Kumba, the principal town of the cocoa agroforest in south-western Cameroon. 10 cocoa agroforests in total were chosen according to their age (0-25 years, 26-40, and 40 years above). In each cocoa agroforest, 4 quadrants of 25 m x 25 m were measured and the DBH of all trees above or equal to 2.5 cm (Sonwa, 2004) were listed and identified using Vivien and Faure (1986) and with the assistance of an advisor, resident of the village. The species which could not be identified on the spot were collected, treated and carried to the Systematic Ecology Laboratory of University of Yaounde I. The biomass of forest/fruit trees is evaluated using Brown et al. (1997) allometric formula. The biomass of Musaceae is evaluated according to the Arifin formula (2001). The biomass of palm trees (Arecaceae) were measured using Frangi and Lugo (1985). Conversion to carbon stock was done using the recommendation from Nolte and Al.(2001).

On average, cocoa agroforest around Kumba stores 74 tC/ha. In agroforest, the main plant is cocoa tree which stores 53% of this quantity. Associated trees store 47%. Within associated plants, timber trees, edible (fruit trees) and other plants including medicinal trees store respectively 45, 41 and 14%. Timber stores about half of carbon of the associated plants. These associated species in addition to the carbon stock have other socio-economic and ecological functions. And their presence offers opportunities to explore their role and contributions in the REDD+ (The new REDD concept that is now trying to avoid deforestation associating it with the forest conservation, sustainable forest management and enhancement of carbon storage).

From the above observation, it is significant to diversify a cacao farm because in addition to serving as an opportunity to mitigate damage from the climate, diversification can also provide alternate income through the production of non-forest timber products, firewood and medicinal values from some medicinal plants. In essence, diversification would improve the livelihood of smallholder farmers. However to integrate these in the mitigation programs, it would be necessary to:

1. Take into account the carbon market (mainly in the CDM and the REDD);
2. Develop sustainable mechanisms for the management of the multispecific systems;
3. Develop approaches to remunerate the smallholder farmers for their environmental services (carbon, biodiversity maintenance, etc).

References

Arifin J.2001.Estimasi cadangan C pada berbagai sistempenggunaan lahan di kecamatan Nganatang, Malang. Skripsi-S1. Unibraw, Malang.

Brown, S. 1997. Estimating Biomass and Biomass Change of Tropical Forest: a Primer. (FAO Forestry Paper-134).55pp.

Nolte, C., Kotto-Same, J., Moukam, A., Thenkabail, P.S., Weise, S.F., Zapfack, L. 2001. Land use characterization and estimation of carbon stock in the alternative to slash and burn benchmark area in Cameroon. Resource and crops management research monograph 28. IITA, Ibadan.

Sonwa D. 2004. Biomass management and diversification within cocoa agroforests in the humid forest zone of southern Cameroon. PhD

Thesis. Institut fur Gartenbauwissenschaft der Rheinischen Friedrich-Wilhelms-Universitat Bonn. 112p.
Zapfack L Engwald S., Sonke B., Achoundong G. and Birang A Madong. 2002. The impact of Land Conversion on plant biodiversity in the Forest Zone of Cameroon. (Biodiversity and Conservation 11).

Acknowledgements
This work was supported by MARS Inc, the Sustainable Tree Crops Program (STCP, www.treecrops.org) hosted by the International Institute of Tropical Agriculture (IITA. www.iita.org), and Food For Progress 2005 (FFP05 with the support of the USDA). The authors thank the smallholder farmers of the villages visited for their time and contributions to the field work. This is part of a Master work of the first author (Nathalie S. Eyoho Ewane) who is also a Master student at the University of Yaounde (Cameroon).

The impacts of harvesting on the carbon balance of mangrove forests

Joseph K. S. LANG'AT, Mark HUXHAM, James KAIRO, Maurizio MENCUCCINI

The study is part of a five-year project "Mangrove forests potential carbon sinks for mitigating climate change", being implemented at Gazi bay, Kenya, by Earthwatch Institute, Kenya Marine and Fisheries Research Institute and Edinburgh Napier University

Mangrove forests are among the most productive ecosystems and hence have significant influence on carbon (C) cycling of coastal regions and the livelihood of human communities relying on these resources. Due to slow decomposition of organic materials in sediments, mangroves may be more effective carbon sinks than terrestrial forests, trapping carbon in sediments as peat. Apart from acting as carbon sink, peat formation in mangrove ecosystems has the added advantage of contributing to surface elevation, thereby helping mangroves to keep pace with the projected sea level rise. Furthermore, the rates of soil respiration and organic C oxidation (which are significant components of forest ecosystem carbon cycling) in mangrove sediments are generally lower than in terrestrial forest soils due to anaerobic conditions. However, the contribution of mangrove forests to the carbon cycle and the factors influencing C emissions from sediments are not well known, therefore, the carbon balance of these ecosystems requires further study.

