



EUROPEAN COMMISSION  
JOINT RESEARCH CENTRE

## The ReCaREDD project – South America Workshop Ispra, 28 September - 2 October 2015

Capacity building for reducing barriers in tropical countries for monitoring forest degradation via satellite data.

Information briefing and executive summary



**Ecuador**



**Colombia**



**Brazil**

Joint  
Research  
Centre

## Capacity building for reducing barriers in tropical countries for monitoring forest degradation via satellite data.

The ReCaREDD South America workshop was held at JRC, Ispra, from 28 September - 2 October under the aegis of the ReCaREDD project, which is funded by DG DevCO.

The workshop was organised in order to create a forum for a meeting of experts from the ReCaREDD South American focus country Colombia and the two ReCaREDD associated countries Brazil and Ecuador with researchers from the Joint Research Centre (JRC) to discuss issues of remote-sensing – based forest degradation monitoring in the context of the REDD+ mechanism.

As part of the workshop, recent research activities from the South American participants were presented as well as current research of the JRC ForObs project. In the JRC presentations, methods (in development) for assessing forest degradation were presented and discussed. In addition, the first (preliminary) image datasets were shown from the new European optical satellite sensors Sentinel-1 and Sentinel-2 ; the latter being one of the main future data sources for forest degradation monitoring.

During the workshop, JRC in-house freeware software packages, IMPACT and GUIDOS ToolBoxes, were presented to the workshop participants and carried out hands-on training of the software with example of multi-resolution optical satellite imagery, such as Landsat 8, RapidEye and Sentinel-2. The software is designed to help with the pre-processing, processing and analysis of satellite imagery to derive information on forest cover change and to further analyse forest cover maps in order to spatially analyse forest patterns. Both software packages were delivered to the workshop participants, with the request to give a feedback to the JRC in order to enhance the performance of the software by changing (if needed) certain functionalities, introducing new features requested by the users or eliminating bugs.

The JRC made available to the researchers of Colombia (focus country) very high resolution satellite imagery over the three defined test sites in the country (Guaviare, Puerto Nare and Santa Marta areas).

In the context of the continuation of the ReCaREDD project, follow-up workshops in Colombia, Ecuador and Brazil in 2016 were discussed.

### *Main results of the workshop include :*

- The participants were very interested by the two software packages presented. They will install the software, work with it with own data in the context of forest cover change monitoring and report back. The IMPACT software works with multi-resolution datasets, such as Landsat 8 (30m), Sentinel / SPOT 5 (10m) and RapidEye (5m).
- The first Sentinel-2 data over South America was shown to the participants. The (preliminary) datasets had been made available by ESA a day before.
- In intensive discussions it became clear that a widely accepted view of how « forest degradation » (in the REDD context) should be defined does not exist. There are (still) no official national definitions available. Brazil might be the first country to define « forest degradation » by the end of 2015.

- It was agreed that in the context of the ReCarEDD project, as for the REDD mechanism in general, the emphasis of analysis of forest cover change will be on the (change in) carbon content of the forests, rather than on the issues of biodiversity of ecosystem services. Open questions remain, such as the possible (or not) inclusion of naturally caused loss in forest cover (windfall, draughts, forest fires caused by lightning...) should be seen as forest degradation, or the inclusion of « shifting cultivation» in forest degradation rather than deforestation processes.
- All participants expressed the need to have more data collected on the ground, especially in areas prone to forest degradation, in order to understand better the degradation processes and measure the change in biomass caused by these processes. A combination of analysis based on remote sensing data and ground data would be essential to get a full picture of the process.
- The three countries have national (Ecuador and Colombia) or sub-national forest biomass maps available, which are used in the context of the national (or sub-national in the case of Brazil) reporting of the REDD Forest Reference Emission Levels.
- For defining a methodology for monitoring forest degradation on a national scale, the spatial and temporal resolution of the satellite imagery is crucial, its spatial resolution should be fine enough to make a detection of small forest changes possible, the temporal resolution should be good enough to account for the cloud persistence in many regions of the three countries. Sentinel-2 data could be a valuable source of information in this respect. All participants have shown high interest in receiving and using this type of data.
- A (sub-)national forest degradation assessment on basis of a stratified sampling would be a valid option, however, the imagery, the strata, as well as the sampling outline (area covered by a sample unit, number of sampling units, weighting of the strata...) would have to be defined for each country. In all three countries similar maps of deforestation activities, based on the same type of satellite imagery (Landsat) exist. These maps could be the basis for a stratification of activity hot spots, cold spots etc. (number of strata to be defined) as needed for the definition of the sampling strategy in relation to the forest degradation assessment.
- RapidEye satellite imagery for the pre-defined Colombian test sites (Guaviare, Puerto Nare and Santa Marta) for forest cover change assessment were made available to the three Colombian research organisations.

