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LATIN AMERICAN AND CARIBBEAN FORESTRY COMMISSION

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Monitoring deforestation and forest degradation

Secretariat note

I. Introduction

1. In recent years, the need for information on forests has become increasingly relevant due to several factors, in particular, the importance of these complex ecosystems for millions of people who depend on them directly, their relationship to global climate change, and loss of biodiversity and ecosystem services[1].

2. In the past, the forest information required was merely focused on forest area and growing stock. Other key aspects that are essential for a sustainable forest management, policymaking and national planning where the role of forests in biodiversity conservation and the provision of other ecosystem services, socio-economic aspects (such as contribution to livelihoods and poverty alleviation), governance and other general land use issues stood out.

3. In addition, information on the status of forests is requested by a number of international agreements such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Forest Instrument and the Sustainable Development Goals (SDGs), to name a few.

4. Within the range of indicators required to meet the need for information on the status of forests, carbon forest reserves, changes in carbon stock in forests and changes in forest area stand out.

5. This Secretariat note briefly reports on the options to monitor deforestation and forest degradation, as well as a description of the current state of forests in Latin America and a brief introduction to the work of FAO in the region. In addition, some important aspects to be discussed and considered will be submitted to the Commission

[1] Food and Agriculture Organization of the United Nations (FAO). 2017. Voluntary Guidelines on National Forest Monitoring. In Press. Rome, Italy. Available at: http://www.fao.org/3/a-mq482s.pdf

II. Monitoring deforestation and forest degradation

6. In 1946, FAO conducted the first global assessment of forest resources and since then, has continued to monitor the state of the world's forests every 10 years at the beginning and now, every 5 years. Two indicators of the state of forests, deforestation and forest degradation rates, are of increasing interest due to their connection with climate change, and because deforestation and forest degradation are one of the main causes of increased carbon and other greenhouse gases (GHG) emissions.

7. In a recent analysis using FRA 2015 data, it was noted that CO_2 emissions from deforestation were equivalent to 4.0 Gt CO_2 per year in 2011-2015 and CO_2 emissions from forest degradation were equivalent to 1.1 Gt CO_2 per year in the same period, reaching, according to the IPCC, 12% of the world's anthropogenic emissions of greenhouse gases between 2000 and 2009. Given the magnitude of the emissions, developing countries have been encouraged in the context of the UNFCCC, at their discretion and on a voluntary basis, to contribute to the mitigation work in the forest sector, taking actions to reduce emissions from deforestation and forest degradation; forest conservation and sustainable management and increase of forest carbon stocks (REDD +).

8. The discussion about fostering mitigation measures in the forest sector consolidated on COP 11, held in Montreal in 2005, where Costa Rica and Papua New Guinea requested to consider reducing emissions due to deforestation in developing countries. Then, during COP 13 in the Bali Action Plan, the reduction of emissions due to forest degradation, conservation and increase of forest carbon stocks and sustainable forest management (REDD+[2]) was also included. In the decisions of COPs 15, 16, 17 and 19[3], the UNFCC seeks to recognize and provide positive incentives (for example, results-based payments) to developing countries (or Non-Annex I Parties as identified in the UNFCCC) to protect their forest resources, improve forest management and sustainability to contribute to the global combat against climate change and its impact, reducing greenhouse gases (GHG) emissions and increase carbon sinks in the forest sector.

9. The REDD+ process, founded during COP 13 in the Bali Action Plan, remains a voluntary process and, according to the requirements agreed upon in the UNFCCC, countries that wish to participate should develop 4 elements[4]: i) National Strategy or REDD+ action plan; ii) National Forest Monitoring System (NFMS); (iii) a system to provide information on how safeguards are being addressed and respected, and (iv) a National Forest Reference Emission Level/Forest Reference Level (NFREL/FRL). NFMS should provide adequate data and information for the measurement, reporting and verification (MRV) of anthropogenic forest emissions by source and removal by sink, carbon forest reserves and changes in forest area. The NFREL/FRL allow to *evaluate the performance of each country in the execution of REDD+ activities*[5]. Both, the NFREL/FRL and the report of results associated with the implementation of REDD+ activities are subject to a technical assessment or analysis according to the procedures and modalities for the Monitoring, Reporting and Verification (MRV) agreed in the Warsaw Framework at COP 19[6].

