



## JRC CONFERENCE AND WORKSHOP REPORTS

# The ReCaREDD project

*Colombia and Ecuador Workshops, Bogotá and Quito,  
1<sup>st</sup> – 8<sup>th</sup> June 2016*



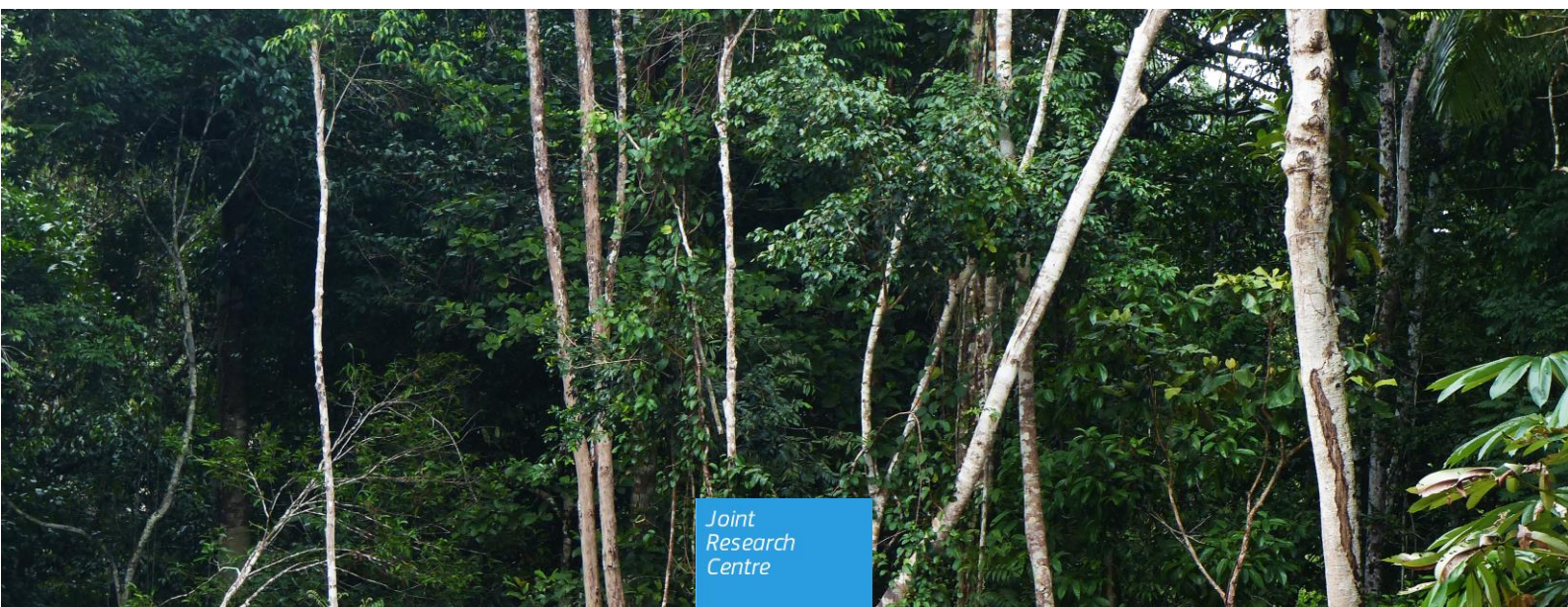
**Colombia**



**Ecuador**

René Beuchle and Marcela Velasco  
<http://forobs.jrc.ec.europa.eu/>

2016



Joint  
Research  
Centre

This publication is a Conference and Workshop report by the Joint Research Centre (JRC), the European Commission's in-house science and knowledge service. It aims to provide evidence-based scientific support to the European policy-making process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

**Contact information**

Name: René Beuchle

Address: Joint Research Centre, Bio-Economy Unit, TP 261, 21027 Ispra, Italy

E-mail: [rene.beuchle@jrc.ec.europa.eu](mailto:rene.beuchle@jrc.ec.europa.eu)

Tel.: +39-0332785201

**JRC Science Hub**

<https://ec.europa.eu/jrc>

**JRC Forest Observatory**

<http://forobs.jrc.ec.europa.eu/>

JRC 103140

PDF ISBN 978-92-79-62005-8 doi: 10.2788/004653

Ispra, Italy: European Commission, 2016

© European Union, 2016

Reproduction is authorised provided the source is acknowledged.

