

Support in the field of nuclear safeguards

The Euratom community has an agreement with the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) on research and development and training in the field of nuclear safeguards. The parties meet regularly in view of international events such as the general conference of the International Atomic Energy Agency (IAEA) or conferences of the European Safeguards Research and Development Association (ESARDA).

In 2009 ABACC expressed its interest in getting two new safeguards capabilities to support their nuclear safeguards inspectors' activities. These capabilities are based on two JRC-owned technologies (approved for safeguards use by both Euratom and IAEA). This support is funded

by the European Commission Directorate-General for International Development and Cooperation (DEVCO) under the Instrument for Nuclear Safety Cooperation (INSC). The project is implemented by the JRC, involving the transfer of two safeguards technologies (including training) and demonstrated activities such: (i) verification of complex plant design and lay-out («as-is») and (ii) containment of spent fuel in a complex storage environment.

Close coordination with the IAEA takes place during the whole project's lifetime. Given that the technologies to be transferred have been approved and are used by the IAEA, the potential joint use of the equipment by both ABACC and IAEA can be envisaged.

JRC – The European Commission's in-house science service

As the European Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

JRC's structure

The JRC's headquarters are in Brussels, in close proximity to the policy-making Directorates-General of the European Commission and other institutions, such as the European Parliament.

Most of the JRC's scientific work is carried out in the JRC's Institutes located on specialist sites in five countries, with the main site located in Ispra, Italy.

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Examples of JRC partners in Brazil
National authorities and laboratories
<ul style="list-style-type: none"> Ministry of Science, Technology and Innovation (MCTI), Brasilia <ul style="list-style-type: none"> National Institute for Space Research (INPE), São José dos Campos Brazilian National Council for Scientific and Technological Development (CNPq) Brazilian Ministry of Environment (MMA), Brasilia Brazilian National Centre for Monitoring and Early Warning of Natural Disasters (Cemaden), Sao Paulo Brazilian Agricultural Research Corporation (Embrapa), Brasilia Brazilian Institute of Science and Technology Information (IBICT), Ministry of Science and Technology, Brasilia National Food Supply Agency (CONAB), Brasilia Nuclear Energy Research Institute (IPEN), Sao Paulo Brazilian Bioethanol Science and Technology Laboratory (CTBE), Campinas National Institute of Metrology, Quality and Technology (Inmetro), Porto Alegre
Academia
<ul style="list-style-type: none"> Federal University of Rio Grande do Sul Federal University of Minas Gerais, Belo Horizonte
Business
<ul style="list-style-type: none"> Brazilian Association of Electric Energy Distributors (ABRADEE) Association of Enterprise Owners of Infrastructure and Private Telecommunication Systems (APTEL)

*Serving society
Stimulating innovation
Supporting legislation*

The European Commission's Directorate-General Joint Research Centre (JRC) has built up a particularly strong cooperation with Brazil, which led to the signing of a collaboration arrangement with the Brazilian Ministry of Science, Technology and Innovation (MCTI).

Signed on 24 January 2013 in Brasilia, the cooperation arrangement between the JRC and MCTI was one of the highlights of the 6th EU-Brazil Summit. With the aim of strengthening cooperation, enhancing science-based support to policy-making and boosting innovation, the jointly identified scientific and cooperative activities include, but are not limited to the following areas:

- **Disaster prevention and crisis management;**
- **Climate change and the sustainable management of natural resources (including forests, land use, water, soils, desertification, bio-resources) and ecosystem services;**
- **Energy, including bioenergy and smart grids, and renewables;**
- **Food security;**
- **Bio-economy;**
- **Information and communication technologies (ICT), including geo-information and space applications;**
- **Nanotechnologies.**

In September 2014, the JRC and the Brazilian National Council for Scientific and Technological Development (CNPq) signed an Implementing Arrangement in the framework of the JRC-MCTI



The JRC and the Brazilian Ministry of Science, Technology and Innovation, signed a cooperation arrangement in a wide range of scientific areas.

cooperation arrangement, allowing the JRC to host Brazilian grantholders at its sites in Belgium (Geel), Germany (Karlsruhe), Italy (Ispra), Spain (Seville) and the Netherlands (Petten).

As of September 2015, the JRC has opened its Institutes' doors to Brazilian scientists in the framework of the Brazilian mobility programme, 'Science without Borders'. Science and technology are core elements of EU-Brazil relations and the arrival of the Brazilian scientists reinforces the scientific collaboration with the JRC. The successful candidates work on projects such as forest degradation monitoring by means of remote sensing, assessing and monitoring biodiversity and alien invasive species in Brazilian protected areas,



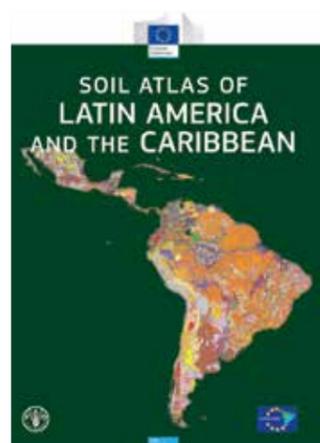
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nanotoxicology, molecular biology for authentication of agricultural products, development of quality assurance and quality control tools for the monitoring of priority pollutants in water or related biota as well as economic analysis of global agricultural markets.

