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UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

AD HOC WORKING GROUP ON LONG-TERM COOPERATIVE ACTION UNDER THE CONVENTION
Fifth session
Bonn, 29 March to 8 April 2009

Item 3 (a–e) of the provisional agenda
Enabling the full, effective and sustained implementation of the Convention through long-term cooperative action now, up to and beyond 2012, by addressing, inter alia:
A shared vision for long-term cooperative action
Enhanced national/international action on mitigation of climate change
Enhanced action on adaptation
Enhanced action on technology development and transfer to support action on mitigation and adaptation
Enhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation

Ideas and proposals on the elements contained in paragraph 1 of the Bali Action Plan

Submissions from intergovernmental organizations

1. The Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA), at its first session, invited Parties and accredited observer organizations to provide additional information, views and proposals on paragraph 1 of the Bali Action Plan (decision 1/CP.13), as may be required for each session.[1] It requested the secretariat to post these submissions on the UNFCCC website.

2. The AWG-LCA, at its second session, further requested the secretariat to compile submissions from Parties and intergovernmental organizations into separate miscellaneous documents, and make them available one week prior to the respective sessions for consideration by the AWG-LCA.[2]

3. The secretariat has received seven submissions from six intergovernmental organizations. As requested by the AWG-LCA, they have been posted on the UNFCCC website.[3] In accordance with the procedure for miscellaneous documents, these submissions are attached and reproduced* in the language in which they were received and without formal editing. The secretariat will continue to post on the UNFCCC website any submissions received after the issuance of the present document.

[1] FCCC/AWGLCA/2008/3, paragraph 23.
[2] FCCC/AWGLCA/2008/8, paragraph 27.
[3] <http://unfccc.int/parties_and_observers/igo/items/3714.php>.
* These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

4. Submissions received from Parties are available in document FCCC/AWGLCA/2009/MISC.1 and are posted on the UNFCCC website.[4] Submissions received from non-governmental organizations will, in line with established practice, be posted on the UNFCCC website.[5]

[4] <http://unfccc.int/meetings/ad_hoc_working_groups/lca/items/4578.php>.
[5] <http://unfccc.int/parties_and_observers/ngo/items/3689.php>.

CONTENTS

PAPER NO. 1A: FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

ENABLING AGRICULTURE TO CONTRIBUTE TO CLIMATE CHANGE MITIGATION

The magnitude of the challenge to stabilize greenhouse gas (GHG) concentrations in the atmosphere and limit average temperature increases makes it imperative that the contributions of all sectors with significant mitigation potential be tapped to the fullest extent possible. Agriculture is recognized as a sector with such potential and farmers, ranchers, herders and other land users around the world can and should be part of the solution to climate change.

This submission highlights ways in which the potential of agricultural mitigation in general, and from smallholder agriculture in particular, may be realized under a future global climate change agreement. It addresses quantifying mitigation and dealing with uncertainty issues associated with soil carbon sequestration, enabling institutional and policy environments required to link carbon finance to mitigation from smallholder agricultural sector and modalities/mechanisms needed to effectively link carbon finance to agricultural sources of mitigation, including financing options for agriculture, including smallholder agriculture. The focus of the submission is on soil carbon sequestration in view of its high mitigation potential, relevance to smallholders, and its current exclusion from the CDM.

1. Background

a. The agricultural sector: high mitigation potential with strong adaptation and sustainable development co-benefits

Agriculture accounts for roughly 14% of global GHGs or about 6.8 Gt of CO_2 equivalent (e) per year (IPCC 2007). GHG emissions from land-use change, including deforestation in tropical areas, are around 17% of total GHG emissions. In most countries they are associated with agricultural activities and exceed emissions from all other agricultural sources. About 74% of total agricultural emissions originate in developing countries.

The technical mitigation potential of agriculture (estimated upper limit if 'best management practices' are widely adopted) has been calculated as 5.5-6 Gt of CO2e per year by 2030 (IPPC 2007). This potential is extremely large, especially relative to emissions from the sector. About 89% of this potential could be achieved through soil carbon (C) sequestration. Mitigation of CH_4 can provide 9% (through improvements in rice management and livestock/manure management) and mitigation of N_2O can provide 2% (primarily through cropland managment). The majority of the potential (70%) can be realized in developing countries (Smith et al. 2007).

In terms of abatement costs, the sector is particularly attractive, with many abatement options being cost neutral or net-profit-positive (increases in agricultural production, already economically justify the adoption of some mitigation activities), with low capital investment required (IPCC 2007 and McKinsey 2009). Moreover, many of the technical options are readily available and could be deployed immediately.

Also significant is the high potential that the agriculture sector offers for synergies with climate change adaptation and key co-benefits of relevance to sustainable development. As emissions from agriculture are concentrated in developing countries, mitigation options that can contribute to food security, poverty reduction and resilience of agro-ecosystems are of crucial importance to sustainable development. The sector is expected to provide more food for future domestic markets within developing countries. 75% of the world's poor live in rural areas in developing countries, and most depend on agricultural for their livelihoods. (World Bank 2008) Agriculture is the main sector of the economy in most Least Developed

Countries and generates essential environmental services (conservation of domesticated biological diversity, land and water management). Perhaps no other sector has the potential to contribute so directly to the aspirations of Article 2 of the UNFCC Convention (the ultimate objective of the Convention is stabilization of GHG concentrations in the atmosphere...at a level...which *ensures that food production is not threatened and enables economic development to proceed in a sustainable manner).*

b. With such significant potential, why has agriculture remained relatively marginal within the climate change negotiations?

Agriculture is perceived to be a difficult sector for climate change mitigation due to the sheer size of land areas under agriculture around the world (but at same the time this breadth of opportunity, which exceeds that of forestry, is part of its potential) the variation in agroecosystems and farming systems, as well as the large numbers of farmers that would need to be involved. Like its land-based sister sector, forestry, it shares challenges related to implementation uncertainties: permanence (and saturation), leakage and additionality, as well as those related to measurement (baselines), monitoring, reporting and verification. Methodologies to deal with these problems do exist and are being continuously improved and simplified. Extensive field testing, coupled with capacity building, to enable confidence and use will come once agricultural mitigation projects are eligible for generating emission reductions for a compliance market..

Existing climate change financing mechanisms to support mitigation have so far been highly inadequate in enabling agriculture (and forestry) to contribute, in line with its potential, to GHG reduction and carbon sequestration through activities with robust co-benefits. For example, soil carbon sequestration, through which nearly 90% of agriculture's potential could be realized, is excluded from CDM unless it is adopted in the framework of CDM A/R projects (N.B A/R.in 2007 number only one out of a toal of 1,100 projects). Financing options that enable agriculture to contribute more effectively to GHG abatement, including through more sector-specific options and those that innovatively combine public and private funding, are urgently needed if climate change is to be addressed to the extent, and at the pace, needed. .

2. How can we quantify mitigation and deal with uncertainty issues associated with soil carbon sequestration?

a. Soil carbon sequestration

Improved land use and management that can increase and maintain greater soil C stocks (i.e., sequester C) include a variety of practices that either increase the amount of C added to soils (as plant residues and manure) and/or reduce the relative rate of CO_2 released through soil respiration. Such practices include: 1) improved grazing land management,, 2) improved crop rotations, 3) improved fallows, 4) residue management, 5) reduced tillage, 6) organic matter amendments, 7) restoration of degraded lands, 8) rewetting of cultivated organic soils and (9 Agroforestry (Paustian et al. 1998, 2004, Smith 2007). If properly implemented these practices can remove and sequester CO_2 while improving agricultural productivity and sustainability. Improved nutrient management, to increase the plant uptake efficiency of applied nitrogen, can also reduce N_2O emissions, while contributing to soil C sequestration.

On the other hand, barriers to adopting C sequestration activities include saturation (maximum capacity of soils to store C); the risk of losing stored C; dificulties in establishing a baseline due to the lack of information on emission estimates and their assessment, achieving low transaction and measurement/monitoring costs. As can be seen below, new methodologies, mechanisms and approaches go some way to addressing these barriers.

b. Current state of measurement capabilities

A crucial requirement for ensuring that soil C sequestration represents real net removals of CO_2 from the atmosphere is that C stock changes be estimated accurately (unbiased) and with a known, and acceptable, level of precision. Further, methods need to be practical (particularly with respect to developing countries) and cost-effective.

Part of reason that soil C sinks have not received much consideration in current GHG reduction policies, may due in part to confusion about the state-of-the-art with respect to soil C measurements and what the most significant limitations are. In general, the scientific capability to quantify soil C *per se* are high and builds upon many decades of research, i.e.:

(i) The carbon content of a soil sample can be measured with a high degree of accuracy and precision. Instrument error associated with modern dry combustion auto-analyzers are < 0.1% and overall lab measurement error using proper protocols is in the neighborhood of 1-2%.
(ii) Equipment and protocols for soil sampling are well documented and have been applied throughout the world for decades.
(iii) The general response of soil C stocks to environmental variables and management practices is relatively well known. There are hundreds of long-term field experiments globally that provide information on management-climate-soil interactions on soil C dynamics.
(iv) Sophisticated models to predict soil carbon stock changes in relation to managment practices have existed for > 20 years and are increasingly deployed for research, management and policy applications.

However, there are challenges to measuring soil C stock changes at field scales and larger, including:

(i) Soil carbon contents are often highly variable within an individual field.
(ii) Annual changes are usually small relative to existing C stocks, e.g., typical C stocks in the top 20 cm or so of many agricultural soils are on the order of 20-80 tonnes/ha whereas typical rates of C changes might be on the order of 0.1-1 tonnes/ha/yr, hence there is a low 'signal to noise ratio' over short time scales.
(iii) Multiple factors (e.g. soil type, climate, previous land use) influence soil responses at a specific location.
(iv) Despite existence of many long-term field experiments (as stated above), experimental measurements are lacking for most crop, soil, climate and management combinations, particularly in developing countries.
(v) There are few existing inventory measurement systems for soil C (e.g. compared with, for example, forest biomass inventories systems).

Thus the **fundamental issue with respect to direct measurement of soil C stocks and stock changes is not so much an issue of measurement capabilities *per se*, but rather a question of applying efficient sampling designs and rigorous protocols.** Various measures, such as use of benchmark sampling locations that can be precisely relocated (to reduce the influence of spatial variability) and remeasured over multi-year intervals can contribute to an efficient design to quantify soil C stock changes (Conant and Paustian 2002, McConkey and Lindwall. 1999, Mooney et al. 2007).

c. A combined measurement and modeling approach

While direct 'on-the-ground' measurements can provide the most accurate estimates of C stock change, requiring an intensive set of field measurements for each project participant, would be too expensive and moreover unnecessary. An alternative approach, is to **combine field measurements and model-based approaches, thus leveraging existing knowledge and data embodied in models of soil C change.** However application of this approach requires an adequate empirical database to draw upon, as well a global coordinated system of information sharing. Applicable models could include empirical approaches, such as the Tier II methods developed for soil C inventory estimates in the IPCC guidelines (IPCC 2006)

and/or more process-based models that have been developed for soil C stock change assessment (e.g., Milne et al. 2008, Paustian et al. 2009). In such an approach, **aggregated field measurements from multiple projects provide the means to estimate uncertainty and correct for potential bias in the model-based estimates** (e.g. Ogle et al. 2007), and the models provide the capability to 'interpolate' the results for varying climate and soil conditions and thus capture the spatial heterogeneity represented individual project participants. Over time, the reliability and performance of such a hybrid system would improve so that **monitoring and verification could increasingly be based on practice-based approaches.** These might include a combination of remote sensing, rapid ground survey methods and participatory ground survey methods, and over time, correspondingly less reliance on only on direct measurement based verification. **Steps to implement such an approach include**:

i) Establishment of a 'fund' or other mechanism to support the establishment of remeasurable inventory locations for a suite of pilot projects, in different major agroecological zones, where direct measurements of soil C would be collected, along with pertinent soil, climate, land use and management information.

ii) Establishment of a set of rigorous field and lab protocols that would be applied across all the pilot projects.

iii) Establishment of a common data archive in which all the information from the various projects participating (with appropriate safeguards for data confidentiality) would be available for use.

iv) Use of pilot projects to develop and test remote sensing-based and ground survey-based methods for monitoring and verification of management practice implementation.

d. Additional considerations

To gain acceptance as a viable mitigation option, soil C sequestration (as for other C removals such as in woody biomass) needs to be a true reduction of CO_2 with respect to the atmosphere. This requires that they be: 1) Real, 2) Additional, 3) Verifiable and 4) Permanent (Offset Quality Initiative 2008). There is abundant research showing that main management practices being considered for increasing soil C stocks can in fact do so, i.e., that if properly executed the removals of CO_2 into the sink are in fact 'seen' by the atmosphere (i.e., they are Real). However a valid quantification approach that is, and is perceived to be, rigorous is needed.