Beuchle, R. and Velasco-Gomez, M. 2016. The ReCaREDD Project, Colombia and Ecuador workshops, Bogotá and Quito, 1<sup>st</sup> – 8<sup>th</sup> June 2016, Ispra, Italy: European Commission, 2016, 15 pp., doi: 10.2788/004653

All images © European Union 2016

## Table of contents

Background .....	1
1 Workshop in Bogotá, Colombia (1 <sup>st</sup> – 3 <sup>rd</sup> June 2016) .....	2
1.1 Main Results.....	2
2 Workshop in Quito, Ecuador (6 <sup>th</sup> – 8 <sup>th</sup> June 2016) .....	5
2.1 Main Results.....	5
3 Annexes .....	7
3.1 Workshop Agenda – IDEAM (Bogotá, Colombia) .....	7
3.2 List of Participants – IDEAM (Bogotá, Colombia) .....	8
3.3 Workshop Agenda – Ministry of Environment (Quito, Ecuador) .....	9
3.4 List of Participants – Ministry of Environment (Quito, Ecuador) .....	10

## **Background**

The ReCaREDD (Reinforcing Capacities for REDD) project is hosted by the Bio-Economy Unit of the European Commission's Joint Research Centre. It is funded by the EU overseas cooperation service DG DEVCO. Its goal is to enhance the ability of institutions in partner countries to report on forest degradation, in a reliable and cost-efficient manner. Further objectives are to develop, share and adapt appropriate monitoring methods and to provide direct assessments of the status and evolution of tropical forest cover in support to forest policies and national and international negotiations on emission reductions. In this framework the JRC is running a set of workshops to inform partner institutions and train them in techniques for monitoring and assessing forest degradation using remote sensing and field surveys.

### **Goals:**

Reinforce the capacity to process, interpret and extract data on forest cover and on forest cover change from satellite data

Propose options and strategies for forest degradation monitoring to national environmental agencies

Provide SENTINEL 2 data and image processing software for forest degradation monitoring

# **1 Workshop in Bogotá, Colombia (1<sup>st</sup> – 3<sup>rd</sup> June 2016)**

The workshop was held at the Colombian National Institute for Hydrology, Meteorology and Environmental Studies (IDEAM) in Bogotá, from 1<sup>st</sup> – 3<sup>rd</sup> June under the aegis of the ReCaREDD project, funded by DG DevCO. IDEAM is the Colombian REDD focal point.

The goal of the workshop was to discuss Colombian forest degradation processes and possible remote sensing – based assessment methods. This debate had already been started at the ReCaREDD South America workshop in Ispra (2015) with a limited number of invited local experts. At IDEAM, some 30 people attended the workshop, including several researchers from the Colombian Amazon Research Institute (SINCHI), from the National University at Bogotá (UNAL), and from Rutgers University (USA), and thus composing a broad audience to discuss with.

During the workshop, the latest research findings at the JRC with respect to tropical forestry and remote sensing were presented. Different concepts and drivers of forest degradation in Colombia and the possible role of remote sensing were presented by and discussed with the participants of the different institutions. One workshop day was dedicated to the introduction and the training of the newest version of the JRC IMPACT Toolbox, with an emphasis on Sentinel-2 data processing and forest degradation assessment. The training followed by a general discussion on the possible developments of IMPACT and the way forward regarding forest degradation assessment, and on the relation of the assessment with the ongoing Colombian National Forest Inventory. In practical terms, the next steps were discussed with respect to the ReCaREDD project.

## **1.1 Main Results**

- IDEAM has proposed an indirect approach of forest degradation assessment on national scale through an analysis of the national forest - non-forest map with MSPA (Morphological Spatial Pattern Analysis), and through the comparison of the four resulting classes (core, perforated, edge and patch) with the respective values of the national biomass map. For a direct approach of forest degradation mapping IDEAM is currently testing the software bfastSpatial (developed by the University of Wageningen), analysing NDVI time series on basis of Landsat imagery. As shown by Katherine Bernal, Landsat data from 2006 – 2016 is analysed currently in some areas of interest (80 km X 80 km test sites) in the Colombian Amazon. The resulting classes of the process are “deforested”, “degraded forest” and “no change”. Time Series Analysis (TSA) is seen by IDEAM as the future in the context of forest degradation analysis. It is currently starting to test other TSA tools developed by Boston and Maryland Universities.
- The IMPACT Toolbox training sessions were attended by 35 people, mainly from IDEAM, with some ‘guests’ from SINCHI and the National University. The training and the IMPACT Toolbox in general have received very positive feedback by the IDEAM workshop participants. It is planned to test it not only for remote sensing (RS) - based forest degradation monitoring, but also for the Colombian national deforestation assessment.