Training is also provided to practitioners from Brazilian authorities and agencies. For instance, the JRC actively supported the establishment of the Brazilian National Centre for Monitoring and Early Warning of Natural Disasters (Cemaden), part of MCTI, located in São Paulo. The JRC collaborates with Cemaden, particularly in relation to crisis management and flood detection and has hosted scientists from Cemaden to research flood and flash flood forecasting. Cemaden is also using the Global Flood Awareness System (GloFAS) jointly developed by the JRC and the European Centre for Medium-Range Weather Forecasts (ECMWF) to monitor Brazilian river basins where currently no national flood early warning system exists.

<http://www.globalfloods.eu/>

Soil Atlas of Latin America and the Caribbean



Initially published in Spanish, the Atlas is now available in English and Portuguese.

This first ever comprehensive overview of the soils of Latin America and the Caribbean was released in February 2014, the result of a fruitful collaboration between the JRC and leading soil scientists in Europe, Central and South America, and the Caribbean. It highlights the importance of soil, a precious non-renewable resource which provides food, fodder and fuel for more than 500 million people in Latin America and the Caribbean.

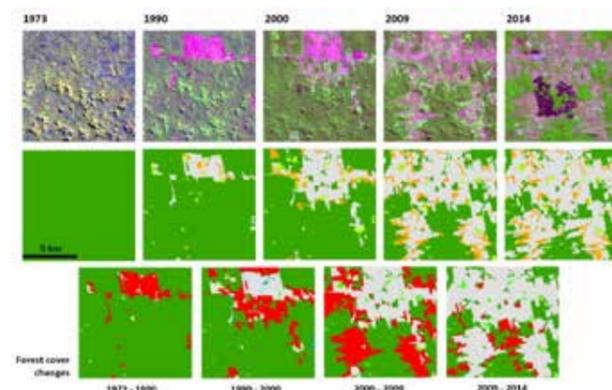
The atlas emphasises the complex relationship between climate and land use and underlines the role of soil in food security. The soils of South and Central America produce large amounts of agricultural commodities that are exported to other countries – around half of the global production of coffee, sugar cane and soya are cultivated in this area. In addition, Latin America's soils host an important share of the world's biodiversity.

More than half of the 576 million hectares of arable land of Latin America are estimated to be affected by degradation processes. The main causes are change in land use (especially deforestation), overexploitation, climate change and social inequality. The atlas presents a number of strategies for soil preservation and conservation.

The Soil Atlas of Latin America and the Caribbean was funded by the EUROCLIMA Programme to build on the knowledge of Latin American decision-makers and the scientific community on the impact of climate change in the region in order to strengthen sustainable development strategies. :

http://eussoils.jrc.ec.europa.eu/library/Maps/LatinAmerica_Atlas/Index.html

Remote sensing imagery for monitoring deforestation and forest degradation



An example of a remote sensing-based deforestation and forest degradation assessment: Deforestation assessment from 1973 – 2014 in the Brazilian Arc of Deforestation.

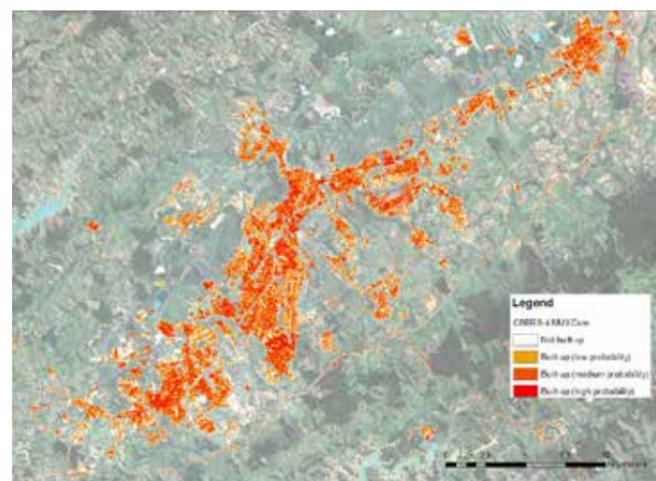
The Brazilian National Institute for Space Research (INPE) and the Brazilian Agricultural Research Corporation (Embrapa) are currently involved in joint developments of methods for the assessment of tropical forest cover change in Latin America.

Through the 7th EU-Brazil Sector Dialogues Support Facility, an international development cooperation created to foster greater exchange of technical know-how between Brazil and the EU, collaboration between Embrapa Florestas and the JRC was initiated in 2014. Embrapa Florestas is responsible for the remote sensing survey or 'landscape ecology' as part of the ongoing Brazilian national forest inventory. Together they are developing open-source software designed for semi-automatic land cover mapping of forest cover on 5000 images of the RapidEye satellite sensor spread over Brazil. The activity is continuing with the support of the 8th Sectoral Dialogue.