10. Although the global forest area continues to get smaller as human population grows and the demand for land and food increases, the annual net forest loss rate declined by more than 50% from the period 1990-2000 to the period 2010-2015[7]. In Latin America and the Caribbean where 23.4% of the global forest area - 935.5 million hectares - is located, the annual net forest loss is slowing, from 4.45 million hectares per year between 1990-2000 to 2.18 million per year between 2010 and 2015. This is positive,

[2] http://unfccc.int/6917
[3] CMNUCC, Decision 4/CP 15 , Decision 1/CP 16, Decision 13/CP.19, Decision 12/CP.17, Decision 13/CP 19
[4] CMNUCC, Decision 1/CP 16, par. 71
[5] CMNUCC, Decision 12/CP.17, par. 7
[6] CMNUCC, Decision 13/CP19
[7] Food and Agriculture Organization of the United Nations (FAO). 2015. Global Forest Resources Assessment 2015: Data digest. Available at: http://www.fao.org/3/a-i4808s.pdf

however, in recent years while deforestation rates have been reduced in many countries[8], forest degradation has increased[9]

11. At the global level, a significant effort is being made regarding assessment and monitoring of deforestation and forest degradation, through national forest inventories and satellite land monitoring systems. A sample of this is reflected in Figure 1 that shows the percentage of forest area covered by a national forest inventory per region. This information clearly shows that at the national forest inventory level in the Latin American region, the Caribbean lags behind, and efforts are being made in the rest of the region to carry out national forest inventories. In the Caribbean, Puerto Rico and the US Virgin Islands are an exception in this sub-region.

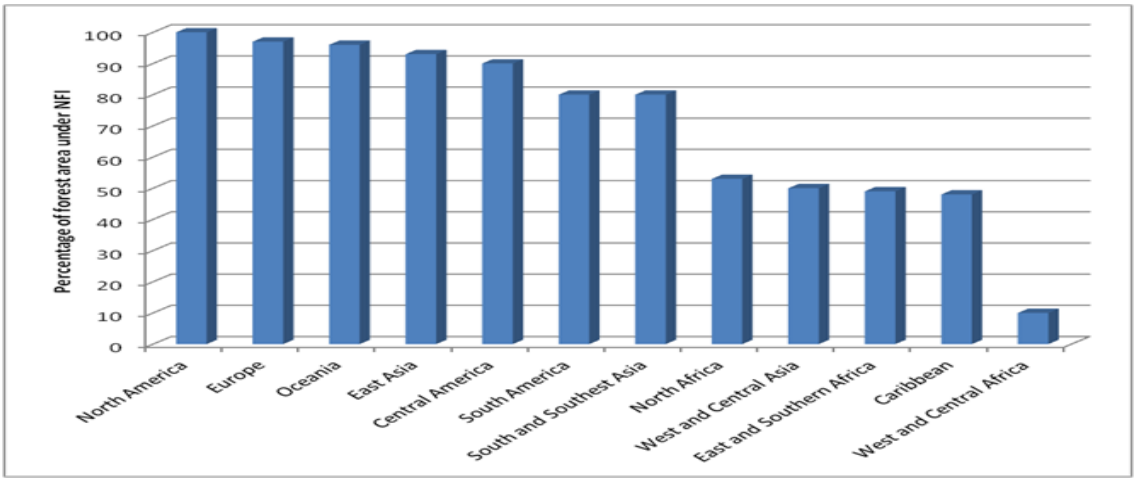

Figure 1: Percentage of forest area covered by a national forest inventory per region[10]

