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Item 5 of the provisional agenda
Reducing emissions from deforestation in developing countries: approaches to stimulate action

Information on experiences and views on needs for technical and institutional capacity-building and cooperation

Submissions from Parties

Addendum

1. In addition to the seven submissions contained in document FCCC/SBSTA/2009/MISC.2, three further submissions have been received.

2. 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.

* 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.

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PAPER NO. 1: BRAZIL

SBSTA – 15 February

Brazil welcomes the opportunity to present information on its experiences and views, and to provide country-specific information, where possible, on needs for technical and institutional capacity-building and cooperation in, *inter alia*, the implementation of methodologies for estimating and monitoring changes in forest cover and associated carbon stocks and greenhouse gas emissions, incremental changes due to sustainable management of forests, reduction of emissions from deforestation and forest degradation, national and subnational monitoring and reporting systems, and methodologies for forest inventories, ground-based and remote sensing approaches.

On the implementation of methodologies for estimating and monitoring changes in forest cover and associated carbon stocks and greenhouse gas emissions: experiences, views, and needs for technical and institutional capacity-building and cooperation

Brazil has a long standing experience in assessing and monitoring changes in forest area cover using remotely sensed data, which have been instrumental for the development of policies and measures to reduce emissions from deforestation and, more recently, from forest degradation. Presently, the country has four systems that fulfills different forest cover data and information needs: (1) one based on moderate resolution satellite data, 20 - 30 meters (Landsat, DMC[1], SPOT, and CBERS-CCD[2]), which provides annual assessments of the gross deforestation rate in the Brazilian Amazonia (which covers approximately 52% of the Brazilian territory) systematically since 1988, known as ***PRODES***; (2) another based on coarse resolution satellite data, 250 meters and temporal resolution of 1 – 2 days (Terra–MODIS and CBERS-WFI) to provide the Brazilian authorities with "real time" georeferenced data on new events of clear cut areas and areas under progressive forest degradation that most likely will convert to deforestation in Amazonia, to support "early" control and enforcement actions by the official enforcement agencies – known as ***DETER***; (3) a new system implemented in 2008 that provides georeferenced data of severely degraded areas (in ***advanced stages of progressive degradation process***) using Landsat and CBERS satellite imagery – known as ***DEGRAD***; and finally (4), another new system that will provide annually assessments of selective logging areas in the Brazilian Amazonia, based on moderate resolution satellite data, as in ***PRODES*** – known as ***DETEX***.

All systems, ***PRODES***, ***DETER, DEGRAD***, and ***DETEX***, are actions of the Ministry of Science and Technology, through its National Institute for Space Research – INPE, within the Permanent Interministerial Working Group to Reduce the Deforestation Rates in Amazonia, created in 2003. This Working Group is responsible for the development and implementation of the *Plan of Action to Prevent and Control Deforestation in the Legal Amazonia*.

[1] Satellites from the Disaster Monitoring Constellation

[2] China-Brazil Earth Resources Satellite

Brazil is considered to have one of the most advanced systems for deforestation assessment and monitoring using satellite data. This results from systematic investments on data acquisition and digital image processing, in addition to systematic investments in research to continuously improve the accuracy of the results.

Brazil's experience with ***PRODES*** has been valuable to identify the following important features of an assessment system:

- it should provide ***consistent*** and ***systematically acquired*** estimates to allow for interannual comparability of the results.
- it should generate ***spatially explicit, wall to wall*** information at an adequate scale to support decision making process at different levels (e.g., federal, state, municipality)[3].
- it should rely on ***transparent*** and ***easily implemented*** definitions of land cover classes, forest, non-forest, deforestation, adequate for the tools used in the assessment of changes in forest area. In the case of the Brazilian systems, the forest cover domain has been identified following tonal and textural features on moderate spatial resolution satellite imagery, supported by the vegetation map of Brazil; deforestation is defined as ***forest converted to other uses*** (clear cut), which, for **annual** assessments, eliminates the need for field assessments (the conversion from forest to non-forest is very clear), still providing accurate estimates[4]. The use of thresholds in the definition of deforestation has demonstrated to increase uncertainties of the deforestation estimates, due to classification errors. The definition used by Brazil provides for the assessment of the ***gross*** deforestation rate and, as such, does not include ***land converted to forest land through reforestation and forest regeneration of abandoned deforested land***. This allows for ***quicker*** and more accurate deforestation estimates to be generated. The monitoring of the deforested areas is subject of a new project that will qualify the land cover of deforested areas
- it should be based on ***simple methodological approaches*** that rely both on automatic classification[5] and human editing, to improve the accuracy of the results.
- it should be ***open*** to assimilate multisensor data to provide ***complete coverage*** of the forest cover to avoid potential biases from systematically clouded covered areas[6].
- it should be ***open*** and ***transparent***, allowing for review and cross validation of the results.