- Juan Fernando Phillips Bernal from the Ministry of Environment and Sustainable Development (MADS) is responsible for the design of the current (on-going) National Forest Inventory. 7% of the NFI have been carried out already, the percentage should increase to around 20% by the end of 2016. The NFI uses 1900 field plot conglomerates distributed over the whole country to represent the different Colombian forest types. He proposed that if a sampling strategy should be chosen for RS – based forest degradation assessment, the NFI sampling should be taken into consideration in order to allow a synergistic use of field and RS data. The existing official national forest biomass map will be updated according to the results of the NFI.
- Juan Pablo Ramirez Delgado, the coordinator of the IDEAM forest degradation research group, proposed a stratified sampling approach for a remote sensing survey (RSS) related to forest degradation monitoring, based on the four classes of the MSPA analysis. However, the design and planning of the RSS would still need to be developed further before discussing it in more detail.
- Gustavo Galindo gave a resume of the ReCaREDD workshop at IDEAM and an outlook on the IDEAM plans for REDD reporting and for further activities JRC – IDEAM in the future: By (the end of) 2017 a definition of forest degradation should be in place, by 2020 a method of national reporting on forest degradation should be in place, and national figures on the issue should be available. The baseline for this should be year 2000, in accordance with REDD reporting on deforestation. As a starting point IDEAM will work on a sub-national level, i.e. it will work on the Colombian Amazon first and then start looking at other Colombian eco-zones.
- IDEAM is currently working on the re-programming of bfastSpatial in "Python" rather than "R", in order to speed up the processing. They would appreciate the help of JRC for the combination of field data and remote sensing imagery.
- IDEAM would appreciate it much if the JRC Soil Fraction Analysis (Grecchi et al. 2016) could be implemented in IMPACT in a more automatised way. In addition, they strongly proposed to add a tool dedicated to time series analysis (NDVI / NBR / Soil Fraction...)

#### Future steps:

- discussion on the possible integration of a time series analysis tool in IMPACT
- discussion on the possible use of IMPACT for the Colombian deforestation assessment
- forest degradation assessment: further discussion on the sampling approach needed
- IDEAM would appreciate help for the integration of field data and remote sensing imagery

- Starting out with a forest degradation assessment method for the Colombian Amazon – how can it be adapted to the other Colombian biomes?

Issues addressed during the workshop:

- Degradation hotspots by country Discussion on the definition of forest degradation, its causes and drivers and the potential classes of forest degradation
- Presentations and hands-on training of the JRC IMPACT Toolbox with an emphasis on remote sensing – based forest degradation assessment and Sentinel-2 imagery
- Discussion on potential classes Review of potential satellite sensors for detecting forest degradation Discussion on a possible sample-based approach for forest degradation monitoring in the Colombian Amazon

Both workshops were organised by Marcela Velasco & René Beuchle

For more information on the ReCaREDD activities in South America:

Technical contact : René Beuchle [rene.beuchle@jrc.ec.europa.eu](mailto:rene.beuchle@jrc.ec.europa.eu)

Administrative contact : Frédéric ACHARD [frederic.achard@jrc.ec.europa.eu](mailto:frederic.achard@jrc.ec.europa.eu)

## **2 Workshop in Quito, Ecuador (6<sup>th</sup> – 8<sup>th</sup> June 2016)**

The ReCaREDD workshop was held at the UN building in Quito from 6th-8th June with 18 participants of the Ecuadorian Ministry of Environment. The Ministry of Environment is the Ecuadorian REDD focal point.

The goal of the workshop, in consistency with the workshop in Bogotá, was to discuss Ecuadorian forest degradation processes and possible remote sensing – based assessment methods. This debate had already been started at the ReCaREDD South America workshop in Ispra (2015) with a limited number of invited local experts. In Quito 18 participants from the Ministry of Environment took part at the workshop.