12. Thanks to the open data policies promoted by various organizations and governments, such as the decision to publish the entire Landsat archive in 2008, along with the existing technological possibilities of analysing information in the cloud, a significant change regarding forest monitoring has occurred. On the other hand, several forests monitoring operational systems based on satellite time series have been developed, such as the PRODES and DETER systems of the Brazilian Space Agency, the Andean Amazon Monitoring Project (MAAP, acronym in Spanish), the Global Forestry Observatory (GFW), facilitate the analysis and visualization of the information. In addition, initiatives such as the one promoted by Matt Hansen and other collaborators[11], tools such as Google Earth[12] and Google Engine[13] to mention some options, have come to revolutionize remote sensing and accessibility to existing resources.

13. In many cases monitoring deforestation is operational, while forest degradation remains poorly known in many areas of the tropics. This is related to the nature of degradation processes, including complex governance structures and drivers, as well as technical challenges related to monitoring degradation and thus remains a bottleneck for the implementation of effective MRV systems. Several methodologies and resources have been used, albeit at the experimental level, in the field of assessing

[8] Food and Agriculture Organization of the United Nations (FAO). 2015. Global Forest Resources Assessment 2015: Data digest. Available at: http://www.fao.org/3/a-i4808s.pdf

[9] Budiharta S, Meijaard E, Erskine PD, et al (2014) Restoring degraded tropical forests for carbon and biodiversity. Environ Res Lett. doi: 10.1088/1748- 9326/9/11/114020

[10] McDicken ,et al 2015. Global progress toward sustainable forest management. In: Forest Ecology and Management. Volume 352-2015 47-56. Elservier. Available at: http://www.fao.org/3/a-i4895e.pdf.

[11] Hansen M.C., Potapov P. V., Moore R., Hancher M., Turubanova S. A., Tyukavina A., Thau D., Stehman S.V., Goetz S.J., Loveland T.R., Kommareddy A., Egorov A., Chini L., Justice C.O., Townshend J.R.G. (2013) High-resolution global maps of 21-st-century forest cover change. Science, 342, 850-853.

[12] https://www.google.com/intl/es/earth/

[13] https://earthengine.google.com/

forest degradation, for example with the use of VRS optical images and SAR, to detect forest exploitation routes, besides time series analysis of SAR data to monitor the impact of migratory cultivation, agroforestry and grazing. In addition, estimates of biomass and its changes are possible using modelled relationships between forest inventory, LiDAR, SAR (and InsAR) and/or optical data.

III. Monitoring deforestation and forest degradation in Latin America

14. Latin America, in terms of monitoring deforestation and forest degradation, is a region with great biophysical, cultural and economic heterogeneity. The region has countries with large forest areas and other countries with almost no forest. In some countries, as in the case of Mexico and Chile, the government invests resources in forest monitoring, although there are other countries where this issue has not been considered as a national priority.

15. One of the countries with long history in monitoring deforestation in Latin America is Brazil. Since 1998 the PRODES project has been providing its reports on the state of deforestation in the Amazon. At present, efforts are being made by the government to strengthen monitoring systems in the Cerrado biome, and in the Catinga biome through the Brazilian Forest Service. In addition, NGOs such as IMAZON in Belén, coexist with inter-institutional projects between NGOs and public agencies such as the MAPBIOMA project to monitor deforestation, giving high relevance to forest monitoring.

16. Mexico has more than 20-year experience in the analysis of INEGI series and efforts of CONAFOR, and a strong process in recent years to strengthen its National Forest Monitoring System. Other countries in the region have also made efforts to strengthen their forest monitoring systems, such as Chile, that has a solid forest monitoring system; Paraguay, which monitors the country's gross deforestation every six months; Ecuador, that is updating coverage such as detection and evaluation of changes; Honduras that has completed its second national forest assessment; Costa Rica is strengthening its Monitoring System for Coverage and Land Use and Ecosystems (SIMOCUTE, acronym in Spanish); Colombia that has made a great effort in institutional and methodological development; Guyana and Suriname, which have a monitoring system based on RapidEye; Argentina, Bolivia, Uruguay, Panama, El Salvador and Belize, which have made an effort to strengthen their monitoring systems, to name a few.