Despite the important ecosystem functions of mangrove forests, they are being degraded at alarming rates, notably through overexploitation. The projected sea level rise due to the effects of global climate change poses another threat to the survival of mangroves. Continued degradation of mangrove forests destabilizes the carbon balance in the mangrove ecosystem. This does not only lead to reduced carbon sequestration, but also to the release of carbon stored in trees and sediments to the atmosphere. However, there is limited information on how overexploitation, affects the carbon cycling in the mangrove ecosystems. Therefore, this research project aims to quantify the effects of harvesting on carbon stocks and greenhouse gases (GHGs) emissions in a tropical mangrove ecosystem. The following hypotheses will be tested;
Mangrove harvesting has no effect on
- gas fluxes from mangrove sediments,
- belowground biomass and
- rates of root decomposition in mangrove sediments
- rates of sediment accumulation
- surface elevation changes

The research is being carried out at Gazi bay (4°25'S and 4° 27' S; 39°50'E and 39° 50' E) in the south coast of Kenya, ~ 55 km south of Mombasa city. The experimental site comprises of a secondary mangrove forest dominated by *Rhizophora mucronata* (Lam), within which 10 plots each of 12 x 12 m^2 were selected. Five of the plots will be subjected to cutting treatment. All the trees in the cut plots will first be girdled and subsequently harvested. Monitoring will continue for at least 18 months.
Fluxes of major GHGs; CO_2, CH_4 and N_2O (determined using the static chamber technique); from cut and control plots will be compared. Samples collected after girdling but before harvesting will be used to assess proportions of autotrophic and heterotrophic respiration. Belowground biomass and root decomposition rates will be estimated using coring and root bags burial techniques, respectively. Other variables to be determined include surface elevation/subsidence, macrofauna biodiversity and natural regeneration.
The research project is expected to come up with an economic model of mangrove forests under harvesting and reforestation regimes. Secondly, it is expected to demonstrate effectiveness of using mangrove forests for REDD (reduced emissions from deforestation and degradation) scenarios. Finally, a carbon budget of Kenyan mangroves will be developed and the factors influencing carbon sequestration of mangrove forests will be identified from literature review.
Preliminary results show that the forest has a stand density, DBH (diameter at breast height) and height of 4417±330 stems/ha, 5.2±1.2 cm and 5.3±0.4 m respectively. CO2 fluxes reported here (Table 1) were higher than those reported for mangrove forests

in the eastern indian ocean (0.2-1.5 µmol $CO_2/m^2/s$), but lower than for terrestrial forests (2.1-14.1 µmol $CO_2/m^2/s$).

Indoor monitoring and assessment of volatile organic compounds

Modinah A.O. ABDUL RAHEEM, Folahan A. ADEKOLA, Elizabeth J. SALAKO, Jamiu ILEASU
Department of Chemistry, University of Ilorin, Nigeria.

Volatile Organic Compounds (VOCs) are a range of high vapour pressure flammable gases from certain solids and liquids which can easily vaporize at room temperature. This includes a variety of chemicals, some of which may have short or/and long term adverse health effects when inhaled e.g. benzene is a probable human carcinogen and toxic; formaldehyde is both an irritant and a sensitizer.
VOCs from out-gassing of fabrics, building and automobile materials etc. are an important contributor to sick building syndrome (SBS). VOCs such as hydrocarbon emissions from cars and trees are important contributors to photochemical smog.
Everyday, large quantities of VOCs are emitted into the atmosphere from both anthropogenic and natural sources. However, concentrations of many VOCs are consistently higher indoors than outdoors. The formation of gaseous and particulate secondary products caused by oxidation of VOCs is one of the largest unknowns in the quantitative prediction of earth's climate on a regional and global scale, and on the understanding of local air quality. To be able to control and model their impact, it is essential to understand the sources of VOCs, their distribution in the atmosphere and the chemical transformations which remove them from the atmosphere.
Monitoring and assessment of indoor VOCs using a combination of field measurement and analytical tools referred to as Toxic Organic Method (TO-14) were carried out in private automobiles using 8 motor cars (one as a control) of two brands (Toyota and Mercedes Benz) under two different conditions (sunlight and shade).
The adsorbent tubes used were of dimension 12cm by 6mm filled with 0.5g activated charcoal packed between small pieces of glass wool capped before and after 10 litres of air were adsorbed from inside each of the sampling population used at the rate of $0.2Lmin^{-1}$.
Desorption of VOCs were done using methanol as solvent and carbon disulphide as eluent in the reversed direction to the air sampling flow at a controlled rate of $0.5cm^{-3}min^{-1}$.
The Gas chromatography showed between 10 and 20 spectrum lines for vehicles inside the sun and between 6 and 8 lines for vehicles under shade with over 200 compounds identified by Mass spectrophotometer. The concentrations of VOCs were found to be higher in other samples (no ventilation) than that of control (ventilated) sample.
To all vehicles, irrespective of brand, model, sun or shade 9 – octadecenamide was common, while benzene,1 – acetyl - 4 - (4 propylcyclohexyl) and Di - n – octyl phthalate were common to all Toyota brand irrespective of their brand and model whereas hydroxyl alkyl ester and carboxylic acid were common to vehicles under shade.
It is however noted that there are other VOC's compounds that are not common either to brand or model but are particular to individual vehicles which confirmed were due to off – gas of specific materials inside the cars which were exacerbated by heat. These VOCs noticed may have short or long term adverse health effects on the vehicles owner if bio-