To achieve such an approach, there is a crucial role for direct measurements, particularly in the initial stages of soil carbon crediting. At this point adequate data to construct practice-based performance standards that are quantitatively sound is limited. A coordinated effort is needed, so that measurements that are taken can be 'pooled', thus optimizing the value of a more limited set of measurements rather than requiring each individual project to do an extensive set of cost prohibitive measurements. However, until such time as performance-based standards are robust enough for certain crops or regions, conservative crediting default values should be used. Once robust systems are in place, crediting values might be adjusted.

Leakage (which can negate the 'reality' of sinks) is arguably less of a problem for many agricultural practices as compared to activities such as afforestation or avoided deforestation, if the production of agricultural services is maintained or even increased, as a consequence of adopting C sequestering practices. However, for activities involving land use change (e.g. agricultural set-asides), leakage associated with displaced agricultural production is an important issue, but several strategies to mitigate leakage have been developed for AR (afforestation-reforestation) projects that are applicable to agricultural settings as well.

Permanence is a real issue for biological C sinks in general, which do have the potential for reversal. However, **mechanisms to ensure the integrity of sinks over a specified duration have been developed, perhaps most notably the Permanence Buffer** concept adopted by the Voluntary Carbon Standard (VCS 2008). This approach considers factors affecting the variable risk of loss of permanence for different types of projects/activities which has several advantages over other approaches such as discounting. By **pooling the permanence risk across a portfolio of projects and taking a conservative approach in ensuring an adequate buffer, soil C sequestration can be fully equivalent to CO_2 emission reductions**. Moreoever, where adoption of soil C sequestration practices also leads to more sustainable/profitable farming systems, the risk of non-permanence is much lower.

3. What modalities/mechanisms are needed to effectively link carbon finance to agricultural sources of mitigation?

a. *Moving beyond present mechanisms*

Current global financing mechanisms have not enabled the capture of the potentially large mitigation effects that agriculture could provide. The CDM in its present form is inadequate. Not only are many sources of agricultural mitigation not allowed under CDM, but its project-based and offsets approach does not generate the breadth and scale of incentives that are needed. Capturing the full potential of agricultural mitigation and its co-benefits requires widespread changes in agricultural production systems, which in turn requires changes in policy, institutions and technologies and a much broader approach by mitigation financing mechanisms. A range of financing mechanisms are needed from market based offsets to public sector funds, which are flexible enough to adjust to the specific agro-ecological, institutional and technological situation of Parties.

Key issues to be addressed include the need to scale up funding and delivery mechanisms, reduce transactions costs and improve the contribution to sustainable development. Several means of scaling up have been proposed including:1) programmatic CDM, sectoral CDM, sectoral "no-lose" accounting and 3) Sustainable Development Policy and Measures (UNFCCC/TP/2008/7) page 80 These vary in the degree to which they can provide incentives for mitigation on a large scale, linked to sustainable development, and their respective transactions costs.
In the development/expansion of financing mechanisms, the following considerations are important for mitigation from agriculture:

a) Equal opportunities for large scale land owners and smallholders.
b) Rights to emissions reductions are held by land users, based on formal as well as traditional systems of property rights.
c) Options for trading and crediting that allow for a range of nationally appropriate mitigation actions
d) Activities to reduce GHG emissions are carried out in accordance with the principle of common but differentiated responsibilities and the sustainable development objectives of the host country, inspired by the Millennium Development Goals, UN conventions on desertification and biological diversity, and Declarations of the World Food Summits.

b. *Consistent accounting for terrestrial carbon pools*

A fundamental requirement for realizing the potential of agricultural mitigation from developing countries is the establishment of a holistic accounting and trading regime for terrestrial carbon. Proposals like that from the Terrestrial Carbon Group (2008) highlight the advantage of establishing national terrestrial carbon budgets that recognize differentiated carbon ownership. The proposal includes two possible ways of establishing a national level terrestrial carbon baseline:

a) including all terrestrial carbon pools (soil & biomass, below & aboveground related GHGs)

or

b) including all terrestrial carbon pools, but with a separate account for those that are already regulated under a national REDD baseline. Nations could propose a baseline year to best reflect business as usual scenarios.

Emission reductions and agricultural carbon sequestered above the baseline could then be credited and marketed on the international compliance or voluntary market or for public sector support, Varied accounting and monitoring standards could be developed, e.g. as outlined within the CDM or the Voluntary Carbon Standard. Carbon crediting would be registered at the national level, and would then be added to a "protected" category additional to the baseline. Countries would hold the ultimate responsibility for protecting credited carbon, but would also have the opportunity to allow sub-national carbon trading where responsibility for protecting carbon could be transferred to contracted entities. A permanence buffer or an insurance mechanism can be developed to manage the respective risks related to unprotected carbon that may have to be replaced. .

Trading rights could be put on hold if the nation's terrestrial carbon budget is not in compliance with the established baseline. This mechanism ensures permanence and that emission reductions are fully fungible with all carbon trading systems. Environmental policies could be developed to ensure that allowances of large emitters will not increase and a low carbon development pathway is adopted.
For such a system to be effective, a national coordination and monitoring body for the above mentioned accounting and trading system would need to be established with international oversight.(an entity reporting to the CDM Executive Board or the UNFCCC COP?) Environmental and social safeguards would also have to be developed.

c. *Key elements for future financing mechanisms to realize the potential of smallholder agriculture*

i. Carbon markets

Carbon market mechanisms that provide strong incentives for government carbon funds and the private sector in developed countries to buy agriculture-related emission reductions from developing countries (to achieve compliance targets) are needed. Crediting emissions reductions generated from smallholder agricultural activities in LDC countries is one important step in leveling the playing field and allowing greater access of smallholder farmer to the benefits of international carbon markets. To achieve this, agricultural land management activities should be considered eligible under international compliance mechanisms. However changes in the operation of these mechanisms are also required to capture the value of mitigation from smallholder agriculture.

Often, mitigation from this sector involves relatively low amounts of tCO_2 e per year, per unit, resulting in a need for aggregation, in order to be cost effective in international compliance markets. Aggregation and up-scaling mechanisms like the programme of activities (PoA) or sectoral approaches are thus critical, and need to be further tested and evaluated in the particular context of smallholder agricultural mitigation. Use of this type of approach for offsets may also reduce the transactions costs associated with establishing additionality, which is recognized as a significant cost barrier in the CDM, but at the same time essential to the acceptance of any offset. In many cases it should be possible to devise broadly applicable practice-based tests of additionality for the agricultural sector at the national level, based on sector wide assessments of likely business-as-usual trajectories. In order to ensure that agricultural offsets are financially feasible, they must be fully fungible with other types of offsets. This will prevent them from being relegated to low value niche markets with credits that are not convertible or recognized in the financial market, for example, temporary certified emission reductions (tCERs).

Carbon revenues could provide the needed stimulus and capacity to adopt sustainable agricultural land management practices that are eventually more profitable for the producer, even without carbon revenues.

This temporary role of carbon finance in stimulating the change to more productive and profitable production systems fits well with the saturation of soil carbon pools. Most carbon sequestration activities are expected to reach saturation at a certain point in time, i.e. after 20 to 100 years and therefore do not provide sustainable income in perpetuity. If C sequestration incentives also lead to more productive and sustainable forms of agriculture, there will be a lower risk of non-permanence (compared to the baseline conditions).

However, carbon financing must be structured to meet the specific constraints faced in these situations, such as the need for investment financing and appropriate technologies. Carbon financing based on payments-on-delivery are not suitable for smallholder agricultural mitigation projects. This suggests a need to create flexible funding approaches within existing carbon funding mechanisms, as well as explore alternative funding mechanisms, including public/private partnerships.

ii. Alternative sources of finance

Some forms of mitigation from smallholder agriculture will not be cost effective for international compliance markets, due to low returns, high transactions costs or high risks. Thus public finance has a critical role to play in realizing the benefits of mitigation from smallholder agriculture. Public finance can also play an important role in facilitating the flow of private sector finance, by funding needed capacity building, reducing risks to private sector investors and assisting in the development and dissemination of technologies. Various proposals have been made regarding the source of such finance, i.e. auctions, international taxes, assessed contributions and dedicated budgetary support. In addition, various proposals have been made for the most effective delivery mechanisms, including the support of Nationally Appropriate Mitigation Actions (NAMAS), the implementation of sustainable development policies and measures (SD-PAM) and actions that link mitigation and adaptation.

Crediting voluntary mitigation action through the implementation of NAMAs and use of national registries could be a relatively low cost means of stimulating the supply of mitigation from smallholder agriculture. Potential links to compliance markets could also be explored. Here, as with market based approaches it is critical to consider the specific nature of various agricultural production systems and the requirements needed to transition to more sustainable systems that also generate mitigation. Financing approaches that address the need for investment capital, risk management and access to new technologies is needed. Another important potential means of reaching agricultural producers with carbon funds is through agricultural product markets, e.g. through the development of agricultural product standards and labeling related to mitigation benefits provided. Building upon the institutions and lessons learned from the development of organic and sustainable agricultural production marketing channels for smallholders can greatly facilitate the implementation of such an approach.

4. **What is the enabling institutional and policy environment required to link carbon finance to mitigation from smallholder agricultural sector?**

Four important aspects of an enabling environment are required to realize the potential of agricultural mitigation from developing countries: 1) institutions that can facilitate the aggregation of carbon crediting amongst a large number of smallholders, 2) policies in the agricultural, financial and environmental sectors that facilitate the flow of carbon finance from private and public sectors and 3) capacity building and (4) an agreed system of property rights to the carbon benefits that can be generated.
Aggregation capacity is fundamental to realize the potential of agricultural mitigation from smallholder agriculture. In many cases agricultural institutions are the natural candidates for such aggregation, be they public, private or NGO. Evidence from the voluntary carbon market shows the importance of local level institutions in linking smallholders to carbon markets, with examples ranging from national forestry agencies (Costa Rican National Forestry Fund; Uganda National Forestry Authority), local NGOs (Grupo Ecológico Sierra Gorda, Mexico), to village forest committees in Indonesia and Tanzania

participating in REDD project planning. Local institutions can play an important role in helping farmers build a resilient project plan and providing support with the contractual agreements made with buyers or aggregators. They have also been successful in attracting donor funds, sometimes coupled with private sector contributions, or facilitating future market agreements to generate funds to cover start-up costs.

Building upon existing capacity and integration with ongoing institutional developments in the agricultural smallholder sector is one way to realize aggregation potential at a relatively low cost and in a way that results in the mainstreaming of climate mitigating sustainable production systems into agricultural development. Working with farmer fields schools and agricultural extensions services is an important example.

An enabling overall policy framework is needed to realize the capacity and effectiveness of any type of approach to realizing the benefits of smallholder mitigation. Agricultural sectoral policies that encourage the adoption of sustainable agricultural production systems are clearly a priority. In some cases this requires removing or changing existing tax, pricing and land management policies that generate perverse incentives for sustainable production systems, such as overuse of pesticides and fertilizers or land degradation Coordination between environmental, natural resource and agricultural policies is needed to maintain a consistent set of incentives for adoption of sustainble management systems and to facilitate cross-sectoral interactions which are often involved in carbon crediting from agriculture. Regulations in the financial sector that facilitate the flow of funds for mitigation benefits to local communities are also important and have been a barrier to paying farmers for environmental benefits in some cases.

Clarification/definition of property rights (individual, community, state) at the outset, may help to reduce the risk of future loss of return on investments related to land. Carbon crediting projects implemented together with land tenure and resettlement projects is one potential way of addressing the property rights issue. Another way is to establish crediting programs that recognize local systems of property rights as a basis for crediting, and build upon local systems of collective action and enforcement. Experience with payment for environmental services (PES) schemes indicate the potentail of designing schemes that allow and support the participation of farmers with unclear property rights. Under the Costa Rican national PES scheme holding a property title is no longer required- participants may apply with proof of possession rights alone. Public sector finance to support a system of clearly recognizable and enforceable rights to carbon revenues generated from agricultural mitigation may be necessary in many cases.