17. At the regional level, there are initiatives such as: the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme); an Inter-Agency programme of the United Nations (FAO-UNDP-UNEP); the project for Monitoring Deforestation, Forest Harvesting and Change in Land Use in the Pan-Amazonian Forest (implemented under the Thematic Programme for Reducing Emissions from Deforestation and Forest Degradation and Improvement of Environmental Services (REDDES) and funded by the International Tropical Timber Council (ITTO), by the ATCO Member Countries, by the governments of the Netherlands and Germany, through the Regional Amazon Program (PRA, acronym in Spanish) and Amazon Fund. At Central American level, we can mention the REDD project (Reducing Emissions from Deforestation and Forest Degradation in Central America and Dominican Republic); joint effort of the Central American Commission on Environment and Development (CCAD, acronym in Spanish), the Central American Integration System (SICA, acronym in Spanish) and the German Corporation for International Cooperation (GIZ), with the financial support of the Government of the Federal Republic of Germany through the Federal Ministry for Economic Cooperation and Development (BMZ). The EU FLEGT-FAO Programme on National Forest Traceability and Governance Systems, the Global Forest Resources Assessment programme (FRA) and the National Forest Assessment programme (NFMA) of FAO, to name a few, have strengthened capacities in monitoring deforestation and forest degradation in the region.

18. As mentioned in the previous section, there is very little progress in monitoring forest degradation. In the region as well as in the rest of the world, few countries include this variable, as Chile and Guyana that have some experience. Colombia and Brazil have started some pilot areas at the experimental level, but nothing operational and reliable nationwide yet.

19. Regarding forest monitoring capacities using remote sensing and forest inventories in Latin America, the FRA2015[14] reports that capacities improved significantly between 2005 and 2015. At present, a high percentage of countries can produce their own estimates of deforestation. Thanks to the progress in some of the countries and lessons learned, a promising South-South cooperation is envisaged between the countries of the region.

20. Regarding capacities to prepare reference levels, it is important to note that some of the most advanced countries in the world are located in the region. By mid-2017 globally 25 countries have delivered their NFREL/FRLs to the UNFCCC, ten of which (40%) are from the region. The submission of NFREL/FRLs and its review is a 'learning by doing' process and several countries are stressing the idea to continue the technical support in this area.

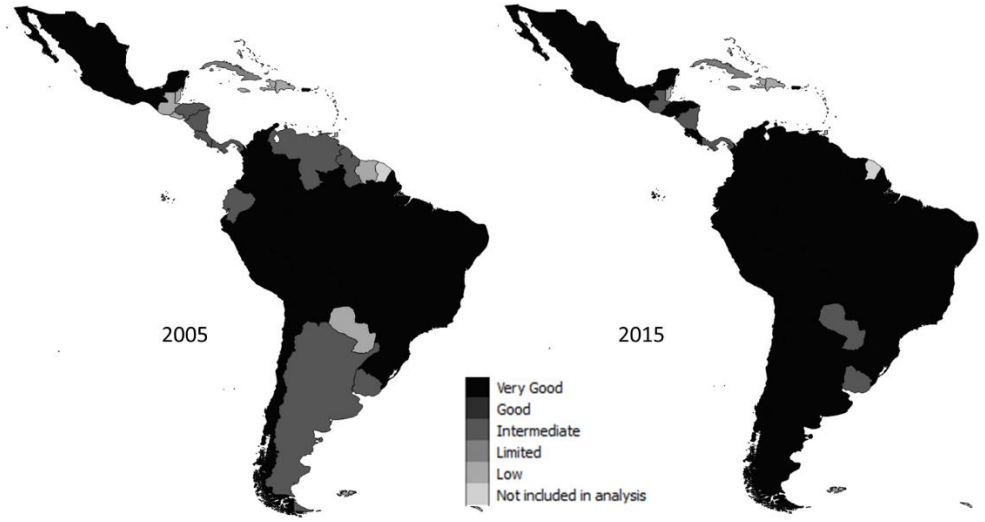

Figure 2: Capacities in the use of remote sensing to monitor changes in forest area in Latin America in 2005 and 2015. (Adapted and updated from Rominj et al [15])