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[3] This has been instrumental for Brazil to identify "hot spot" deforestation areas that guided the government on its control and enforcement activities, and to understand the drivers of deforestation in different parts of Amazonia which are fundamental for drawing specific policies and measures

[4] The estimates of gross deforestation using Landsat and CBERS data have an estimated uncertainty of approximately 4 per cent (Maldonado, 2005 – Análise da cobertura florestal da bacia trinacional do rio Acre na região de fronteira entre Bolívia, Brasil e Peru. Master dissertation in Ecology and Natural Resources Management, Federal University of Acre).

[5] The automatic classification in Brazil is based on mixture models that generate three distinct images (shadow, vegetation, and soil) that facilitate the identification of clear cut areas. It is followed by image segmentation and classification, and editing to correct for classification ambiguities and improve accuracy.

[6] Clouds over forest areas impair the ability of optical sensors onboard satellites to provide data (and hence, information) on the areas affected. In Brazil, statistical models are applied to estimate likely deforestation under clouds, in addition to the use of data from a suite of satellites (***multisensor approach***).

The monitoring system ***DETER*** has similar features to ***PRODES***, but generate data on different spatial and temporal scales that facilitate the allocation of limited resources (human, infra structure, and financial) to implement law enforcement for deforestation control activities by the governments at different levels (federal, state, municipality). The main features of a monitoring system to support these activities are ***timely*** and ***frequent***[7] provision of data and information, ***best possible*** coverage[8], ***open and broad dissemination*** (e.g., web platforms), ***integrated efforts*** between agencies (data providers and enforcement agencies).

The assessment system ***DEGRAD*** identifies areas that will *very likely* be deforested and are presently under an intense process of degradation, and complements ***PRODES*** data. It provides governments with useful information to assess if a decreasing rate of deforestation is not promoting an increase in forest degradation activities. The two results, together, can be used as an indicator of the effectiveness of the policies, measures and actions introduced by governments to reduce deforestation rates. The Brazilian experience in identifying forest degradation using satellite imagery shows that it is difficult to characterize as forest degradation, forest areas that are under initial stages of forest cover change. However, traditional practices of forest logging with a network of roads and waiting sites are conspicuous in moderate resolution data and are being mapped by a new system, ***DETEX***, to be implemented in 2009. Experience has also demonstrated the need to develop and apply ***specific techniques*** to identify certain patterns of forest degradation, such as selective logging and scars from forest fires.

Estimating emissions from deforestation: the Brazilian experience

PRODES, ***DEGRAD*** and ***DETEX*** are systems for assessing deforestation, forest degradation and monitoring subtle changes in forest cover, respectively, but provide relevant data to estimate gross emissions and changes in carbon stocks. For the purposes of the First National Communication of Brazil to the UNFCCC, emissions from changes in forest and other woody biomass were estimated using the 1996 Revised IPCC Guidelines for the six Brazilian biomes[9] individually[10]. Brazil is presently implementing a National Forest Inventory based on permanent sites systematically distributed across the Brazilian territory. For Amazonia, the largest Brazilian biome, data (diameter at breast height, height) are available from a survey finalized in 1976 (RADAMBRASIL). These data serve as input for allometric equations defined by destructive sampling approach developed by the National Institute for Amazonia Research (INPA) specifically for Amazonia. The Brazilian experience demonstrates the following:

- ***inadequacy*** of remotely sensed systems to directly provide reliable estimates of forest living biomass for Amazonian forest types
- need for ***coupling remotely sensed data with field data*** to reliably distinguish between different types of forest physiognomies
- need for ***specifically designed models*** (e.g., based on destructive sampling) and remotely sensed data (e.g., PolInSAR and LIDAR data that provide estimates of canopy height) to generate useful biomass estimates

[7] In the case of Brazil, the frequency is at every two weeks.
[8] The use of satellite radar data has demonstrated to be useful to complete DETER coverage in conditions of cloud cover. However, analysis of these data requires more technical expertise than the use of data from optical systems.
[9] Amazonia, Cerrado, Mata Atlantica, Pantanal, Caatinga and Pampas.
[10] Refer to the Reference Report available at www.mct.gov.br/clima