5. Conclusions

(a) Agriculture in general, and smallholders in particular, have tremendous potential to mitigate GHG emissions, while generating co-benefits of the highest importance to sustainable development (poverty reduction, food security, environmental services).

(b) There are certain challenges in operationalizing agricultural mitigation activities: permanence/saturation, leakage and additionality. In measuring, reporting and verifying GHG emission reductions and sequestration, these difficulties must be taken into account. Methodologies and approaches to deal with these exist and are continually being perfected and simplified (e.g. combining measurement and model-based approaches or monitoring and verification employing practice-based approaches, the VCS Permanence Buffer, applying efficient sampling designs and rigorous protocols). Greater coordination of data collection, modeling and field testing of these methodologies is needed, together with capacity building for their use.

(c) Existing financing mechanisms have enabled only a very small fraction of the mitigation potential of agriculture to be realized. Soil carbon sequestration, which has the highest potential for generating mitigation from agriculture, and engaging/benefiting smallholder farmers, is outside the scope of the

CDM. Neither climate change mitigation, nor food security, nor sustainable development, benefit from this exclusion.

(d) Whether existing mechanisms are reformed or new ones created (and the two are not mutually exclusive), certain features are required for agriculture to contribute to climate change mitigation in accordance with its potential, including:

- Institutions for carbon finance where up-scaled and broad approaches can be applied, facilitating the involvement of large numbers of smallholder farmers covering a wide area and range of ecosystems and that can have an influence on developing needed policies and technologies.
- Financing arrangements that address specific needs in smallholder agriculture mitigation adoption including the need for investment capital and insurance.
- A range of options for mobilizing private and public funds for financing, including use of compliance market credits, voluntary market credits, publicly funded programs and agricultural product labels.

(e) Linking farmers, including smallholder farmers, to carbon financing requires an enabling environment with appropriate policies, institutions/capacity building and an agreed system of property use/rights/access.

6. Possible Options for consideration by Parties

(a) Establishment of a REDD-like approach/initiative for agriculture in order to build a globally coordinated effort to test MRV methodologies and incentive/payment schemes, and build readiness, possibly with the following sector-sensitive financial instruments: a global agricultural land management accounting and trading system; smallholder agriculture climate change readiness fund, linked to a public-private trust fund serving as a market incubator to buy emission reductions from early action agricultural mitigation projects from smallholder farmers

(b) Consideration of the need to establish a range of funding and delivery mechanisms to realize the potential from agricultural mitigation and its co-benefits, related to sustainable agricultural development and adaptation to climate change.

(c)Consideration could be given to the eventual possibility (post Copenhagen) of moving towards a more comprehensive approach to terrestrial carbon in all land uses to enable better management of synergies and trade-offs across different land uses and land use changes, as well as to capture efficiencies and cost-effectiveness.

(d) Integration of soil carbon sequestration into the scope of LULUCF accounting, as well as into existing/future financing mechanisms, including any eventual mechanisms linked to NAMAs.

References

Antle, J., M. and Stoorvogel, J., J. 2008. Agricultural carbon sequestration, poverty and sustainability. Environment and Development Economics 13: 327-352.

COMESA. 2009. African Bio-Carbon Initiative Background Document.

Conant, R.T. and K. Paustian. 2002. Spatial variability of soil organic carbon in grasslands: implications for detecting change at different scales. Environmental Pollution 116:127-135.

EU Commission. 2009. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Towards a comprehensive climate change agreement in Copenhagen - Additional background information - {COM(2009) 39 final}{SEC(2009) 101}

IPCC 2006. 2006. National Greenhouse Gas Inventory Guidelines. Institute of Global Environmental Strategies (IGES), Kanagawa, Japan.

IPCC. 2007. Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)]. Chapter 8 Agriculture, pp 498-540. Cambridge University Press.

Lal, R. 2004. Soil carbon sequestration to mitigate climate change. Geoderma, 123, pp. 1-22.

McConkey, B. and C.W. Lindwall. 1999. Measuring Soil Carbon Stocks - A system for Quantifying and Verifying Change in Soil Carbon Stocks due to Changes in Management Practices on Agricultural Land. Presentation prepared for special seminar, UNFCCC, SBSTA, Bonn, Germany, June, 1999. Semiarid Prairie Agricultural Research Centre, Swift Current, Saskatchewan.

McKinsey&Company. 2009. Pathways to low-carbon economy. Version 2 of the Global Greenhouse gas Abatement cost curves.

Milne, E., Al-Adamat, R., Batjes, N.H., Bernoux, M., Bhattacharyya, T., Cerri, C.C., Cerri, C.E.P., Coleman, K., Easter, M., Falloon, P., Feller, C., Gicheru, P., Kamoni, P., Killian, K., Pal, D.K., Paustian, K., Powlson, D., Rawajfih, Z., Sessay, M., Williams, S., Wokabi, S. 2007. National and sub national assessments of soil organic carbon stocks and changes: the GEFSOC modelling system. Agri. Ecosys. Environ 122:3-12.

Mooney, S., K. Gerow, J. Antle, S. Capalbo and K. Paustian. 2007. Reducing standard errors by incorporating spatial autocorrelation into a measurement scheme for soil carbon credits. Climatic Change 80:55-72.

Offset Quality Initiative. 2008. Ensuring Offset Quality: Integrating High Quality Greenhouse Gas Offsets Into North American Cap-and-Trade Policy. www.pewclimate.org/docUploads/OQI-Ensuring-Offset-Quality-white-paper.pdf

Ogle, S.M., F.J. Breidt and K. Paustian. 2005. Agricultural management impacts on soil organic carbon storage under moist and dry climatic conditions of temperate and tropical regions. Biogeochemistry 72:87-121.

Ogle, S.M., F.J. Breidt, M. Easter, S. Williams and K. Paustian. 2007. An empirically-based approach for estimating uncertainty associated with modeling carbon sequestration in soils. Ecol. Model. 205:453-463.

Pacala, S. and R. Socolow. 2004. Stabilization wedges: Solving the climate problem for the next 50 years with current technologies. Science 305:968-972.

Paustian, K., B. A. Babcock J. Hatfield, C.L. Kling, R. Lal, B. A. McCarl, S. McLaughlin, A.R. Mosier, W.M. Post, C.W. Rice, G.P. Robertson, N.J. Rosenberg, C. Rosenzweig, D. Zilberman. 2004. Climate Change and Greenhouse Gas Mitigation: Challenges and Opportunities for Agriculture. Council on Agricultural Science and Technology (CAST), Ames, IA, 120 p.

Paustian, K., C.V. Cole, D. Sauerbeck and N. Sampson. 1998. CO2 mitigation by agriculture: An overview. Climatic Change 40:135-162.

Smith, P., D. Martino, Z. Cai, D. Gwary, H.H. Janzen, P. Kumar, B.A. McCarl, S.M. Ogle, F. O'Mara, C. Rice, R.J. Scholes, O. Sirotenko, M. Howden, T. McAllister, G. Pan, V. Romanenkov, U.A. Schneider, and S. Towprayoon. 2007. Policy and technological constraints to implementation of greenhouse gas mitigation options in agriculture. Agriculture, Ecosystems and Environment 118:6-28.

Tennigkeit, T. and Wilkes, A. 2008. An Assessment of the Potential for Carbon Finance in Rangelands. ICRAF Working. Paper no. 68.

The Terrestrial Carbon Group. 2008. How to Include Terrestrial Carbon in Developing Nations in the Overall Climate Change Solution.

UNFCCC. 2007. Background paper on Analysis of existing and planned investment and financial flows relevant to the development of effective and appropriate international response to climate change. United Nations Framework Convention on Climate Change.

UNFCCC.2008.Investment and financial flows to address climate change: an update. Technical paper. United Nations Framework Convention on Climate Change.

VCS. 2008. Voluntary Carbon Standard: Guidance for Agriculture, Forestry and Other Land Use Projects. 44 p. www.v-c-s.org/docs/Guidance%20for%20AFOLU%20Projects.pdf

Ward, M. (ed.). 2008. The role of sector no-lose targets in scaling up finance for climate change mitigation activities in developing countries. International Climate Division Dept for Environment, Food and Rural Affairs (DEFRA) United Kingdom.

Wölcke, J. and Tennigkeit, T. 2009. Harvesting agricultural carbon in Kenya. The International Journal for Rural Development. Vol. 43 Nr. 1.

World Bank 2008 World Development Report: Agriculture for Development Washington DC World Bank

PAPER NO. 1B: FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

The Collaborative Partnership on Forests

Submission of Views on the fulfilment of the Bali Action Plan and the components of the agreed outcome to be adopted by the Conference of Parties at its fifteenth session (AWG-LCA)"

6 February 2009

1. At its fourth session, the AWG-LCA invited Parties to submit to the UNFCCC Secretariat, by 6 February 2009, their views on the fulfilment of the Bali Action Plan and the components of the agreed outcome to be adopted by the Conference of Parties at its fifteenth session. (FCCC/AWGLCA/2008/L.10 paragraph 2(a) and FCCC/AWGLCA/2008/8 paragraph 25).

2. This submission is made to the Secretariat of UNFCCC by the Food and Agriculture Organization of the United Nations, on behalf of the members of the Collaborative Partnership on Forests (CPF).

3. The CPF is a voluntary arrangement among 14 international organizations and secretariats with substantial programmes on forests. CPF members are: The Center for International Forestry Research (CIFOR), the Food and Agriculture Organization of the United Nations (FAO), the Global Environment Facility (GEF) Secretariat, the International Tropical Timber Organization (ITTO), the International Union for Conservation of Nature (IUCN), the International Union of Forest Research Organizations (IUFRO), the Convention on Biological Diversity (CBD) Secretariat, the United Nations Convention to Combat Desertification (UNCCD) Secretariat, the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Forum on Forests (UNFF) Secretariat, the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat, the World Agroforestry Centre (ICRAF), and the World Bank.

4. The submission is made with a view to making available to Parties the findings of the *Strategic Framework for Forests and Climate Change: A Proposal by the Collaborative Partnership on Forests for a Coordinated Forest-sector Response to Climate Change.* The CPF Strategic Framework was developed by the members of the CPF in 2008, and released at a side event on 5 December 2008 at the climate change meetings in Poznan, Poland.

5. CPF prepared this document to support the United Nations Framework Convention on Climate Change (UNFCCC) process, particularly the Bali Action Plan, as well as the Non-Legally Binding Instrument on All Types of Forests of the United Nations Forum on Forests and other agreements, and in response to the need for concerted action on forests and climate change. It lays the groundwork for a coordinated response from the forest sector to climate change, notably through the widespread adoption of sustainable forest management and its integration into broader development strategies.

6. The electronic versions of the executive summary and full report may be obtained at www.fao.org/forestry/cpf-climatechange. The full report is also being provided to the UNFCCC Secretariat as part of this submission.

7. The Strategic Framework highlights the following points:

- Forests cover nearly one-third of the earth's land surface, harbour three-quarters of its terrestrial biodiversity and account for almost half its terrestrial carbon pool. Deforestation, forest degradation and other changes in forests contribute an estimated 17.4% of global greenhouse gas emissions.
- According to FAO estimates, the total forest area continues to decrease but the rate of net loss is slowing. In the period 2000–05, 13 million hectares of forest were deforested, on average, each year. In 2000–05, 5.7 million hectares were added annually to the forest estate, giving a net annual forest loss of 7.3 million hectares, which was a lower rate than during the period 1990–2000. The estimated average global rate of forest carbon depletion is 1.6 gigatonnes per year, which is about 0.25% of total forest carbon. Tree planting in agricultural landscapes is rising and efforts are under way to provide estimates of tree cover in such systems. Deforestation and forest degradation have

direct and indirect causes. The main direct cause is the expansion of agriculture. Indirect causes include policies that subsidize non-forest land use, as well as poverty, poor governance, and high prices for agricultural commodities.