[14] Romijn E et al. 2015. Assessing change in national forest monitoring capacities of 99 tropical countries. In: Forest Ecology and Management Science to Sustain the World's forests volume 352 – 2015: Special Issue: Changes in Global Forest Resources from 1990 to 2015. Elservier. Disponible en: http://www.fao.org/3/a-i4895e.pdf.

[15] Romijn E et al. 2015. Assessing change in national forest monitoring capacities of 99 tropical countries. In: Forest Ecology and Management Science to Sustain the World's forests volume 352 – 2015: Special Issue: Changes in Global Forest Resources from 1990 to 2015. Elservier. Disponible en: http://www.fao.org/3/a-i4895e.pdf.

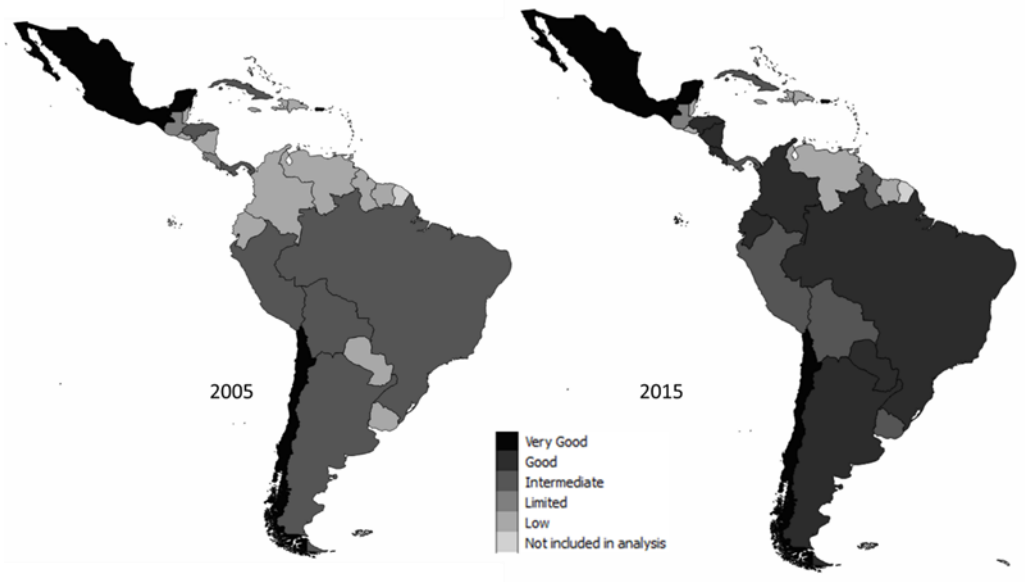

Figure 3: Capacities in Forestry Inventories in Latin America in 2005 and 2015. (Adapted and updated from Rominj et al)

IV. FAO's support in the region regarding monitoring deforestation and forest degradation

21. For several decades, FAO has been supporting the region in Forest Monitoring, initially from the FRA programme, followed by NFMA programme, and more recently with the UN-REDD/REDD+ FAO programme and the FAO-EU FLEGT Programme). FAO's support to the region regarding forest monitoring focuses on the following main pillars: development of methods and tools, raising awareness and knowledge-sharing, technical support and capacity building for countries, national empowerment, South-South cooperation and the incentive for networks and alliances.