80 GB of Sentinel-2 data were delivered to the workshop participants. JRC ForObs research was presented, followed by talks of the Ecuadorian participants on the National Forest Inventory, the process of defining the REDD+ Forest Reference Emissions Level (FREL) for deforestation, the environmental datasets as input for this task. The JRC IMPACT Toolbox was presented to the audience, six exercises were jointly worked through. The next steps for methods development regarding forest degradation assessment were discussed and the future joint activities in the ReCaREDD context discussed.

### **2.1 Main Results**

- At a meeting at the headquarters of the Ecuadorian Ministry of Environment, both Verónica Bohórquez (General Coordinator of Environmental Planning) and Diana Pabón (Office Manager of the Unique Environmental Information System) welcomed the ReCaREDD initiative.
- 80 GB of Sentinel-2 data (16 scenes) were delivered to the remote sensing and GIS lab of the Ministry. The Ecuadorian Ministry of Environment is working on national forest monitoring and the monitoring of the “Natural Heritage” since 2010. They have the mandate to produce statistics on deforestation, forest degradation, the State of the Ecosystem and on forest resources (species and their distribution, basal area, biomass...) at 1:100.000 scale. The plan is to produce figures on deforestation every two years, on forest degradation every five years. Reference years for deforestation are the years 1990, 2000 and 2008, forest cover change activity data exists for the two periods plus the period from 2008 – 2014. The deforestation map 2014-2016 is currently produced.
- One of the main problems of Ecuador regarding the remote sensing – based forest cover change assessment is the persistent cloud cover. National image mosaics (produced by Matthew Hansen) were used for the analysis of forest cover change to fill gaps from maps of the years 2000 and 2008. Other products by the Ecuadorian Ministry of Environment on national scale are: a) Ecosystems of Continental



Ecuador, with 91 defined ecosystems. b) National Forest Inventory with a 5-year repeat cycle, looking at 9 different forest types (palm forest, mangrove, rain forest, mountain forest, ry forest...) c) National Map of Basal Area, d) National Carbon Map and f) Map of the Ecosystem Fragility.

- The reason why Ecuador is interested to produce information on national forest degradation is not only related to REDD+. The information is also needed for biodiversity conservation purposes, for better decision making, for sustainable development, for forest recuperation actions and to optimize human and technical resources.
- Whereas the drivers of deforestation are mainly palm oil plantations (Amazon forest), crops and palm oil (coastal forest) and pasture and crops (mountain forest). Forest degradation is mostly due to (small scale) wood extraction, understorey crops (e.g. mix of coffee and forest) and the mix of forest and pasture, which is triggered by the 'invasion' of the natural forests by cattle. Forest fires are not an issue of forest cover change in Ecuador, according to the workshop participants. No national data on active fires or burned scars exist.
- It became clear that for a national scale forest degradation assessment, several adapted approaches would have to be applied in different areas and for different forest types. As a first approach, CONEFOR and GUIDOS software has been used to produce a map of connectivity and fragmentation for all nine Ecuadorian forest types. Potential legends for characterising forest degradation

Future steps:

- Discussion on integration of own or additional tools into IMPACT, as required by the workshop participants of the Ecuadorian Ministry of Environment: work with cloud masks, integration of an alternative (own) image classification approach, working with masks in general (e.g. forest / non-forest)
- Discussion on the options for of successive meetings

Topics covered in the workshop Issues addressed during the workshop:

- Degradation hotspots by country Discussion on the definition of forest degradation, its drivers and the potential classes of forest degradation
- Discussion on potential classes Review of potential satellite sensors for detecting forest degradation Handing over of Sentinel-2 data / integration of S-2 data into the forest degradation assessment process of IMPACT
- Interactive sessions on the JRC IMPACT tool for forest degradation assessment. Presentations and hands-on training.
- Review of methods for detecting and quantifying degradation with satellite data. Potential stratification methods for a forest degradation assessment method based on sampling