Variable	Depth profile	Mean ± SE
Gas fluxes		
CO_2 (µmol/m²/s)		1.8±0.6
CH_4 (nanomol/m²/s)		3.8±1.8
N_2O (nanomol/m²/s)		0.09±0.02
Live root biomass (t/ha)	0-20 cm	8.6±2.0
	20-40 cm	11.1±1.2
Necromass (t/ha)	0-20 cm	14.5±2.4
	20-40 cm	13.3±2.0
Sediment organic carbon (%)	10 cm	8.4±0.6
	40 cm	9.1±0.5
Phosphates (ppm)	10 cm	2.3±0.3
	40 cm	2.1±0.3
Nitrates (ppm)	10 cm	1.9±0.2
	40 cm	1.9±0.2
Ammonia (ppm)	10 cm	9.4±0.7
	40 cm	6.2±0.9
Salinity (‰): *Dry season*	10 cm	46.5±0.7
	40 cm	46.6±0.4
Wet season	10 cm	32.5±0.8
	40 cm	38.3±1.4
*Surface elevation/subsidence (mm/month)		- 0.6±2.1
Sediment accretion (mm/month)		2.7±0.9

*Table 1. Belowground biomass and sediment physic-chemical properties in a secondary mangrove forest at Gazi bay, Kenya. *Negative values indicate subsidence.*

accumulated and therefore harmful to human health in general.

Mass Peak	Base Peak	Molecular Weight	Molecular Formular	Compond Name
108	59.00 (716515)	281	$C_{18}H_{35}NO$	9 – Octadecenamide
52	57.05 (207734)	390	$C_{24}H_{38}NO_4$	Di – n – Octyl phthalate
67	229.20 (133790)	244	$C_{17}H_{24}O$	Benzen, 1 – acety 1- 4 – (4-Propylclohexyl
50	74.05 (157372)	270	$C_{17}H_{34}O$	Pentadecanoic acid.
76	355.00 (371690)	592	$C_{16}H_{48}O_8Si_8$	*Cyclooctasilox ane Hexadecamethyl
61	74.05 (288155)	270	$C_{17}H_{34}O_2$	*Hexadecanoic acid methyl ester
19	59.05 (83996)	278	$C_{14}H_{30}O_3S$	*Sulfurous acid, 2 –ethylhexyl isohexyl ester

*Table 2. Spectrum lines description of some common / non common VOCs in automobile indoor air (from our results). *Non common VOCs (specific to some vehicles due to their interior decorations and deodorants).*

The UN-REDD, a framework to support the REDD mechanism

Matieu HENRY[1,2,3]
[1]Department of Forest Environment and Resources (DISAFRI), University of Tuscia, Italy
[2]Institut de Recherche pour le Developpement, IRD, France
[3]AgroParisTech-ENGREF, France

From 9 to 11 September 2009, the FAO hosted the UN-REDD workshop which aimed to identify the states of 10 countries in establishing national forestry inventories and systems for monitoring, reporting and verifying forest changes and its associated carbon stock changes. Based on a solid comprehension of the different contexts and available tools, the UN-REDD will propose a tool-kit to support their activities. The UN-REDD initiative was launched last September and aims to support the countries to establish a favourable framework to decrease the emissions of greenhouse gases from deforestation and forest degradation. As for that, the United Nations support the countries in establishing forest inventories and establish adequate and necessary forest policies.