- Forests can contribute to the mitigation of climate change through carbon sequestration, carbon substitution, and carbon conservation. The extent to which they do so is a function of their management and the effectiveness of policies at the local, national and global levels.
- Forests are much more than pools of carbon: they house a large part of the world's biological wealth, perform an important role in the provision of water and other ecosystem services, sustain many Indigenous cultures, and support the livelihoods of hundreds of millions of people. Therefore, comprehensive and integrated sustainable development approaches are needed to combat deforestation and forest degradation and to expand the role of forests as carbon sinks.
- Forest-based approaches can make a substantial contribution to climate change mitigation. They are not, however, a panacea for climate change and should be pursued simultaneously with other measures, including a shift towards low-carbon energy production and measures to assist the forest sector to adapt to climate change.

8. The ten key messages of the CPF Strategic Framework are provided below:

Message 1: Sustainable forest management provides an effective framework for forest-based climate change mitigation and adaptation

Sustainable forest management (SFM) provides a flexible, robust, credible and well-tested framework for simultaneously reducing carbon emissions, sequestering carbon, and enhancing adaptation to climate change. At the same time it can help supply environmentally friendly forest products, protect biodiversity, secure freshwater supplies, and provide other essential ecosystem services.

SFM encompasses seven thematic elements: 1) extent of forest resources; 2) biological diversity; 3) forest health and vitality; 4) productive functions of forests; 5) protective functions of forests; 6) socioeconomic functions; and 7) the legal, policy and institutional framework. It can be applied to forests in which wood production takes place, including planted forests, as well as to protected forests and to degraded forests in need of restoration.

Protected forest areas increase the resilience of ecosystems and landscapes to climate change and can provide a 'safety net' for climate change adaptation through their genetic resources and ecosystem services. Inadequate funding for the management of protected areas, however, poses a significant threat to climate change mitigation and adaptation and needs to be addressed.

Wood is a renewable resource and, when obtained from sustainably managed forests, an efficient material for storing carbon. Although wood-harvesting temporarily reduces carbon storage in the forest, a large part of the harvested carbon can be stored in wood products, potentially for many decades. When wood is used in long-term products such as housing and furniture, the reduction in greenhouse gas emissions is substantial compared to other, more energyintensive and carbon-intensive substitutes such as concrete, steel, aluminium and plastics.

Sustainably managed forests are a valuable, renewable and carbon-neutral source of biomass for energy. Compared to other renewables such as solar, hydro and wind, wood-based bioenergy plantations require relatively little capital or technological development and could be an especially efficient land use on abandoned agricultural land and on soils too poor to produce annual crops.

Under SFM, harvested trees are replaced by others through regeneration, replanting or other silvicultural measures; many forests have been managed in this way for centuries without measurable declines in condition or productivity. Carbon lost during harvesting is eventually estored through new growth. Managed unsustainably, however, forests can lose carbon stock and productivity.

Forest plantations, which supply over 60% of industrial roundwood, are already important carbon sinks and pools and their role in climate change mitigation is likely to increase in importance.

Compared to other forest biomes, arid and semi-arid forests have low carbon values. Such forests can, however, act as buffers between agricultural lands and denser forests and thereby play n important role in carbon conservation. In some cases, semi-arid lands might also be suitable candidates for forest-based mitigation schemes.

Message 2: Forest-based climate change mitigation and adaptation measures should proceed concurrently

Implicit in SFM is an adaptive approach, which will help ensure that forest management changes to suit changing conditions. Measures that might assist forest ecosystems to adapt to climate change include the conservation of genetic variation, reduced impact logging, increasing the size and connectedness of buffer zones, and policies that ensure effective management responses to ecological change.

Under certain circumstances, climate change mitigation might take precedence over adaptation, especially in the short term. In forests, however, both are critical and should proceed concurrently. Adaptation and mitigation objectives are interlinked and compatible and policy approaches to address them can be mutually supportive.

The impacts of climate change are likely to affect poorer countries disproportionately and policy approaches to adaptation should therefore particularly address their needs. Many forest-dependent communities are highly vulnerable to the effects of climate change and will require financial and technical assistance in order to adapt.

Measures for climate change mitigation and adaptation should also aim to ensure the continued (or increased) delivery of other forest-related benefits – 'co-benefits'. To do so will require strong engagement between the conservation and development communities, climate-change policymakers, governments, and other stakeholders, including Indigenous communities. Often, tradeoffs between all the potential benefits of forests will be needed, and these should be negotiated between all stakeholders.

Afforestation and reforestation activities have been included in the Clean Development Mechanism (CDM) since 2001, but so far only one such project has been implemented due to high transaction costs. Given the potential of afforestation and reforestation in carbon sequestration, CDM procedures should be simplified. Implicit in SFM is an adaptive approach, which

Message 3: Inter-sectoral collaboration, economic incentives, and the provision of alternative livelihoods are essential for reducing deforestation and forest degradation

The Bali Action Plan identifies forest-based mitigation, particularly reduced emissions from deforestation and degradation (REDD), as a viable mechanism for reducing greenhouse gas emissions. Within a framework of SFM, increasing the forest area through afforestation and reforestation, restoring degraded forests, and substituting carbon-intensive materials with wood and fossil fuels with wood-based biofuels are also viable strategies for climate change mitigation. All such strategies can generate increased revenues and employment, thereby providing economic alternatives to forest conversion.

An overriding principle of policy approaches to the role of forests in climate change mitigation and adaptation must be coordination at the regional and national levels. For REDD and SFM to succeed, their elements must be integrated into national development strategies and part of holistic national land-use planning. Moreover, they should be incorporated in national forest programmes or other equivalent national forest policy frameworks.

National and local forest administrations are well placed to facilitate the implementation of forest-based climate change adaptation and mitigation measures. Given that most of the underlying causes of deforestation are generated outside the forest sector, they do, however, need to increase their collaboration with those governmental agencies dealing with agriculture, water, energy and other relevant sectors and with

other stakeholders, including Indigenous people, community groups, forest owners, the private sector, research institutes, NGOs and national planning and financing entities.

There have been many attempts to calculate the costs of REDD, especially in tropical countries. The financial flows needed are usually estimated as the opportunity costs of converting forests to other land uses and are in the order of several billions to tens of billions of dollars annually.

Schemes to offset the opportunity costs of forest conversion are not, in themselves, sufficient to prevent carbon emissions from forests. Those forests 'saved' by REDD, or reforested, restored or afforested, will still need to be managed.

Current global climate change arrangements provide no incentives for reducing deforestation and only very limited incentives for reforestation and afforestation. One reason for this is concern about leakage, in which the protection of one forest area merely displaces deforestation activities to other areas that are unprotected, as well as other issues such as baselines, additionality and permanence. SFM provides a suitable framework for addressing such issues within the forest sector, but cross-sectoral approaches will also be needed.

The implementation of forest-based measures to mitigate climate change will require significant start-up funds and sustainable financing over decades. Such funding is currently unavailable in most developing countries and forest communities in which REDD and other measures will be undertaken. Several new forest carbon funds have been created, including by the World Bank and the Global Environment Facility. The UNFCCC has also created a fund to assist adaptation measures. There are concerns, however, that subsistence systems such as shifting cultivation and agroforestry might not qualify for REDD funding. Enabling smallholder farmers to benefit from carbon funds can be an incentive for the intensification of tree-planting on farms as part of mitigation and adaptation efforts.

While foreign direct investment is essential, the bulk of private investment remains domestic across all sectors. Private investment in SFM in developing countries should be encouraged, particularly through the establishment of small and medium-sized enterprises.

Under any new climate change finance scheme, especially REDD, care must be taken to prevent perverse effects, such as rewarding unscrupulous behaviour and disadvantaging those countries and communities that are already conserving, sustainably managing and expanding their forests. Climate change mitigation funds will be most effective when they encourage SFM, including forest conservation, rehabilitation and restoration.

Message 4: Capacity-building and governance reforms are urgently required

Many countries, particularly developing countries, have insufficient financial or technical resources to design, implement and monitor effective measures for forestbased climate change mitigation and adaptation. Building in-country capacity is an area in which CPF members can play an important role. Technology transfer is a major issue in current intergovernmental climate negotiations; many of the technologies and much of the knowledge required to implement mitigation activities exist today but are not universally available.

Many forest communities suffer disproportionately from conflicts, humanitarian crises and corruption, which often then spread nationally and internationally. The property rights of many forest communities are insufficiently recognized, and the human, civil and political rights of Indigenous peoples, women and other marginalized groups in forest areas are frequently limited.

Forestry is evolving towards more participatory forms that place greater emphasis on the involvement of local people and the contributions that forests make to local livelihoods. There is a risk, however, that climate change mitigation and adaptation measures could swamp such change. There has been little systematic analysis of the potential social implications of proposed climate change mitigation mechanisms, especially for the poor. Many Indigenous communities have serious concerns that global and national REDD schemes will further interfere with their rights, livelihoods, customs and traditions. They are demanding, therefore, that future policies recognize and adhere to the principles articulated in the UN Declaration on the Rights of Indigenous Peoples.

Current international discussions imply that using financial incentives to dissuade forest owners from clearing or degrading their forests will be sufficient to achieve substantial carbon emissions reductions. Such incentives will only work, however, if a number of preconditions are met. There must be clear property rights and good forest governance, for example, and an SFM regime should be in place. Poorly directed, REDD incentives could further marginalize poor forest-dependent communities, exacerbate problems of forest governance, and hinder the application of SFM.

A key issue for effective post-2012 forest-based arrangements on climate change is accelerating progress in national and international governance reforms to ensure equity and fairness in the costs and benefits of forest-related mitigation and adaptation.

There is an increasing awareness among both policymakers and scientists that the forest science-policy interface must be strengthened if long-term sustainable strategies for the forest sector's contribution to climate change mitigation and adaptation are to be developed. Such a strengthening will be best achieved through interdisciplinary research and through sustained interactions between scientists, policymakers and practitioners. More support for research is urgently required and, in this regard, cross-sectoral policy efforts should be strengthened.

Message 5: Accurate forest monitoring and assessment helps informed decision-making but requires greater coordination at all levels

The robust monitoring of forest status and area change is necessary for the design, implementation and verification of climate change commitments. Considerable synergies can be achieved by integrating carbon monitoring requirements in overall forest inventory and monitoring efforts that address the full range of forest goods and services.

Carbon change in forests is usually estimated as a function of forest biomass using conversion factors. Remote sensing and imagery analysis, followed by ground verification, can be used to measure forest area and estimate forest biomass.Currently, however, there is no widely accepted standard practice for measuring forest carbon stocks remotely at the regional or national scales. Of all sources, net emissions of carbon from tropical land-use change are the most uncertain, with a wide range of estimates. The main causes for the inaccuracies are related to the data used to calculate rates of deforestation, the carbon stocks of the forest being cleared, and the fate of carbon after clearing.

National forest monitoring systems need to deliver cost-effective, quality-controlled information on changes in carbon stocks on a regular basis. In many countries, existing systems are still unable to do so, although steps have been taken to increase monitoring capacity and to make use of new technologies. The full range of efforts to produce consistent, reliable data and analysis on the flux of carbon in forests, including for the setting of realistic reference emissions levels, could be harmonized through stronger collaboration among the main actors at the national and global levels.

The setting of national baselines and accountability measures for forest-based climate change mitigation is a prime candidate for further scientific research. Research is also needed into the socioeconomic implications of broadening the concept of SFM to include the management of carbon pools, and into the potential ecological and carbon impacts of resultant changes to forest management.

Message 6: CPF members are committed to a collaborative and comprehensive approach to forest-based climate change mitigation and adaptation

With their broad experience in the promotion of SFM, forest conservation, poverty alleviation and forest governance, the members of the CPF can greatly facilitate comprehensive approaches to the role of forests in climate change mitigation and adaptation. The CPF itself provides a mechanism by which its members can coordinate their climate-related actions.

CPF members are working together to provide information, support the implementation of SFM, and inform the development and negotiation of forest-based climate change policies at all levels. Within their respective mandates, they are also committed to working collaboratively to assist countries to:

- Incorporate adaptation and mitigation, including REDD and other climate change initiatives, into national forest programmes, and integrate national forest programmes within national development strategies through multi-stakeholder consultations.
- Build capacity for SFM and forest-based climate change mitigation and adaptation.
- Enhance the biophysical adaptation of forests to climate change while safeguarding the livelihoods of forest-dependent communities and small forest owners and protecting forest biodiversity and other essential forest services.
- Reduce and eventually eliminate unsustainable forest activities, thus reducing greenhouse gas emissions and enhancing forest-based carbon sequestration and storage.
- Enhance capacity to design, monitor, verify and report on climate change mitigation and adaptation efforts.
- Improve the science-policy interface and ensure that decision-making at all levels is based on timely, reliable and scientifically sound information.
- Explore ways of securing international and national financing and private-sector investment to assist countries in achieving compliance with the provisions of arrangements on climate change and other conventions and instruments related to forests.
- Work in concert with other sectors such as agriculture, energy, transport, urban development and law enforcement towards realizing these elements.