### 3 Annexes

#### 3.1 Workshop Agenda – IDEAM (Bogotá, Colombia)

Hora	Día 1: Miércoles 01 de junio de 2016	Participantes
09:00-10:00	Avances metodológicos para estimar la degradación forestal en Colombia (Juan Ramírez, Katherine Bernal)	Funcionarios IDEAM, JRC, SMBYC, participantes del UNAL e SINCHI
10:00-11:00	Degradación de bosques en Latinoamérica: Síntesis conceptual, metodologías de evaluación y casos de estudio nacionales (Dolors Armenteras)	
11:00-11:15	Pausa para el café	
11:15-12:15	Presentación del JRC / Unidad de Recursos Forestales y Clima / Proyecto ForObs / Proyecto ReCaREDD (René Beuchle)	
12:15-14:00	Pausa para el almuerzo	
14:00-15:00	Experiencias para definir, estimar y/o monitorear la degradación forestal (René Beuchle)	
15:00-16:00	Experiencias para definir, estimar y/o monitorear la degradación forestal en la Amazonía Colombiana (SINCHI)	
16:00-16:15	Pausa para el café	
16:15-16:30	Mesa redonda: Discusión sobre la degradación forestal en Colombia (conceptualización, motores y avances para su estimación)	
16:30-16:50	Definiendo la degradación forestal en Colombia: Propuesta del Sistema de Monitoreo de Bosques y Carbono (SMBYC) de Colombia (Juan Ramírez, Katherine Bernal)	
16:50-17:00	Conclusiones y cierre día 1	

Hora	Día 2: Jueves 01 de junio de 2016	Participantes
09:00-09:30	Bienvenida, introducción al taller, agenda del taller y presentación de participantes (Juan Ramírez)	Funcionarios IDEAM, JRC, SMBYC, participantes del UNAL, SINCHI e
09:30-10:15	Introducción al programa IMPACT Toolbox: Una herramienta de sistemas de información geográfica para el procesamiento digital de imágenes de satélite y cartografía de las coberturas de la Tierra (René Beuchle)	
10:15-10:45	Ejercicio de práctica: Perturbaciones forestales con IMPACT Toolbox (René Beuchle)	
10:45-11:00	Pausa para el café	
11:00-12:45	Ejercicio de práctica: Perturbaciones forestales con IMPACT Toolbox (René Beuchle)	
12:00-14:00	Pausa para el almuerzo	
14:00-15:35	Ejercicio de práctica: Perturbaciones forestales con IMPACT Toolbox (René Beuchle)	
15:20-15:35	Pausa para el café	
15:35-16:35	Ejercicio de práctica: Perturbaciones forestales con IMPACT Toolbox (René Beuchle)	
16:35-16:50	Mesa redonda: discusión sobre el uso de IMPACT Toolbox e imágenes de sensores remotos para la estimación y/o monitoreo de la degradación forestal en Colombia	
16:50-17:00	Conclusiones y cierre día 2	

Hora	Día 3: Viernes 03 de junio de 2016	Participantes
09:00-10:00	Experiencias aprendidas sobre estrategias de muestreo para el monitoreo de bosques: Inventario Forestal Nacional (IFN) (Adriana Barbosa, Juan Phillips)	Funcionarios IDEAM, JRC, SMBYC, Rutgers University
10:00-11:00	Propuesta de diseño de muestreo para medir y/o monitorear la degradación forestal en Colombia (Juan Ramírez, Katherine Bernal)	
11:00-11:15	Pausa para el café	
11:15-12:15	Mesa redonda: Discusión y aportes sobre la propuesta de diseño de muestreo para medir y/o monitorear la degradación forestal en Colombia	
12:15-14:00	Pausa para el almuerzo	
14:00-16:00	Continuación mesa redonda: Discusión y aportes sobre la propuesta de diseño de muestreo para medir y/o monitorear la degradación forestal en Colombia	
16:00-17:00	Conclusiones y cierre día 3	

### 3.2 List of Participants – IDEAM (Bogotá, Colombia)

Juan Pablo RAMIREZ DELGADO, Institute for Hydrology, Meteorology and Environmental of Colombia (IDEAM / FAO Colombia), Gustavo GALINDO, Ederson CABRERA, Carol FRANCO, Rosa Helena LOZANO, José VILLE TRIANA, Nelson VERDUGO RODRIGUEZ, Omar SOTELO, Diana RAMIREZ, Kattia Magreth VARGAS JURADO, Gloria Lucía ARANGO CASTRO, Edgar Augusto BLANCO TOVAR, Luis Mario MORENO, Cristian FORERO CASTRO, Fabián GARCES, Andrés Camilo ZULUAGA, Alvaro CUBILLOS, Paula Andrea BELALCAZAR, María Alejandra CHADID, Miguel ARIAS, Johanna Katherine BERNAL SOTELO, Oscar Javier ESPEJO, Hector PABON, Diana Alexandra LARA (all IDEAM), Dolors ARMENTERAS, Joan Sebastián BARRETO RIVERA, María Constanza MEZA, Eduardo MOLINA (all UNAL), Oscar Javier BARON RUIZ, Natalia QUINTERO (all SINCHI), Juan Fernando PHILLIPS BERNAL (MADS), Laura SCHNEIDER (Rutgers University, USA)