22. Regarding monitoring deforestation and forest degradation, FAO has supported a few activities in the region in countries like Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Peru, Paraguay, Brazil, Uruguay, Chile, Argentina, Bolivia, Guyana and Suriname. Support has been provided in different ways, mainly in the field of national forest inventories. In countries like Ecuador, Honduras, Paraguay, Argentina, Chile, Guyana, support is provided in remote sensing/satellite monitoring system and the Land Cover Classification System (LCCS)[16] as well as for links and contributions to the preparation of national communications and I-GEI inventories and Nationally Determined Contributions (NDCs).

23. FAO has also developed open access software and applications to facilitate monitoring of deforestation and degradation. One of them is the Open Foris[17] initiative, which consists of a set of free and open source software tools that facilitate the collection, analysis and generation of reports in a flexible and efficient way for forest monitoring, the SEPAL[18] platform (system for accessing, processing and analysing information on land use monitoring), and portals for the visualization of information on deforestation. In addition, FAO with other partners has made available the GlobAllomeTree[19] platform that will enable countries to improve the assessment of forest biomass and volume and carbon stocks. In several countries, FAO has also supported the establishment of a national geo-portal for the visualization of forest monitoring information that can be of use for national requirements as well as the REDD+ process in Argentina, Colombia, Ecuador, Panama, Costa Rica and Paraguay.

[17] http://www.openforis.org/

[18] https://sepal.io/

[19] http://www.globallometree.org/

24. The FAO "Voluntary guidelines on forest monitoring" is an instrument to support countries in the region to strengthen their national forest monitoring systems[20]. The document was developed at the request of member countries, in coordination with different actors and experts, based on experiences and lessons learned from FAO and member countries as well as other organizations. The document includes the basic principles to be considered in the design of a National System for Forest Monitoring, as well as guidelines or guides for the implementation of the system. In countries such as Guatemala, Costa Rica and Colombia, the monitoring systems are based on legal regulations.

25. Community monitoring is being supported in countries such as Panama, Guatemala, Paraguay and Colombia, and a process of systematization of knowledge and South-South cooperation in this area in the region is being facilitated. At traceability level, Honduras has supported the timber tracking IT system (SIRMA, acronym in Spanish); in Guatemala, the Electronic Information System for Forest Companies (SEINEF, acronym in Spanish); the Forest Information System of Guatemala (SIFGUA, acronym in Spanish); in Panama, The Forest Traceability and Control System (STCF); in Ecuador, the Forest Management System (SAF).

26. In terms of monitoring, to ensure consistency and support countries in their strategies to mitigate climate change in the forest sector and to move towards results-based payments, FAO has also supported different initiatives in Argentina, Chile, Colombia, Costa Rica, Ecuador, Honduras, Mexico, Panama, and Paraguay regarding monitoring of forest emission levels.

27. In terms of sharing knowledge, FAO, in coordination with other partners, has supported initiatives such as the Centre for Virtual Excellence in Forest Monitoring[21] and the Global Forest Observation Initiative[22] (GFOI), in addition to promoting national and regional training and exchange of experiences.

V. Matters for consideration by the Commission

28. The Commission may wish to:

- Invite and encourage Member States, as well as resource and technical partners, to disseminate and implement the Voluntary guidelines on national forest monitoring, through their inclusion in curriculum on forests.
- Request FAO to maintain and strengthen its support to countries in the measurement, monitoring and report on deforestation and forest degradation as well as links to national communications, NDCs, construction/revision of reference levels of forest emissions, among others, by strengthening the capacity of public forest administrations and other relevant stakeholders.
- Request FAO and member states to strengthen existing South-South cooperation platforms (or develop new ones if needed) to enhance the exchange of experiences and lessons learned in the area of national forest monitoring (including community monitoring and protocols to link with national systems) and support to national and international reports.

[20] Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO). 2017. Directrices Voluntarias sobre el Monitoreo Forestal Nacional. In Press. Roma, Italia. Disponible en: http://www.fao.org/3/a-mq482s.pdf

[21] http://www.monitoreoforestal.gob.mx/

[22] http://www.gfoi.org/