*Partner countries expressed a series of needs, which the JRC will attempt to meet under the project :*

- Help to get access to Sentinel-2 data
- Help with the outline of a stratified sampling approach for forest degradation assessment
- Help with defining a remote sensing – based method for the detection of degraded forest areas
- Follow-up the development of the GUIDOS ToolBox
- The Ecuadorian participants proposed to get help with the analysis of LIDAR data available to the Ecuadorian Ministry of Environment and with the usage of LIDAR cameras in general
- Improvements and new image processing options in the JRC IMPACT tool

### *Future steps:*

- The ReCaREDD project will be organising follow-up workshops in Colombia, Ecuador and Brazil in the course of (early) 2016. In these workshops, new developments of the two JRC freeware SW packages will be presented, which will have been integrated also due to the needs of the ReCaREDD focus and associated countries. Practical applications with available satellite imagery (focussed on the respective country) will be shown, always in relation with forest degradation monitoring.
- RapidEye datasets will be provided to the Colombian research institutions that had participated at the Ispra workshop
- Follow-up activities with South American ReCaREDD focus and associated countries will be discussed before and during the up-coming workshops

### *Issues addressed during the workshop:*

- Discussion on the definition of forest degradation, its drivers and the potential classes of forest degradation
- Potential satellite imagery to map forest degradation, especially regarding satellite sensors with a spatial resolution between 5 and 10 meters (Sentinel-2 and RapidEye)
- Review of methods for detecting and quantifying degradation with satellite dataPotential stratification methods for a forest degradation assessment method based on sampling
- Country capacities for providing reference and current degradation activity dataActivities of the invited research institutes with respect to forest cover change mapping
- Potential sources of national emissions factors (transitions between land cover classes)Existing forest biomass information, existence of ground data
- Interactive sessions on the JRC open source tool for working with satellite dataPresentations and hands-on training of the JRC freeware GUIDOS and IMPACT Toolboxes
- Interactive review of high resolution Rapideye dataReview potential work program by JRC and partners for improving capacity for degradation monitoringDiscussion on the specific needs of the involved institutions in terms of capacity building, methods developments, data and software

The workshop was organised by Rosana Grecchi & René Beuchle

For more information on the ReCaREDD activities in South America:

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## WORKSHOP AGENDA

### Monday, 28 September 2015

09:00	<b>Arrival at the Joint Research Centre in Ispra / entry procedures</b>
09:30-10:00	<b>Welcome, introduction, workshop agenda</b>
10:00-10:30	<b>Presentation of the JRC / Forest Resource and Climate Unit / ForObs Project</b> (Frédéric Achard, JRC)
10:30-11:00	Coffee break
11:00-12:00	<b>Presentation of the ReCaREDD Project</b> (René Beuchle, JRC)
12:00-12:30	<b>Administrative information for the workshop participants</b> (Marek Kedzierski, JRC)
12:30-14:00	Lunch Break
14:00-14:30	<b>Forest degradation in Brazilian Amazon: assessing selective logging and forest fires using medium resolution satellite images</b> (Rosana Grecchi, JRC)
14:30-15:00	<b>ReCaREDD activities in Central Africa for forest degradation monitoring</b> (Astrid Verhegghen, JRC)
15:00-15:30	<b>The Roadless-FOR Pilot Project - Mapping of pan-tropical forest at 30m</b> (Christelle Vancutsem, JRC)
15:30-15:50	Coffee break
15:50-16:05	<b>Analysis and harmonization of existing pan-tropical biomass maps</b> (Andreas Langner, JRC)
16:05-16:20	<b>Forest disturbance monitoring in continental Southeast Asia</b> (Andreas Langner, JRC)
16:20-16:30	<b>New methods to improve the estimate of CO2 emissions from deforestation in Madagascar</b> (Ghislain Vieilledent, JRC)
16:30-17:00	<b>IMPACT – A Portable GIS Toolbox for image processing and land cover mapping</b> (Dario Simonetti, JRC)