PAPER NO. 2: INTERNATIONAL CIVIL AVIATION ORGANIZATION

Submission of the International Civil Aviation Organization (ICAO) to the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention (AWG-LCA)

12 February 2009

In response to the invitation by the Chair of the AWG-LCA for Parties and observer organizations to submit further ideas and proposals for the Assembly paper dated 15 January 2009 (FCCC/AWGLCA/2008/16/Rev.1), ICAO would like to make the following requests:

Paragraph 91 (page 64)

The current text is not in line with the message that ICAO conveyed in the document FCCC/AWGLCA/2008/MISC.3. It seems to be an interpretation of the last paragraph of the Executive Summary of our submission to the AWG-LCA3 (page 14 of the document) which stated:

> "Cooperation with other UN bodies and in particular with the UNFCCC process is paramount to achieving a sound and effective solution for addressing aviation emissions. … It is also critical that States' representatives taking part in meetings within the UNFCCC and ICAO align their respective views and positions to ensure that emissions from international aviation will be considered in the most effective way under the upcoming climate agreement."

However, our main message in this paragraph is the importance of national coordination so that States express aligned positions to both the UNFCCC and ICAO. In this context, we would like to request the correction of paragraph 91, by replacing it with the text offered above and reflecting our intention in the FCCC/AWGLCA/2008/MISC.3 correctly.

The Outcome of MEET in Japan

The Ministerial Conference on Global Environment and Energy in Transport (MEET) was held in Japan last month, with participation of transport ministers and representatives of 21 major States and 9 international organizations, including the UNFCCC. The MEET produced the Ministerial Declaration, of which paragraphs related to international aviation sector are in the Appendix (full text of Ministerial Declaration is available at http://www.mlit.go.jp/kokusai/MEET/result_en.html).

Bearing in mind that the Ministerial Declaration was adopted to reflect a collective will of all participants to the MEET, we would like to request that the current paragraph 72 (h) (page 54) in the Assembly paper be replaced by the two paragraphs below:

> **"72 (h)** Emissions from international aviation are global in nature and are not restricted to national boundaries. Accordingly, the task of assigning them would be extremely complex at best and equally difficult to implement or enforce (ICAO);"
>
> "**72 (i**) ICAO, as the competent UN body on aviation issues, should continue to lead in developing globally effective measures to address GHG emissions from international aviation, encompassing a basket of measures of a technological, operational and market-based nature, as was resolved at the 36th Session of the Assembly of ICAO (ICAO);".

Enclosure:

A – Ministerial Declaration on Global Environment and Energy in Transport (Excerpt)

ATTACHMENT

Ministerial Declaration on Global Environment and Energy in Transport (Excerpt)

7. We recognize the global nature of the international aviation and shipping sectors, and their importance to global economic growth and sustainable development, as well as the necessity of addressing emissions from these sectors considering the seriousness of the challenge of climate change. We recognize the key role of the ICAO and the IMO as the competent UN bodies on aviation and maritime issues, respectively, and encourage them to continue to lead in developing globally effective measures to address GHG emissions from international aviation and shipping. We will also work collaboratively through the ICAO and the IMO to foster frameworks of action to appropriately address emissions from their respective industries.

International Aviation

10. To limit or reduce GHG emissions from international aviation, reaffirming the importance of expeditious discussions in the ICAO, we in particular:

(1) Support the ICAO to develop preferably by the end of 2009 an implementation framework that involves a comprehensive approach, consisting of work on technology and standards, and on appropriate operational and market-based measures to reduce GHG emissions from international aviation, as was resolved at the 36th Session of the Assembly of the ICAO;

(2) Support the efforts by the ICAO to identify possible global aspirational goals, including in the form of fuel efficiency, for GHG emission reduction; encourage manufacturers to produce aircraft with further improved fuel efficiency; and call on the ICAO to consider effective measures to facilitate the introduction of more fuel efficient aircraft;

(3) Promote the introduction by the ICAO Contracting States of improved navigation systems to shorten flight routes, and of air traffic management that enables more efficient air traffic flows and air space management;

(4) Encourage RD&D by the ICAO Contracting States of improved environmental aircraft technology and sustainable alternative fuels to reduce aviation emissions; and welcome ICAO's initiatives to promote discussion of sustainable alternative fuels for aviation on a global scale;

(5) Support the efforts of reporting, estimation and prediction by the ICAO on GHG emissions from international aviation as well as its evaluation of the technological feasibility, environmental benefits, economic reasonableness, and environmental trade-offs of policies and measures; and

(6) Encourage the ICAO Contracting States to collect information on progress of their industries with regard to fuel efficiency improvement and provide it to the ICAO so it can communicate the performance of the international aviation sector.

PAPER NO. 3: INTERNATIONAL ORGANIZATION FOR MIGRATION, OFFICE OF THE UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES AND THE UNITED NATIONS UNIVERSITY

SUBMISSION by the
INTERNATIONAL ORGANIZATION FOR MIGRATION (IOM), THE UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES (UNHCR) AND THE UNITED NATIONS UNIVERSITY (UNU)

In Cooperation with
THE NORWEGIAN REFUGEE COUNCIL (NRC) AND THE REPRESENTATIVE OF THE SECRETARY-GENERAL ON THE HUMAN RIGHTS OF INTERNALLY DISPLACED PERSONS (RSG ON THE HR OF IDPS)

Climate change, migration, and displacement: impacts, vulnerability, and adaptation options

6 February 2009

5th session of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention (AWG-LCA 5). Bonn, March 29 – April 8, 2009

Introduction

The First Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) issued in 1990 noted that the greatest single impact of climate change might be on human migration and displacement. This claim was further substantiated by the findings of the IPCC Fourth Assessment Report (2007), which provided ample indications that climate change will raise the risk of humanitarian emergencies, as a result of, inter alia, increasing intensity of natural hazards. The International Organization for Migration (IOM), the UN High Commissioner for Refugees (UNHCR), the UN University (UNU) and the Norwegian Refugee Council (NRC) – agencies directly concerned with migration and displacement issues – are already facing the growing impact of climate change on human mobility.

While there are no scientifically verified estimates of climate change-related displacement or of overall population flows triggered by the effects of climate change, it is evident that gradual and sudden environmental changes are already resulting in substantial human migration and displacement. This trend is expected to continue, with anywhere between 50 and 200 million people moving as a result by the middle of the century, either within their countries or across borders, on a permanent or temporary basis. There is a possibility of even higher numbers if the IPCC's worst-case scenarios materialize. In some cases, in particular at early stages of environmental degradation and for those with the resources to move, migration may be an adaption mechanism, allowing for example to diversify the sources of income. In other instances, in particular in cases of natural disasters and for those with fewer means to move, leaving their places of habitual residence may be an expression of failed adaption and constitute a survival mechanism.

Ensuring that migration and displacement triggered by climate change are systematically considered and addressed by the international community is our shared responsibility. This cannot be achieved unless these consequences are duly acknowledged in the successor-agreement to the Kyoto Protocol[6].

IOM, UNHCR and UNU in cooperation with NRC and the RSG on the HR of IDPs therefore compiled this joint submission with the aim of bringing the migration and displacement implications of climate change to the attention of the UNFCCC and requesting that these implications are considered in the 15th Conference of Parties agreement. This submission is based on the assembly document text (FCCC/AWGLCA/2008/16/Rev.1) and contains concrete text proposals in order to indicate the gaps relating to migration and displacement in the previous draft and facilitate the inclusion of these issues in subsequent versions of the draft agreement. Climate-change related migration and displacement is a topic of relevance for Article 4, paragraph 1(e) and 1(f) of the Convention, the Bali Action Plan, and the Nairobi Work Programme.

This submission should be read in conjunction with the previous submissions also relating to the topic of climate change, migration and displacement:

1) "Change, Migration and Displacement: Who will be affected?" Working paper submitted by the informal group on Migration/Displacement and Climate Change of the IASC – 31 October 2008 to the UNFCCC Secretariat.
2) "Disaster Risk Reduction Strategies and Risk Management Practices: Critical Elements for Adaptation to Climate Change" Submission to the UNFCCC Adhoc Working Group on Long Term Cooperative Action by The Informal Taskforce on climate change of the Inter-Agency Standing Committee and The International Strategy for Disaster Reduction 11 November 2008.

Ideas and Proposals on paragraph 1 of the Bali Action Plan[7]

Additional Text Proposals[8] by
IOM, UNHCR and UNU
in cooperation with NRC and RSG on the HR of IDPs

II. A shared vision for long-term cooperative action

14. On the **scientific basis**

- More analytical inter-disciplinary work is required to improve the knowledge base and understanding of the scale, nature and patterns of climate change related population movements and impacts of such movement on the population distribution at the national, regional and global levels.
- There is a need for better assessment of the humanitarian consequences of climate change, including in relation to climate related population movements. Such assessments should be gender sensitive with special attention given to the situation of indigenous peoples. The results of

[6] Climate-change related migration was highlighted in several statements at the fourteenth session of the Conference of the Parties (COP 14), including in the opening statement by the Minister of the Environment of Poland and President of COP 14 and in the statement delivered by the Ambassador of Algeria to the Republic of Poland on behalf of the African Group.

[7] FCCC/AWGLCA/2008/16/Rev1, 10 December 2008, the text below refers to the paragraph number and titles as given in this document.

[8] These proposals build on the references to migration and displacement and related issues included by the Member States in paragraphs 177 (b) and 187 (g) of the assembly document FCCC/AWGLCA/2008/16/Rev1, 10 December 2008.

such assessments should feed into disaster risk reduction, risk planning and preparedness strategies and activities.

16. On the **scope of the shared vision**

- Include the consideration of the impacts of climate change on population settlement and movements and the need to manage these impacts, including as part of the adaptation strategies and activities.
- Include the recognition of humanitarian consequences of climate change, including migration, displacement and, in some instances, statelessness, and of the need to take action to minimize them, including through prevention of displacement, and to prepare for and address the unavoidable consequences.

17. On **principles for a shared vision**

- Consider giving priority to the particular needs of the people most vulnerable to and most affected by climate change, including the displaced and those at risk of displacement.

19. On a shared vision for enhanced action on **adaptation**

- Build coherence at national and international levels between mitigation and adaptation policies and other relevant policy domains, such as development, humanitarian action, migration and health.
- Include migration, both internal and cross-border, as a possible adaptation strategy, especially at early stages of gradual environmental degradation.

IV. Enhanced action on adaptation

A. International cooperation to support urgent implementation of adaptation actions

99. On the **context of adaptation planning and implementation**

- Adaptation strategies and action need to consider the human mobility, health and demographic implications of climate change as well as their economic and social consequences.
- Adaptation strategies and action need to consider the humanitarian consequences of climate change, including migration, displacement and the need to prepare for and address them.
- Consider giving priority to the particular needs of the people most vulnerable to and the people most affected by climate change, including the displaced and those at risk of displacement.

100. On the **nature of adaptation plans**

(a) A framework/structure for adaptation (AOSIS, MISC.2/Add.1 and MISC.2/Add.2; EC and its member States, MISC.5/Add.1 and MISC.5/Add.2; United States, MISC.5; EC and its member States, adaptation workshop) should be adopted, geared towards the evaluation and implementation of strategies and programme support (EC and its member States, MISC.2; United States, MISC.5) and structured but flexible (AOSIS, MISC.5/Add.2). The formulation of such a framework/structure should take into account/focus on, inter alia:

- Consideration of migration, both internal and cross-border, as a possible adaptation strategy, especially at the early stages of environmental degradation. This will require factoring migration considerations into national adaptation policies and vice versa.

(b) National adaptation plans should go beyond the current NAPAs, and should:

- Incorporate other relevant policy considerations such as development, human mobility, disaster prevention and preparedness, avoidance of statelessness and health and be consistent with relevant national policies and strategies.