### 3.3 Workshop Agenda – Ministry of Environment (Quito, Ecuador)

<b><u>Día 1: Lunes 6 de junio</u></b> (Edificio de las Naciones Unidas)	
<b>HORARIO</b>	<b>ACTIVIDAD</b>
08:30 - 09:00	Registro de participantes
09:00 - 09:10	Bienvenida
9:00 - 9:30	Revisión de la agenda y metodología de trabajo
9:30 - 12:00	Presentación del trabajo realizado en el la Unidad de Monitoreo en temas de degradación Forestal.
12:00 - 13:00	Receso para el Almuerzo
13:00 - 17:00	Discusión sobre los puntos de vista del Ecuador sobre la "degradación de los bosques" - donde debe ser un "punto de partida" para la evaluación de la degradación forestal en Ecuador. Discusión sobre los tipos de bosques del Ecuador, en los datos nacionales (o regionales) existentes, y en los sitios piloto para poner a prueba las posibles metodologías.

<b><u>Día 2: Martes 7 de junio</u></b> (Edificio de las Naciones Unidas)	
<b>HORARIO</b>	<b>ACTIVIDAD</b>
09:00 - 12:00	Presentación de la versión más reciente IMPACTO - incluyendo varias herramientas para el procesamiento de Sentinel-2
12:00 - 13:00	Receso para el Almuerzo
13:00 - 17:00	Ejercicios de procesamiento de imágenes de muestra.

<b><u>Día 3: Miércoles 8 de junio</u></b> (Edificio de las Naciones Unidas)	
<b>HORARIO</b>	<b>ACTIVIDAD</b>
09:00 - 12:00	Discusión sobre el muestreo frente al mapeo wall-to-wall, en un diseño de muestreo potencial, sobre la base de una posible estratificación de la muestra (mapas nacionales de la deforestación).
12:00 - 13:00	Receso para el Almuerzo
13:00 - 16:00	Discusión sobre el muestreo frente al mapeo wall-to-wall, en un diseño de muestreo potencial, sobre la base de una posible estratificación de la muestra (mapas nacionales de la deforestación). Pasos a seguir.
16:00 - 17:00	Conclusiones y recomendaciones

### 3.4 List of Participants – Ministry of Environment (Quito, Ecuador)

Angel Alberto AGUILAR ALVAREZ, Augusto Alexander SOLA MONTERO, Digner Francisco JIMENEZ MONGE, Erith Alexander MUÑOZ, Javier Francisco MOLINA CARRERA, Gabriela Paola PAZ FLORES, Gicela Fernanda ARIAS NARANJO, Jorge Iván ARMIJOS RAMÓN, Laura María ALAYON HURTADO, Lenín Patricio BELTRÁN CEVALLOS, Margarita ALVARRUIZ BERMEJO, María Gabriela VITERI VILLACÍS, Miguel Angel CHINCHERO LEMA, Mónica Andrea LOPEZ ROMO, Rodrigo Patricio TORRES MUÑOZ, Rosa Ana GONZALEZ BENITEZ, Verónica CADENA PEÑA, Ximena María HERRERA JIRÓN (all from the Ministry of Environment)



Europe Direct is a service to help you find answers to your questions about the European Union  
Free phone number (\*): 00 800 6 7 8 9 10 11  
(\*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.  
It can be accessed through the Europa server <http://europa.eu>

#### **How to obtain EU publications**

Our publications are available from EU Bookshop (<http://bookshop.europa.eu>),  
where you can place an order with the sales agent of your choice.

The Publications Office has a worldwide network of sales agents.  
You can obtain their contact details by sending a fax to (352) 29 29-42758.

## JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



**EU Science Hub**

[ec.europa.eu/jrc](https://ec.europa.eu/jrc)



@EU\_ScienceHub



EU Science Hub - Joint Research Centre



Joint Research Centre



EU Science Hub