In addition to INPE and Embrapa, the JRC has worked with the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) since the 6th EU-Brazil Sector Dialogues Support Facility in 2013 on the land cover and land cover change in the Brazilian Cerrado biome.

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

Fine-scale human settlement mapping of Brazil



A Global Human Settlement Map (GHSL) map for São José dos Campos based on CBERS-4. The settlement information is superimposed in red and yellow on the satellite image.

Supported by the EU-Brazil Sector Dialogues Support Facility, the cooperation between the JRC and the Brazilian National Institute for Space Research (INPE) has led to improved mapping of human settlements in identified São Paulo regions, through the JRC's Global Human Settlement Layer (GHSL) system using RapidEye satellite data provided by INPE. The project continues with the support of the 8th EU-Brazil Sectoral Dialogue, aiming to establish an automatic human settlement mapping in Brazil using the JRC's tools based on the new CBERS-4 (China-Brazil Earth-Resources Satellite) satellite and RapidEye data. In May 2015, the JRC delivered a webinar on Human Settlement Mapping to Brazilian institutions.

The JRC's Global Human Settlement Layer (GHSL) system proposes a new way to map, analyse, and monitor human settlements and urbanisation in the 21st Century. Based on automatic image information retrieval, the tool allows not only to spot human settlements, but also to make a satellite-based assessment of population numbers, which is an important driver in disaster risk management.

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

Nanotechnologies

Following discussions between the JRC and the Brazilian Ministry of Science, Technology and Innovation on nanotechnologies' regulation, Brazil joined the dedicated NANoREG project in April 2015. NANoREG was the first project supported by the EU's Seventh research and innovation Framework Programme (FP7) to deliver scientific evidence to regulators and legislators on environmental health and safety issues through a common European approach to the regulatory testing of manufactured nanomaterials.

<http://nanoreg.eu/>

Alternative methods to animal use in Brazil



MCTI representatives visited the EU Reference Laboratory for alternatives to animal testing (EURL-ECVAM) at the JRC Ispra site.

The joint action of the JRC and the Brazilian Ministry of Science, Technology and Innovation for scientific and regulatory cooperation towards the use of alternative methods to animal testing is supported by the 8th EU-Brazil Sector Dialogues. This cooperation aims at establishing and strengthening dialogue between experts from Brazil and the EU related to alternative methods and the exchange of methodologies for the implementation of new alternative methods. It will contribute to the promotion of common initiatives and cooperation by aligning regulatory matters to facilitate the development of alternative methods.

In September 2015, MCTI representatives participated in the European Societies of Toxicology Bridging Sciences for Safety Congress

(EUROTOX) and visited the EU Reference Laboratory for alternatives to animal testing (EURL-ECVAM) at the JRC Ispra site.

<https://ec.europa.eu/jrc/en/research-topic/alternatives-animal-testing-and-safety-assessment-chemicals>

Offshore oil and gas safety

In the context of the EU-Brazil Sector Dialogues programme, the JRC has established a dialogue between Brazilian and European research centres, laboratories, authorities and industry in the area of offshore oil and gas safety. The aim is to promote collaboration and partnership of research, industrial and governmental bodies in international projects related to offshore safety. The collaboration focuses on safety systems, safe technologies, and standards applied in the exploitation of offshore hydrocarbon resources, especially in view of the increasingly challenging conditions such as tightened environmental regulations. With the cooperation of the Brazilian Ministry of Science, Technology and Innovation, JRC scientists headed a delegation of European experts on offshore safety from the UK, Italy, Norway to Brazil in December 2014 for discussions with Brazilian counterparts. More than 80 experts from Brazilian Institutions, researchers, consultants and the industry took part in a large seminar where many topics of future collaboration in the field of offshore oil and gas safety were discussed.

Brazilian partners have proposed a bigger collaboration project for 2015-2016 which will focus on safety and environmental critical systems and the related requirements for the prevention of accidents in the exploration and exploitation of offshore hydrocarbon resources.

<https://ec.europa.eu/jrc/en/research-topic/energy-system-and-security-supply>

Smart grid deployment



The JRC's European Interoperability Centre for Electric Vehicles and Smart Grids.

In the field of smart grids, the JRC has a working arrangement with the Brazilian Ministry of Science, Technology and Innovation (MCTI) within the context of the EU-Brazil Sector Dialogues Support Facility. The arrangement supports shared use of knowledge and joint scientific research, reciprocal access to laboratories and exchange of personnel and scientific information.

Within the 7th EU-Brazil Sector Dialogues Support Facility concluded in 2014, the JRC continued to develop its work on smart grids with Brazilian counterparts such as identifying relevant smart grid projects in Brazil and the EU. The JRC participated at the 'International Mapping of Suppliers of Information and Communication Technology for Smart Grids and Sector Dialogues: Brazil – European Union' seminar in Brasília in October 2014 by presenting its activities on policy support for smart grid deployment.

<https://ec.europa.eu/jrc/en/science-area/energy-and-transport>