102. On **vulnerability and adaptation assessments** to support adaptation planning and Implementation

(a) Consideration of the following elements in order to ensure the effectiveness of the assessment process:

- The need to collect better data on the nature and patterns of climate change related population movements and vulnerability mapping to more accurately locate areas experiencing or likely to experience an outward flow of people owing to the direct or indirect effects of climate change,
- Vulnerability, risk and adaptation assessments to take account of the risk of displacement and statelessness as well as the particular protection needs of those already displaced.

103. On **incentivizing adaptation, and creating enabling environments**

(c) That governments should play leading roles in creating enabling environments for adaptation, including through identifying vulnerabilities to climate change; improving the environment for doing business; creating legal and regulatory conditions that facilitate adaptation; reducing perverse incentives that encourage maladaptation; enhancing the necessary information and knowledge base; and educating stakeholders (United States, MISC.5/Add.2);

- That governments may consider facilitating the role of migration as an adaptation strategy by strengthening its development effects on areas of origin.

105. Parties proposed that **financial support** be directed at:

- Disaster risk reduction, risk management and humanitarian response at all levels, whether local, national, or international.
- Community stabilization and development projects aimed at increasing the resilience of vulnerable communities.
- Protection and assistance in accordance with the 1998 Guiding Principles on Internal Displacement to persons internally displaced as a result of the effects of climate change. States significantly affected by displacement and migration as a result of climate change may also require support to meet their needs, including to ensure adequate protection of and assistance to concerned populations.

108. On **the ways to enhance knowledge sharing**

- Facilitate the sharing and dissemination of good practices based on countries' experiences in addressing cross-border and internal environmental population movement, relocation and resettlement as well as return.
- Support inter-disciplinary cooperation to improve the knowledge base and generate data on the scale, nature and patterns of climate change related population movements.

2. Input by observer organizations

115. On institutional arrangements

(a) Efforts by the United Nations system and other relevant organizations to coordinate action to support Parties in respect to climate change, and specifically to provide support for adaptation practices, should be

continued (ISDR, MISC.6), and adaptation efforts should take advantage of the multistakeholder ISDR system and the multi-partner IASC system (IASC/ISDR, MISC.6/Add.1);

D. Economic diversification to build resilience

2. Input by observer organizations

123. Organizations proposed that economic diversification policies should be organized within sectors or by the promotion of new activities from other economic sectors, and that all stakeholders be consulted (ITUC); new activities in other economic sectors should be proposed for workers in sectors at risk, and social dialogue with all stakeholders at all levels needs to be undertaken in an institutionalized manner (ILO, MISC.5/Add.2).

- Recognize and facilitate the role of migration, including climate change related migration, as an income diversification strategy at the household level; seek to strengthen the development effect of migrant remittances on areas of origin.

163. On **guiding the disbursement of, and access to, financial resources** for mitigation and adaptation and technology cooperation

- Objective criteria, such as a small number of internationally recognized indicators representing economic status and vulnerability to climate impacts, including the likelihood of migration and displacement could be developed for determining who receives broader multilateral funding.

PAPER NO. 4: UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION

5th Session of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA 5), Bonn, Germany, 29 March – 8 April 2009

Submission containing ideas and proposals on Paragraph 1 of the Bali Action Plan:

Required policy actions to include carbon contained in soils including the use of biochar (charcoal) to replenish soil carbon pools, and restore soil fertility and sequester CO_2

Summary

1. The United Nations Convention to Combat Desertification (UNCCD) is one of the "Rio" conventions that resulted from the 1992 United Nations Conference on Environment and Development (UNCED). The UNCCD has a global objective to address the issues of land degradation including desertification as well as mitigation of the effect of droughts, namely desertification, land degradation and drought (DLDD) and emphasizes action to promote sustainable development in drylands from the global to the community level.

2. The role that land, i.e., soils, plants and vegetation plays in sequestering carbon is an issue of interest for the three Rio Conventions. As regards drylands the inclusion of the potential of soils in carbon sequestration can help to achieve the ultimate objective of the UNFCCC to reduce emissions while guaranteeing the priority sustainability issues of developing and developed countries. The contrary is also true, carbon release that happens in drylands impacts in several ways DLDD and negatively impacts sustainable livelihoods, ecosystem management, and global benefits.

3. The UNCCD recognizes that globally drylands cover around 41.3% of the land surface[1].

4. The growing population in drylands will reach as much as two billion people during this decade, most of it susceptible to DLDD. Vulnerabilities and associated risks to climate change and variability may negatively impact agricultural yields and practices, biodiversity, and livelihoods in these areas.

5. Indeed, the UNCCD's 10-year strategic plan (10YSP) recognizes the links between DLDD and climate change. One indicator of the plan's strategic objectives is to generate global benefits through effective implementation of the UNCCD; another one is to achieve an increase in carbon stocks (soil and plant biomass) in affected areas.

6. Actions related to sustainable land management (SLM) influence directly, through the soil component, the increased capture and sequestration of carbon and other greenhouse gases that mitigate global climate change. Conversely, unsustainable land practices that lead to DLDD can bring about further disturbances in carbon storage and management. Policy frameworks that target the conservation of soils in a sustainable way in degraded ecosystems, such as drylands, contribute to, *inter alia*, the increased capacity of ecosystem services from these lands, the generation and availability of other goods that improve the living conditions of people living off the land, thus contributing to sustainable food production and food security. Other direct long-term environmental benefits that SLM can help to achieve are: the enhancement of soil water storage capacities, and the mitigation of risks of drought and flood prevention.

7. The recognition of soil carbon as a greenhouse gas abatement technology can be optimally achieved with the utilization of Biochar. As indicated in the first submission to the LCA made by the UNCCD secretariat (Poznan, December 2008) we stated that "According to the IPCC biochar management

[1] Including hyper-arid regions. Antarctica and Greenland not included.

would be a valid carbon sink in the current and post 2012 LULUCF guidelines. However, the following policy action is urgently required:

a. Raising awareness on the role of the land on mitigation and adaptation to climate change and in particular the importance of Biochar in enhancing the sequestration of carbon in the soils.
b. Inclusion of biochar in the CDM mechanism along with currently already included afforestation and reforestation (A/R).
c. Revision of the additionally and permanence rules in order to take into account the fact that biochar is a permanent means of carbon capture that has more value than the potentially reversible (A/R).
d. In view of item 3 above, increase the level of CERs that an annex I Party can use towards meeting the Kyoto Protocol targets from the current 1% to a higher percentage. This would result in large financial flows for both mitigation and adaptation to developing countries where use of this technique would result in the highest returns, due to the high losses of SOC."

8. The present submission refers to the role and approaches for action on reducing emissions from carbon in soils in drylands of developing countries.

9. There is the short-term need to include into the negotiation agenda of UNFCCC other practical approaches, such as biochar-related mitigation (CDM) focusing on increased land productivity, which simultaneously takes into account the global objective of the UNFCCC to reduce emissions, as well as the objectives of combating desertification and conservation and sustainable use of biodiversity. In the medium-to-long term all stakeholders need to engage in the dialogue for the post 2012 climate regime as this approach to soil organic carbon restoration can constitute a significant adaptation tool to climate change, in addition to sequestering carbon. Biochar utilization as a soil amendment could be the strong link needed between the three Rio conventions as it simultaneously addresses climate change, desertification and biodiversity issues.

I. Short-term policies: Raising awareness on carbon storage in drylands and Biochar

10. The key policy requirement is the recognition of soil carbon sequestration as an accredited mitigation and adaptation technique, for all countries, within the framework to be adopted in Copenhagen. It is necessary then to raise awareness on the existence of the missing information for decision-making. Through the past years, efforts in the management of greenhouse gases have highlighted the relevance of forest carbon sock management, as the amount of carbon sequestered by forests is important. The secretariat of the UNCCD supports these efforts and believes that the issues of LULUCF and REDD are perfectly complementary with the inclusion of soil carbon sequestration.

11. The intention of this submission is not to go further in the existing knowledge on how plants take up carbon dioxide from the atmosphere and incorporate it into plant biomass through photosynthesis, as this is currently included within the different negotiation frameworks of UNFCCC. The main interest of the UNCCD is to flag the case of what happens to the carbon that is left in the live and dead vegetation, above and below ground. The organic carbon reservoirs made up by this biomass enhance the soil carbon pools. In the case of Biochar, however, mean residence time of Biochar's recalcitrant carbon in soils is about 2,000 years[2], meaning that Biochar effectively removes net carbon dioxide from the atmosphere in a virtually permanent soil carbon pool, when sustainable production of the biomass feedstock is achieved.[3]

12. The Biochar white paper states that incorporating Biochar into the soil "does not in the long-term disturb the carbon-nitrogen balance, but holds and makes water and nutrients available to plants.

[2] Kuzyakov, Y, Subbotina, I., Chen, H., Bogomolova, I., Xu, X., Black carbon decomposition and incorporation into soil microbial biomass estimated by 14C labeling, Soil Biology & Biochemistry 41 (2009) 210-219.
[3] Biochar White Paper (2008), the International Biochar Initiative, http://www.biochar-international.org/

When used as a soil amendment along with organic and inorganic fertilizers, biochar significantly improves soil tilth, productivity, and nutrient retention and availability to plants."[4]

13. Research conducted to date indicates that the world's soil reservoirs contain more organic carbon than the atmospheric or global vegetation reservoirs. Thus a change in the flow of carbon in the soil carbon reservoir, however small, can have a significant effect on a global scale[5].

14. The research undertaken so far provides the evidentiary recognition[6] that action geared to SLM directly impacts the soil component by increasing capture and retention of carbon and other greenhouse gases that mitigate global climate change. Soil conservation brings about, *inter alia*: the capability to improve the services of the ecosystem; the sustainable production of food, henceforth contributing directly to food security, as well as other goods that improve the living conditions of populations living off the land; increased capacities for water storage, drought mitigation, flood prevention, and water supply. These are the direct long-term environmental benefits that SLM can help to achieve.

15. It is known that in the drylands there is a low plant biomass per unit area. Some researchers[7] put it at about 6 kilograms per square meter. Other terrestrial ecosystems have two to three times that amount. But when considering the size of the drylands around the world, their capability in relation to carbon sequestration is very high. According to a recent study commissioned by UNEP, UNCCD and UNDP, the total drylands represent 27% of total reserves of organic carbon in the soil. It is therefore plausible, given the extent of land degradation in drylands, that they are far from saturated with carbon, thus their potential to sequester carbon is estimated to be very high[8]. The potential for Biochar to contribute to land remediation and increased soil carbon sequestration in drylands should be investigated.

II. Medium-to-long-term policies: Issues, including technical, for the inclusion of soil carbon, especially Biochar, in drylands under the deliberations of UNFCCC towards Copenhagen 2009.

16. As indicated by some of the issues tabled by countries on Biochar[9] there is the need to open a dialogue to elucidate, within the framework of the UNFCCC and its subsidiary bodies, the constraints and opportunities that serve for the identification of best options, including technical and policy options, that can bring forward the notion of soil carbon sequestration and Biochar utilization as recognized mitigation and adaptation technologies.

17. As for the technical issues, the use of Biochar within a project-based approach is advisable. For this to occur more detailed research on Biochar as a soil amendment in drylands (per region / sub region of the world) is needed. Up front there is the need to clarify the role of soils (and Biochar) within the UNFCCC definitions.

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[4] Ibid
[5] Ibid
[6] This is recognized by many, for example IPCC, IUCN, UNCCD, UNEP and others. For IUCN see: http://www.iucn.org/what/issues/law/index.cfm?uNewsID=242: International Forum on Soil, Society and Global Change in Iceland, 17 September 2007; For IPCC see, among others: The Physical Science Basis of Climate Change: IPCC Working Group I Report, 2007, available at http://soilcarboncenter.k-state.edu/originals/IPCC%20WG%20I.html. For UNEP see the paper available at WWW.UNCCD.int
[7] Trumper Kate, C. Ravilious and B. Dickson "Carbon in Drylands: Desertification, Climate Change and Carbon Finance", A UNEP-UNDP-UNCCD Technical Note for Discussions at CRIC 7, Istanbul, Turkey - 03-14 November, 2008,Prepared on behalf of UNEP, UNCCD and UNDP. Nov. 2008.
[8] Ibid, page 2. The document was presented at a side event in Poznan (Dec 13, 2008) organized by the UNCCD secretariat.
[9] Micronesia in Poznan, Dec 2008 as well as new submissions scheduled to be made in 2009 by developing country parties prior to Copenhagen, as informed to the UNCCD secretariat.