- no need for a detailed assessment of forest biomass to guide the implementation of sound policies and measures to reduce emissions from deforestation
- changes in carbon stock are more readily assessed for the aboveground carbon pool. Costs increase significantly to reliably estimate changes in carbon stock in the belowground carbon pool, and this has to rely on ground surveys exclusively.
- changes in the soil organic carbon pool are complex to be estimated, and require ecosystem specific models to be developed to generate more reliable estimates.
- changes in the dead organic matter pool need to rely on ground observations, which are costly and time consuming.

Incremental changes due to sustainable management of forests

The assessment of incremental changes in carbon stock due to sustainable management of forests cannot rely directly on the use of remotely sensed data and require substantial ground measurements and should not be limited to the assessment of incremental changes but should also assess decreases in carbon stock that can also result from the sustainable management of forests.

The most difficult aspect related to sustainable management of forest relates to the separation of the effects of sustainable management in the changes (positive and negative) in the carbon stocks from changes induced by natural, indirect, seasonal, and age dynamic effects (factoring out). Some of these effects can be more easily estimated than others (e.g., age dynamics), but still require intensive use of other, complementary, data.

PAPER NO. 2: MEXICO

SUBMISSION OF MEXICO

- Reducing emissions from deforestation in developing countries: approaches to stimulate action (SBSTA)
  - The SBSTA invited Parties to submit to the secretariat information on experiences and views, and to provide country-specific information where possible, on needs for technical and institutional capacity-building and cooperation in, inter alia, the implementation of methodologies for estimating and monitoring changes in forest cover and associated carbon stocks and greenhouse gas emissions, incremental changes due to sustainable management of forests, reduction of emissions from deforestation and forest degradation, national and sub national monitoring and reporting systems, and methodologies for forest inventories, ground-based and remote-sensing approaches. For this matter, Mexico, Panama, Honduras, Peru, El Salvador, Paraguay, Colombia, and Costa Rica held fruitful discussions in Panama on February 9th and 10th, 2009. This submission presents the main ideas that were discussed in these sessions, which are supported by Mexico, and also includes a couple of additions of particular interest for Mexico.)

We believe that technical, institutional and local support should be provided in order to allow Parties to identify and develop the financial instruments and adequate mechanisms to design and implement REDD activities; strengthen institutional frameworks and social capacity required for this purpose; and facilitate the transfer of relevant technologies. Support for these activities should be measurable, reportable and verifiable, and REDD activities should be developed under the principle of environmental integrity.

We have identified needs for technical and institutional capacity-building and cooperation in, inter alia:

1. *The implementation of methodologies for estimating and monitoring changes in forest cover and associated carbon stocks and greenhouse gas emissions:*

   - In terms of methodology development, a top-down approach is needed, that is, methodologies would be proposed by the IPCC for different options of scale. However, bottom-up approaches must be allowed so that countries and project developers can propose their own methodologies to be approved by a body under the UNFCCC. In any case, there is a need for capacity-building to develop these methodologies, and to strengthen the national capacities required to implement them. Moreover, capacity building in ground level assessment is needed.
   - Capacity-building specifically oriented to include indigenous peoples and local communities and local organizations, especially under participatory approaches and methodologies, such that these stakeholders can be efficiently engaged in the design and implementation of REDD methodologies (i.e. monitoring and the measurement of carbon stocks).
   - Regarding inventories and monitoring, capacity-building needs have been identified in the following areas:
     - Generation of important activity data for inventory development, including guaranteed access to this information;
     - generation and/or access to data on forest cover and land use change; and
     - remote sensing and ground-based inventories.
     - dissemination and adoption of monitoring methodologies at the local level, based on approaches that link these to national monitoring systems and strategies.
   - Promote cooperation to facilitate better access and technology transfer in terms of quality forest cover data and information on carbon content by forest ecosystem type.

- Capacity-building to generate, access, interpret and assess remotely sensed imagery and data on deforestation and degradation.
- Capacity-building to identify and assess forest degradation.
- Regarding methodologies to estimate emissions, capacity building is required to:
    - Apply the relevant IPCC Inventory Guidance;
    - improve data on emission factors for the LULUCF sector, given that default emission factors provided by the IPCC Guidelines do not adequately reflect national circumstances: and
    - enable local communities to monitor and asses the changes in forest biomass/carbon stocks.