### Tuesday, 29 September 2015

09:00	<b>Arrival at the Joint Research Centre in Ispra / entry procedures</b>
09:15-09:50	<b>Spatial pattern analysis to identify potentially degraded forests in Colombia</b> (Juan Ramirez, FAO Colombia / IDEAM)
09:50-10:30	<b>Forest cover and forest cover change monitoring at SINCHI</b> (Uriel Murcia, SINCHI Institute, Colombia)
10:30-10:45	Coffee break
10:45-11:15	<b>Fire interactions with climate, deforestation and forest fragmentation in Colombia</b> (Dolors Armenteras, Universidad Nacional de Colombia, Bogotá)
11:15-11:45	<b>National Forest cover and forest cover change monitoring in Ecuador</b> (Lenin Beltrán, Oscar Periche, Rodrigo Torres, Ecuadorian Ministry of Environment)
11:45-12:30	<b>The Amazon Program - Forest monitoring in Brazil by INPE (projects and perspectives)</b> (Alessandra Gomes, INPE-CRA, Brazil)
12:30-14:00	Lunch Break
14:00-14:30	<b>RS Imagery for forest cover assessment</b> (René Beuchle, JRC)
14:30-15:30	<b>Round Table: Definitions: Forest, Deforestation, Forest Degradation</b>
15:30-16:00	Coffee break
16:00-17:00	<b>FREL of Brazil, Colombia and Ecuador</b>

### **Wednesday, 30 September 2015**

09:00	<b>Arrival at the Joint Research Centre in Ispra /entry procedures</b>
09:30-10:30	<b>Hands-on training with the IMPACT Toolbox</b>
10:30-10:45	Coffee break
10:45-12:30	<b>Hands-on training with the IMPACT Toolbox</b>
12:30-14:00	Lunch Break
14:00-15:30	<b>Hands-on training with the IMPACT Toolbox</b>
15:30-16:00	Coffee break
16:00-17:00	<b>Round Table Discussion: possible tactics for regional or national forest degradation assessment</b>

### **Thursday, 01 October 2015**

09:00	<b>Arrival at the Joint Research Centre in Ispra / entry procedures</b>
09:30-10:30	<b>GuidosToolbox – a tool for forest pattern analysis (Peter Vogt, JRC)</b>
10:30-10:45	Coffee break
10:45-12:30	<b>GuidosToolbox – a tool for forest pattern analysis (Peter Vogt, JRC)</b>
12:30-14:00	Lunch Break
14:00-14:30	<b>Possible combinations of IMPACT and GuidosToolbox</b>
14:30-15:30	<b>Round Table Discussion on definitions: Forest, Deforestation, Forest Degradation, on methods: wall-to-wall vs. sample-based analysis</b>
15:30-16:00	Coffee break
16:00-17:00	<b>Round Table: possible approaches for regional or national forest degradation assessment</b>

### **Friday, 02 October 2015**

09:00	<b>Arrival at the Joint Research Centre in Ispra /entry procedures</b>
09:30-10:30	<b>Defining the next steps to be taken within ReCaREDD</b>
10:30-10:45	Coffee break
10:45-12:30	<b>Defining the next steps to be taken within ReCaREDD</b>
12:30-14:00	Lunch Break
14:00-17:00	<b>Workshop wrap-up, Delivering data, tools, documentation</b>

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