- **On additionality**: Establishment at the national level of soil carbon baselines for drylands and other ecosystems according to land uses.
- **On Leakage**: There is the need to consider the issue of increased net primary productivity from biochar utilization as a soil amendment; carbon sinks by different land uses; as well as issues of incomplete combustion of biomass, as achieved in biochar production technologies.
- **On Permanence**: This is directly related and congruent with the decisions, adopted and ongoing, on carbon mechanisms in place under the CDM that relate to compliance, insurance and other risks. As stated by multiple researchers, biochar has a mean residence time in soils (under natural conditions) of about 2,000 years.[10]
- **On Monitoring**: These aspects should be developed according to specific land uses and can best be classified if linkages with ongoing monitoring schemes (such as under the CDM) and platforms are clearly identified.
- **On Adaptation**: Carbon in soils and Biochar represent an optimal opportunity for policy development and implementation in drylands in developing countries. One such example, *inter alia*, on Biochar and adaptation and mitigation is Biochar as part of a solution to NAPAs implementation.

18. These are some of the issues to consider for the CDM, as well as the global carbon trade market to make practical options to increase soil fertility available and accessible to land managers, especially in drylands. Biochar is one such approach, with significant promise and ancillary benefits.

III. The UNCCD working towards the inclusion of carbon in soils and Biochar under the UNFCCC – Copenhagen agreement.

19. Given that carbon sequestration in soils has much to offer to climate change mitigation and adaptation, land and livelihood protection and resilience, concrete short and long-term actions must be identified as part of the Copenhagen agenda. These can be hampered by lack of data, lack of finance and perhaps lack of capacity to implement changes. This is why policies and institutions addressing these issues should work co-operatively, as set out in 10YSP of the UNCCD.

20. The secretariat of the UNCCD is ready to facilitate discussions on possible approaches on the importance of carbon in soils, particularly Biochar.

PAPER NO. 5: UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

[10]Kuzyakov, Y, Subbotina, I., Chen, H., Bogomolova, I., Xu, X., Black carbon decomposition and incorporation into soil microbial biomass estimated by 14C labeling, Soil Biology & Biochemistry 41 (2009) 210-219. See also: The Biochar White Paper states that (page 2) " most of the applied biochar can remain in the soil for several hundreds to thousands of years, (see also Terra Preta soils)". See also Pessenda, L.C.R., Gouveia, S.E.M., and Aravena, R., 2001, Radiocarbon dating of total soil organic matter and humin fraction and its comparison with 14C ages of fossil charcoal, Radiocarbon, 43: 595-601. And Schmidt, M.W.I., Skjemstad, J.O., and Jager, C., 2002, Carbon isotope geochemistry and nanomorphology of soil black carbon: Black chernozemic soils in central Europe originate from ancient biomass burning. Global Biogeochemical Cycles, 16: 1123. (Source IBI)

AIR POLLUTION AND CLIMATE CHANGE: DEVELOPING A FRAMEWORK FOR INTEGRATED CO-BENEFITS STRATEGIES

Report by the secretariat

INTRODUCTION

1. This document, prepared by the secretariat, reports the results of a major conference and workshop titled "Air Pollution and Climate Change: Developing a Framework for Integrated Co-benefits Strategies", held from 17 to 19 September 2008 in Stockholm. It was prepared in consultation with Sweden, which hosted the event, and the Chairs of the event. The report is prepared in accordance with the 2008 workplan for the implementation of the Convention, (ECE/EB.AIR/91/Add.2 and ECE/EB.AIR/91/Add.2/Amend.1, section 1.1 (k)) as amended by the Bureau of the Executive Body according to its mandate (ECE/EB.AIR/91/Add.1, annex I). The event was held under the auspices of the Convention and the United Nations Environment Programme (UNEP), in consultation with the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC). The event was funded by the Swedish International Development Cooperation Agency (Sida) and organized by the Stockholm Environment Institute (SEI) and the International Union of Air Pollution Prevention and Environmental Protection Associations (IUAPPA) as secretariat for the Global Atmospheric Pollution Forum.

2. One hundred and ten experts attended the workshop. The following Parties to the Convention were represented: Austria, Belgium, Canada, Croatia, the Czech Republic, France, Germany, Italy, the Netherlands, Norway, Romania, Sweden, the United Kingdom of Great Britain and Northern Ireland and the United States of America; the European Community was also represented. Also present were representatives of the Steering Body of EME[11], the Task Force on Hemispheric Transport of Air Pollution, the Expert Group on Techno-economic Issues and representatives of the Working Group on Effects' International Cooperative Programme (ICP) on Integrated Monitoring, ICP Materials and ICP Vegetation, as well as the Centre for Integrated Assessment Modelling of EMEP.

3. The meeting was attended by representatives of UNEP, the UNFCCC secretariat, the Arctic Monitoring and Assessment Programme, the Clean Air Initiative for Asian Cities (CAI-Asia), CAI-Latin America, the Air Pollution Information Network for Africa (APINA), the Acid Deposition Monitoring Network in East Asia (EANET), the Inter-American Network for Atmospheric and Biospheric Studies (IANABIS) in Latin America, and the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia. The European Commission and its Joint Research Centre were also represented.. In addition, the meeting was attended by representatives of SEI, IUAPPA, the European Federation of Clean Air and Environmental Protection Associations, the International Council on Clean Transportation, the Union of the Electricity Industry, the European Environmental Bureau, the Oil Companies' European Association for Environment, Health and Safety in Refining and Distribution. A member of the Convention secretariat also attended.

4. The Global Atmospheric Pollution Forum, which had been responsible for planning the event, was represented through the representatives of its component bodies: the Convention, APINA, CAI-Asia, CAI-Latin America, EANET, IANABIS, IUAPPA, the Malé Declaration and SEI.

[11] The Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe.

5. From outside the ECE region, the following countries were represented: Australia, Brazil, Chile, China, Ghana, India, the Islamic Republic of Iran, Japan, Kenya, Mongolia, Panama, the Philippines, Thailand, Tunisia, Zambia and Zimbabwe.

6. Mr. R. Mills (IUAPPA) and Mr. J. Kuylenstierna (SEI), the convenors of the Global Atmospheric Pollution Forum, chaired the meeting.

I. AIMS OF THE CONFERENCE/WORKSHOP

7. The conference/workshop brought together international policymakers and scientists to consider ways to develop and implement programmes that simultaneously decrease emissions of air pollutants and greenhouse gases (GHGs). The main focus was on co-benefits strategies and, as well as considering Convention-related activities in Europe and North America, included consideration of programmes in Asia, Africa and South America.

8. The goal of the event was to provide recommendations to the Executive Body as well as to other relevant international negotiating forums. The intention was also that the results would be disseminated to a number of regional conferences planned in 2008.

9. The event aimed, in particular, to examine:

(a) The science linkages between air pollution and climate change;

(b) The effectiveness of integrated assessment techniques to link air pollution and climate policy;

(c) The challenges in developing and applying integrated approaches at various policy and geographic levels; and

(d) How to develop strategies, frameworks and processes for better integrating air pollution and climate change programmes.

II. ORGANIZATION OF THE CONFERENCE/WORKSHOP

10. The conference was opened by Ms. E. Falemo, State Secretary for Environment, Sweden, and H.E. Mr. J. De Zorzi, Ambassador of France to Sweden, on behalf of European Union Presidency. Ms. Mia Horn af Rantzien, Deputy Director, Sida, welcomed delegates and emphasized the importance of air pollution and climate change to Sweden's development agenda. Mr. M. Iyngararasan (UNEP Regional Resource Centre for Asia and the Pacific), Mr. H. Wuester (UNFCCC secretariat) and Mr. M. Williams, Chair of the Executive Body, explained the context and expectations for the conference/workshop.

11. Conference participants had received previously preparatory working papers on the following topcs: (a) introductory summary of co-benefit issues and conference objectives; (b) scientific understanding behind the development of integrated co-benefits strategies; (c) integrated assessment of co-benefits between air pollution control and GHG mitigation; (d) challenges of developing and applying integrated strategies at various scales; (e) linking climate and air pollution policy processes at the international scale; and (f) taking an integrated approach to air pollution and climate change – opportunities and challenges from an African perspective (a personal contribution by Mr. Y. Sokona, Sahara and Sahel Observatory, Tunisia).

12. Following the opening and introductory presentations, the event comprised three plenary sessions, each with extended discussions to help develop conclusions. Each session focused on one of the first three aims of the conference, namely:

(a) Science linkages between air pollution and climate change (chaired by Mr. P. Artaxo (Brazil));

(b) The effectiveness of integrated assessment techniques to link air pollution and climate policy (chaired by Mr. P. Grennfelt (Sweden));

(c) Challenges in developing and applying integrated approaches at various policy and geographic levels (chaired by Mr. A. Lloyd (United States)).

13. The plenary sessions were followed by regional break-out sessions with delegates participating in one of the following groups:

(a) Europe, North America and the Arctic (chaired by Mr. A. Zuber (European Commission));
(b) Asia (chaired by Mr. Changhong Chen (China) and Mr. Hu Tao (China));
(c) Africa (chaired by Mr. Y. Sokona (Tunisia));
(d) Central and South America (chaired by Mr. S. Sanchez (CAI-Latin America)).

14. The Chairs of the plenary and break-out sessions provided summary reports and conclusions for their sessions; these were discussed and conclusions were amended taking account of the plenary discussions.

15. In a final plenary discussion, chaired by Mr. B. Kjellén (SEI) and Mr. R. Mills (IUAPPA), key conclusions were agreed by the participants. These are set out in chapter III below.

16. The conclusions of the plenary and break-out sessions, as well as the key conclusions will be published in a workshop report to be prepared by the organizers. This will be made available online (at www.gapforum.org), together with the background papers and presentations for the conference/workshop.

III. CONCLUSIONS AGREED BY THE CONFERENCE/WORKSHOP

17. The principal conclusions and recommendations made by the conference/workshop are summarized in the paragraphs below.

18. Current science emphasizes the urgent need to address air pollution and climate change in an integrated way. We should no longer treat these two issues separately as we strive to achieve sustainable development and a low-carbon society.

19. Global climate change is primarily the result of 150 years of carbon dioxide (CO_2) and other GHG emissions. Recent studies indicate that 13 to 90 per cent – with a central value of 40 per cent – of the warming by GHGs in the atmosphere is presently being masked by certain aerosols (and aerosol-cloud interactions) that increase the reflection of sunlight; these aerosols result from air pollution emissions (see para. 27).

20. In both developing and industrialized countries, abatement of air pollution and mitigation of climate change have generally been treated separately. There are, however, substantial benefits to

considering the control options together. Such an approach would mostly lead to increased health and/or climate benefits and decreased costs.

21. The current priority for many developing countries is poverty eradication and sustained economic development. In that context they seek to improve air quality and the health of their citizens, as part of their development policies. An integrated co-benefits approach could achieve win-win solutions and, indeed, some countries in different regions are already explicitly integrating air pollution controls and GHG mitigation.

22. A range of integrated assessments and analyses around the world highlight that GHG mitigation net costs are lower due to cost savings on air pollution control, and benefits of GHG mitigation are greater due to reduced air pollution impacts. For example, recent assessments for Europe and parts of Asia found that a 20 per cent decrease in CO_2 emissions could lead to about a 15 per cent fall in air pollution-induced deaths, with considerable associated cost savings.

23. Ground-level ozone and black carbon aerosols are both air pollutants and act as warming agents (see para. 24). Methane is a precursor of ozone formation and a GHG. Urgent action to decrease their concentrations in the atmosphere would provide opportunities, not only for significant air pollution benefits (e.g. health and crop-yield benefits), but also for rapid climate benefits, by helping to slow global warming and avoid crossing critical temperature and environmental thresholds. The substances are relatively short-lived in the atmosphere (compared to CO_2), lasting from days to weeks (ozone and black carbon) to a decade (methane), and so decreasing their concentrations by cutting emissions could produce relatively quick climate benefits. However, achieving this would require careful consideration, extensive commitment and regional and global cooperation.