The United Nations and 10 non-Annex I tropical countries decided to collaborate and exchanged their point of view during the workshop. The experiences were particularly rich for the agent of the United Nations and for the representatives of the countries. On one hand, the context of the different countries is particularly different and the programme will take it into consideration and integrate it into the most efficient way. The experience from some of the countries will help the other countries. As for example, Bolivia does not have a national forest inventory while Vietnam already established forest inventories and is now building scenario of reference based on a combination of satellite imageries. When considering African countries, the forest inventory of the Democratic republic of Congo is going to start and represent an important challenge for the UN-REDD. Zambia already established a forest inventory in partnership with the FAO. Tanzania is implementing forest inventories in partnership with local communities and building capacities in the rural areas to achieve the field measurements.

Most of the discussions were focusing on the various technical aspects concerning remote sensing methods, identification of the various vegetation forms and its spatialization, the different methods of classification and stratification, the optimisation of the sampling methods and the different already existing forest inventories.

A good comprehension of the negotiation framework of the climate change convention and of the already available tools of the IPCC allows the implementation of a programme which is enough robust scientifically and admits the monitoring, the reporting and the verification of forest area changes and its associated carbon changes.

More information:
http://www.undp.org/mdtf/UN-REDD/overview.shtml

Identification and quantification of forest degradation: a complex equation

Matieu HENRY[1,2,3]
[1]Department of Forest Environment and Resources (DISAFRI), University of Tuscia, Italy
[2]Institut de Recherche pour le Developpement, IRD, France
[3]AgroParisTech-ENGREF, France

From 8 to 10 September 2009, the FAO hosted a Technical Meeting on “Assessment and Monitoring of Forest Degradation”. The objectives were to identify the different forms of forest degradation, its associated definitions and to identify guidelines for its quantification. Organized by the Forestry Department of the FAO, this meeting brought together international experts working on various thematics linked with forest degradation: biodiversity, carbon, bush meat, etc.

Forest degradation is not new. However, its quantification is becoming necessary with the development of the REDD mechanism and the identification of the various forms of degradation and its impacts on environmental services is a preliminary step. Forest degradation is one step in the process of deforestation and affect global environment by contributing to greenhouse gases emissions. Today, forest degradation and deforestation contribute for about 15-25% of the total anthropogenic emissions. The total area of degraded forests and forest lands in tropical countries has been estimated to be as high as 800 million hectares, or 20 % of the global forest area. The consideration of forest degradation within the climate negotiations would mitigate the process and allow improvement of forest management.

However, forest degradation is not only a carbon story. On one hand, the increase of logging activities facilitates the access to remote forest and hunting activities that, when not well controlled, leads to a decreased availability of bush meat. Forest degradation, from logging activities and slash and burn activities, leads to a decrease of the biodiversity and in some cases up to the extinction of certain animal and plant species. Canopy opening facilitates the development of invasive species that limits the regeneration of native species.

The use of remote sensing allows the identification of forest degradation in the case of logging activities in Brazil. However, this technique is limited to identify certain forms of forest degradation in Madagascar.

The meeting allowed to underline the gaps when identifying the various forms of degradation, which is the main limit for a global assessment.

The meeting ended with the following conclusions:

- Endorsement of generic definition of 'forest degradation' as a reduction in the capacity of a forest to provide goods and services;
- The many different aspects of forest degradation should be communicated better to the climate change negotiators;
- Attention should be focused on harmonization of definitions and methods for monitoring five aspects of forest degradation: stocking level, biodiversity, forest health, level of use/production and forest soils.
- Methodologies do exist to monitor changes in carbon stocks and therefore to include forest degradation in terms of climate change into the proposed REDD mechanism.

More information: http://www.fao.org/forestry/cpf/degradation/en/

CarboAfrica NewsLetter N. 8

This bulletin is published by FAO (The Food and Agriculture Organization of United Nations) every four months in portable document format (PDF) and distributed free of charge by e-mail and through the CarboAfrica Web site (www.carboafrica.net).

If you need printed hard copies, please email: CarboAfrica@fao.org

Acknowledgements

The CarboAfrica NewsLetter N. 8 has been prepared by Antonio Bombelli. Many thanks to Matieu Henry and Sandrine Gerboin for their support, and to all the authors of the published contributions.

Contacts

CarboAfrica is an international project funded by the European Commission under the 6th Framework Programme and coordinated by *Prof. Riccardo Valentini, University of Tuscia (ITALY)*.

www.carboafrica.net

Further information: Antonio Bombelli (Project Manager): bombelli@unitus.it; Antonio.Bombelli@fao.org