2. *Incremental changes due to sustainable management of forests:*

(Refer to item 1).

3. *Reduction of emissions from deforestation and forest degradation:*

- Capacity-building needs were identified with respect to the following issues:
    - Identification of direct and indirect drivers of deforestation by economic sector, political and regulatory framework and social issues.
    - Estimation and analysis of land-use and land-use change opportunity costs.
    - Design and implementation of alternative productive activities at the community level based on appropriate methodologies.
    - REDD information and consultation processes.
    - Design of national REDD strategy and sub national frameworks.
    - Implementation of REDD measures as defined by each country.
    - REDD data quality assurance and control, archiving and reporting.
    - Development of REDD payment structures and distribution mechanisms, according to national REDD strategies and sub national frameworks.
    - Identification and assessment of wildfires´ effects on emissions and deforestation.

4. *National and sub national monitoring and reporting systems:*

- Support should be provided in:

    - Institutional capacity-building to establish a national emission reductions tracking system and registry, supported by a tripartite panel (government, NGO´s and academic institutions).
    - At the project level, support is needed to enable governments to provide assistance in the set-up of baseline and monitoring systems, which should be bounded to a national tracking system and reporting, in accordance to the country's decision regarding the scale of implementation.

5. *Methodologies for forest inventories, ground-based and remote-sensing approaches.*

(Refer to item 1).

PAPER NO. 3: NEPAL

Submission by NEPAL

Reducing Emissions from Deforestation in Developing Countries: Approaches to Stimulate Actions

(Technical and Institutional Capacity Building and Indigenous People)

Taking note of the invitation to the Parties to UNFCCC contained in FCCC/SBSTA/2008/L.3 on paragraphs 10 and 11, Nepal takes this opportunity to submit its views with due consideration of its specific needs and being the mountainous land-locked country.

1. Regarding the information contained in paragraph 10, Nepal has the following experiences, views and needs for technical and institutional capacity building on implementation of methodologies for estimating and monitoring changes in forest cover and associated carbon stocks and greenhouse gas emissions:

   a) Nepal experience in conventional forest resource monitoring has clearly demonstrated that local communities have good capacity for monitoring and are able to undertake this as part of their responsibility for managing the forest resources. Building their capacity to monitoring including monitoring of forest carbon is an important element of decentralization of forest resource management in Nepal and of ensuring good governance for the conservation, development, management and sustainable use of forest resources.

   b) Where remote sensing is difficult due to extensive steep slopes and mountainous terrain, Nepal feels that there is a need for adopting two types of monitoring that need to be somehow 'nested' or interlinked. Firstly, focus should be made on remote sensing techniques at the central level, and secondly, equal focus should be given on participatory carbon monitoring techniques at the local level. For this, capacity building needs are required to encompass on both these types of monitoring.

   c) Since 25% of Nepal's forest are already under some form of participatory forest management, community-based management will inevitably form a key part of our REDD strategy. Therefore, it is important that our capacity building needs, particularly on forest carbon monitoring, are developed at sub-national levels with a focus on developing the capacity of communities for monitoring carbon stocks, and at the central level additional capacity needs are essential for using remote sensing and other inventory technologies.

   d) Addressing forest degradation rather than deforestation is of major importance in Nepal. Capacity building will therefore be required for developing and applying methodologies for measuring and monitoring changes in carbon stocks and incremental changes due to sustainable management of forests. Monitoring of degradation by remote sensing alone is difficult in the mountainous terrain, and site-based work at forest level is equally required. This will have to involve local communities, and for this, consideration of their capacity needs and those of local service providers is also required.

2. Views relating to indigenous people and local communities for the development and application of methodologies are covered above, to some extent. Nepal would like to add, in order to emphasize our unique position regarding involvement of local communities in the management of forest resources that in our experience, local communities and indigenous people have proven capacity to be involved in monitoring and assessment. Supporting them to take on these actions would contribute to strengthen and promote their roles for the conservation and management of forest resources. This obviously has implications for sustainable forest management and carbon capture. Consequently, their close involvement in R-Plan preparation and implementation that Nepal has initiated recently is fundamental to Nepal's REDD approach.
3. Nepal underscores the importance of REDD to further encourage the participation of local communities and bring people in the mainstream of sustainable forest management and increase in carbon stock by reducing the forest degradation.

13 March 2008, Friday

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