24. Methane, ozone and black carbon aerosols together are a major warming component compared with CO_2. According to the Intergovernmental Panel on Climate Change, the mean anthropogenic radiative forcing resulting from all GHGs is estimated to be +3.05 W m^{-2} of which methane accounts for +0.48 W m^{-2} and tropospheric ozone for +0.35 W m^{-2}. In addition, it is estimated that black carbon accounts for +0.34 W m^{-2} in the atmosphere and an additional +0.1 W m^{-2} on snow. Regionally, however, black carbon heating effects can rival that due to CO_2 increases, for example in the Arctic and the Himalayan-Tibetan glacier regions.

25. Opportunities for decreasing emissions of methane and other ozone precursors in industry, agriculture, mining and transport are widely recognized and relatively inexpensive. Decreasing black carbon emissions from the majority of diesel engines is effective and practical, and there are other promising opportunities in both industrial processes and the uncontrolled burning of biomass.

26. Decreasing concentrations of methane, ground-level ozone and black carbon should occur alongside CO_2 emission cuts and the required climate change adaptation measures. Ozone reductions are best achieved by cutting emissions of all precursors, which include nitrogen oxides and volatile organic compounds as well as methane. Studies show that decreasing nitrogen oxide concentrations alone might exacerbate the build up of global methane levels.

27. Air pollution abatement policies that decrease sulphate and some other aerosols to help protect human health and the environment will produce inadvertent acceleration of warming because of the “cooling” effect of these aerosols on climate. This warming could be alleviated to some degree by

reducing the short-lived warming agents (methane, ozone and black carbon) as described above (para. 23), and emphasizes the urgent need to decrease concentrations of these substances.

28. Among air quality policies, structural change, for example through replacement of fossil fuels by renewable energy sources, could provide greater climate and air pollution co-benefits than the traditional end-of-pipe technologies.

29. The national level may be the most important for the development of co-benefit strategies, since the content and focus of such strategies are likely to differ from region to region and country to country. Countries which do not have well-established systems of air quality regulation have the opportunity to develop groundbreaking integrated systems more simply and effectively than countries where well-established air pollution control systems are already in place.

30. Existing regional air pollution networks, climate networks, inter-governmental agencies and agreements could play an important role in linking the climate and air pollution communities at different scales and in sharing expertise.

31. Potential co-benefits might have implications for the future development of international air pollution and climate change negotiating and policy processes. It is important that these conclusions be made available to the UNFCCC and relevant air pollution conventions and networks. This could be achieved through their secretariats.

32. It is also important that these significant climate and air pollution co-benefits are made known to negotiators and relevant policymakers at the national level as soon as possible, since they may affect future decisions on abatement and mitigation. The conclusions should be considered and promoted at the national and local scales. In the UNECE region, the Convention could play a lead role. In other regions, the established international networks and agreements could take the lead.

33. To promote broader understanding of the issues it would be helpful if an early, comprehensive review of the issues and available evidence could be undertaken. For example, a body such as the Intergovernmental Panel on Climate Change or other scientific bodies or networks could be invited to develop authoritative reports which draw upon relevant information from the climate change and air pollution communities.

34. To develop co-benefits strategies, enhanced collaboration and communication between key climate change and air pollution stakeholders is considered essential at the international, national and local scales; these may include government departments and industry.

35. A substantial programme would be needed to enhance and build capacity to implement a co-benefits approach; this should start with raising awareness and understanding among key stakeholders. As part of this programme, there would be a need to provide the necessary tools and assistance for work at the regional and national scales to undertake the necessary modelling, assessments, planning, etc.

36. Addressing all of these issues would require the urgent mobilization of significant resources. However, such investment is believed to be highly cost-effective.

PAPER NO. 6: UNITED NATIONS ENVIRONMENT PROGRAMME

Submission of the United Nations Environment Programme (UNEP) to the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention (AWG-LCA)

December 7, 2008 (revised February 2009)

Background

In response to the invitation by the Chair of the AWG-LCA for Parties and observer organizations to submit further ideas and proposals in correspondence with the earlier invitations, the United Nations Environment Programme (UNEP) makes the following submission. The submission provides UNEP's views on selected elements contained in paragraph 1 of decision 1/CP.13 focussing on five key areas. They deal with enhanced action on (1) mitigation of climate change; (2) adaptation; (3) technology development and transfer to support mitigation and adaptation; (4) the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation; (5) supporting the implementation of UNFCCC decisions.

Mitigation

On mitigation of climate change, dealing in particular with the reform of the Clean Development Mechanism (CDM), UNEP recommends a clear separation in the discussions on the proposed action between longer term vision for the evolution on the market and the short term improvements needed in the current market situation and design of the mechanism. The longer term vision could be worked in the language to be developed on Nationally Appropriate Mitigation Actions (NAMA), on Reporting, Monitoring and Verification (MRV) and on sectoral approaches and will be closely linked with the other key elements of a possible future agreement.

In the near term as the Parties desire to maintain and enhance the current dynamic development of CDM activities, there is an urgent need to develop concrete approaches and methodologies that can deal with current bottlenecks in the project process and delays in the review and approval process, and to support more rapid development of the existing options for programmatic activities (P-CDM). There is also a need for enhanced capacity building efforts to increase regional distribution of CDM projects.

UNEP with its on-going activities in analytical and capacity building activities, if invited, is well placed to work with Parties, the UNFCCC secretariat and the CDM Board on these short-term actions. UNEP will in April 2009 issue new guidance on P-CDM and initiate further capacity building activities in support of the Nairobi Framework.

Adaptation

On adaptation, UNEP proposes the following for the consideration of Parties and the UNFCCC secretariat: (a) separate the immediate steps to deal with urgent needs for adaptation from long-term arrangements needed to prepare and respond to future climate risks; (b) focus on the most vulnerable countries, communities and groups of people, and responding to the specific support needs identified by them; (c) deliver packages of support for the adaptation activities of governments and communities of vulnerable regions, including assessments of impacts and vulnerabilities, piloting adaptation, and capacity building in support of policy setting, planning and adaptation practices; (d) provide increased, sustainable and long-term funding to meet the increasing needs for capacity building, technology development and transfer, and adaptation practices; (e) strengthen the management and

mobilization of data, information and knowledge to support knowledge-based adaptation; and (f) build the resilience of ecosystems and apply
ecosystem-based approaches in adaptation.

UNEP will work to strengthen its supportiveness and complementarity to the actions taken by governments, communities and other partners on adaptation, to ensure the enhanced resilience of the most vulnerable regions and communities to climate change. In particular, UNEP will work with countries on the integration of adaptation into national development planning processes, and on increasing the climate resilience of key vulnerable ecosystems and the people depending on them. To enhance the adaptive capacity of vulnerable countries in a sustainable manner, UNEP is facilitating the development of the Global Adaptation Network in partnership with other UN and international organizations.

Technology

UNEP believes that there are a number of barriers to the development of robust markets for cleaner energy technologies. They include poor access to timely and unbiased information, weak institutional and human capacities, and limited access to finance, which affects all actors in the market. UNEP, supported by other bilateral or multilateral aid agencies, is well placed to facilitate and help the implementation of a number of these activities and initiatives.

The activities suggested below can help foster market development for cleaner energy technologies in developing countries. These initiatives include: (a) help governments design and implement climate and sustainable energy policies and programmes that provide the basis for the systematic removal of barriers needed to develop markets for prioritised technologies; (b) provide institutional and financial support to governments willing to test out changes in energy subsidy regimes in favour of climate-mitigation technologies; (c) establish national centres of excellence in clean energy technology and link them with regional networks of climate change officials to provide a means for sharing knowledge, exchanging information and experience, and accelerating technology transfer through cooperative regional efforts; (d) facilitate the scale-up of seed financing and later stage bank financing to climate entrepreneurs, as guarantees are provided to share market and technology risks; (e) provide affordable long term financing on concessional terms for low carbon infrastructure projects by establishing a Least-developed country credit facility for climate infrastructure; (f) help the domestic banking community to begin financing the uptake of cleaner technology amongst households and small business; (g) facilitate first-of-a-kind carbon transactions based on new methodologies and approaches; (h) provide targeted support for first-movers investing in cleaner energy technologies through information and financial assistance that reduce transaction costs; (i) create technology platforms to scale-up the uptake of cleaner energy technologies at the regional level in key areas such as energy-using devices, energy intensive industries or fossil-fuelled power generation; (j) develop standards and norms for selected products and strengthening of national and regional capacities to adopt, implement and enforce a range of product standard programmes.

Finance

On provision of financial resources and investment, UNEP believes that key questions include: What should be the scale of new financing by governments? How can public monies mobilize and leverage sufficient commercial capital to achieve GHG reduction objectives? In other words: how to get and importantly make most of those new financing resources?

A wide range of public finance mechanisms can be used to catalyze private investment in low-carbon technologies and projects, including credit lines, risk sharing guarantees, private equity and venture capital funds, carbon finance facilities and a wide range of innovative grant based instruments. New mechanisms or adaptations of existing mechanisms are also being proposed, for instance inducement prizes and different types of technology funds. To ensure their success, UNEP suggests that these new

mechanisms be aimed at complementing national policy instruments such as regulations, taxes and market mechanisms, rather than operation in isolation. Their role is to help commercial financiers act within a national policy framework, filling gaps and sharing risks where the private sector is initially unwilling or unable to act on its own.

Besides being aligned with policy frameworks, public finance mechanisms must also be structured to act along the entire chain of financial intermediation, which can include development finance institutions, commercial financial institutions, investors, equipment manufacturers and technology delivery companies. In many cases, technical assistance programmes, like those being successfully demonstrated by UNEP, are needed to build the capacities of these market actors to create a pipeline of investment-ready projects, a pre-condition for leveraging commercial funding. Examples of such programmes involving leveraging public finance, capacity development and provision of seed finance are included in the technology section above.

A review of existing public finance mechanisms has found that at any scale they can be made most effective and efficient if they: (a) accurately assess technology market barriers and financial market conditions; (b) target market segments where the project economics are compelling; (c) take a programmatic approach to financial mechanism design; (d) use and strengthen existing financial delivery capacities throughout the chain of financial intermediation; (e) address the lending or investment criteria of commercial financial actors; (f) include marketing and market aggregation plans; and (g) develop plans for public or donor-supported technical assistance programmes to build capacities, fill gaps, and take on any roles or risks not assumed by commercial parties.

UNEP notes that an in-depth exchange of best practices on public funding instruments is needed if parties are to design and implement a new financial architecture under the convention. With this goal in mind UNEP has recently set up a public finance alliance (www.SEFAlliance.org) of public finance and publicly financed agencies focused on clean energy and climate sector development. UNEP has also released at COP14 a preliminary report on Public Finance Mechanisms to Mobilise Investment in Climate Change Mitigation and will look to further contribute to the AWG-LCA finance agenda and the UNFCCC Secretariat Technical papers on Investment and Finance Flows to Address Climate Change.

Support to implementation of UNFCCC process

On supporting the implementation of UNFCCC decisions, UNEP notes that the UN Secretary General has asked agencies with specific programmes and mandates in areas of climate change (REDD, technology transfer, finance, capacity building and adaptation) to play a convening role within the UN, and to help deliver results in each of these areas. At the same time, the UNFCCC will act as the conduit for United Nations system inputs to the intergovernmental negotiation process. UNEP will focus its activities in the provision of the substantive work that will help inform and support the negotiation process.

More broadly, UNEP believes it is crucial:
(1) That adaptation planning, financing and cost-effective preventative actions are increasingly incorporated into national development processes that are supported by scientific information, integrated climate impact assessments and local climate data;

(ii.) That countries make sound policy, technology, and investment choices that lead to a reduction in greenhouse gas emissions and potential co-benefits, with a focus on clean and renewable energy sources, energy efficiency and energy conservation;

(iii.) That improved technologies are deployed and obsolescent technologies phased out, financed through private and public sources, including the Clean Development Mechanism;

(iv.) That increased carbon sequestration occurs through improved land use, reduced deforestation and reduced land degradation;

(v) That country policy-makers and negotiators, civil society and the private sector have access to relevant climate change science and information for decision-making. In this regard it is important to help advance negotiations on future action through capacity building workshops for climate change negotiators to help them articulate and refine their national, sub-regional and regional policy positions with regard to specific building blocks of the Bali Road Map and with the requirements of any negotiated outcome at COP15.

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